CHAPTER 10

LONG-TERM OUTLOOK

« *People's experiences when they visit, recreate and work in the Region may be different in the future.* © Matt Curnock

LONG-TERM OUTLOOK

'an assessment of the long-term outlook for the ecosystem…' within the Great Barrier Reef Region, s 54(3)(h) of the *Great Barrier Reef Marine Park Act 1975*

'an assessment of the long-term outlook for the heritage values…' of the Great Barrier Reef Region, paragraph 116A(2)(f) of the *Great Barrier Reef Marine Park Regulations 1983*

10.1 Background

Chapters 2 to 9 of this Report provide the evidence to inform an assessment of the long-term outlook for the Region's ecosystem and heritage values. Specifically, the long-term outlook discussed below is built from an understanding of: current condition and trend of the ecological (natural heritage value), economic, social and heritage (Indigenous and historic) values of the Region (Chapters 2, 3, 4 and 5); the factors influencing those values (Chapter 6); the effectiveness of protection and management measures (Chapter 7); the resultant resilience of the Region's ecosystem and its heritage values (Chapter 8); and the risks the ecosystem and heritage values are facing (Chapter 9). Figure 10.1 summarises key findings from these chapters.

The main influences on the long-term outlook for the Region include human-induced climate change, population growth, land-based run-off and direct use of the Region (Chapters 5 and 6). These drivers and pressures interact, resulting in cumulative effects on the condition and trend of values.

Everyone's actions are important. © GBRMPA, photographer: Pine Creek Pictures

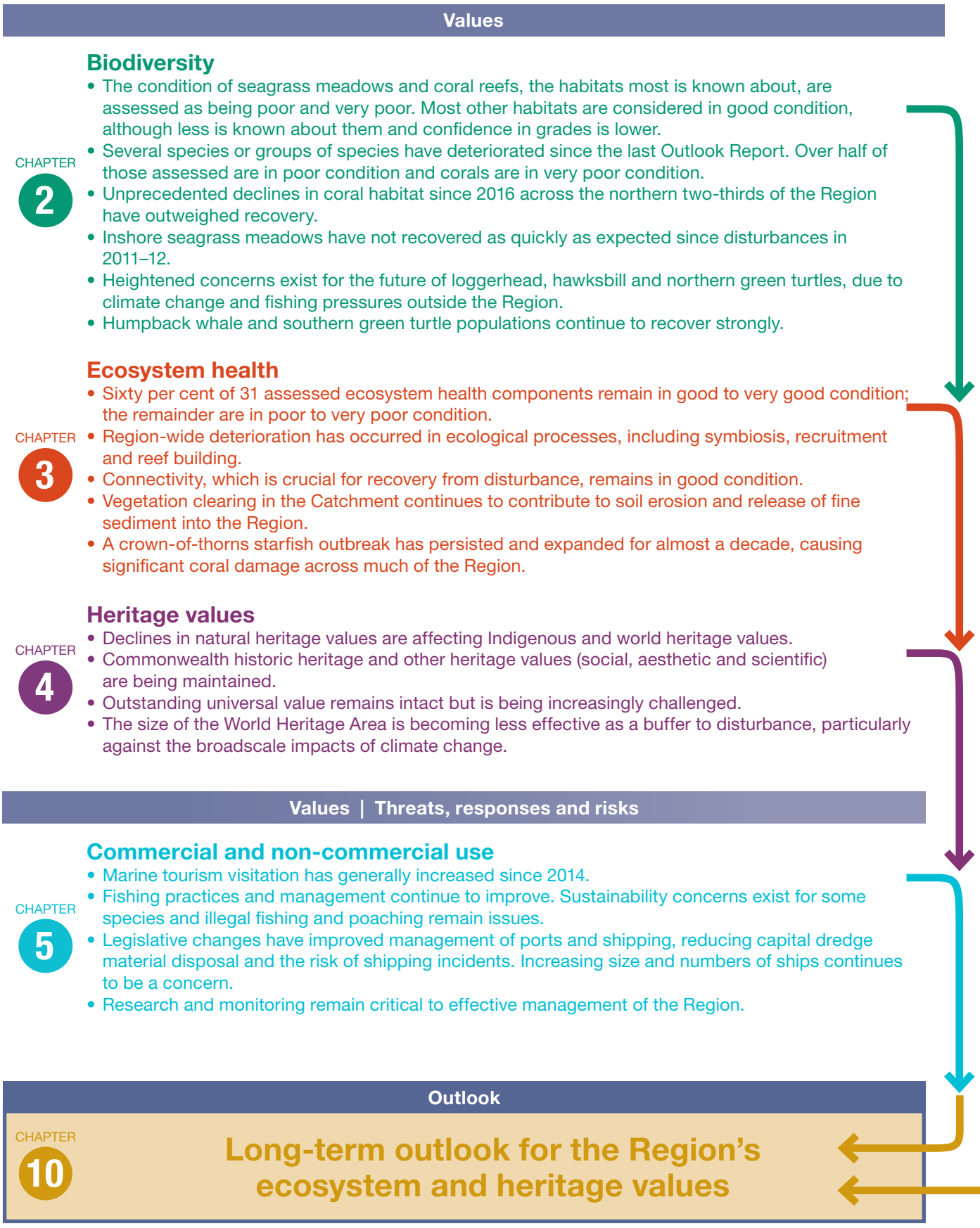


Figure 10.1 Summary of the findings underpinning the long-term outlook for the Region's ecosystem and heritage values

Factors influencing the Region's values

- Societal attitudes about the Reef are complex and influence behaviours and decision-making.
- Overwhelmingly, climate change is the primary issue affecting the Reef, and its influence is increasing faster than previously predicted.
- Increasing and record-breaking sea temperatures have affected the Region and pose the most immediate threat to values.
- Efforts to improve water quality entering the Region have resulted in a gradual reduction in some pollutants from the Catchment. However, water quality targets are not being met, which is compounding the effects of climate change and slowing recovery of inshore ecosystems.
- Poor agricultural land management practices in the Catchment remain the greatest contributor to poor water quality.
- Past and current development (such as land clearing and modification of waterways) in the Catchment continues to affect the Region.
- Human population in the Catchment is expected to grow at 1.1 per cent per year, further increasing direct use of the Region (for example, tourism, recreation and recreational fishing).

CHAPTER 6

Existing protection and management

- Management of the Region is good across all six effectiveness criteria when considering the 14 management topics as a group.
- The Reef 2050 Plan has improved jurisdictional consistency, coordination and resourcing across many management topics.
- Improvements within management topics are most notable for ports, heritage values and fishing.
- Declines in effectiveness occurred for some aspects of managing biodiversity values, climate change and recreational use (excluding fishing).
- Management challenges remain for complex, spatially extensive values such as biodiversity and threats from climate change, land-based run-off and fishing.
- Some threats (such as sea-temperature increase) are both global and national issues, not directly in the control of day-to-day Reef and Catchment managers. For other threats, recent plans have not had time to translate into outcomes (such as the Queensland Sustainable Fishing Strategy).
- Knowledge of ecosystem and heritage condition is not keeping pace with disturbance frequency, delaying management actions.

CHAPTER 7

Resilience

- Case studies of some species show continuing recovery from past impacts, but concerns remain for other species. Humpback whales have demonstrated resilience by continuing to recover strongly since harvesting ended outside the Region.
- Reef resilience is being severely compromised by global warming, which has resulted in mass mortality of adult coral and subsequent 89 per cent decline in coral recruitment.
- Loggerhead turtle recovery may be affected by low levels of juvenile recruitment.
- Community awareness and appreciation are important to the resilience of the Region's historic and Indigenous heritage values. Lack of data makes the current state of heritage resilience difficult to quantify.
- The Region's resilience has deteriorated due to an increased frequency of disturbances; ecological recovery from recent disturbances will take far longer as a result.
- Sea-temperature extremes and other threats will continue to undermine resilience.
- Management actions at all scales are needed to reduce drivers, support recovery and build resilience. For example, localised coral reef restoration efforts are increasing and the largest ever crown-of-thorns starfish control program is underway.

CHAPTER 8

Risks

- Threats identified as posing the highest risk are already affecting ecosystem and heritage values at a Region-wide scale.
- The 10 threats identified in 2014 as presenting a very high risk to the Region's ecosystem and heritage values are again the highest ranked.
- Of the very high risk threats, most relate to climate change or land-based run-off (water quality).
- Direct use impacts are amplified by climate change and pose ongoing risk given the declining state of the Region's ecosystem.
- Interest in habitat restoration and other interventions is increasing, and the risks posed by these activities are not yet well understood.
- Developing and implementing effective responses to cumulative impacts requires continued evolution of policy and practical actions.

CHAPTER 9

10.2 Likely future trends

Given the current state of the Region's values, actions to reduce the highest risks have never been more time-critical. Strong mitigation actions within the next decade are necessary to achieve the best possible outlook for the Reef and future generations.[1141] Specifically, early and effective global and national action on climate change, coupled with local actions to maintain condition and facilitate recovery from disturbances, are imperative over the next 10 years if the Region is to have a positive long-term outlook.

10.2.1 Possible long-term futures for the Region

The condition of the Region is deteriorating due to anthropogenic global warming and other escalating drivers (such as population growth). Even a scenario of reduced greenhouse gas emissions that could restrict a global temperature increase to less than 1.5 degrees Celsius (which is what the Reef needs) would still see substantial changes occurring to marine ecosystems and associated community benefits.[1159] Future coral reefs are unlikely to be as diverse and colourful as they were a decade ago[273], and the fish life seen while snorkelling and caught while fishing may also change. People and Reef-dependent industries need to prepare for this change.

Actions taken now can influence the Reef's future pathway

Figure 10.2 shows two possible futures for the Region, for the medium term (2030 to 2050) and long term (beyond 2050). These possible long-term outlooks are indicative, and are based on information presented in preceding chapters of this report.

Whether the Region's condition continues to deteriorate depends on a combination of immediate global action on climate change[1129], effective management of remaining risks that originate within the Region and its Catchment, and the Region's resilience. At a regional level, the rate and scale at which water quality can be improved is also a critical factor for coastal habitats. Locally, given a steadily increasing Catchment population, use of the Reef will grow, requiring effective and agile Marine Park management and compliance.

The Reef has limited capacity to adapt to the current rate of climate change. The scale of the threats posed by climate change means further change to the Reef ecosystem is inevitable. Notwithstanding the seriousness of the challenges the Region faces, there is still hope for its recovery if effective and timely mitigation of risks occur within the next decade. By protecting the environmental and heritage values of the Region, the lifestyles and livelihoods of the communities who live on its coastline and the intrinsic value to the global community will also be maintained. All actions that promote recovery processes and limit further decline will improve the Region's long-term outlook.

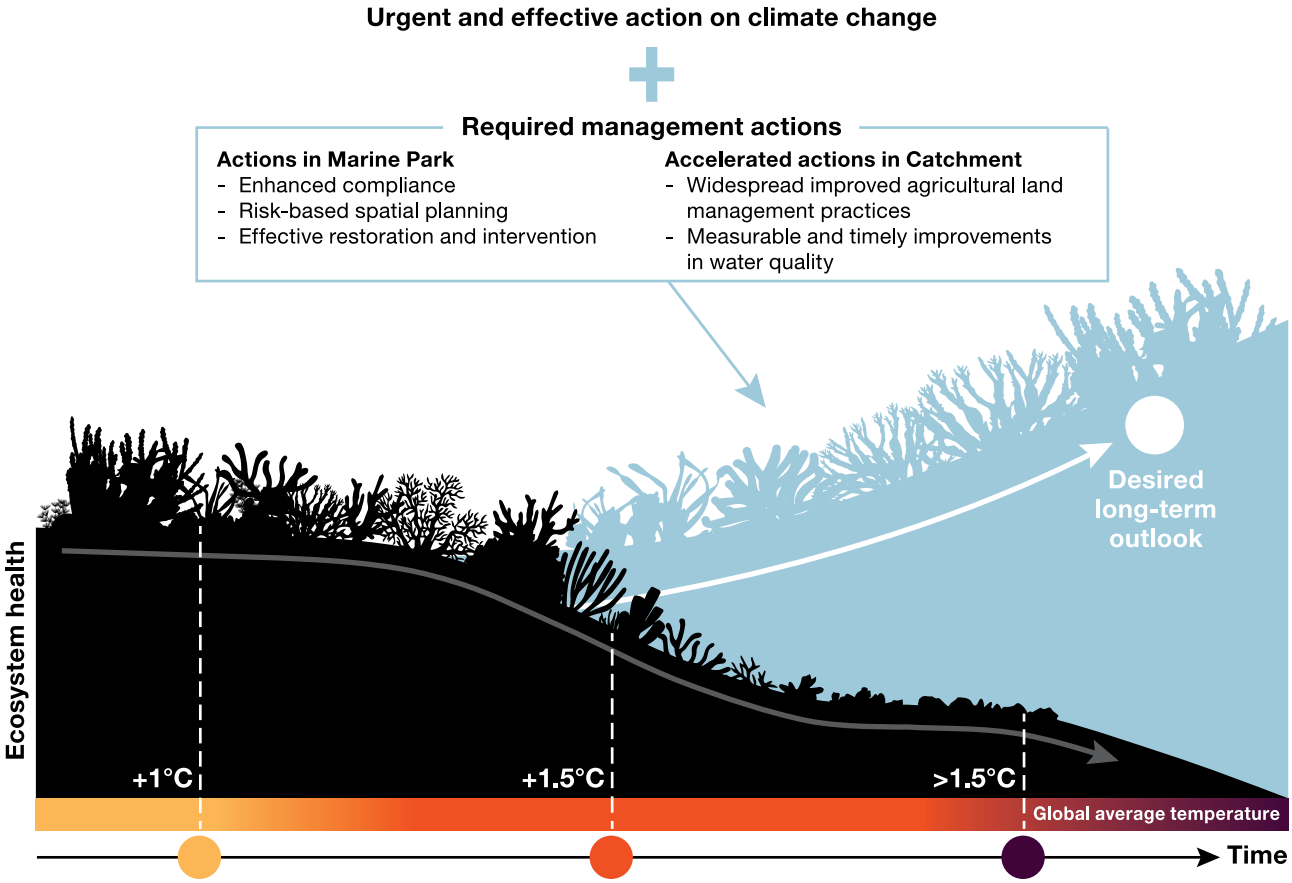
10.2.2 Prospects for the outstanding universal value of the Great Barrier Reef World Heritage Area

The spatial extent of the World Heritage Area has not changed. However, the Reef is being increasingly exposed to broadscale impacts that are affecting it at a regional level. Given the global scale of human-induced climate change, the size of the Region is becoming a less effective buffer to broadscale and cumulative impacts. While the property is still whole and intact, recent temperature extremes have forever changed the World Heritage Area and its integrity is deteriorating. World heritage attributes that remain in good condition at a Region-wide scale include the geographic scale and extent of the property, over half of the ecosystem processes, most habitats (noting large data gaps exist for many habitats) and some species components.

The property's outstanding universal value will be further impacted as the ocean continues on its rapid warming trajectory

Outstanding universal value remains across all four criteria for which the Reef was inscribed on the World Heritage List. However, the condition of the property has deteriorated to varying extents with respect to criteria vii, viii, ix and x:

- The beauty of underwater seascapes (criterion vii) is deteriorating (in terms of water clarity and coral reefs) and tourists surveyed believe the beauty of the Reef has declined since 2013.[785]
- Overall, there has been alteration of some elements important to major stages of the Earth's evolutionary history (criterion viii) (Section 4.2.3).
- One third of the ecosystem processes assessed (criterion ix) are in poor to very poor condition (Chapter 3), including several critical processes essential for whole-of-system functioning (recruitment, symbiosis and reef building).
- Two of the Region's most important habitats, seagrass meadows and coral reefs, support a high diversity of species including species of conservation concern (criterion x) and are in poor and very poor condition, respectively (Chapter 2).



2019 — Current Reef condition

- World heritage values deteriorated
- Less diverse coral reefs and some reef fish declining
- Coral bleaching events and other impacts accumulating, and recovery time increasing
- Intensifying pressures are slowing seagrass meadow recovery
- Warmer temperatures cause more female and fewer male marine turtles
- Indigenous heritage and community wellbeing impacted
- A stable nature-based tourism industry, but in restricted locations as areas recover post-disturbance
- Viable fishing industries, but lower catches post-disturbances

2030 to 2050 — Possible Reef

- World heritage elements significantly deteriorated
- More drab looking reef with fewer branching and plate corals
- Fewer colourful reef fish
- Loss and degradation of some seagrass meadows
- Annual marine heatwaves twice as likely
- Unreliable weather affects reef use
- More island-based and water sport tourism; less snorkelling and diving
- Fisheries may target different species, more disease prevalence in fish and crustaceans

2050 onwards — Possible Reef

- World heritage elements lost and not intact
- Coral reefs replaced with flatter, more drab, algal-dominated systems
- Major reductions in seagrass abundance
- Mangroves shift shoreward in response to rising sea level
- Coastal protection reduced and coast less habitable
- Turtles, seabirds and dugong in rapid decline
- Annual marine heatwaves three times as likely
- Extreme weather events far more frequent
- Irreversible impacts to Indigenous heritage and community wellbeing
- Fisheries may transition to new products and markets (algae and herbivorous fish)

Figure 10.2 Future pathways for the Great Barrier Reef Region
The two outlook pathways shown provide examples of what the future might look like depending on whether key risks are adequately mitigated within required timeframes.[96,1139,1141,1159,1172,1479] *The pathways are indicative and based on a large body of evidence from the previous chapters. Reef condition and social values have already changed and will continue to change. The desired outlook pathway is still possible if global, regional and local mitigation and management actions are accelerated and implemented in time.*

Previously, when the climate regime was considered more stable, protection and management approaches were generally considered to be effective in protecting the World Heritage Area. However, the Great Barrier Reef World Heritage Area, like other world heritage properties globally, is increasingly affected by anthropogenic climate change.[1480] Australia and many other countries will find it increasingly challenging to deliver effective protection and management for their world heritage listed properties. To combat the deterioration of values, managers, Traditional Owners and stakeholders are increasingly intervening where the condition of critical habitats or species can be improved (Chapter 8). The most significant interventions for World Heritage Area values have been on the Reef's islands, where active conservation actions have protected critical nesting habitats for vulnerable species and restored ecosystems.[1481]

While understanding of the Region's heritage values remains far from comprehensive, an increased effort is progressing under the *Reef 2050 Long-Term Sustainability Plan*[1482] to improve this knowledge base. Building on previous efforts, heritage values continue to be better defined, including aesthetic[1010,1483] and geomorphological[655,795,1484] attributes and Indigenous heritage[814] values (Chapter 4).

10.3 Current and future initiatives to improve the long-term outlook

Threats are multiple, cumulative and increasing, requiring constantly evolving and agile management approaches

Predicting the long-term outlook for the Reef remains a complex task. Threats to the Reef are multiple, cumulative and intensifying, requiring constantly evolving and agile management approaches. Finding increasingly effective ways to plan for, and respond to, the Reef's rapidly changing environmental and social condition is essential.

The assessment of the long-term outlook for the Region's ecosystem and its heritage value includes consideration of current management arrangements and relevant management initiatives identified but not yet fully implemented (Figure 10.3). The future initiatives under the Reef 2050 Plan[9,941], the *Great Barrier Reef Blueprint for Resilience*[24], and the *Reef 2050 Water Quality Improvement Plan*[527] set the framework for improving resilience-based management and protection of values. Also considered here are the future commitments of both the Australian and Queensland governments and partners under the Reef 2050 Plan.[9]

Several significant management initiatives have been in place for some time and continue to protect values and support resilience of the Region. In spite of this, the resilience of the Region is deteriorating. The scientific evidence is clear — the most urgent initiatives are those that will halt and reverse climate change at a global level and effectively improve water quality at the regional scale.[1396] In addition, there is some scientific consensus that controlling crown-of-thorns starfish populations is one of the most scalable and feasible on-ground actions for reducing coral mortality at local scales and enhancing Reef resilience in the face of increasing climate impacts.[752,757]

Engagement Ongoing and collaborative working relationships are the strongest they have ever been due to a greater collective understanding of pressures affecting the Region and shifting sentiments.[857] Stewardship within the Region and continued on-ground initiatives to reduce risks and improve Reef and catchment health are important and make a collective difference. This continued approach will provide a strong foundation for maintaining a balance between protecting the Region's values and supporting sustainable use.

Australian and Queensland government agencies, Traditional Owners and many other partners continue to make significant contributions to protecting and managing the Region. The scientific research community and multi-generational ecological knowledge are both critical to inform effective management of the Region. A mature, independent and enduring research community and strong partnerships with Traditional Owners and Reef users are necessary to strengthen and enable effective management.

Many stakeholders and community members continue to participate in voluntary research and monitoring programs. These groups are becoming more active in delivering local management actions, such as removing marine debris and responding to marine animal strandings. Twelve Local Marine Advisory Committees, from Cooktown to Bundaberg, comprising more than 170 community members, continue to advise management agencies on local issues. A range of specialist advisory committees have been established since 2015 to advise government on matters relating to the Reef and help improve the quality, effectiveness and transparency of management actions. With increasing levels of partnership, local communities are undertaking specific actions to implement the Reef Blueprint.[24]

Environmental regulation Effective education and enforcement of current management tools, such as regulations, zoning plans, plans of management and permits, will continue to be important in reducing direct risks to the Region and supporting resilience of the Reef. To enable this, significant investment in the Reef Joint Field Management Program has increased the capability of marine and island national park management (Box 15). Initiatives are underway to transform Marine Park policy and planning and the regulatory framework, specifically to modernise the risk approach and make sure policies and plans are contemporary, pre-emptive and strategic so they can adapt to how people want to use and access the Reef in a sustainable manner.[24,1485]

Overarching

- *Reef 2050 Long-Term Sustainability Plan* (2018) and Reef Trust investment
- *Great Barrier Reef Blueprint for Resilience* (2017)
- Reef 2050 Integrated Monitoring and Reporting Program
- Scientifically valid, ongoing monitoring involving the community

Natural heritage values (biodiversity and ecosystem health)

- Reef Joint Field Management Program — expanded biodiversity protection and enhanced compliance activities
- *Queensland Sustainable Fisheries Strategy 2017-2027* — commitment to implementation and outcomes
- Crown-of-thorns starfish control — expanded efforts to protect coral cover
- Islands and fringing reefs — Queensland Government values-based framework for Queensland islands
- Reef Restoration and Adaption Program — implementation

Heritage values (Indigenous and historic)

- *Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park* (2019) — increasing understanding and protection of Indigenous heritage

Climate change

- *Queensland Climate Transition Strategy* and *Queensland Climate Adaptation Strategy* (2017)
- Marine Park Authority climate change position statement — due for release 2019
- Options paper on post-2020 action to transition Queensland to a zero net emissions economy by 2050
- National Environmental Science Program— long-term commitment to environment and climate research
- Clean Energy Finance Corporation and the Australian Renewable Energy Agency — Reef funding program
- State-wide Land Restoration Fund— support for carbon-reduction projects

Coastal development and land-based run-off

- *Reef 2050 Water Quality Improvement Plan* (2018)
- Queensland vegetation management laws and State Planning Policy
- *Sustainable Ports Development Act 2015* (Qld) — management of port related development
- *Wetlands in the Great Barrier Reef Catchments Management Strategy 2016–21*

Direct Use

- Public moorings and reef protection markers — expanded network
- *North-East Shipping Management Plan* — revision due for release 2019
- Port master plans and *Maintenance Dredging Strategy for Great Barrier Reef World Heritage Area Ports*
- Vessel monitoring — for commercial fishing vessels
- Traditional Use of Marine Resources Agreements — expanded coverage
- Marine debris reduction initiatives — national threat abatement plan, Marine Park Authority position statement, and funded citizen science programs

Improved resilience of the Great Barrier Reef Region

Figure 10.3 Current and future initiatives to improve the Region's values and support resilience

BOX 15

Expansion of island and marine park management capacity

Since the last Outlook Report, the Reef Joint Field Management Program has received a number of funding and capacity increases. In 2017–18, the Australian and Queensland governments provided an additional $73.7 million over six years, with an ongoing commitment of a further $20.6 million per year. This is the largest expansion of the program since its inception in 1979. An additional $6 million has been put towards construction of a second 24 metre vessel and increased operating funds, which will enter service in 2019. The program also administers $5 million to $9 million annually from a number of sources to deliver additional field activities that would otherwise not be achievable, such as the Raine Island Recovery Project, expansion of Whitsunday Island visitor facilities and expansion of reef protection infrastructure.

Rangers inspecting newly installed moorings at Yanks Jetty, Orpheus Island. © Queensland Parks and Wildlife Service 2019

The program is responsible for practical, on-ground delivery of marine and island national park management. The additional funding will enable delivery of field activities identified in the Reef 2050 Plan and Reef Blueprint. The program's on-water capacity has been drastically increased, growing from an annual base funding commitment of $17 million to over $38 million in 2020–21. This funding will see more than a sixty per cent increase in staffing and an enhanced vessel fleet of more than 21 vessels (including two 24 metre vessels). This will enable an increased focus on compliance, island and reef restoration activities, incident response, collaboration with Aboriginal people and Torres Strait Islander people to deliver field activities, and engagment with Reef and island users.

Knowledge, integration and innovation The independent management effectiveness review (Chapter 7) rated managers' understanding of the Region and its stakeholders as the strongest element of management overall. This reflects the large body of collaborative research and monitoring effort undertaken to date. Despite this, researchers and managers are finding it increasingly difficult to maintain up-to-date knowledge of ecosystem and heritage condition, given the rate and cumulative nature of disturbances in the Region. Following the 2014 Outlook Report, a review of the available scientific and other knowledge about the Region was undertaken and gaps were identified. The resulting report, *Science Strategy and Information Needs 2014–2019*[6], summarises high-priority science needed to improve management of the Reef. This report will be updated following release of the 2019 Outlook Report and will be critical to informing future research needs and resourcing.

Effective Reef management will increasingly require access to integrated information on Reef condition, Catchment inputs and human use of the Region

Developing ways to understand and respond to the effects of cumulative impacts on the Region's values remains paramount, and is guided by a Reef-wide policy released in 2018.[1468] While implementation of this policy is underway[1486], cumulative impact management of multiple uses in and adjacent to the Region remains a challenge, especially as some uses are highly regulated (ports and tourism) while others are not (recreational fishing). Escalating climate change pressures have heightened the importance of implementing this policy and progressing pre-emptive spatial planning in the Region and Catchment.

Agile approaches are needed to protect key values and prevent undesirable human use patterns becoming entrenched, unsustainable and hard to manage. To do this, managers require up-to-date spatial and temporal information on how and where people use the Region and the condition of associated local environmental, Indigenous and social values. Additionally, access to the best available science from a network of providers will continue to underpin management and allow evaluation of the effectiveness of actions. Access to relevant information on biological and human dimensions will be key to supporting evolving policies and spatial planning.

Implementing a Reef-wide integrated monitoring and reporting program that directly links to an outcomes-based management framework will underpin a transformative adaptive management approach. The Reef 2050 Integrated

Monitoring and Reporting Program (RIMReP), which is under development by the Marine Park Authority and many partner agencies, aims to address integrated information needs for future management of the Reef (Box 16). The RIMReP monitoring program and online platform will provide access to up-to-date, reliable information to support pre-emptive planning and responsive management. For example, it will provide information to inform management and provide guidance on where to best target crown-of-thorns starfish culling and increased compliance efforts.

Given the increasing frequency of acute and chronic stressors, timely information on the health of key indicators and their trajectories (species, processes and human dimension values) over time and space is critical. Thresholds for ecosystem health and community wellbeing are being developed through RIMReP to measure condition and trend of values. Good alignment between what is measured, how it relates to relevant thresholds, and how that is meeting the desired outcomes for the Region's values will provide the most powerful insight.

There is also an immediate need to explore scalable and effective strategies and technologies for restoring degraded habitats.[1026,1487] Research into reef restoration is being expanded under the Reef Restoration and Adaptation Program.[1026] The program is currently investigating and developing feasible restoration techniques that can be applied at sufficient scale to have a positive effect on Reef condition. This will require a combination of discovery research and applied field testing. Given the connection to, and value of, the Region for Traditional Owners and the community, those undertaking restoration activities must understand and consider social attitudes. Information on how restoration activities can be effective at scale, while minimising harm, is important for researchers, managers and the community.

Investment in innovative field-based and desk-top technologies is needed to support improvements in monitoring and management. Increasing use of drones, night vision and vessel tracking will increase surveillance and enforcement of Reef rules. Currently, drones are providing increased and cheaper monitoring capability and aerial mapping. Use of underwater acoustic technology in compliance is an emerging innovation[1488], which could be used to detect fishing vessels in areas where access or fishing is prohibited.

BOX 16

Bringing knowledge together for Reef management

The vision for the Reef 2050 Integrated Monitoring and Reporting Program is to develop a knowledge system for resilience-based management of the Reef and its Catchment. It will also provide managers with an understanding of how the Reef 2050 Plan is progressing.

Program development commenced in 2016 and more than 70 experts have been involved in the design of the program. A prototype, designed to be the first edition of the knowledge system, is scheduled for testing from mid–2019.

Program development focuses on three knowledge system components:

- **Collecting and integrating data:** For the first time, access to information from monitoring and modelling of the Reef's biophysical, social, economic, Indigenous and heritage values, as well as the drivers and pressures on those values, will occur through a centralised location.
- **Improving data access:** Enabling access to data through the knowledge system requires meeting sufficient standards for data management collection and sharing. This is a complex task involving input from those involved in collecting Reef data and establishing technical infrastructure.
- **Visualising data:** The knowledge system will allow users to access consolidated and integrated information, becoming a 'first-stop-shop' for Reef managers.

Monitoring programs provide vital information on reef health, such as the extent and severity of coral bleaching.

The program's knowledge system is intended to enable the early detection of trends and changes in the Reef's environment. The goal is to drive effective, efficient and transparent management decisions. The knowledge system will evolve in response to changes in the Reef's condition, new science and technologies, and high-priority needs of management and stakeholders. It will be used to guide day-to-day decisions, shape strategic policy and inform future Great Barrier Reef Outlook Reports.

10.4 Assessment summary — Long-term outlook

Paragraph 54(3)(h) of the *Great Barrier Reef Marine Park Act 1975* requires *'… an assessment of the long-term outlook for the ecosystem …'* within the Great Barrier Reef Region.

Paragraph 116A(2)(f) of the *Great Barrier Reef Marine Park Regulations 1983* requires *'… an assessment of the long-term outlook for the heritage values …'* of the Great Barrier Reef Region.

Grading statements — long-term outlook

Very good
The values are likely to remain healthy and resilient for the foreseeable future with strong recovery at damaged locations. Additional management intervention is not required to maintain the values.

Good
With only minor additional management intervention, the values are likely to remain generally healthy and resilient for the foreseeable future, with only some values showing signs of significant deterioration.

Poor
Without significant additional management intervention, some of the values will deteriorate in the next 25 years and only a few values are likely to be healthy and resilient in the longer term.

Very poor
Without urgent and effective additional management intervention, the values are likely to deteriorate rapidly with the loss of most values in the longer term.

Borderline
Indicates where a component or criterion is considered close to satisfying the adjacent grading statement.

Trend since last report

- ↑ Improved
- ↔ Stable
- ↓ Deteriorated
- – No consistent trend

Future trend

- ↑ Improving
- ↔ Stable
- ↓ Deteriorating
- – No consistent trend

Confidence

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

10.4.1 Outlook for the Region's ecosystem

Grade and trend			Confidence		Criterion summary
2009	2014	2019	Grade	Trend	
	↓	↓	●	●	**Outlook for the ecosystem:** The Reef has fundamentally changed since 2009. The threats affecting the Region's ecosystem (natural heritage values) are increasing, compounding and expanding in scale; they are driven strongly by climate change. Multi-jurisdictional solutions and on-ground management involving stakeholders and the community are highly valuable. However, outcomes are being undermined by climate change. The window of opportunity to influence the Reef's long-term future is now. Strong, effective management actions are urgent at global, regional and local scales.

10.4.2 Outlook for the Region's heritage values

Grade and trend			Confidence		Criterion summary
2009	2014	2019	Grade	Trend	
	↓	↓	◐	◐	**Outlook for heritage values:** Many of the Region's heritage values are closely tied to the condition of the ecosystem. The projected risk to these values from most threats is, therefore, the same as for the ecosystem. The most serious risks to the Region's heritage value are from climate change, land-based run-off, coastal development and some aspects of direct use. Identification and monitoring of the broad range of Indigenous, historic and other heritage values is not yet well established. Greater shared knowledge of heritage values among the Region's managers, Traditional Owners and stakeholders is critical to ensuring recognition and continued protection of those values.

10.5 Overall summary of long-term outlook

The Great Barrier Reef is already a changed system — the effects of climate change are happening now. The Region's current long-term outlook is for continued deterioration: this could be altered with urgent and coordinated actions to curb greenhouse gas emissions. The Region's short to medium-term future will be determined by the actions of many within the next five to 10 years. By 2030, or within the next decade, without timely and effective management actions a declining outlook for the Region will continue to manifest. Every action taken to improve Reef health and reduce drivers, threats and impacts is critical.

The Region was at a crossroads in 2009, with an opportunity for the right decisions to protect the Reef into the future. In 2014, assessments indicated all threats needed to be reduced to prevent the Region's overall condition worsening from poor. Since then, the outlook for the Region's ecosystem has become very poor. The outlook is no longer about forecasting the effects of climate change; the Region and those people dependent on it are already experiencing climate change and, as a result, a changed and less resilient Reef.

The current rate of global warming will not allow the maintenance of a healthy Reef for future generations. Increasingly frequent temperature extremes are the highest and most immediate risk, significantly affecting a range of species and habitats on a Region-wide scale. In turn, Traditional Owners' enduring connection to sea country and the quality and quantity of economic and social benefits the Reef provides to all people who value, enjoy or depend on it are being affected.

The Reef can recover from major impacts if its broader resilience is high and it experiences adequate disturbance-free periods. However, disturbances are becoming more frequent and are undermining recovery in many places. Mitigation of threats and resilience-based management on global and local scales remains essential to reinvigorating recovery of the system.

Everything possible should be done to create recovery windows for the Reef. Current efforts that are effective in ensuring that use is sustainable and compliant with environmental protection rules should be continued. Catchment management actions aimed at reducing pollution in land-based run-off are not working fast enough and a significant step change is needed to accelerate improvement in the quality of water flowing into the Reef.

Every action taken to improve Reef health and reduce drivers, threats and impacts is critical

In 2015, one of the greatest multi-jurisdictional efforts to protect the Reef, the Reef 2050 Plan, was implemented. Progress has occurred in many areas, including sustainable port development and sustainable fisheries management, however, the full benefits of this improved planning are still to be seen. Although beyond the scope of the Reef 2050 Plan, demonstrable effective global, national and local efforts to mitigate climate change are needed urgently within the next decade if the Reef is to recover and persist.

Given the global scale of human-induced climate change, the size of the Region is becoming a less effective buffer to broadscale and cumulative impacts

At local and regional levels, direct management actions do reduce some pressures. Localised ecosystem recovery is being observed in some areas, but it is slow. Additional actions to address all threats — large and small, widespread and local — are imperative, and many people and organisations play a critical role. At a broader scale, efforts to improve water quality entering the Reef have gradually reduced land-based pollutants in some areas. Multi-agency efforts to explore tangible and scalable reef restoration and adaptation measures have begun to create a suite of innovative and targeted measures that may provide large-scale options for management in future. However, the success of restoration efforts depends on favourable Reef conditions for growth and recovery, which will not occur unless the rate of anthropogenic climate change is halted and reversed.

The Reef can recover from major impacts if its broader health is strong and disturbance-free periods are long enough

Catchment population growth is likely to increase people's use of the Reef. Compliance incidents, such as fishing in no-take areas, are affecting biodiversity and reducing the Region's resilience. Therefore, marine policies and planning that aim to protect representative areas while allowing for multiple use will need to be agile and responsive to changing use patterns and disturbances.

The success of restoration efforts depends on favourable Reef conditions for growth and recovery, which will not occur unless the rate of anthropogenic climate change is halted and reversed

Given the accumulation of these and many other risks (Chapter 9), broad, multi-jurisdictional management actions that involve the community and behaviour change are essential. The Reef 2050 Plan has made progress in this direction. A comprehensive review of the plan in 2020 will need to address the findings of this Outlook Report to continue the transformational progress required within the critical time window (the next 10 years).

The challenge is big, but not insurmountable – actions taken now will matter

As a social-ecological system, the health of the Reef ecosystem will continue to have both impacts on, and benefits for, the community (socially, culturally and economically). Society will need to play a pivotal and urgent role in mitigation and adaptation to support the Region's resilience. It is important not to lose optimism by thinking the job is too big, or to think that a changed Reef is far in the future — actions taken now will matter.

Seagrass meadow at Green Island. © Dieter Tracey 2013