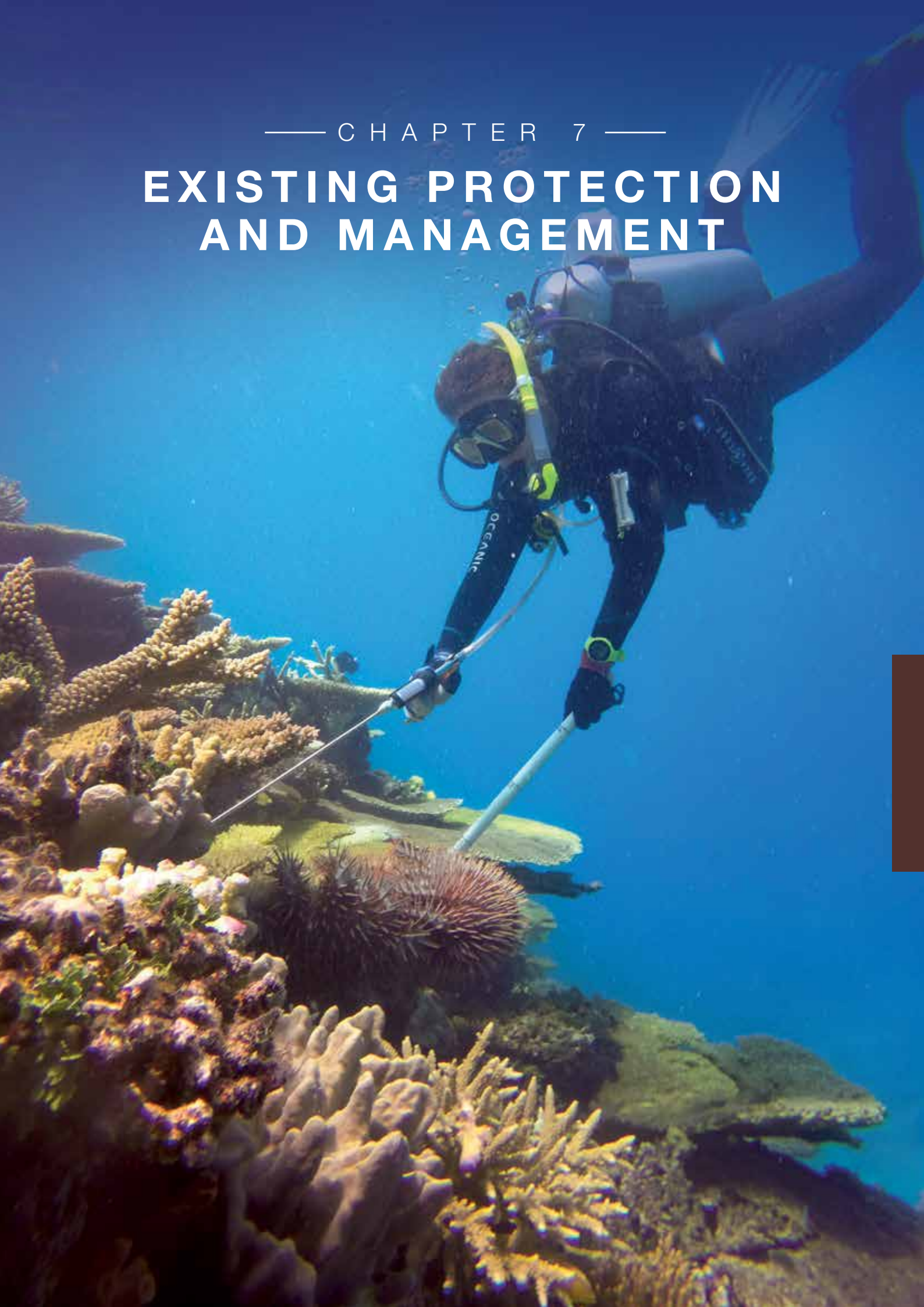


— CHAPTER 7 —

EXISTING PROTECTION AND MANAGEMENT



◀ *Diver culling crown-of-thorns starfish* © GBRMPA 2013

EXISTING PROTECTION AND MANAGEMENT

‘an assessment of the existing measures to protect and manage the ecosystem ...’ within the Great Barrier Reef Region, s 54(3)(f) of the Great Barrier Reef Marine Park Act 1975

‘an assessment of the existing measures to protect and manage the relevant heritage values ...’ of the Great Barrier Reef Region, paragraph 116A(2)(d) of the Great Barrier Reef Marine Park Regulations 1983

7.1 Background

Protection and management of the Region is a partnership between many government agencies, Traditional Owners, stakeholders and community members, with influencing activities occurring within and adjacent to the Region. An understanding of management effectiveness for these activities is an important component in determining the probable resilience of the Region’s ecosystem and heritage values. Management effectiveness also contributes to an assessment of the major risks that remain after management actions are considered; the assessment informs future adaptive management options to strengthen and improve the outlook for the Reef.

The effectiveness of existing measures to protect and manage the Region’s ecosystem was independently assessed in the 2009 Outlook Report and the 2014 Outlook Report. An assessment has been completed for the 2019 Outlook Report to compare management effectiveness over time and highlight areas that have been strengthened and those that have weakened. This assessment was undertaken by five independent reviewers.⁵ Their assessment considered the effectiveness of management actions undertaken by all government agencies and other parties that play a role in protection and management of the Region.

The full report of the independent assessors¹ is available on the Great Barrier Reef Marine Park Authority’s (Marine Park Authority’s) website (www.gbrmpa.gov.au). A separate high-level assessment, the Reef 2050 Insights Report², provides insights into the effectiveness of the contributions of the *Reef 2050 Long-Term Sustainability Plan* (Reef 2050 Plan). It is also available on the Marine Park Authority’s website.

7.1.1 Roles and responsibilities

Protection and management responsibilities within the Region Both the Australian and Queensland governments have direct legislative responsibilities within the Region (Figure 7.1). The Australian Constitution does not expressly regulate natural resource management and environment protection. These matters are regulated by the Queensland government. The Reef and Australia’s world and national heritage properties are protected through Commonwealth legislation under other Constitutional powers.

The Great Barrier Reef Marine Park Act 1975 (Cth) (the Act) is the primary legislation dedicated to the long-term protection of the environment, biodiversity and heritage values of the Region. It established the Marine Park Authority and governs its operations. The Marine Park Authority manages the Great Barrier Reef Marine Park (Figure 7.1) in accordance with the Act. This Commonwealth marine protected area is complemented by the Queensland Great Barrier Reef Coast Marine Park in adjacent Queensland waters and the Commonwealth Coral Sea Marine Park, which extends from the outer boundary.

Both the Australian and Queensland governments have direct legislative responsibilities within the Region

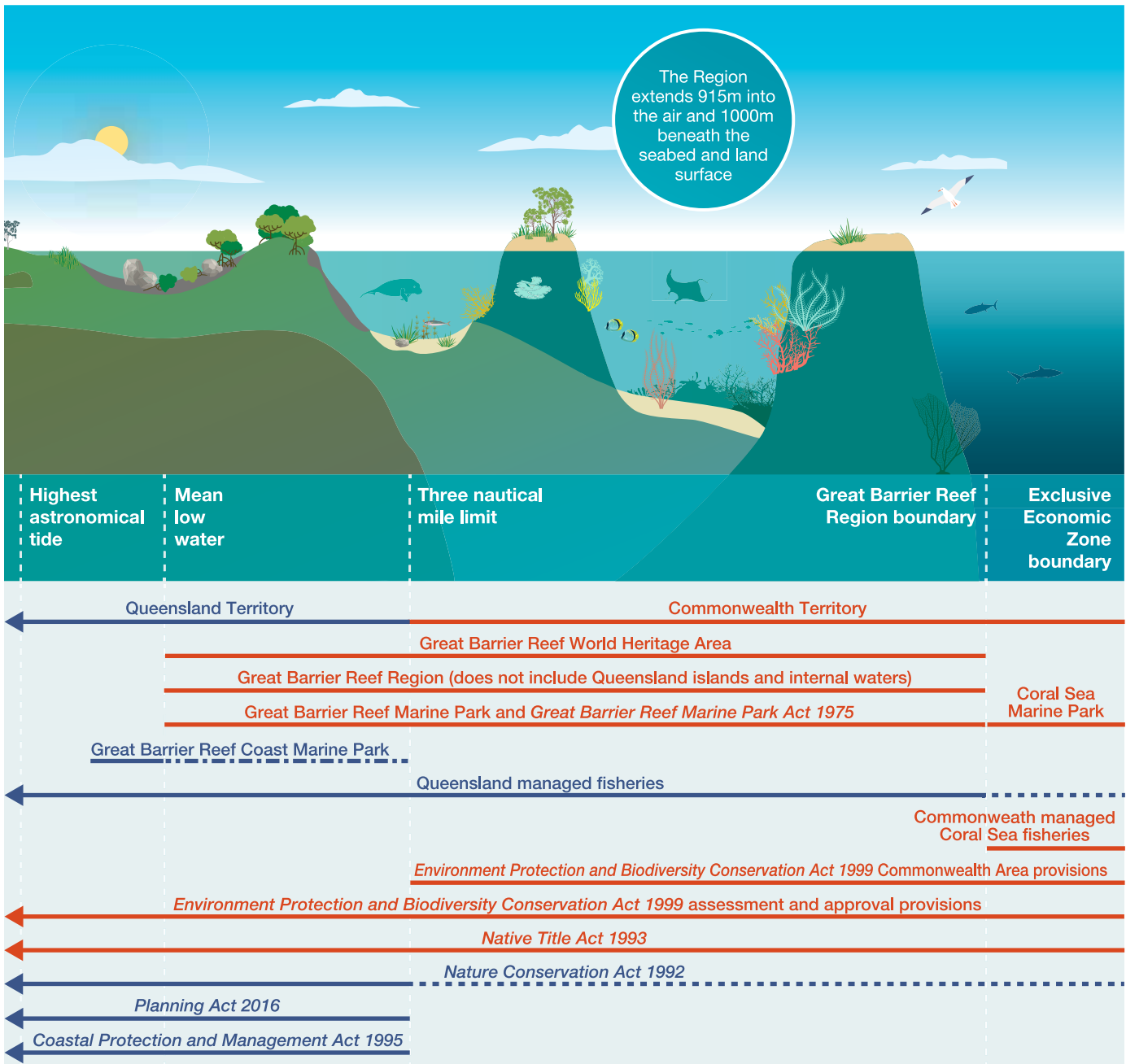


Figure 7.1 Jurisdictional boundaries

The 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 latter marine park includes the Queensland-owned islands that lie within the 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 Region is regulated by the Queensland Government. The assessment and approval provisions of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) apply throughout the Region. However, its Commonwealth reserve provisions apply only in the Coral Sea Marine Park.

To ensure a cooperative approach, the Australian and Queensland governments work in partnership through the *Great Barrier Reef Intergovernmental Agreement 2015*⁹³⁸ to protect and manage the Region. The responsible government agencies (Marine Park Authority and Queensland Parks and Wildlife Services) have a close working relationship, resulting in joint management on many issues within the Marine Park, the adjacent Queensland Great Barrier Reef Coast Marine Park and Queensland island national parks.

Since the 2014 Outlook Report, the roles and responsibilities for the long-term protection of the Great Barrier Reef World Heritage Area (World Heritage Area) and the Region have been focused and guided under the overarching Reef 2050 Plan.⁹ This plan helps respond to findings of the 2014 Outlook Report and provides management direction to 2050.⁹ The Reef 2050 Plan forms a new addendum to the Great Barrier Reef Intergovernmental Agreement 2015.

Protection and management responsibilities outside the Region Many of the threats to the Region's ecosystem (natural heritage value) and heritage values (Indigenous, historic and other) arise outside its boundaries (such as climate change, coastal development and Catchment land use practices). Australian, Queensland and local government agencies have mixed regulatory responsibilities for these matters.

The Australian Government has national and international responsibilities in relation to environment and heritage protection for the World Heritage Area. Actions having, or likely to have, a significant impact on matters of national environmental significance (including the Marine Park and the World Heritage Area), whether they are undertaken in or outside the Region, are regulated under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (the EPBC Act). The Queensland Government is responsible for natural resource management and land use for Queensland's islands, coast and hinterland, including through the *Planning Act 2016* (Qld), *Coastal Protection and Management Act 1995* (Qld) and *Nature Conservation Act 1992* (Qld).

Partners in management Many government agencies, Traditional Owners, stakeholders and individuals directly participate in protection and management activities within the Region and the adjacent Catchment (Table 7.1).

Table 7.1 Partners in the management of the Region

Australian Government	The Great Barrier Reef Marine Park Authority is the primary agency dedicated to protection of the Region, and is responsible for implementing the Great Barrier Reef Marine Park Act and contributing to reporting on the state of the World Heritage Area
	The Department of the Environment and Energy is responsible for implementing the EPBC Act and coordinating reporting on the state of the World Heritage Area
	Australian Maritime Safety Authority is responsible for maritime safety including environmental considerations and search and rescue
	Maritime Border Command provides aerial surveillance of the Region
	Parks Australia manages the adjacent Coral Sea Marine Park, for which a management plan came into effect on 1 July 2018
Queensland Government	The Queensland Parks and Wildlife Service is responsible for day-to-day joint field management of the Marine Parks and Islands with the Marine Park Authority
	The Department of Environment and Science is the lead agency on environmental management matters in intertidal areas, Queensland internal waters and the Catchment
	Maritime Safety Queensland is responsible for the protection of Queensland's waterways and the people who use them
	Department of Agriculture and Fisheries and Queensland Boating and Fisheries Patrol manage and enforce fisheries and transport legislation
Partners	Traditional Owners work to protect cultural and heritage values, conserve biodiversity and enhance the resilience of their land and sea country
	Researchers and research institutions provide training, public outreach and scientific evidence to inform policy reform, improved governance and adaptive management through formal and informal channels
	Local governments, industry groups (for example, ports and shipping), regional natural resource management bodies, advisory committees and the community are involved in actions to minimise impacts, address threats and improve outcomes for the Region

7.1.2 Focus of management

Activities to protect and manage the Reef focus on 14 broad management topics across three areas:

Managing direct use

- commercial marine tourism
- defence activities
- fishing
- ports
- recreation (not including fishing)
- research activities
- shipping
- traditional use of marine resources

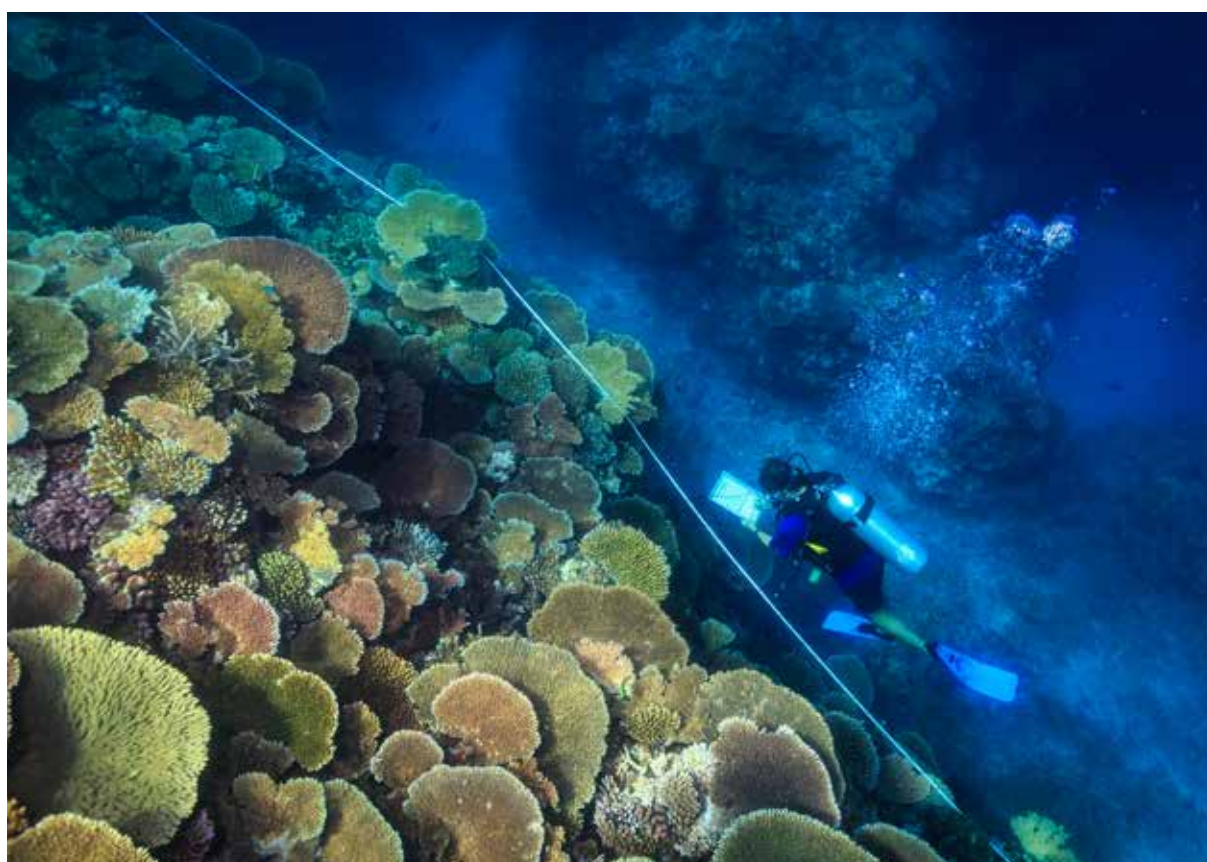
Managing external factors

- climate change
- coastal development
- land-based run-off

Managing to protect the Region's values

- biodiversity values
- heritage values
- community benefits of the environment.

These topics form the basis of the assessment of existing measures to protect and manage the Region's ecosystem and heritage values. Additionally, three main management approaches are examined: environmental regulation; engagement; and knowledge, integration and innovation.



A researcher conducting a coral health survey along a marked transect. © Tane Sinclair-Taylor

7.1.3 Scale and complexity

The 14 management topics assessed vary in scale and complexity (Table 7.2). The assessment of effectiveness for each management topic has not been weighted to take into account differences in scale and complexity between topics. Inter-relationships between management topics often manifest with cumulative effect, creating additional management challenges. This complexity is further analysed in the risks chapter (Chapter 9) and addressed in the long-term outlook chapter (Chapter 10).

Table 7.2 Scale and complexity of management topics

Management topic	Scale	Complexity		
		Social	Biophysical	Jurisdictional
Managing direct use				
Commercial marine tourism	Region-wide but variable in intensity	Major	Moderate	Moderate
Defence activities	Limited in area and duration	Minor	Minor	Minor
Fishing	Region-wide but variable in intensity	Major	Major	Moderate
Ports	Concentrated around ports	Major	Moderate	Major
Recreation (not including fishing)	Region-wide but variable in intensity	Major	Moderate	Moderate
Research activities	Region-wide but limited in intensity	Minor	Moderate	Minor
Shipping	Concentrated around shipping lanes	Moderate	Moderate	Moderate
Traditional use of marine resources	Region-wide but variable in intensity	Major	Moderate	Moderate
Managing external factors				
Climate change	Region-wide	Major	Major	Major
Coastal development	Region-wide, but limited to Catchment areas and mainly inshore waters	Major	Major	Major
Land-based run-off	Catchment and mainly inshore waters	Major	Major	Major
Managing to protect the Region's values				
Biodiversity values	Region-wide	Minor	Major	Moderate
Heritage values	Region-wide	Major	Moderate	Moderate
Community benefits of the environment	Region-wide	Major	Moderate	Minor

7.1.4 Management approaches and tools

Three main management approaches are used to protect and manage the Region:

- **Environmental regulation:** management tools, such as regulations, zoning plans, management plans, permits and licences, and compliance actions (audits, infringement notices and prosecutions) are used to establish and enforce the environmental standards necessary to protect and manage the Reef.
- **Engagement:** management agencies work with Traditional Owners, scientists, the community, industry and local government to strengthen knowledge, ensure fit-for-purpose management and influence actions that will help improve the outlook for the Region.
- **Knowledge, integration and innovation:** effective management is based on the best available science and draws on traditional ecological knowledge and information from the wider community. It is informed by the results of ongoing monitoring.

Each of these approaches is explicitly assessed in Section 7.4. Many management tools are used to address a number of topics and each topic is addressed by a combination of tools (Table 7.3). The effectiveness of all of the relevant tools has been assessed for each management topic.

Table 7.3 Management tools used to address the broad management topics

Management tools	Direct uses								External factors			Values		
	Commercial marine tourism	Defence activities	Fishing	Ports	Recreation (not including fishing)	Research activities	Shipping	Traditional use of marine resources	Climate change	Coastal development	Land-based run-off	Biodiversity values	Heritage values	Community benefits of the environment
Acts and regulations	●	●	●	●	●	●	●	●		●	●	●	●	●
Zoning plans	●	●	●	●	●	●	●	●		●	●	●	●	●
Management plans	●	●	●	●	●	●	●	●	●		●	●	●	●
Permits and licences	●		●	●	●	●	●	●		●	●	●	●	●
Traditional Owner agreements						●		●				●	●	●
Compliance actions	●	●	●	●	●	●	●	●		●	●	●	●	●
Site infrastructure	●		●	●	●	●	●					●	●	●
Fees and charges	●		●	●		●	●			●	●			
Policy	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Partnerships	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Stewardship and best practice	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Education and community awareness	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Research and monitoring	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Reporting	●	●	●	●	●	●	●	●	●	●	●	●	●	●

7.2 Assessing protection and management measures

To ensure the assessment of existing measures to protect and manage the Region’s ecosystem (natural heritage value) and heritage values (Indigenous, historic and other) was independent, the Marine Park Authority engaged five external independent assessors through an open tender process to jointly undertake the assessment. These assessors have expertise in protected area management, defence, ports, shipping, monitoring and evaluation, public policy and governance. The full report⁵, including the evidence assessed to inform grades, has been summarised in Sections 7.3 to 7.5. These sections were reviewed by the independent assessors to make sure they are a transparent and fair reflection of their findings.

The effectiveness of protection and management measures was independently assessed

Since 2014, the Reef 2050 Plan⁹ has been a key driver of actions. The related Reef 2050 Insights Report considers the Reef 2050 Plan's strengths, weaknesses and contribution to the effective management of the Region.⁸

7.2.1 Scope

The scope and methods for this assessment are consistent with the 2009 and 2014 Outlook Reports. The assessment considers the activities of all Australian and Queensland government agencies and other partners that contribute to protection and management of the Region. The scope is, therefore, much broader than just the management responsibilities of the Marine Park Authority.

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

7.2.2 Assessment method

The International Union for the Conservation of Nature and Natural Resources (IUCN) has developed a framework for assessing management effectiveness of protected areas, which has been applied around the world.¹³⁵⁰ The 2019 Outlook Report assessment consistently applies this framework. This framework is based on a management cycle in which management is continuously evaluated and refined (Figure 7.2).

The assessment was based on the six elements of the management cycle:

- understanding context
- planning
- financial, staffing and information inputs
- management systems and processes
- delivery of outputs
- achievement of outcomes.

The independent assessment examined the six elements of the management cycle for each management topic outlined in Section 7.1.2 above. This framework specifies that effective management needs to be underpinned by a thorough understanding of the specific conditions related to protected areas, be carefully planned and implemented, and include regular monitoring, leading to changes in management as required.

For each management topic, the independent assessors considered evidence provided by managing agencies against 49 indicators to assess effectiveness at each stage of the management cycle (Appendix 5). Based on the results of the assessment of each management topic, the independent

assessors also provided a summary of effectiveness for each of the three broad management approaches (environmental regulation; engagement; and knowledge, integration and innovation).

The independent assessment of management effectiveness is examined around the six elements of the management cycle

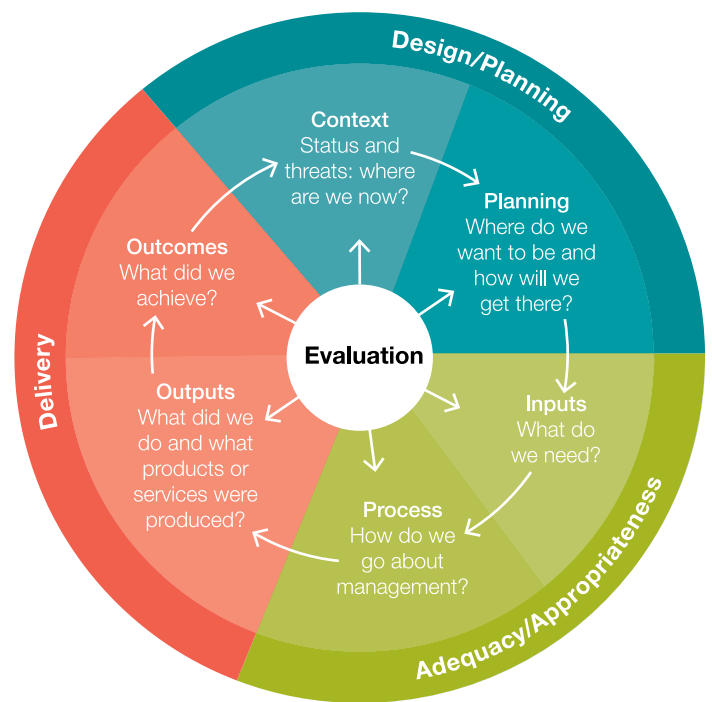


Figure 7.2 Framework for assessing management effectiveness of protected areas

Effective management is a closed loop where issues are considered, plans are made, resources are expended, processes are followed, and products and services are delivered, all leading to outcomes that address the issues. Source: Adapted from Hockings et al. 2006¹³⁵⁰

7.2.3 Information used

Information relevant to assessing performance against each of the indicators was assembled by both Australian and Queensland government agencies and provided to the independent assessors. To refine existing methodology without affecting comparability, the independent assessors introduced another step based on an innovation developed as part of the IUCN Green List of Protected and Conserved Areas Programme. This involved specifying 'means of verifying' each indicator, which identifies the most relevant types of evidence needed to appropriately assess each indicator.

The independent assessors also sought extra information from relevant research papers, semi-structured stakeholder interviews, workshops with managing agencies and other source documents. The assessment was based on documentation available and advice provided before the end of September 2018. Where necessary, information has been updated after this date with the consent of the independent assessors, but only where the new information involved a substantial change in management.

7.3 Assessment of existing protection and management measures

The following assessment of existing measures to protect and manage the Region's ecosystem and heritage values is a summary of an independent analysis of the 14 broad management topics by the five expert assessors.⁵

Managing direct use

7.3.1 Commercial marine tourism

In terms of economic value and employment, tourism is recognised as the most significant direct use of the Region.⁸⁴⁶ Both the Australian and Queensland governments recognise the importance of the Region to tourism. Marine tourism activities are considered to be a comparatively low risk to the Reef's values when considered across the entire Region. However, at a local scale, marine tourism activities can affect the environment and heritage values and displace other users (for example, through congestion at particular high-use sites).

To address risks associated with marine tourism, the Marine Park Authority and the Queensland Parks and Wildlife Service jointly manage use and access through permits, management plans and compliance operations. A comprehensive suite of management tools, complemented by strong industry partnerships, continues to contribute to a sustainable tourism sector in the Region.

The strongest improvements in management over the past five years have involved revised planning and permit processes and better material informing tourists about the Reef and its values. For example, in 2017, the amended *Whitsundays Plan of Management 1998* increased protection of sensitive seabird nesting areas, increased flexibility to accommodate low or no-impact activities, improved recognition of the importance of the area to Traditional Owners and increased flexibility for some tourism activities, such as motorised water sports at established locations.

In 2017, permission processes in the Marine Park regulations were reviewed. New assessment guidelines and policies under a strengthening permissions systems project were completed by the Marine Park Authority with a view to improving consistency and transparency in decision-making. The Marine Park Authority is meeting the service level standards for processing applications for permissions it developed and set out in the permission system service charter.¹³⁵¹ Local-scale issues, such as damage to coral (from anchoring and fin damage from tourists snorkelling or diving) and disturbance of marine wildlife (through feeding, touching, noise and crowding) have been reduced through regulation, communication of responsible reef practices, and increased provision of reef protection infrastructure, such as public moorings.

The impact of climate change (causing unprecedented mass mortality of corals in 2016 and 2017), poor water quality and severe weather on particular tourism sites, has increased dramatically since 2014. The tourism industry and managing agencies need to make sure future management and use of the Region are sustainable, adaptable and flexible. This is especially important for addressing potential issues, such as congestion, if some sites become unviable for tourism purposes following disturbances. The Marine Park Authority's *Marine Tourism Contingency Plan 2014*¹³⁵² provides some flexibility for tourism operators to relocate following damage at particular sites (for example, after cyclone Debbie in 2017).

The Marine Park Authority has invested additional resources in the enforcement of permissions. This includes making sure permitted structures are well-maintained to reduce risks to the Region's values (for example, in 2016–17, all nine tourism pontoons were audited and no significant issues were found).

A comprehensive suite of management tools, complemented by strong industry partnerships, contribute to the sustainable management of tourism activities

Stakeholders are well known by managing agencies and are proactively engaged through meetings, training programs and advisory committees. Managing agencies leverage better practices from the tourism industry through a High Standard Tourism Operator Program. Eligible operators are accredited on the basis of their operations being ecologically sustainable and culturally appropriate, including presenting the values of the Region to a high standard. The number of independently certified high standard tourism operations has steadily increased from 19 operators in 2004 to 69 in 2017. These operations carry approximately 63 per cent of tourists visiting the Reef.

In 2015, the Marine Park Authority commissioned an independent audit of certified high standard tourism operators to determine the level of compliance with certification requirements. The audit identified fundamental strengths and positive experiences and also significant gaps relating to how the world heritage values were presented in interpretive content and education. The Master Reef Guides program and Reef Discovery Training course have been developed by the Marine Park Authority in partnership with the tourism industry to address this deficiency.

Context and planning are identified as areas that require strengthening. No systematic monitoring system is in place to assess the effectiveness of plans of management. The *Cairns Area Plan of Management 1998* and the *Hinchinbrook Plan of Management 2004* are both overdue for review – the Cairns plan was last amended in 2008 and the Hinchinbrook plan has not been amended since it was created in 2004. The delayed review of these plans is in part due to the low risk nature of marine tourism compared to other activities, such as crown-of-thorns starfish control. Since 2016, these plan of management areas have been affected by multiple stressors, such as mass coral bleaching and several severe cyclones. Some understanding of how impacted habitats have affected enjoyment of, and accessibility to, the Reef by visitors and the reef-based tourism industry exists, but is limited. To make sure the plans remain fit for purpose in the face of increasing cumulative impacts and a changing environment, the future needs of these areas should be considered through a risk-based planning approach.

The value that tourism visitors put on the Region is indicative of its national and international importance. The effective management of marine tourism in the Region is based on strong partnerships with the industry and a strong joint management approach between the Marine Park Authority and the Queensland Parks and Wildlife Service.

7.3.2 Defence activities

Activities undertaken by the Department of Defence in the Region continue to be managed effectively. Close cooperation exists between Defence, the Marine Park Authority and other agencies, particularly relating to the management cycles for major exercises using the Shoalwater Bay Military Training Area. Any impacts identified through day-to-day management of exercises were localised and short-term, and all incidents were considered to be well managed.

Defence has a mature environmental management system in place that has operated very effectively for many years. The memorandum of understanding between Defence and the Marine Park Authority continues to underpin strong working relationships and information sharing, and instils a high level of confidence that defence activities are environmentally sustainable in the Region.

Defence continues to demonstrate a strong commitment to minimising its impacts, including implementing strict controls in sensitive habitats. For example, as part of the Talisman Sabre exercise in 2017, amphibious landing activities occurred at Stange Bay rather than within the Shoalwater Bay Military Training Area. Stange Bay offered deeper water access and thus reduced the potential impacts on seagrass beds important for dugongs and green turtles. The decision to use Stange Bay recognised pressures on the Region from other threats, particularly coral bleaching impacts associated with climate change and storm events.

Shoalwater Bay remains a relatively large and intact natural area that is an increasingly important refuge for species (for example, dugongs and birdlife) whose distribution are contracting in response to other pressures, such as coastal development and climate change. Balancing the Defence requirements for training with conservation of critical environmental values will remain a significant challenge for managing agencies and Defence.

Defence continues to play an effective role in response to reports of legacy unexploded ordnance. Since the 2014 Outlook Report, some improvements have been made to the publicly available information about management of unexploded ordnance, explosive ordnance waste, and a wide range of dumped war materials. Web-based mapping tools now cover some of the known marine areas where contamination is likely to exist outside existing Defence training areas. This information is useful for managers making decisions about permitted uses in areas that might be affected by discarded or misfired ordnance. Almost no information is available on the presence or effects of ordnance contamination on the Reef. An exception is the World War II dump site at John Brewer Reef, offshore from Townsville, where extensive surveys have been undertaken since the discovery of dumped ordnance in 1988. As noted in the 2014 Outlook Report, Defence continues to treat hazards arising from unexploded ordnance contamination completely differently to all other forms of hazardous material contamination of the environment. It is a specific shortcoming that the Commonwealth policy on the management of land in Australia affected by unexploded ordnance does not clearly consider environmental contamination risks.

The management framework for defence activities continues to deliver effective environmental monitoring and management, commensurate with the low level of evident risks

7.3.3 Fishing

Fishing is the principal extractive use of the Reef. Viable commercial fishing industries and recreational fishing depend on a healthy ecosystem. Management of fishing, and the aquatic environment on which it depends, is shared between the Australian and Queensland governments. The primary management tool for commercial and recreational fishing is the *Fisheries Act 1994* (Qld) and associated fisheries regulations. These require licensing of commercial fishing and establish fishing gear limitations, size and possession limits, spatial and temporal fishery closures and total allowable commercial catch limits. Also, the Queensland Boating and Fisheries Patrol and the Reef Joint Field Management Program carry out a comprehensive compliance program. These programs have been strengthened over the past five years, particularly in relation to recreational fishing. The Reef Joint Field Management Program is on track to double in size by 2021, further improving capacity for compliance and enforcement.

The most significant change in management of fishing in the Region since 2014 is the development of the *Queensland Sustainable Fisheries Strategy 2017–2027* (Sustainable Fisheries Strategy).⁹⁹² This strategy covers both commercial and recreational fishing and commits to 10 major reform areas, including improved monitoring, research, environmental risk assessments and fish stock management. Delivery of this plan and associated investment have resulted in an increased management effectiveness grade for planning and inputs (Table 7.4). For example, in 2017–18 an extra 16 Queensland Boating and Fisheries Patrol compliance officers were appointed in the Region and 11 other full-time equivalent staff were recruited to support implementation of the strategy.

Illegal fishing is considered one of the greatest risks to targeted stocks and the sustainability of legal fishing. Fisheries compliance measures have increased since 2014, with Vessel Monitoring Systems (Section 5.4.3 Box 7) to be operational on all commercial vessels by 2020 and the Marine Park Authority making greater use of legislation to restrict activities of repeat offenders.

Recreational fishing in no-take areas, primarily Marine National Park (Green) Zones continues to be the most common offence in the Marine Park, undermining the health of the ecosystem. Each year since 2014–15, the Reef Joint Field Management Program has recorded more than 500 offences per year involving recreational fishing in the Marine Park. The number of offences has been gradually increasing with 653 reported in 2017–18.

This increase is partly due to improved surveillance focussed on recreational fishing, but also reflects increased illegal activity. Recent research to understand why people fish in no-take zones has determined that the primary drivers of intentional illegal activity are fishers' perceptions of better fishing, the beliefs they will not get caught and that others are doing the same.^{992,995} This information is being used to inform and refine compliance plans and strategies to target illegal recreational fishing. Notably, the vast majority of fishers (98 per cent) have high regard for the legitimacy of management and believe that illegal fishing is socially unacceptable.⁹⁹⁵

The Queensland Sustainable Fisheries Strategy 2017–2027 represents a significant change in fisheries management

Ecosystem effects and cumulative impacts of recreational fishing are concentrated in inshore areas close to major population centres. Increasing numbers of recreational fishers will increase the pressure on particular species and locations, but these impacts are largely unquantified.

While managers have a good understanding of the values of the Region with respect to fishing, the effect of ecosystem degradation on fisheries productivity is less understood. For example, the condition and trend of habitats that support fisheries have diminished following multiple wide-scale impacts (bleaching, cyclones). Fisheries are likely to experience lag effects of those impacts in the next few years (Sections 2.4.7 and 8.3.4).

There is good understanding of commercial fisheries' effort and harvest information. The Queensland Department of Agriculture and Fisheries assesses the stock status of important Queensland fish species each year. While some of the cumulative impacts associated with commercial fishing are known, information gaps exist, especially with respect to the impact of the coral bleaching events on fish stocks and the impact of fishing activities on Reef ecosystems. In addition, the sustainability of pearl perch, which has been classified as depleted, is of concern. There are also concerns about large declines in spawning aggregations and catch rates for Spanish mackerel^{15,16}, and evidence of major declines in catch rates for the Queensland component of the snapper stock¹³⁵³.

Management agencies engage with key fishing stakeholders to promote stewardship and influence good management practices. The Marine Park Authority's Local Marine Advisory Committees are used to gauge community views on Reef matters and provide a conduit for managers. However, these committees generally lack commercial fishers as members due to their job requirements. Significant public consultation with stakeholders was undertaken as part of the development of the Sustainable Fisheries Strategy.⁹⁹² A Sustainable Fisheries Expert Panel was established in July 2018 and stakeholder-based fishery working groups were formed, which include Marine Park Authority representatives. These working groups are effective partnerships that will achieve the outcomes required.

Actions associated with the Sustainable Fisheries Strategy, which has been in place since June 2017, are on track. The strategy provides a clear program of work and an opportunity to introduce best practice standards. It is responsible for the improved management effectiveness scores for fishing (Section 7.6). Implementation of the strategy and the improved compliance measures provides the opportunity for improved and effective future management of fisheries.

Benefits of zoning and importance of compliance

Since the rezoning of the Great Barrier Reef Marine Park in 2004, a growing body of research has reported important ecosystem benefits arising from the expansion of no-take zones.¹³⁵⁴ As the Reef faces a range of pressures and impacts that threaten its health and future, no-take zoning and user compliance is more important than ever. However, during the 2016 and 2017 bleaching, zoning did not protect reefs from extreme temperatures due to climate change.¹⁴¹

Reefs in no-take and no-entry zones have a greater density and biomass of fishes targeted by fishers than reefs in zones open to fishing.^{613,998,1355,1356} A wider ecosystem and fisheries benefit of this protection comes from the spread of targeted fish larvae out of no-take zones, and the ‘spillover’ contribution to stocks in areas open to fishing.^{618,619} Fish in no-take zones are larger and more numerous, and may make a considerable contribution to sustaining populations in fished areas.^{618,619} This spillover effect is important in educating fishers about the importance of compliance because it demonstrates the benefits they gain personally from no-take areas and encourages them to report non-compliance.

Other ecosystem benefits of no-take zones in the Reef include lower levels of coral disease (potentially as a result of reduced damage to coral tissue from fishing activity⁹⁹⁰) and fewer and less severe crown-of-thorns starfish outbreaks (potentially due to increasing densities of predators of young starfish⁷⁶²). Long-term monitoring data has indicated that reefs in no-take zones have a more stable community structure. Whether these findings remain following broadscale coral mortality from back-to-back bleaching events remains to be seen. However, research has shown that the magnitude of disturbance from impacts, such as a single coral bleaching event, crown-of-thorns starfish outbreaks, coral disease and cyclones, was 30 per cent lower in no-take zones, and reefs recovered 20 per cent faster than nearby reefs that are open to fishing.⁷⁵⁶

The differences in fish biomass between no-take zones and zones open to fishing^{613,998,1355,1356} suggests that most users comply with zoning. However, non-compliance remains a significant problem with 500–600 zoning offences involving recreational and commercial fishing recorded by the Marine Park Authority each year.

Lost fishing lines have been recorded in substantial quantities in no-take zones¹³⁵⁷ and social surveys estimated that three to 18 per cent of recreational fishers fished in a no-take zone during the preceding year.^{992,996} Illegal fishing in no-take zones can reduce targeted fish densities significantly¹³⁵⁸ and is limiting the full potential of the ecological and fishery benefits of the Zoning Plan.

There is strong evidence for the importance and effectiveness of the Zoning Plan in maintaining ecosystem health and supporting the Reef’s resilience and recovery. These, and perhaps other as yet unidentified benefits, may be crucial to the Reef’s long-term health and survival. Minimising the impacts of illegal fishing and other zoning non-compliance is vital, and the recent funding and technology-related enhancements to compliance and enforcement capability in the Marine Park are an important and valuable investment in the future of the Reef.



Marine Park vessel Reef Sentinel — one of the range of vessel and aircraft surveillance platforms used in the multi-agency compliance program for the World Heritage Area. © GBRMPA

7.3.4 Ports

In this assessment, the topic of ports encompasses all aspects of the development, operation and maintenance of ports, with the exception of shipping and ship movements. It includes construction and maintenance of port facilities and navigational equipment, dredging, dredge material disposal, movement of harbour support vessels and the declaration and siting of anchorages. The assessment is confined to those aspects of the operation and management of the 12 Reef ports (Section 5.7) that affect the Region's ecosystem and heritage values.

New legislation and management processes are coordinating holistic planning for future port developments

Since 2009, the Marine Park Authority's interest in matters relating to ports adjacent to the Region has been facilitated through a memorandum of understanding with the Queensland Ports Association. This agreement allows for a cooperative approach to Reef-related policy and regulatory matters relevant to Reef ports. Policy and regulatory matters are discussed at regular port forum meetings, which include representatives of all relevant port corporations as well as Australian and Queensland government environmental regulators.

Since the 2014 Outlook Report, port planning and development in the Region have been reinvigorated with significant reforms. The *Sustainable Ports Development Act 2015* (Qld) limits the spatial extent of port development to existing port sites and new Marine Park regulations restrict the disposal of capital dredge material in the Marine Park. Actions under the Reef 2050 Plan⁹ related to ports have improved the management of ports and their potential impacts. These include developing a *Maintenance Dredging Strategy for the Great Barrier Reef World Heritage Area*¹⁰³⁴, guidelines for long-term maintenance dredge management plans and the Queensland Ports Strategy.¹⁰⁴¹ The Queensland Government has also implemented the statutory port master planning process, including guidelines.

Implementation of the port master planning process is still in its infancy at the time of this management effectiveness review. Therefore, the full effect of this new initiative could not be observed or assessed. Nevertheless, the new mandatory and coordinated approach to port development in the Region is intended to ensure effective recognition and protection of the Reef's outstanding universal value, which will probably be reflected in future management effectiveness evaluations.

In general terms, ports within the Region continue to be well managed. While ports conduct a diverse range and number of monitoring programs, there are gaps in the range, quality and consistency of data collected across ports generally. These gaps also apply to the presentation and availability of collected data, as evidenced by a review of the publicly accessible ports monitoring data (for example, seagrass data). Expanded monitoring and reporting programs focused on known risks have the potential to identify new or emerging threats to the Region. They can also demonstrate the absence of such threats, which may include significant deterioration in sediment quality or the incidence of invasive marine species.

7.3.5 Recreation (not including fishing)

Recreation is defined as an independent visit for enjoyment that is not part of a commercial tourism operation.¹⁰⁰⁷ Responsibility for managing non-extractive recreation is spread across a variety of Australian and Queensland government agencies. Relevant agencies (the Marine Park Authority, Queensland Parks and Wildlife Service, Queensland Boating and Fisheries Patrol, Maritime Safety Queensland and Queensland Water Police) continue to coordinate effectively to enforce the Commonwealth and Queensland Marine Park Acts, regulations, zoning plans and plans of management.

These management tools are supported by a risk-based compliance and enforcement plan. Stewardship and education programs, such as responsible reef practices, aim to increase sustainable recreational behaviours and support positive stewardship activities undertaken by recreational users. The recently expanded network of public moorings and no-anchoring areas will help reduce impacts of recreation, such as anchor damage in heavily accessed areas, while providing for easier access.

The revised *Whitsundays Plan of Management 1998* provides more anchorages for superyachts, increases water sport opportunities at already established locations and simplifies boundaries to make it easier for users to understand what activities are allowed where. The changes to the plan of management also considered the impacts of cyclone Debbie in March 2017 and the resulting pressure on popular sites.

Work undertaken on the aesthetic values of the Region reported that the cumulative use of recreational users at popular sites had a localised, medium risk of affecting naturalness, solitude and tranquillity.⁷⁸² The condition and trend of recreation are discussed in the Marine Park Authority's 2012 *Recreation Management Strategy for the Great Barrier Reef Marine Park* (Recreation Management Strategy)¹⁰⁰⁷, but information about impacts of recreation on the condition and trend of values as a whole is still lacking. Relevant key risks identified in the risk-based compliance and enforcement plan include vessels approaching whales, disposal of garbage, island national park offences, misuse of public moorings and offence under the plans of management offences (for example, motorised water sports outside designated areas, anchoring in no-anchoring areas or exceeding vessel speed limits).

Limited Marine Park Authority resources have been directly allocated to managing recreation since the development of the Recreation Management Strategy in 2012.¹⁰⁰⁷ Recreational use is seen as a low risk to the Region, which is supported by the IUCN Outlook report for the Reef.¹³⁵⁹ The lack of an implementation plan or review of the Recreation Management Strategy since it was released reflects the low risk recreation has on Reef values. However, to make sure the Recreation Management Strategy remains fit for purpose in the face of increasing cumulative impacts, a review of the risk assessment within the strategy would strengthen its effectiveness as a planning tool.

Stakeholder engagement with recreational users remains strong. Marine Park Authority and Queensland Parks and Wildlife Service staff across the Region continue to interact with recreational users, particularly through Local Marine Advisory Committees, public engagement and via the Reef Guardian program, which includes schools, councils and fishers. However, the diversity and informality inherent in recreational use continues to make it difficult to engage with most users, and document their values and activities spatially.

7.3.6 Research activities

This evaluation of the effectiveness of management in relation to research activities primarily concentrates on the direct management of research activities in the Region. Management agency interactions with research providers and alignment of research into management is also considered, but to a lesser extent.

Reef managers aim to minimise impacts of research activities through a risk-based permits process

The Reef is known internationally as a premier site in which to conduct scientific studies. The majority of research occurs at the four major research stations at Lizard, Orpheus, One Tree and Heron islands. A wide range of low-intensity research is conducted at other locations.

Researchers who undertake research in the Region, such as the collection of specimens and installation of research equipment, require permits and licences from managing agencies. The Marine Park Authority, Queensland Parks and Wildlife Service and Queensland Department of Agriculture and Fisheries have lead roles in managing research activities. Joint accreditation of research institutions by the Marine Park Authority and Queensland Parks and Wildlife Service also enables low-risk research to occur in particular locations without the need for specific permits. These mechanisms are underpinned by zoning plans, legislation and policy. The Marine Park Authority's policy on *Managing research in the Great Barrier Reef Marine Park*¹³⁶⁰ and the Marine Park regulations were updated in late 2017 to increase consistency and transparency in decision-making and make it easier for researchers to understand permit application requirements.

Researchers are generally required to spread collections across species and locations to reduce impacts. Research station directors help with monitoring and managing the activities of researchers who use those facilities. Research is not considered to have a large or detrimental impact on the Reef ecosystem. However, limited knowledge is readily available on the cumulative collection of samples by researchers. It had been intended that environmental management plans and improved electronic systems would address this. However, since the 2009 Outlook Report, the implementation of environmental management plans adjacent to research stations has continued to be slow and auditing of research permit compliance remains limited. The online submission of research permits and collection reports has been possible since mid-2018. This is expected to help address this weakness and improve permit processing timeframes.

Research is key to assessing and advising on the condition and trend of the values and threats arising from broader environmental and anthropogenic stressors. Numerous science strategies, research partnerships and funding streams are in place to support and influence research priorities so that outcomes can be applied to management of the Region. For example, the Marine Park Authority's *Science Strategy and Information Needs 2014–2019*⁶ identifies key research priorities to better inform management of the Reef. Promoting and applying research to understand and address the larger environmental stressors from both a biophysical and socio-economic perspective is a key role for management agencies. The role needs to be maintained and strengthened, particularly in relation to understanding impacts from climate change stressors, reef intervention and restoration activities, and liaison with Traditional Owners about research undertaken on their country.

The flow-on effects to the ecosystem from multiple disturbances are only just beginning to be quantified. The shortening of recovery periods between disturbances is leading managing agencies, researchers and the community to consider, facilitate and deploy more hands-on intervention and restoration activities, some of which are in their infancy on the Reef. A major research effort is now underway (including the Reef Restoration and Adaptation Program) to potentially increase the local abundance of corals.

Inclusion of Traditional Owners in research within their sea country is limited and research results are often not disseminated to Traditional Owners. However, examples of collaboration are increasing. These include: a protocol between the Wuthathi Aboriginal Corporation and Queensland Parks and Wildlife Service to manage permits for research in the Shelburne Bay area in Cape York; new guidelines for Woppaburra Traditional Owner Heritage Assessments in the Keppel islands region; and involvement of Traditional Owners in the development and implementation of research, monitoring and beach restoration at Raine Island.

Multiple managing agencies continue to have representation on major committees relating to research on the Reef. Many of these are coordinated through the overarching Reef 2050 Plan. However, a number of researchers noted decreased engagement from the Marine Park Authority's staff on research priorities, which they attributed to a loss of key staff members at the authority over the past few years. The reduced engagement may also be a consequence of diversified sources of funding for research in the Region, with significant research funds being managed through the Commonwealth Department of the Environment and Energy.

7.3.7 Shipping

In this assessment, the topic of shipping encompasses the movement and operation of ships (greater than 50 metres in length), including ships travelling to, from and between ports in the Region and those transiting through the Region. It also includes ship loading and unloading, ship anchoring and the activities and impacts of ships while at anchor (for example, illegal discharge of ballast water or effluent).

Agencies with responsibility for managing shipping and shipping safety in the Region (Australian Maritime Safety Authority, Maritime Safety Queensland and, to a lesser extent, the Marine Park Authority) are considered to be generally well equipped to undertake the required tasks. They have effective methods and procedures for planning and implementing appropriate measures to manage shipping activity.

Shipping is generally well regulated and managed within the Region

Shipping safety in the Region is well regulated and effectively managed through an extensive suite of control, risk-reduction and risk-response measures. While shipping incidents, such as loss of propulsion and navigation, and errors, inevitably occur at times, the rate of such incidents and the potential consequences are attenuated to a significant extent by improvements in technology. These include advancing ship design and marine environment protection and safety requirements (for example, protected fuel tanks and electronic aids to navigation), other controls (for example, the vessel tracking system REEFVTS and designated shipping areas) and enforcement and compliance mechanisms (for example, port state control inspections and ship vetting). Since 2012, the coordinated management of shipping has improved markedly through the development and progressive implementation of the 2014 *North-East Shipping Management Plan*.¹³⁶¹ Actions have included more marine surveyors at ports to ensure effective inspection of ships and upgraded emergency towage capacity in the Region. The plan also identified emergent risks, improved multi-agency coordination, and refined existing management practices. It is enhanced by the parallel implementation of elements of the Reef 2050 Plan related to shipping.

It is critical that control and emergency response arrangements anticipate and respond to changes in shipping activity levels and risk profiles. Planning and processes could be strengthened by improved policies and procedures for restoring and rehabilitating damaged areas following groundings, and improved control, surveillance and monitoring for introduced marine species, particularly in relation to ship biofouling.

In general, single, catastrophic events have been planned for, but chronic, low-level effects have not been adequately considered. There is also particular concern about the cumulative effects of aspects of shipping, such as leaching and loss of biocidal antifouling paints, wake and turbulence effects, animal strikes, and altered light and underwater noise regimes. Aesthetic issues related to shipping in remote areas are less understood than in designated port and anchorage areas. While there has been some progress on the study and management of these issues in recent years, further work is required.

7.3.8 Traditional use of marine resources

The program to develop and implement statutory agreements to sustainably manage traditional use of marine resources remains one of the success stories in management of the Region.¹³⁶² Under the *Native Title Act 1993* (Cth), Aboriginal and Torres Strait Islander peoples from more than 70 Traditional Owner groups along the Reef have rights in relation to the harvest and use of marine resources for traditional uses within their land and sea country. Managers have a good understanding of Commonwealth and state legislation, as well as national and international obligations in relation to biodiversity conservation and the rights of Indigenous peoples.

Traditional Use of Marine Resources Agreements remain one of the management success stories of the Region

At a formal, administrative level, traditional use of marine resources in the Region is primarily managed through Traditional Use of Marine Resources Agreements — formal agreements developed by Traditional Owner groups that are jointly assessed and accredited by the Marine Park Authority and Queensland Government. These agreements promote sustainable use of species, such as dugongs and green turtles. They also incorporate monitoring and management of other species and ecosystems, such as seagrasses, oyster beds and shellfish. Aspiration statements, clear objectives and implementation plans are part of each Traditional Use of Marine Resources Agreement. In 2018, nine Traditional Use of Marine Resources Agreements and one Indigenous Land Use Agreement were in place. This is an increase of two agreements since 2014.

Combined, these agreements cover approximately 25 per cent of the Great Barrier Reef coastline. It is noted that expansion of Traditional Use of Marine Resources Agreements will take time.

While securing Traditional Use of Marine Resources Agreements over the remaining areas of the Region is important, the process cannot be rushed. Appropriate inputs will enable relationships between Traditional Owners and managing agencies to be maintained and strengthened. Sustainable funding announced in 2018 for the Traditional Use of Marine Resources Agreements program, mean that appropriate levels of engagement should be possible with existing Traditional Use of Marine Resources Agreements.

Traditional Use of Marine Resources Agreements also provide mechanisms and support for many other activities conducted by Traditional Owner groups, including monitoring, education, community activities and compliance activities within their land and sea country. Since 2014, investment in Indigenous ranger programs has improved partnership and compliance outcomes for the Region's values. For example, compliance training was delivered to more than 500 Traditional Owners over 2016–17, strengthening enforcement of Traditional Use of Marine Resources Agreements and increasing Marine Park compliance generally. Social, economic and health outcomes have not been formally assessed, but are likely to also be substantial, as are outcomes from the Indigenous ranger program.¹³⁶³

It is clear that impacts from a range of pressures (such as climate change, other users, depletion of megafauna and severe weather) have affected Traditional Owners' use of the marine environment and their ability to continue important cultural practices. For traditional use of marine resources, the management effectiveness grade for context has declined from effective to mostly effective (Table 7.4 in Section 7.6). This decrease is due to the challenges of understanding threats, impacts and current status of the relevant values in times of rapid change, especially due to the impacts of cyclones and climate change (for example, coral bleaching). The cumulative impacts of all other threats, and the ability of species of cultural significance to recover, are not well understood.

The effectiveness of engaging broader stakeholders and local communities is highly variable. In 2015–16, some issues occurred in multiple-use areas where the activities of tourism operators and visitors conflicted with Traditional Owner use of marine resources. Some of these tensions were relieved by the Gunggandji Traditional Use of Marine Resources Agreement signed in June 2016.

Managing external factors

7.3.9 Climate change

The Paris Agreement under the United Nations Framework Convention on Climate Change provides the international framework for actions to mitigate climate change. Nationally determined contributions, which set out countries' actions to limit climate change to well below two degrees Celsius, are not yet sufficient to achieve this goal.¹³⁶⁴ The effectiveness of global actions to mitigate climate change will be the primary determinant of further climate impacts on the Reef.

The Reef 2050 Plan aims to address key threats and boost the health and resilience of the Reef so that it can better cope with the impacts of climate change. Primary responsibility for national responses to climate change rests with the Commonwealth Department of the Environment and Energy. In 2015, the Reef 2050 Plan did not set out to directly address the threat of climate change through its objectives, targets and actions. In mid-2017, the Great

Barrier Reef Ministerial Forum brought forward the plan's mid-term review in recognition of the impacts of coral bleaching and future climate projections. The resulting updated Reef 2050 Plan (2018) focuses on additional actions within the Region to address climate change impacts, such as, implementing the *Great Barrier Reef Blueprint for Resilience*.²⁴ A broader review of targets and objectives will be undertaken in 2020 following release of this 2019 Outlook Report.

Climate policy and mitigation and adaptation programs remain in a state of flux at the national level as made clear in the report of the 2017 Senate inquiry on impacts of climate change on marine fisheries and biodiversity.¹³⁶⁵ Policy dissonance exists within government and society whereby conflicting policies relating to environmental protection and development sit side by side. Many of these conflicts cannot be directly addressed by most Reef 2050 partners as they lie outside the direct management role of agencies limited by statute.

At the time of the 2014 Outlook Report, the Queensland Government's focus and action on climate change had diminished with the disbanding of their Office of Climate Change. Also, significant reductions in staffing and expertise relevant to climate change occurred within the Australian and Queensland governments. Since then, the Queensland Government has released the Queensland Climate Change Response, comprising the *Queensland Climate Transition Strategy*¹³⁶⁶, with a zero net emission target by 2050, and the *Queensland Climate Adaptation Strategy*¹³⁶⁷. Climate change programs and staffing have been rebuilt. These include specific sectoral strategies and programs for local governments, such as QCoast 2100, which supports local governments to prepare coastal hazard

Widespread coral bleaching events in 2016 and 2017 have increased attention on climate change as the principal threat to the Reef

adaptation measures. Under the Queensland Climate Adaptation Strategy are eight sector adaptation plans. The *Biodiversity and Ecosystems Climate Adaptation Plan*¹³⁶⁸ aims to minimise the negative impacts of climate change on Queensland biodiversity and ecosystems through collaboration, planning and on-ground action.¹³⁶⁸ However, governments at all levels continue to exhibit considerable policy dissonance in the strategies they are pursuing for climate change response and economic development.¹³⁶⁹

With respect to its management activity in the Region, the Marine Park Authority advises other agencies about mitigation of, and adaptation to, climate change and extreme weather. It also undertakes activities to build the resilience of the Region's ecosystems (for example on Raine Island) (Section 2.4.10). While the Marine Park Authority has no jurisdictional responsibility for addressing climate change in the broad sense, it has contributed significantly to developing international best practice for managing responses to climate change and cyclones as they relate to Reef ecosystems. This contribution has been achieved through research, monitoring and partnerships with research institutions, government agencies and stakeholder groups as well as education, community awareness and stakeholder engagement programs. Assessing the effectiveness of the Marine Park Authority and other Reef management agencies in addressing this issue is challenging, as so much depends on the actions of others. This is especially so in regard to the effectiveness of mitigation measures taken at national and international levels and the mitigation and adaptation measures undertaken in adjacent coastal areas by local governments and others.

Alongside other research institutions, the Marine Park Authority plays a key role in facilitating awareness of the impacts from climate change and cyclones on the Region. The Outlook Report continues to emphasise that climate change is the principal long-term threat to the condition of the ecosystem. The Marine Park Authority prepared a vulnerability assessment for the Reef in relation to climate change in 2007 and a strategic plan to address climate change in 2009. The *Climate Change Strategy and Action Plan 2012–2017*¹³⁷⁰ (Climate Change Action Plan) acknowledged the important role the Marine Park Authority plays in informing national and international climate policy and providing knowledge to support effective management of inshore areas. However, implementation of the Climate Change Action Plan was defunded early in its life, and many actions in that plan remain unaddressed or only partially implemented. A number of the actions have been incorporated into annual operational plans or are now included in the sectoral adaptation programs being developed by the Queensland Government. Changes in staffing and organisational structures within the Marine Park Authority have lowered its prominence in addressing climate change. The Marine Park Authority no longer has an identifiable unit focused on climate change responses, although a number of staff across the Marine Park Authority have responsibility for climate policy and responses. In early 2019, the Marine Park Authority released a draft position statement on climate change for targeted consultation. While not completed before the finalisation of the independent reviewers' management effectiveness assessment, its finalisation will provide a clear position on this critical threat.

Management effectiveness of climate change is the weakest topic assessed, with most elements trending down or declining in grade

Work continues on identifying the gaps in available biophysical information. This job has been made larger and more important by bleaching events and the decline in our knowledge of the condition of Reef biota. The Reef 2050 Integrated Monitoring and Reporting Program (RIMReP), when operational, will help to provide critical knowledge within a structured framework. The need to clarify socio-economic implications is being addressed in collaboration with the CSIRO through the Social and Economic Long-Term Monitoring Program, established with National Environmental Research Program Funding in 2011, and the National Environmental Science Program in 2015.

Critical elements of current condition and trend are being monitored by researchers and managers, but knowledge in this area has declined since the bleaching events. Work is also underway with Traditional Owners to apply available traditional knowledge to consider climate change implications, through Traditional Use of Marine Resources Agreements and Sea Country forums.

Community engagement relating to climate change continues through initiatives, such as Eye on the Reef and the Reef Guardian program, which includes schools, councils and fishers. A reef health incident response framework was developed in 2011, in consultation with stakeholders, and continues to be updated as needed.

The Marine Park Authority is just one voice in what is an increasingly crowded policy and management space, with strategies being developed at national, state and local levels. However, the defunded Climate Change Action Plan¹³⁷⁰ represented a significant withdrawal of the Marine Park Authority from a very visible role in planning for, and leading, work on addressing climate change relating to the Region. To some extent, this has shifted its role from being a 'consequence maker' advocating for effective climate mitigation to being a 'consequence taker' responding to climate change impacts with actions to improve Reef resilience as part of an adaptation strategy.

Documents based on the latest scientific research, such as the revised Reef 2050 Plan⁹ and *Great Barrier Reef Blueprint for Resilience* (Reef Blueprint)²⁴ make it clearer that restricting the global temperature increase to 1.5 degrees Celsius or lower is critical to the Reef remaining a functioning ecosystem. The Reef Blueprint, released in late 2017 (Box 12), may mark a resurgence of a more active role by managing agencies in this space, with a focus on building a 'resilience network' of areas within the Region that have the best chance of supporting system-wide resilience and recovery following disturbances. The proposed activities within the Region, such as dramatically

enhancing compliance, accelerating actions to address climate change, expanding crown-of-thorns starfish control, protecting key species and locations, and actively restoring local areas, are all desirable, 'no-regrets' actions. However, the success of the Reef Blueprint will depend on the extent to which they are able to achieve broader objectives of fostering change at a wider policy, societal and geographic level.

Blueprint for resilience

In May 2017, with the Reef facing unprecedented pressures, the Marine Park Authority convened regional, national and international Reef experts for the first ever Reef Summit. Working with the goal of improving the capacity of corals to resist and recover from climate-related impacts, the summit released the Reef Blueprint.²⁴

The Reef Blueprint signals a change in the focus of future management of the Reef. It identifies the 10 most promising initiatives to guide future actions and solutions that can be pursued with partners, developed quickly and applied to large areas (Figure 7.3).

The Reef Blueprint has already contributed to securing unprecedented levels of funding to develop and implement innovative and timely strategies.¹³⁷¹ It has also helped galvanise collaboration and resilience-building efforts across the Reef community. The on-water and immediate efforts underway include enhancing compliance, crown-of-thorns starfish control, and identifying and protecting a network of resilient coral reef sites.

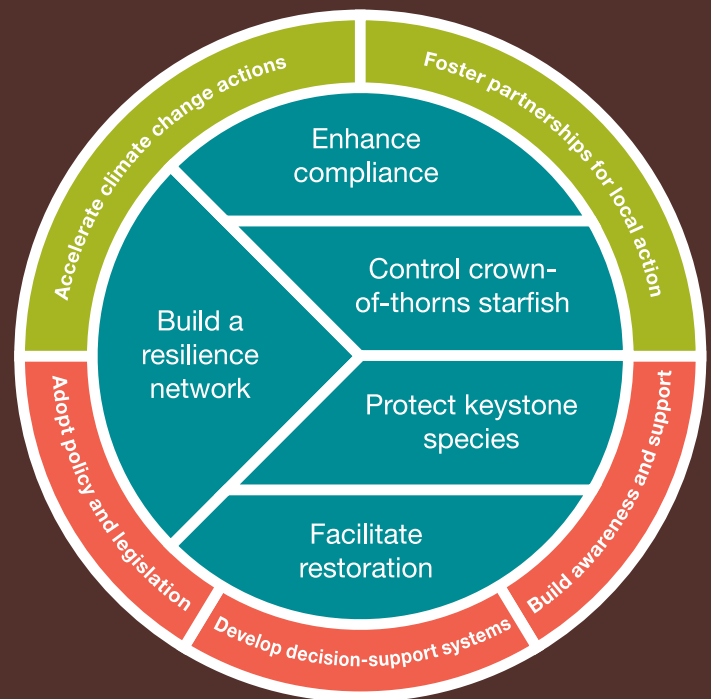


Figure 7.3 Great Barrier Reef Blueprint for Resilience initiatives
Source: GBRMPA 2017²⁴

7.3.10 Coastal development

Coastal development includes management of activities undertaken within the Catchment that affect the Region. Although part of this broad topic, the management of ports in, and adjacent to, the Region has been considered separately in Section 7.3.4. Similarly, the management of land-based run-off is considered in Section 7.3.11.

Planning systems to effectively address coastal development have evolved and improved over the past five years

The *Planning Act 2016* (Qld) (the Planning Act) and associated legislation, preserve ecological sustainability as a core principle of planning in Queensland. The planning reform that led to this new Planning Act reinstated coastal land surrender provisions under the *Coastal Protection and Management Act 1995* (Qld) to make sure areas at high risk of coastal erosion remain free from development.

The 2014 *Queensland State Planning Policy*¹³⁷² introduced a coordinated approach to all state interests. The state development assessment provisions were introduced in 2013 to guide Queensland's assessment of development applications that were likely to affect state interests. These documents were reviewed in 2017¹³⁷³ in association with the introduction of the Planning Act. In early 2018, the coastal protection state interest of the State Planning Policy was integrated into the planning schemes of 12 of the 22 coastal local governments in the Catchment.

As part of the planning reform since 2014, the Queensland Government introduced new erosion prone areas in coastal hazard maps. Planning scheme reviews have rezoned some privately owned land in the erosion prone area to 'limited development zone'. This means undeveloped rural and natural areas within the Catchment now have restricted development potential.

Development regulations (largely focused on urban areas) regarding coastal development, water quality and protection of wetlands have improved as local governments progressively update their planning schemes. The *Wetlands in the Great Barrier Reef Catchments Management Strategy 2016–21*¹³⁷⁴ outlines an integrated approach to catchment and coastal environment management. The strategy considers the multiple values of wetlands and the role they play in the ecosystem health of the Region. It provides a whole-of-system framework for Catchment management and the protection, maintenance and restoration of wetland systems. Implementing regional water quality improvement plans (such as the *Wet Tropics Water Quality Improvement Plan 2015–2020*) also improves ecosystem function.¹³⁷⁵ Earthworks above a specified scale in wetlands (including earthworks for agricultural activities) were regulated in 2014, and a reduction in the rate of loss of these wetlands in the Catchment has been observed.⁴³ Pressure from mining-associated coastal development appears to be less than in previous years following a downturn in the mining sector.



Reprofiling of Raine Island turtle nesting beach. © GBRMPA

While a 45 per cent increase in the rate of clearing of woody vegetation occurred in the Catchment between 2014–15 and 2015–16, the rate of clearing from 2016–17 (166,000 hectares) to 2017–18 (148,000 hectares) decreased.⁷⁰⁴ Legislation to reinstate stricter tree clearing was passed by the Queensland Government in 2018. While it is still too early to measure outcomes, this legislative planning tool is expected to reduce the future clearing rate, and the associated increase in adverse impacts on coastal ecosystems.

Legacy issues remain in coastal areas, such as retaining dams that hold significant volumes of toxic water that can leach into the Region. The financial collapse of the Yabulu nickel refinery in Townsville in 2016 highlighted a limitation of the Queensland Government's power to enforce environmentally relevant activity conditions on operators. This issue has recently been addressed by the *Environmental Protection (Chain of Responsibility) Amendment Act 2016* (Qld) that allows the state to enforce environmental and rehabilitation obligations against 'related persons' of companies in financial difficulty.

Stakeholder engagement on coastal ecosystem management continues to play an important role in protecting the Region's values. Coastal ecosystems management is a focus of coastal Reef Guardian councils and schools and is regularly discussed at Local Marine Advisory Committees and Reef Advisory Committees.

For coastal development, the management effectiveness grades for planning, inputs, processes and outputs have improved to a rating of mostly effective (Table 7.4 in Section 7.6). This is a positive sign that the major issues are starting to be addressed. However, the impact of these improvements on the attainment of desired outcomes for coastal development has yet to be demonstrated. The long-term future condition and trend for inshore and coastal ecosystems are very poor if strong cooperative management action is not taken to halt and reverse their decline. The impact of inappropriate coastal development has been highlighted in the Reef 2050 Plan⁹ and the 2017 Scientific Consensus Statement.^{43,462}

7.3.11 Land-based run-off

Land-based run-off has been recognised as having a significant impact on the values of the Region.^{2,462,941,1376} The Queensland Government regulates land-based run-off from industrial, municipal and agricultural sources in the Catchment under the *Environmental Protection Act 1994* (Qld), and the current government is committed to broadening Reef protection regulations to reduce nutrients and sediment pollution.

Planning approaches to address land-based run-off continue to improve. The Reef 2050 Plan includes actions to protect the values, health and resilience of the Region while allowing for ecologically sustainable use. The *Reef 2050 Water Quality Improvement Plan 2017–2022* (Reef 2050 WQIP, previously the Reef Plan)⁵²⁷ directly aligns with, and is nested within, the Reef 2050 Plan. Since 2014, an understanding of how poor water quality is perceived by, and affects, Reef users has improved. Restrictions on vegetation clearing in the Catchment were reintroduced after 2018 and restrictions on riparian clearing in the Catchment were expanded to the Fitzroy, Burnett–Mary and Cape York NRM regions. Healthy waters management plans are additional legislative tools under the *Environmental Protection (Water) Policy 2009* (Qld). These plans identify management goals and water quality objectives to protect specific environmental values of waterways.

An unavoidable lag occurs between actions on the ground and better Reef water quality

The Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Paddock to Reef program) and the associated Reef Report Card process have continually improved to provide a succinct snapshot of improvements and changes in land management practices and pollutant loads across the Catchment. Nutrients, fine sediments and pesticides are the primary pollutants that pose an ongoing risk to the Reef coastal and marine ecosystems. Significant progress has been made in understanding these pollutants, their delivery from the Catchment and the benefit of improved land management practices on water quality entering the Region.⁴⁶² The annual Reef report cards have confirmed the estimated average pollutant loads in land-based run-off have declined since 2014. However, progress from the adoption of improved land management practices continues to be slow. Significant time lags are expected between improved land management practices and condition of the Reef.

Measurable targets, improved accountability and coordinated monitoring, evaluation and reporting are clearly articulated in the Reef 2050 WQIP. The plan includes a diverse set of actions and builds on almost 15 years of effort by governments at all levels, working in partnership with landholders, natural resource managers, industry, researchers and conservation groups. It addresses agricultural land-based sources of water pollution, and added urban, industrial and public lands in 2018. The Reef 2050 WQIP also recognises the importance of people in creating change and includes social, cultural and economic values. The plan sets targets for improving water quality for 35 major river basins flowing to the Reef, for the six NRM regions and the whole Reef. This is an increased level of specificity compared to previous targets. The planning process used sophisticated modelling and other scientific information to make sure the targets are based on what is needed for a healthy Reef.

The Reef 2050 Plan Investment Framework¹⁰ identified the investment needed to reduce land-based run-off through improved land management practices, as well as the research and monitoring programs needed to assess effectiveness of the investments. This framework has resulted in significant increases in financial inputs over the past five years. Planning has expanded and continues to be effective.

The processes and outputs of the Reef 2050 WQIP continue to improve. However, the 2017 Scientific Consensus Statement highlighted that poor water quality is continuing to degrade Reef health.¹²²³ On-ground delivery programs are undertaking landscape restoration and habitat repair in areas that pose the greatest risk to the Reef. Change will remain slow while improvements to agricultural land management practices remains voluntary, and the significant time-lag between actions on the ground and better water quality results will be exacerbated. It should be noted that, in February 2019, a bill was introduced into Queensland Parliament to strengthen existing Reef protection regulations.



Coastal ecosystems can benefit from revegetation; these local students are from Mission Beach State School. © GBRMPA 2014

Managing to protect the Region's values

7.3.12 Biodiversity values

Protection of biodiversity values in the Region is one of the primary objectives for management. The focus on biodiversity was heightened following international attention on the World Heritage Area by UNESCO and the subsequent Strategic Assessments. The outcomes from these assessments strengthened research collaborations and increased understanding of threats to the system, and the state of biodiversity in the Region.

The cumulative and consequential impacts across the Region of back-to-back coral bleaching events in 2016–17, the 10 severe cyclones that have crossed the Region since 2006, and the impacts of crown-of-thorns starfish, have dramatically changed the situation in relation to management of biodiversity in the Region. Reef surveys have documented the extent of damage, recovery and mortality.⁴⁴⁰

However, the resulting flow-on effects of coral loss to the broader ecosystem and species are only just beginning to be quantified. Management agencies are now in a space of knowledge uncertainty as research and monitoring strive to keep pace with a rapidly changing system. Although progress has been slow, once implemented, the Reef 2050 Integrated Monitoring and Reporting Program (Section 10.3 Box 16) will consolidate monitoring information and make it more readily available to address this knowledge deficiency.^{1377,1378}

The rate at which the system is changing following disturbances makes biodiversity protection a challenge

At a Region-wide scale, the amalgamated Zoning Plan, which came into effect in 2004 and is reflected in the adjacent Queensland Great Barrier Reef Coast Marine Park, is the most significant planning tool to enhance biodiversity protection. To be effective, zoning provisions need to be enforced. Enforcement has significantly improved over recent years with improved compliance monitoring technology, the planned expansion of remote

vessel tracking across the commercial fishing fleet, and better targeting of compliance actions based on risk that gives priority to impacts on protected species. Zoning has provided a robust framework for Reef-wide management and is demonstrating positive results.^{613,998,1355,1356} However, the zoning provisions only address biodiversity protection at a broad level. Some threats, such as crown-of-thorns starfish outbreaks, are addressed at a local level by other measures (Box 13), but major threats to biodiversity, such as climate change, coastal development and land-based run-off, cannot be addressed directly by either the zoning provisions or individual biodiversity protection measures.

The *Great Barrier Reef Biodiversity Conservation Strategy* (Biodiversity Conservation Strategy)¹³⁷⁹, developed in 2013, has been superseded by the Reef 2050 Plan, which includes a specific theme on biodiversity including targets and outcomes to improve and reduce the pressures. In addition, the Reef Blueprint²⁴, recommends approaches for better reef management into the future. It emphasises adapting to climate change and promoting actions through a resilience network of areas, to supporting resilience and recovery following disturbances. Although the Reef Blueprint is still in its infancy, some stakeholders question the validity of its approach, especially given the widespread extent

BOX 13

Crown-of-thorns starfish control program

The goal of the Marine Park Authority’s crown-of-thorns starfish control program is to protect coral from starfish predation on high-value reefs in the Marine Park. This is achieved by culling starfish to bring their numbers down to ecologically sustainable levels for coral growth and recovery.

The management objectives of the control program progress through different stages (prevention, suppression, containment and protection) as the dynamics of the outbreak progress over time (Figure 7.4). In 2018, the secondary outbreaks that began in 2010 were well underway, and the control program continued to focus on the protection of coral at high-value sites in the Marine Park. Recent research has shown the crown-of-thorns starfish control program to be effective in reducing starfish numbers and improving hard coral cover at sites where culling is regularly carried out.^{758,1380}

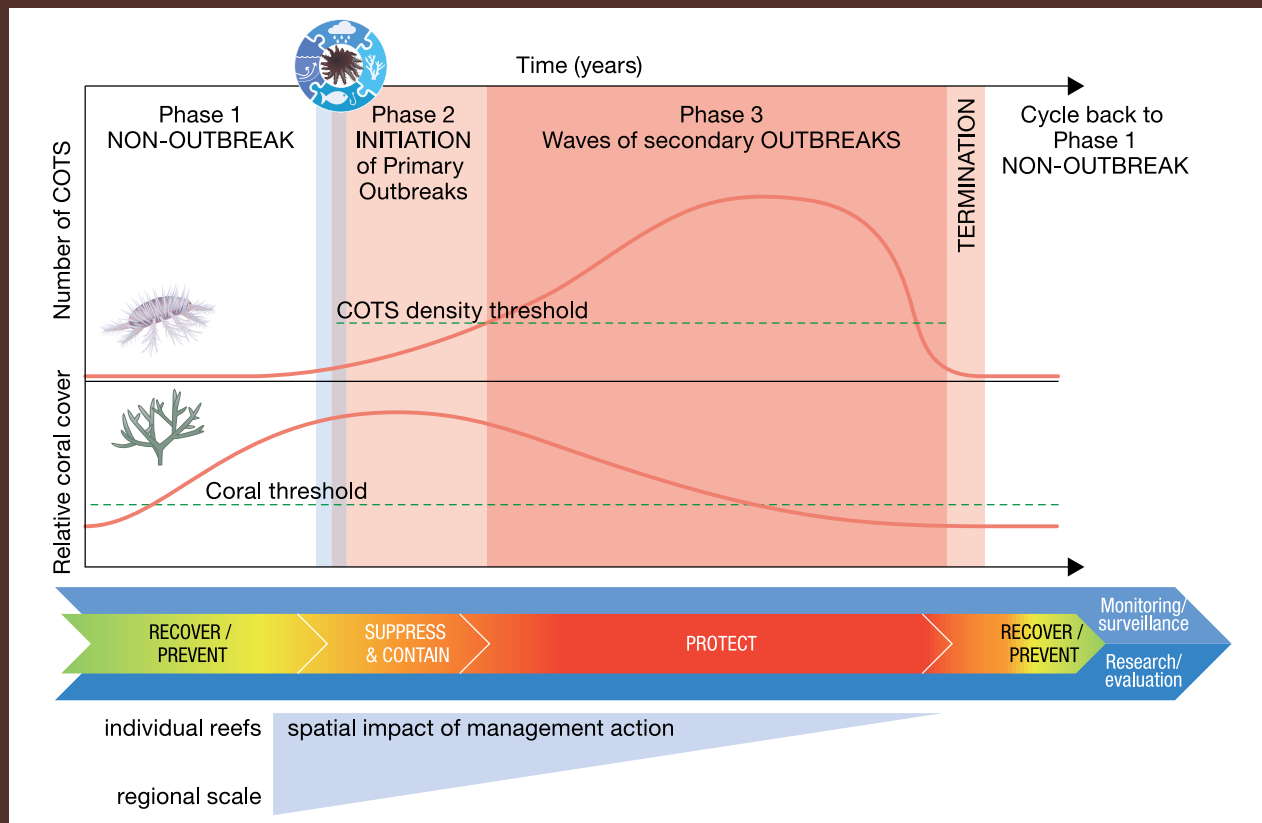


Figure 7.4 Crown-of-thorns starfish (COTS) outbreak cycle and the associated stages of management action
 Outbreak management actions for the current outbreak are in the phase 3 protect stage, with the outbreak likely to approach termination in the next few years. Source: GBRMPA (unpublished)¹³⁸¹

of coral bleaching across the Region, and the limited dispersal capacity of coral larvae. Others assert it would be a mistake not to pursue this approach and related initiatives, such as the Reef Restoration and Adaptation Program.

Various initiatives have considerably improved the availability and accessibility of relevant Traditional Owner knowledge to managers. Examples include the Indigenous ranger programs and strengthened communications between managers and Indigenous people through the Land and Sea Country Partnership Program.

Major risks and threats to biodiversity protection are well documented and risk assessment and management procedures are in place. Vulnerability assessments specify risks to biodiversity values and recommend mitigation measures. However, the rate at which the system is changing following disturbances makes biodiversity protection a challenge. Managers have little capacity to track the biodiversity outputs and outcomes resulting from management actions in this area.

Culling vessel operations are guided by science and scouting surveys undertaken by cull vessels and the Reef Joint Field Management Program. Outcomes are measured by comparing coral cover and starfish densities at high-value target reefs before culling begins, and then monitoring over time to ensure culling efforts do not cease until starfish densities fall below a threshold needed to support coral recovery.

John Brewer Reef, one of the high value sites prioritised for culling, located 70 kilometres offshore from Townsville, is an important reef for recreational fishing and diving. During the first survey in November 2018, the reef was experiencing a severe outbreak with an average of 3.5 starfish counted per survey (Figure 7.5). Intensive culling operations at this reef began following the initial survey, and over several months a team of trained divers culled more than 20,000 starfish to bring starfish numbers down to levels that minimise their impact on corals. In March 2019, another round of surveys revealed that culling had reduced the severity of the outbreak, with an average of 0.35 starfish counted per survey (Figure 7.5). Hard coral cover was maintained at an average of 31–42 per cent throughout intensive culling operations. This high-value reef will continue to be visited by the control program vessels to further reduce starfish numbers and protect coral.

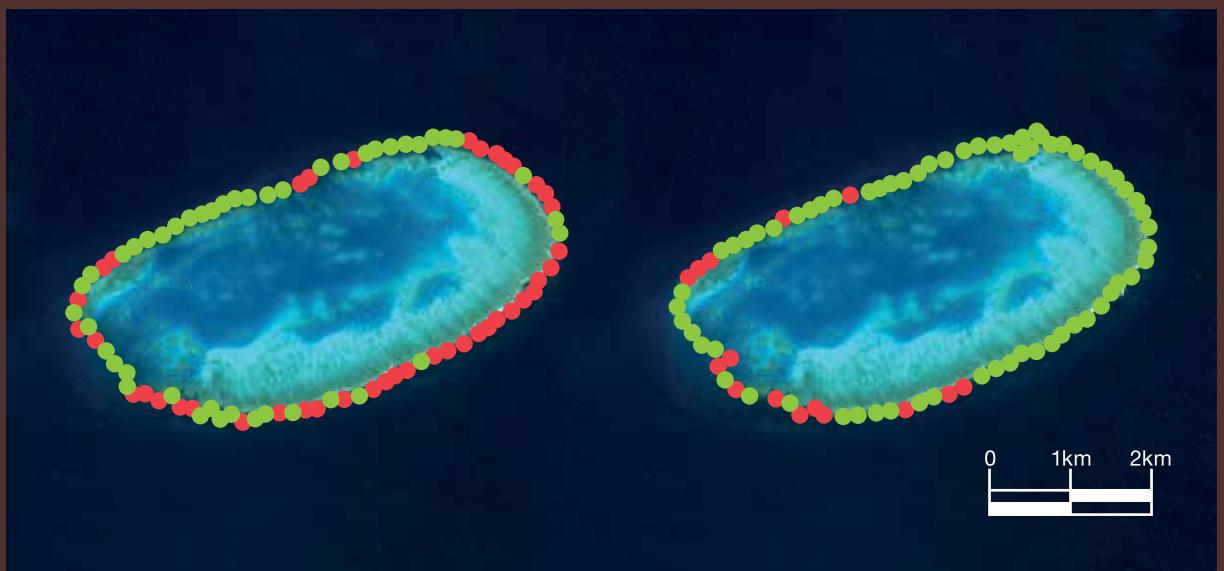


Figure 7.5 Survey data showing progress in COTS control at John Brewer Reef

Each dot represents a two-minute manta tow survey. Green dots indicate surveys where no crown-of-thorns starfish were counted, and red dots indicate they were observed. Left: Initial surveys undertaken November 2018 around the perimeter of John Brewer Reef indicate the reef was in severe outbreak mode, with an average of 3.5 crown-of-thorns starfish per survey. Right: Surveys, repeated in March 2019 during intensive culling, indicated that the reef had shifted from severe outbreak to established outbreak status, with an average of 0.35 crown-of-thorns starfish per survey. Source: GBRMPA Eye on the Reef (unpublished)⁷³⁵

7.3.13 Heritage values

In this assessment, the topic of heritage encompasses Indigenous, historic and other heritage values (aesthetic, social and scientific) as set out in Chapter 4. Commonwealth heritage values as well as the Region's world and national heritage value (not including natural heritage values) are also included in the assessment. The effectiveness of measures to protect and manage natural heritage values (an element of world heritage) is considered in the assessment of management to protect biodiversity value (Section 7.3.12) and further set out in Chapters 2 and 3.

Recognition of the Region's heritage value has improved over the last four years, especially in relation to Indigenous heritage values. The 2015 Great Barrier Reef Intergovernmental Agreement includes a commitment to 'ensure that Indigenous traditional cultural practices continue to be recognised in the conservation and management of the Great Barrier Reef'.⁹³⁸

The Reef 2050 Plan includes a dedicated heritage theme with associated targets, objectives and actions. This has stimulated further heritage planning and increased engagement of Traditional Owners in protection and management of the Reef. The 2019 *Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park*⁸⁰³ sets out outcomes, objectives and actions for gaining more information and protecting and managing the Region's Indigenous heritage value. There was extensive engagement with more than 20 Traditional Owner groups during its development phase, as well as a program of public consultation.

There is concern that some places of special cultural importance, as well as Indigenous structures, technology, tools and archaeology, have not been systematically identified, and some are deteriorating. Knowledge of Indigenous heritage is held by the Traditional Owners, who decide what knowledge should be shared. In some places, initiatives, such as the Traditional Use of Marine Resources Agreements and Indigenous Land and Sea Ranger programs are helping more Traditional Owners access their sea country and pass on knowledge from Elders to younger people. A good example of Traditional Owner-approved knowledge gathering, storage and application is demonstrated by the Woppaburra Guidelines. The guidelines, adopted in July 2017, map important Indigenous heritage values in the Keppel islands region, which informs permit assessments. Traditional Owners can also use the values mapping for other purposes.

Planning for Indigenous heritage in the Region is very complex, involving an array of broad and site-specific plans for marine environments and islands. Plans are improving in their recognition of the central role and rights of Indigenous people, but often actions are not specific and lack deadlines. As with other matters, separating heritage plans for state-owned islands and coastal areas from the adjacent reefs makes little sense to Traditional Owners or the public, especially within the World Heritage Area. Traditional Owners have proposed that more Sea Plans or Land and Sea Plans covering traditional sea country should be produced to specifically focus on Indigenous matters across tenures or ownership.¹³⁶⁹

Reef Joint Field Management Program annual business plans now recognise Indigenous engagement as a standalone high-level strategy with specific targets, performance indicators and activities that promote Indigenous partnerships in heritage management. The program focuses on the implementation and field delivery of agreements, and mentoring, training and empowering Land and Sea Rangers and Indigenous Compliance Officers. It is responsible for protecting both Indigenous and historic heritage values, including story places and other locations of ceremonial and spiritual significance, on island national parks and Commonwealth islands. Protection is typically achieved through education or by enforcing compliance with legislation. If active maintenance or restoration works are necessary, they are undertaken in partnership with Aboriginal and Torres Strait Islander people.

Involvement of Traditional Owners in field management has increased and is yielding benefits in terms of cross-cultural awareness, as well as being of benefit to conservation. However, there is still more work to do. In recent years, Traditional Owners have expressed concern that they are not yet fully recognised as partners in management and that some cultural sites are deteriorating.

Knowledge of the Region's historic heritage remains patchy. The five Commonwealth listed heritage places and six priority shipwrecks are thoroughly understood, but less is known of the remaining shipwrecks and aircraft wrecks in the Region. It is

Recognition of the heritage values of the Region has improved over the last four years

Traditional Owner groups have expressed concern that they are not yet fully recognised as partners in management and that some cultural sites are deteriorating



Dent Island lightstation is on the Commonwealth Heritage List; it includes a lighthouse (foreground), accommodation (background) and other structures. © GBRMPA 2018

not clear to what extent historical knowledge, such as of the history of conservation and science in the Region, has been documented. The Marine Park Authority has developed a heritage register that will capture all values for each of the Commonwealth Heritage-listed places within the Marine Park. The Australian National Shipwreck Database, established under the *Historic Shipwrecks Act 1976* (Cth), documents known historic shipwrecks, aircraft and maritime heritage sites in Australian waters. The Marine Park Authority's historic heritage guidelines consider three components of the Region: World War II features and sites; historic voyages and shipwrecks; and other places of historic significance.

Since 2015, legislative changes to the Marine Park regulations have increased the ability to protect underwater archaeological sites. Since that time, two Catalina aeroplane wrecks dating from World War II have been protected under a Maritime Cultural Heritage Protection Special Management Area. In 2018, the *Underwater Cultural Heritage Act 2018* (Cth) was passed to extend protections previously conferred to historic shipwrecks in Australian waters. The provisions will extend to historic aircraft wrecks and other forms of underwater cultural heritage in Commonwealth waters. The new Act will come into effect in mid-2019, replacing the *Historic Shipwrecks Act 1976* (Cth). This is intended to enable Australia to ratify the UNESCO Convention for the Protection of the Underwater Cultural Heritage.

7.3.14 Community benefits of the environment

In this assessment, the topic of community benefits of the environment encompasses cultural, social and economic benefits, such as employment, income, understanding, appreciation, enjoyment, personal connection, health benefits and access to Reef resources. Many of these attributes are values-based.

To understand community benefits, it is recognised that the Region is a multiple-use marine park and that people and their environment are interconnected, as reflected in the definition of the environment in the Act and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). Significant work has been undertaken over the past five years to understand the range of community benefits, and to incorporate community benefits into policy, assessment processes and decision-making guidelines. This reflects a high-level understanding by managers that the Reef provides substantial and diverse community benefits.

Community benefits are now included in many of the policy and decision-making guidelines because of the Reef 2050 Plan

Projects under the National Environmental Science Program are developing cost-effective indicators and metrics for human dimension outcomes, objectives and targets in the Reef 2050 Plan. Other projects are further investigating the aesthetic value of the Region.

Many of the issues associated with community benefits, such as population change, economic growth and climate change, are recognised as global issues and are difficult for a single planning system to encompass. The Social and Economic Long-Term Monitoring Program is helping managers understand the human dimensions of the Region and incorporate such considerations into their planning and management.⁷⁸⁵

Stakeholder engagement through the Reef Advisory Committees and Local Marine Advisory Committees informs management about community values and issues of concern. Volunteer programs, such as components of the Marine Monitoring Program and Eye on the Reef program, also provide avenues for community involvement in protecting the Region. The Reef Guardian program aims to engage the community in protection of the environment. The Reef Joint Field Management Program is also strongly committed to improving community understanding of values and threats to the Reef and islands, fostering responsible behaviour and providing visitor facilities. These actions help protect and maintain community benefits and connections.

7.4 Assessment of management approaches

The purpose of this section is to assess the three broad management approaches as described in Section 7.1.4; environmental regulation; engagement; and knowledge, integration and innovation. The findings are based on assessments of each of these approaches against all management topics (Section 7.3).

7.4.1 Environmental regulation

As previously reported, statutory management instruments within the Region remain contemporary and appropriate. While gaps exist in the regulation of climate change and agriculture, there is caution about the practicality of more regulation of these complex issues.¹³⁸² The Reef 2050 Plan considers relevant existing regulation, policies and strategies across all government agencies. Some Commonwealth legislation has been reviewed to keep pace with emerging issues.

Statutory instruments within the Region remain contemporary and appropriate

The relevant Queensland legislation is not necessarily consistent between the Australian and Queensland governments, often due to differences in objectives of those governments. Some of these inconsistencies are managed through the *Environment*

Protection and Biodiversity Conservation Act 1999 (Cth) bilateral agreement between the Australian and Queensland governments. The Marine Park Authority and Queensland Government issue joint permits, and have done so for more than 20 years. Policies and processes relating to assessment and issue of permits have been reviewed, and new service level standards have been set (for example, for standard tourism permits).

The Reef 2050 Plan strengthens a number of policies, in particular, Indigenous engagement in ecosystem management, enhancing ecosystem resilience, biodiversity assessment and the protection of species and habitats considered to be of conservation concern. It also encourages increased consideration of cumulative impacts and community benefits.

Zoning plans and dedicated fisheries management have been very effective for managing activities, such as fishing, resulting in higher biomass of targeted species in no-fishing zones compared with fished areas. The three plans of management complement the Zoning Plan and address issues in high-use and sensitive areas. The Whitsundays Plan of Management was updated in 2017. However, the Cairns Area Plan of Management has not been updated since 2008 and the Hinchinbrook Plan of Management has not been updated since 2004. The protection offered to the Marine Park through plans of management and zoning plans has not reduced impacts from global warming, as demonstrated by the two coral bleaching events in 2016 and 2017.

Compliance systems are very sophisticated and focus on issues of risk to the Region

Compliance systems are very sophisticated and focus on issues of risk to the Region, such as illegal fishing. The *Queensland Sustainable Fisheries Strategy 2017–2027* requires all commercial fishing vessels (including dories) to be fitted with vessel tracking units by 2020, with a priority for net, line and crab vessels fitted by 1 January 2019. Illegal recreational fishing remains a concern and the number of incidents continues to increase. This is probably a combination of both increased illegal fishing and more effective detection of incidents. Additional Commonwealth funding announced in 2018 for the Reef Joint Field Management Program will further strengthen compliance activities within the Region.

A number of Commonwealth and Queensland policies, strategies, position statements and guidelines were prepared or updated in the lead-up to the 2019 Outlook Report. However, some have not been actively updated or fully implemented (for example, the Recreation Management Strategy¹⁰⁰⁷ and the Biodiversity Conservation Strategy¹³⁷⁹). Of concern is the Marine Park Authority's Climate Change Adaptation Strategy and Action Plan 2012–2017¹³⁷⁰ which has not been re-funded or updated. Some of the policies and strategies would benefit from more outcome-oriented targets, with clear objectives, actions and milestones. To a limited extent, the Reef 2050 Plan has overtaken some of these strategies as an overarching plan for the Region and the 2018 review of the plan has increased focus on climate change.

7.4.2 Engagement

The 2015 Great Barrier Reef Intergovernmental Agreement between the Australian and Queensland governments⁹³⁸ articulates joint management arrangements for the Region. It has been in place for over 40 years and was updated in 2015 to incorporate the Reef 2050 Plan. Positive engagement and collaboration between government agencies, partners and stakeholders has been encouraged and mandated through the Reef 2050 Plan.

The Reef Joint Field Management Program works well for cooperative engagement between the two levels of government (Commonwealth and Queensland) and requires each government to develop priorities for activities and allocation of funding. Adequate resourcing to enable staff to undertake required management remains a major concern despite record funding to address issues, such as water quality, crown-of-thorns starfish outbreaks and in the Reef Joint Field Management Program. The *Reef 2050 Investment Framework*¹⁰, released in 2016, recognised a substantial funding gap of between \$143 million and \$408 million. Since then both governments have committed large amounts of new money to the Reef, exceeding the gap identified in the Investment Framework.

Governance arrangements for the Region have become much more complex

Engaging Traditional Owners as partners in the Region remains vital. This occurs through internal mechanisms in the Traditional Use of Marine Resources Agreement program, various Reef management initiatives and under the Reef 2050 Plan (for example, Traditional Owner advisory groups). The number of Traditional Owners gaining access to their sea country through the Reef Joint Field Management Program vessels has increased significantly since 2014. This has many benefits, including informal training of non-Indigenous staff in Indigenous culture, increasing management involvement of Traditional Owners and maintaining their connection to country.

Research collaboration between managing agencies and researchers is generally positive, although some researchers reported that engagement of Marine Park Authority staff in planning for research and monitoring had declined in recent times. The basis for this view was unclear, but may be due to the transition of senior staff from the Marine Park Authority or the perceived withdrawal of the Marine Park Authority from research and monitoring. It may also be a product of the Commonwealth Department of the Environment and Energy becoming more prominent through research funding programs (for example, the National Environmental Science Program) and policy matters in the Region.

Although the issues are outside its areas of responsibility, the Marine Park Authority was also perceived by stakeholders to have a diminished voice regarding land-based run-off and coastal development. Governance arrangements for the World Heritage Area have become more complex and 11 high-risk areas of governance were identified as requiring transformational change to address declining outcomes in the Region.¹³⁸³ Disengagement by the Marine Park Authority and other management agencies around factors that influence, but fall outside the formal mandates for management of, the Region is likely to heighten risks to the Reef.

One of the strongest aspects of management involves partnership and stewardship arrangements, such as Reef Guardians, Reef 2050 WQIP and the Eye on the Reef program. The Reef 2050 WQIP, for instance, depends on forming partnerships with NRM bodies, industry bodies and local governments and, through them, with land managers. The partnerships and stewardship programs are underpinned by long-standing consultation arrangements with key sectors and regions via the Marine Park Authority's Reef Advisory Committees and Local Marine Advisory Committees. In addition, face-to-face engagement through community access points (such as local businesses and fishing stores) and management presence at shows, events and meetings strengthens engagement, education and partnerships. Advisory bodies have also been established under the Reef 2050 Plan to provide independent expert advice and stakeholder views in relation to the plan's implementation.

7.4.3 Knowledge, innovation and integration

Research and monitoring Strong partnerships with managing agencies and research providers (CSIRO, Australian Institute of Marine Science and universities) have become more targeted as key knowledge gaps have been identified through the Outlook Report process, strategic assessments and Scientific Consensus Statements. Managing agencies and researchers have initiated programs and projects to fill these knowledge gaps, including Reef 2050 WQIP, Reef Blueprint for Resilience²⁴, aerial surveys of coral bleaching in 2016 and 2017, and the Marine Park Authority's Science Strategy and Information Needs⁶. However, the coral bleaching events in 2016 and 2017 have meant that knowledge of current condition and trends for many species and ecosystems has declined and it will take time to update this knowledge.

Despite extensive research and monitoring in the Region, up-to-date knowledge of ecosystem and socio-economic condition is struggling to keep pace with disturbances

The Australian Institute of Marine Science's long-term monitoring program represents the longest continuous record of change in Reef communities in the Region and has provided data critical to understanding the condition and trend of the Reef. The Social and Economic Long-Term Monitoring Program recognises the inter-dependencies of people within the Region and contributes to long-term planning and evaluation of management decisions. These programs demonstrate the value of maintaining consistent monitoring over a large area for an extended period of time.

The development of the Reef 2050 Integrated Monitoring and Reporting Program (RIMReP) may help to address some of the deficiencies in past monitoring efforts, especially in relation to cumulative impacts.

Reporting and evaluation The five-yearly Outlook Report provides the most comprehensive and regular basis for evaluation and reporting on the condition and management of the Region. The Reef 2050 Plan provides an overarching strategy for the management of the Region, including clear monitoring and reporting requirements. The development of the RIMReP is a positive initiative that will help to address some of the deficiencies in past monitoring efforts. This applies especially to monitoring cumulative impacts and overall ecosystem health to inform assessment of the Reef 2050 Plan. However, RIMReP has been very slow to develop with only very modest progress made over the past two years.

The Paddock to Reef program and its associated annual Reef report cards have been continually improved to provide a succinct snapshot of improvements and changes in land management practices, Catchment indicators (ground cover, riparian extent and wetland extent and condition), Catchment water quality (sediment, nutrients and pesticides) and the health of the inshore ecosystems. Apart from RIMReP, the reporting and evaluation frameworks for the management of the Region are generally on track.

7.5 Assessment summary

– Existing protection and management








Paragraph 54(3)(f) of the *Great Barrier Reef Marine Park Act 1975* requires ‘... an assessment of the existing measures to protect and manage the ecosystem ...’ within the Great Barrier Reef Region.

Paragraph 116A(2)(d) of the *Great Barrier Reef Marine Park Regulations 1983* requires ‘... an assessment of the existing measures to protect and manage the heritage values ...’ of the Great Barrier Reef Region.








The assessment was undertaken by five independent, expert assessors based on the six elements of the management cycle:

- understanding of context
- planning
- financial, staffing and information inputs
- management systems and processes
- delivery of outputs
- achievement of outcomes.








7.5.1 Understanding of context

Grading statements – understanding of context				Trend since last report
				↑ Improved ↔ Stable ↓ Deteriorated — No consistent trend
Very good Understanding of values, threats, regional/global influences and stakeholders is good for most management topics.	Good Understanding is generally good but there is some variability across management topics or components.	Poor Understanding of values, threats, regional and global influences and relevant stakeholders is only fair for most management topics.	Very poor Understanding of values, threats, regional and global influences and relevant stakeholders is poor for most management topics.	
Grade and trend			Criterion summary	
2009	2014	2019	Understanding of context	
			Context is assessed as the strongest management effectiveness element in 2019. Across most management topics this element was mostly stable or improving. However, context has declined for biodiversity and traditional use of marine resources. Understanding of values, direct and indirect threats and stakeholders is generally strong. Some aspects of biodiversity, ecosystem health and environmental conditions are less understood as a consequence of the bleaching events and other cumulative pressures, such as cyclones and crown-of-thorns starfish predation. Tourism, defence activities, ports, recreation, research activities, shipping and land-based run-off are well understood. This reflects a solid information and research base and a very mature understanding of the key values in the Region.	








7.5.2 Planning

Grading statements – planning				Trend since last report
				↑ Improved ↔ Stable ↓ Deteriorated — No consistent trend
Very good Effective planning systems that engage stakeholders are in place for all or most significant issues. There is adequate policy to manage issues that are consistent across jurisdictions.	Good Effective planning systems that engage stakeholders are in place for many significant issues. Policy and consistency across jurisdictions is generally satisfactory.	Poor Planning systems that engage stakeholders are deficient for a number of significant issues. Policy and consistency across jurisdictions is a problem for some issues.	Very poor Planning systems that engage stakeholders are deficient for many significant issues. Policy and consistency across jurisdictions is a problem for some issues.	
Grade and trend			Criterion summary	
2009	2014	2019	Planning	
			Significant efforts have been made in planning for a number of topics, such as ports, fishing, research activities, shipping and coastal development. However, planning effectiveness has continued to decline for climate change measures specific to the Region, principally as a result of defunding, changing policy and a lack of clarity about future directions. Planning has also declined for recreation largely because plans have not been reviewed since 2014. The lack of systems to ensure adequate monitoring is the weakest aspect of planning overall.	








7.5.3 Financial, staffing and information inputs

Grading statements – financial, staffing and information inputs				Trend since last report
				↑ Improved ↔ Stable ↓ Deteriorated — No consistent trend
Very good Financial and staffing resources are largely adequate to meet management needs. Biophysical, socio-economic and Traditional Owner knowledge is available to inform management decision-making.	Good Financial and staffing resources are mostly adequate to meet management needs. Biophysical, socio-economic and Traditional Owner knowledge is mostly available to inform management decision-making although there may be deficiencies in some areas.	Poor Financial and staffing resources are unable to meet management needs in some important thematic areas. Biophysical, socio-economic and Traditional Owner knowledge is variably available to inform management decision-making and there are significant deficiencies in some areas.	Very poor Financial and staffing resources are unable to meet management needs in many thematic areas. Biophysical, socio-economic and Traditional Owner knowledge to support decision-making is frequently deficient in some areas.	
Grade and trend			Criterion summary	
2009	2014	2019	Financial, staffing and information inputs	
			Adequacy of inputs is variable across management topics, being least effective for climate change. Most topics did not adequately understand and apply Indigenous heritage and historic heritage information inputs. Resourcing has significantly increased for many areas of Reef management, through the Reef 2050 Plan and associated investment strategy. The Reef Joint Field Management Program and the Marine Park Authority have received significant stabilisation funding. The Queensland Government has also provided significant funding through the Office of the Great Barrier Reef. Staff inputs have been variable since 2014 across both governments, with injections in some places (biodiversity and community benefits) and reductions in others (climate change and coastal ecosystems).	








7.5.4 Management systems and processes

Grading statements – management systems and processes				Trend since last report
				↑ Improved ↔ Stable ↓ Deteriorated — No consistent trend
Very good The majority of management processes are appropriate and effective in addressing the management of the various management topics.	Good The majority of management processes are appropriate and effective in addressing management although there are deficiencies in relation to a small number of management topics or processes.	Poor A minority of critical management processes show significant deficiencies across most management topics.	Very poor A majority of management processes show significant deficiencies across most management topics.	
Grade and trend			Criterion summary	
2009	2014	2019	Management systems and processes	
			Management processes are particularly strong for defence activities, shipping, research activities and management of land-based run-off. They are weakest for climate change. Stakeholder and community engagement and application of biophysical information are the strongest aspects of management across all topics. Governance is generally strong, except for climate change. The application of socio-economic and heritage knowledge, and setting of targets to benchmark performance are problematic for many topics, but processes are generally stable to improving.	

7.5.5 Delivery of outputs

Grading statements — delivery of outputs				Trend since last report
				↑ Improved ↔ Stable ↓ Deteriorated — No consistent trend
Very good Management programs are mostly progressing in accordance with planned programs and are achieving their desired objectives. Managing agency and community knowledge base is improving.	Good Management programs are mostly progressing in accordance with planned programs and are achieving their desired objectives but there are problems in some management topics. Managing agency and community knowledge base is generally improving.	Poor Many management programs are not progressing in accordance with planned programs (significant delays or incomplete actions) or actions undertaken are not achieving objectives. The knowledge base is only growing slowly.	Very poor Most management programs are not progressing in accordance with planned programs (significant delays or incomplete actions) or actions undertaken are not achieving objectives. The knowledge base is only growing slowly.	
Grade and trend			Criterion summary	
2009	2014	2019	Delivery of outputs	
			Delivery of desired outputs was rated as effective or mostly effective for all topics except climate change and recreation. It is strongest for commercial marine tourism, defence activities, research activities and traditional use of marine resources. The knowledge base of managing agencies and the community has consistently improved. While the majority of management programs are progressing satisfactorily, timeframes frequently slip and it is not yet clear that the programs are achieving all their desired objectives.	

7.5.6 Achievement of outcomes

Grading statements — achievement of outcomes				Trend since last report
				↑ Improved ↔ Stable ↓ Deteriorated — No consistent trend
Very good Desired outcomes are mostly being achieved, values protected and threats abated for most thematic areas. Use of the Great Barrier Reef is largely environmentally and economically sustainable with good community engagement, understanding and enjoyment.	Good Desired outcomes are being achieved in many management topics, values protected and threats abated for many management topics. Use of the Great Barrier Reef is largely environmentally and economically sustainable with good community engagement, understanding and enjoyment.	Poor Desired outcomes, protection of values and abatement of threats are not being achieved at desirable levels in some critical management topics with likely eventual flow-on effects across the Great Barrier Reef. Critical aspects of the use of the Great Barrier Reef are not environmentally or economically sustainable.	Very poor Desired outcomes, protection of values and abatement of threats are not being achieved at desirable levels in most management topics, including critical areas with likely eventual flow-on effects across the Great Barrier Reef. Critical aspects of the use of the Great Barrier Reef are not environmentally or economically sustainable.	
Grade and trend			Criterion summary	
2009	2014	2019	Achievement of outcomes	
			Achievement of desired outcomes is highly variable across the management topics. Objectives are being achieved in relation to community understanding of issues and development of effective partnerships. Overall, performance is strong, particularly for research activities, shipping, ports, commercial marine tourism and defence activities. Performance is weakest for climate change and the management of climate change is ineffective. Biodiversity outcomes have declined markedly, principally as a result of cumulative impacts and bleaching events in 2016 and 2017.	

7.6 Overall summary of existing protection and management

Effective management of the Region remains a complex task given local, regional and global threats. The effectiveness of existing measures to protect and manage the Region's ecosystem (natural heritage value) and its heritage value (Indigenous, historic and others) was independently assessed for 14 broad management topics. The activities of all relevant Australian and Queensland government agencies that perform Reef management and other contributing partners were evaluated for six elements of the management cycle: context, planning, inputs, processes, outputs and outcomes.

Improvements within management topics are most notable for ports, heritage values and fishing

The assessment concluded that the Region continues to be managed effectively in most areas of activity (Table 7.4). Since the independent assessment for the 2014 Outlook Report, considerable improvements have been made in parts of the management cycle for a number of management topics.

For example, the elements of context, planning and outputs have improved for coastal development through the introduction of the *Planning Act 2016* (Qld) and associated legislation, which established ecological sustainability as a core principle and reinstated coastal land surrender provisions.

Many of the improvements in management effectiveness are a result of the Reef 2050 Plan, which has improved jurisdictional consistency and coordinated a range of actions, targets and objectives to address the key threats to the Region. A number of assessment processes, policies and guidelines have incorporated understanding and consideration of cumulative impacts, such as on community benefits.

The Reef 2050 Plan has improved jurisdictional consistency, coordination and resourcing across many management topics

Planning systems for ports and fishing have received the most profound reforms under the Reef 2050 Plan. While only in the early stages of implementation, effective outcomes are already being seen for ports. For example, the management effectiveness elements of outputs and outcomes have improved for ports following improvements in planning, and

in understanding the values, threats and opportunities available. Implementation and resourcing of the Sustainable Fisheries Strategy are expected to improve the management effectiveness of fishing over the next five years. This may have flow-on benefits to biodiversity and heritage values.

Stakeholder engagement remains a strong theme across most management topics. Significant work has also been undertaken to better recognise and embed less tangible values (such as community benefits and heritage) into management systems.

Management effectiveness remains strongest for topics of limited scale or complexity. For example, defence activities, research activities and shipping are managed effectively and improving across most indicators.





Achieving outcomes on the ground continues to be difficult for complex and spatially broad topics, such as climate change, land-based run-off and biodiversity

Management effectiveness challenges remain evident for broadscale, complex topics, such as biodiversity, climate change, fishing and coastal development, and achieving outcomes on the ground continues to be difficult. For example, while some targeted actions have locally reduced sediment and nutrient loads entering the Reef lagoon, Reef 2050 WQIP targets are unlikely to be achieved within the stated timeframes. With improved land management practices relying on voluntary uptake (and affecting a relatively small area of the Catchment), change is slow. Further, there are significant time lags between actions on the ground and observable improvements in water quality.

The extensive coral bleaching episodes in 2016 and 2017 highlight the vulnerability of the system, and the need to actively address climate change. These bleaching events have dramatically changed the situation in relation to management of biodiversity in the Region.

Table 7.4 Overall assessment of the effectiveness of existing measures to protect and manage the Region's values
 The assessment of management effectiveness for the topic of climate change only relates to management measures undertaken specifically to protect and manage the Reef. The degree of complexity shown in the first column is based on the analysis provided in Table 7.2.

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

Grading statements				Trend since last report
				↑ Improved, grade changed
Very good The grading statements for each of the assessment criteria are provided in Section 7.5.1 to 7.5.6.	Good The grading statements for each of the assessment criteria are provided in Section 7.5.1 to 7.5.6.	Poor The grading statements for each of the assessment criteria are provided in Section 7.5.1 to 7.5.6.	Very poor The grading statements for each of the assessment criteria are provided in Section 7.5.1 to 7.5.6.	↗ Improved within same grade
				↔ Stable
				↘ Deteriorated within same grade
				↓ Deteriorated, grade changed