

Queensland  
**REEF WATER  
QUALITY**



**Queensland Reef Water Quality Program**  
Five-year investment plan  
2017–18 to 2021–22



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## Introduction

Protecting the Great Barrier Reef is one of the Queensland Government's six priorities under *Our Future State: Advancing Queensland's Priorities*. The government's achievements are measured by progress towards the Reef water quality targets and greenhouse gas reduction targets.

The Queensland Reef Water Quality Program is the Queensland Government's key response to addressing water quality impacts affecting the Great Barrier Reef.

The Queensland Reef Water Quality Program delivers activities as part of implementing the Reef 2050 Water Quality Improvement Plan 2017–2022 (Reef 2050 WQIP) which supports the water quality theme of the Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan).

The Reef 2050 WQIP addresses all land-based sources of water pollution including run-off from urban, industrial and public lands; while recognising the main source of Reef pollutants (nutrients, fine sediments and pesticides) from Great Barrier Reef catchments is diffuse source pollution from agriculture.

The Reef 2050 WQIP is based on the best available independent scientific advice, as provided by the *2017 Scientific Consensus Statement: Land use impacts on Great Barrier Reef water quality and ecosystem condition*. It also aligns with the recommendations of the Great Barrier Reef Water Science Taskforce (the Taskforce), incorporating social, cultural and economic values as drivers of actions to improve water quality.

The key objectives of the Queensland Reef Water Quality Program are to:

- improve progress towards the water quality targets under the Reef 2050 WQIP
- ensure that Queensland Government Reef water quality investment is coordinated, effective and aligned to water quality outcomes
- capitalise on activities that are proving successful across the Reef catchments
- support landholder management practices to reduce nitrogen, pesticide and sediment run-off to the Reef whilst ensuring productivity, profitability and sustainability of farm enterprises
- ensure the best and most cost-effective approaches are used for the maximum Reef water quality benefit through trialling, research and ongoing monitoring and evaluation.

The Queensland Reef Water Quality Program Investment Plan 2017–2018 to 2021–2022 (five-year investment plan) Part A describes the key areas of investment as they align to the actions under the Reef 2050 WQIP. Part B of the five-year investment plan is a table that sets out the activities and corresponding investment amounts across the Queensland Reef Water Quality Program.

# Funding

Activities within the Queensland Reef Water Quality Program from 2017–2018 to 2021–2022 are primarily funded from three sources. Total investment for the five-year period is \$261.4 million.

These three sources of funding are:

- a) An annual investment totalling \$175 million over five years (referred to in Part B Investment Table as **Annual** funding). This funding is likely to be increased through co-contributions.
- b) An additional \$13.84 million over four years (2018–2019 to 2021–2022) to support graziers and cane and banana growers in Reef catchments to transition to compliance with improved practice standards. This funding includes support for farmers to access professional advice to assist their transition to practices that are known to limit the amount of nutrients and sediments in farm run-off as well as sustain farm productivity and profitability. This is referred to in Part B Investment Table as **Transitional** funding.
- c) An additional \$100 million over five years (2015–2016 to 2019–2020) with \$90 million for Great Barrier Reef water quality improvement and \$10 million for the creation of net free fishing zones. This is referred to in Part B Investment Table as **Additional** funding. Of the additional \$100 million, \$72.6 million is allocated for 2017–2018 – 2019–2020. This investment will fast track progress towards the Reef water quality targets, taking direction from the recommendations of the Taskforce.

The 2019–2020 financial year is the fifth and final year of the additional \$100 million funding. The government has allocated this funding towards implementing Taskforce recommendations in partnership with a range of stakeholders and organisations across all Reef catchments.

Partners across industry, not-for-profit organisations, research organisations, Australian and local governments, landholders and private organisations also co-invest and provide in-kind contributions to the Queensland Reef Water Quality Program.

## Investment prioritisation

The Queensland Government convened the Taskforce to provide advice on the best possible approach to achieving the water quality targets. The Taskforce evaluated current and past water quality programs and produced a report in 2016 recommending a mix of policy, regulation and investment to accelerate progress towards the Reef water quality targets.

The Taskforce's recommendations were accepted in-principle by the Queensland Government and are incorporated into the Reef 2050 WQIP.

Regional investment is also prioritised using the catchment management priorities and targets identified in the Reef 2050 WQIP as well as modelling scenarios, local and regionally developed plans (such as regional water quality improvement plans) and other decision support tools.

The Queensland Government also works with the Australian Government and other partners to ensure Reef water quality investments are well planned and targeted, and that funding is leveraged where possible to broaden the investment base. Examples of co-investment include the Great Barrier Reef Gully and Streambank Joint Program and the innovative enhanced efficiency fertiliser trials.

The outcomes of targeted research programs also influence investment decisions, ensuring that the Queensland Reef Water Quality Program adapts and responds to new information.

# Program governance

The Australian and Queensland governments work together to coordinate the implementation of the Reef 2050 Plan and the Reef 2050 WQIP.

The Great Barrier Reef Ministerial Forum (MinFo) of Australian and Queensland government ministers oversees Reef decision-making, supported by senior government officials through the Standing Committee of Officials (SCO). MinFo takes advice from government agencies, science experts and stakeholder advisory committees. The Reef 2050 Executive Steering Committee (ESC) jointly coordinates actions under the Reef 2050 Plan and the nested Reef 2050 WQIP. It includes executive representatives from the Australian Department of Agriculture, Water and Environment, the Great Barrier Reef Marine Park Authority and the Office of the Great Barrier Reef within the Department of Environment and Science.

The Office of the Great Barrier Reef within the Department of Environment and Science provides oversight and coordination of the Queensland Reef Water Quality Program on behalf of the Minister for Environment and the Great Barrier Reef.

Activities within the program are implemented by the Queensland departments of:

- Environment and Science (DES)
- Natural Resources, Mines and Energy (DNRME)
- Agriculture and Fisheries (DAF)

Some activities are delivered by external providers and are managed by the relevant department.

The Office of the Great Barrier Reef works closely with other relevant Queensland Government departments, the Australian Government, local government, community organisations, research organisations, peak bodies, industry and private organisations through various partnerships, advisory panels, expert panels and committees that contribute to implementing Reef-related initiatives.

The Queensland Reef Water Quality Program is coordinated through:

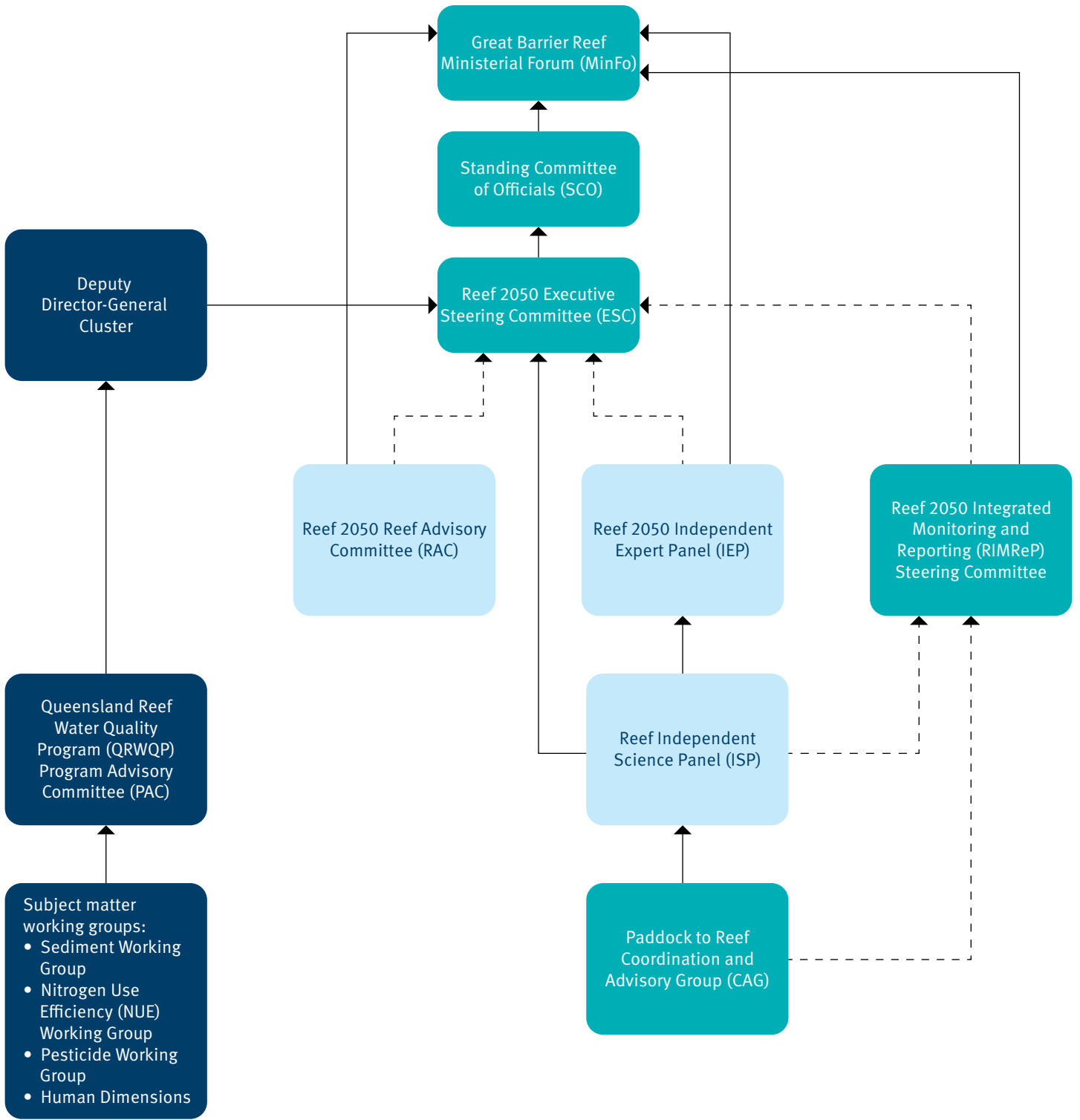
## Queensland Reef Water Quality Program Advisory Committee (PAC)

The Queensland Reef Water Quality Program Advisory Committee, consisting of representatives from DNRME, DAF and DES, provides strategic advice regarding the Queensland Reef Water Quality Program and project planning.

## Annual investment plans and reports

Annual investment plans are produced for the Queensland Reef Water Quality Program to set out the intended investment in the upcoming year. Annual investment reports present the investment made in the preceding year. These annual reports and plans support the accountability of the Queensland Reef Water Quality Program. The 2019–2020 Annual Investment Plan is incorporated in Part B of this five year investment plan (refer to columns presenting totals for 2019–2020).

Figure 1: Queensland Reef Water Quality Governance Structure



**Key**

- Joint government
- Queensland Government
- Independent
- Reports to
- Advises

# Responding to the challenge:

## On-ground actions to accelerate progress towards targets

### Minimum practice standards

The Queensland Government is seeking to achieve widespread adoption of minimum practice standards through industry-led agricultural best management practice programs (BMPs) and regulatory approaches.

### Support for voluntary industry-led best management practice programs

The Queensland Government supports the continual improvement of the BMPs that encourage voluntary uptake of improved land management practices.

The BMP programs are a holistic farm management approach that combines profitability, productivity and environmental sustainability. Producers participate by benchmarking their operations and then become accredited to the industry standard for management practices.

BMP module content, standards, BMP accreditation and data reporting systems are continually improved as part of the BMP program.

### Reef regulations

In September 2019, the Reef protection regulations were strengthened to address land-based sources of water pollution flowing to the Great Barrier Reef. This includes agricultural and industrial sources of nutrient and sediment pollution from all six Reef regions—Cape York, Wet Tropics, Burdekin, Mackay Whitsunday, Fitzroy and Burnett Mary.

The requirements under the new Reef protection regulations are:

- Record keeping—all graziers, sugarcane and banana producers in the Wet Tropics, Burdekin, Mackay Whitsunday, Fitzroy and Burnett Mary regions must keep records from 1 December 2019 and all grains and horticulture producers must keep records from 1 December 2022. From 1 December 2019, agricultural advisers must also keep records. Records need to be kept to demonstrate activities are being undertaken on the property in accordance with the minimum agricultural practice standards.
- Minimum practice agricultural standards—all producers in the Wet Tropics, Burdekin, Mackay Whitsunday, Fitzroy and Burnett Mary regions must comply with industry specific minimum practice agricultural standards (grazing, sugarcane, bananas) as these are applied to each region over the next three years.

- Farm nitrogen and phosphorus budget (sugarcane only)—all sugarcane producers in the Wet Tropics, Burdekin and Mackay Whitsunday regions must implement a farm nitrogen and phosphorus budget from 1 December 2021 and then in the Fitzroy and Burnett Mary regions from 1 December 2022.
- New or expanded cropping and horticulture activities—all new or expanded cropping and horticulture activities in any Reef region on five hectares or more that do not meet the cropping history test will require an environmental authority (permit), subject to farm design standards, from 1 June 2020.
- New, expanded or intensified industrial development—all regulated industrial land use activities in any Reef region must meet new discharge standards to ensure there is no increase in nutrient or sediment pollutant loads from 1 December 2020.

The new regulations commenced on 1 December 2019 and will be rolled out over the next three years with regions regulated at different stages based on improved water quality management priorities.

### Targeted compliance program

The Queensland regulation and compliance program delivers a targeted program of enforcement of the Reef protection regulations under the *Environmental Protection Act 1994*.

### Transitional program and compliance

The Queensland Government is providing increased funding of \$13.8 million over three years from 2018–2019 to support the cane, grazing and banana industries in Reef catchments to transition to compliance with the regulated minimum practice standards. This includes a transitional package to assist producers to meet new standards as quickly as possible by supporting their access to professional and agronomic advice. The package complements existing investment by Australian and Queensland governments, including education and extension, behaviour change and improved practices investments.

# Culture of innovation and stewardship

Industries and communities will be supported to build a culture of innovation and stewardship. Land managers will be engaged in implementing innovations and best practices to maintain viable communities and further reduce water quality risk.

The understanding and recognition by landholders of the productivity and profitability benefits of improved land management practices is critical to improving the uptake of better practices that will also deliver improved water quality outcomes. The Queensland Reef Water Quality Program seeks to improve the communication around this link and the need to change as well as providing support to landholders in understanding and using this information.

For the first time under the Reef 2050 WQIP, there is a focus on human dimensions, taking into account social, cultural, institutional and economic factors: from the aspirations and capacities of landholders, industries and communities, to their stewardship practices, and broader governance of the Reef. As such, the knowledge and understanding of human dimensions will inform both the continued investment in innovation and stewardship and the related research, development and innovation.

## Extension and education

Significant investment is being made to:

- boost extension resources, providing greater access for farmers to extension services that enable greater practice change
- build long-term capacity in the landholder advisory services
- undertake behaviour change and education programs.

Activities that address both the business and environmental needs of landholders can increase participation and achieve better outcomes than environmental programs alone.

Ensuring that extension and education efforts are coordinated, targeted, effective and efficient ensures that producers are engaged and informed to enable practice change. There are a number of programs that deliver this outcome including the placement of extension coordination officers in key partner organisations and ongoing support of BMP programs.

Extension and education activities support the implementation and uptake of BMP by delivering training and guidance to build land manager capability. Support also includes integrating the latest science into BMP and extension programs and focusing on innovative approaches to help move industry beyond the current BMP standards. For example, the Queensland Government leads or supports trials and demonstrations of precision agriculture and variable rate technologies, longer rotations, alternative crops and better fallow management. Resultant data is incorporated into the Paddock to Reef Program to report on improvements in management practice.

Other activities include wetlands demonstration sites with on-ground case studies, wetlands extension with clients, management of local wetlands committees, and development and delivery of wetlands information and tools for landholders.



## Major Integrated Projects

The Queensland Government has committed up to \$33 million over four years to implement two Major Integrated Projects (MIPs) in the Wet Tropics and Burdekin regions. The MIPs will pilot a range of activities with producers and the communities in each region to reduce nutrient, pesticide and sediment loads into local waterways and ultimately the Great Barrier Reef. Activities include: improved communication, collaboration and extension; trialling of innovative practices; use of incentives and restoration works such as gully, streambank and ecosystem repair. Local monitoring and evaluation will be undertaken in project areas to test the effectiveness of activities with a view to transferring successful approaches to other areas.

## Innovation

The Queensland Government has committed up to \$9 million over four years for a Great Barrier Reef Innovation Fund, providing the dedicated resources needed to develop, trial and implement innovative approaches to improve Reef water quality.

The Queensland Government will continue to collaborate with a range of stakeholders to identify new solutions to leverage further investment for the Reef from private and philanthropic sources.

Types of projects underway include:

- **Enhanced efficiency fertilisers (EEF) trials** (with the Australian Government Reef Trust): Broad trialling of enhanced efficiency fertilisers to evaluate the technology's potential to reduce the loss of nitrogen from farms to the Reef. The project results will also inform the development of an EEF decision support tool for cane farmers.
- **Innovative gully remediation** (with Greening Australia): Trialling different techniques for gully remediation to deliver more cost-effective solutions that can be applied across Great Barrier Reef regions.
- **Affordable water quality monitoring sensors** (through the Advance Queensland Small Business Innovation Research (SBIR) program): Developing more cost-effective solutions to enable widescale monitoring of dissolved inorganic nitrogen, suspended sediment and flow that will help to increase the coverage of water quality monitoring across the Reef catchments.
- **Coral Abundance Challenge** (through the Advance Queensland SBIR program and the Australian Government Reef Trust): Global challenge to develop solutions which support the protection, regeneration and recovery of coral populations on the Great Barrier Reef.
- **Erosion management planning for Springvale Station, Cape York**: On-ground erosion management works focused on sediment management and gully remediation on Springvale Station which was purchased by the Queensland Government for its biodiversity values and to reduce high sediment pollution loads to the Great Barrier Reef.

The Queensland Reef Water Quality Program invests in agricultural research and development projects in relation to grazing, sugarcane, grains, bananas and horticulture with partner organisations, including industry and universities. These projects provide significant Reef water quality benefits through exploring new technology and practices, improved pesticide and fertiliser management, economic evaluation and improved farm system management.

## Economic validation of practices

The Queensland Reef Water Quality Program also ensures the provision of economic information that enables landholders to understand the productivity and profitability consequences of changing practices to improve water quality.

The Queensland Government will address the gaps in the economic validation of the BMPs and support embedding water quality improvement practices into BMP activities. Economic evaluations will be undertaken to better inform the prioritisation of investments for water quality improvement. Decision support tools for sugarcane, grazing and bananas will be developed to enable stakeholders to evaluate individual practice change decisions.

Economic expertise will also be provided to deliver targeted and coordinated extension activities (integrating agronomy, environmental, economic and social aspects). The extension of economic information is critical for the adoption of improved management practices and building skills in economics and business management.

## Demonstration projects

Demonstration sites are important tools for promoting the importance and effectiveness of practice change. Projects such as the nutrient trials in the Burdekin (RP20) and the subsequent project to extend farmer assistance to a broader Burdekin grower population (RP161) have attracted a high degree of interest from growers. These projects seek to help growers adjust their fertiliser rates in line with the SIX EASY STEPS which matches crop requirements. Providing agronomic assistance to growers while implementing improved fertiliser practices increases the understanding of growers and improves the basis on which they can make future land management decisions.

## Targeted projects of direct action

Science in the Paddock projects are aimed at solving problems and testing theories that will improve the government's ability to implement the Reef 2050 WQIP and work towards meeting the water quality targets. Outcomes will influence investment decisions and address new practice standards. This research and development is supported by the involvement of technical expertise for advice, synthesis and critical analysis within the Queensland Government and across other research providers.

The Queensland Government is also supporting other innovative approaches to motivating practice improvement, investing in 'science delivery' or extension projects that have demonstrated great potential to influence farm management decisions.

These projects may use trusted suppliers (e.g. agronomists) or local water quality monitoring with extension activities to increase producers' understanding of localised pollutant (nutrient, pesticide, sediment) losses and management options that will improve water quality outcomes as well as farming enterprises.



# Catchment restoration

Catchment restoration related programs and projects are key components of the Queensland Reef Water Quality Program which deliver significant on-ground outcomes.

The design and location of catchment restoration projects is informed by many decision support tools. For example, the Queensland Wetlands Program supports decisions through the Great Barrier Reef Wetlands Network, provides policy and planning advice on wetlands and coastal ecosystem information, inputs into on-ground management of wetlands through extension and provides wetlands tools such as the WetlandInfo website, and delivers Walking-the-Landscape whole-of-catchment management initiatives.

## Targeted projects of direct action

A part of the Queensland Natural Resources Investment Program 2018–2022 (NRIP) focuses on targeted Great Barrier Reef projects to reduce pollutants with an emphasis on sediment and nutrient reduction, as well as riparian protection, coastal wetlands rehabilitation, streambank stabilisation and gully remediation. The Queensland NRIP is administered by DNRME.

## Gully and streambank remediation

The Queensland and Australian governments' Great Barrier Reef Gully and Streambank Joint Program is an integrated response of on-ground activities alongside extension and data collection. The outcomes of these activities and the measure of their effectiveness involves assessing soil characterisation, grazing land management, LiDAR (light detecting and range data) capture, water quality monitoring and characterisation of bioavailable nutrients. This analysis will also enable an enhanced ability to model water quality outcomes for the Great Barrier Reef.

## Reef Islands Project

Over five years, the Great Barrier Reef Foundation (GBRF) will deliver a \$14 million tailored program of on-ground restoration and conservation actions across a network of Great Barrier Reef islands that will boost the resilience and provide critical habitat for species in the face of climate change. Islands have been prioritised based on an assessment undertaken by the Queensland Parks and Wildlife Service and the Great Barrier Reef Marine Park Authority. This assessment considered both the biodiversity and conservation value of each island and the threat level to these values due to global and local stressors. The Queensland Reef Water Quality Program funding of \$3 million over three years has been focussed on Lady Elliott Island. The project is also supported by funding from Lendlease, the Australian Government's Reef Trust and the Fitzgerald Family Foundation.

## Central Queensland

A total of \$4 million has been invested in Reef water quality projects in the Central Queensland region focused on improving management practices and productivity across agricultural industries and specifically seeking to reduce nutrient, pesticide and sediment losses to waterways.

# Enabling delivery

## Science and knowledge

### Research, Development and Innovation Strategy

The identification and prioritisation of knowledge gaps is achieved through the Research, Development and Innovation (RDI) Strategy under the Reef 2050 WQIP. This joint Queensland and Australian government strategy provides researchers, funders and end users of research with a guide to the priority knowledge gaps relevant to achieving the outcomes of the Reef 2050 WQIP. Investment in projects to fill these gaps will be guided by the RDI Strategy.

### Annual synthesis workshop

An annual synthesis workshop is held to coordinate and communicate research to practitioners, policy-makers and on-ground land managers. Attendees also discuss ways to communicate and use science and research outputs to improve land management activities.

### Communication

The Queensland Reef Water Quality Program includes a range of communication activities to build landholder and community understanding of the pressures on the Reef and support large-scale practice change.

### Decision support tools

The Queensland Reef Water Quality program includes synthesis of information into simple to use decision support tools and grazing extension tools such as Forage, Vegmachine and the Land Condition Assessment Tool. A spatially-enabled tool kit will be developed to enhance the capacity of extension providers to support graziers. Use of these tools for climate-responsive management decisions will be encouraged as part of the BMP programs.

In addition, the adaptive management approach to implementing the Reef 2050 WQIP requires government to regularly assess the effectiveness of its current investments. This will help prioritise future funding and increase investment in specific areas to enable achievement of the targets, underpinned by a robust evaluation framework.

# Governance

## Reef 2050 Plan and Reef 2050 WQIP implementation support

Management of the Great Barrier Reef is an important national and international issue with the Queensland Government having considerable coordination, administration and secretariat responsibilities. The Queensland Government has joint responsibility for administering the Reef 2050 Plan with the Australian Government's Department of Agriculture, Water and Environment and the Great Barrier Reef Marine Authority; providing a secretariat function for the Reef 2050 Advisory Committee and Reef Independent Science Panel and co-funding and supporting the operations of other Reef 2050 governance bodies.

The Office of the Great Barrier Reef coordinates the Queensland Government's contribution to joint policy and program development and Queensland's international engagement with the World Heritage Centre and International Union for Conservation of Nature.

# Evaluating performance

## Paddock to Reef Program

The Paddock to Reef Integrated Monitoring, Modelling and Reporting program (Paddock to Reef program) measures and reports progress towards the Reef 2050 WQIP targets. It is jointly funded with the Australian Government and is administered by the Queensland Government and the Great Barrier Reef Marine Park Authority through the marine monitoring program. The Paddock to Reef program collects and integrates data and information on land management practices, catchment indicators, catchment water quality loads and the health of the Great Barrier Reef.

It uses cutting edge monitoring and modelling tools that link across each of the scales (paddock, catchment and marine) to enable reporting of outcomes in the short-to-medium term. Results are presented in the Reef water quality report card and supporting technical reports as well as through case studies.

The Queensland Reef Water Quality Program also provides support to regional natural resource management (NRM) bodies to deliver Paddock to Reef program project activities and reporting, coordinated through NRM Regions Queensland. Wetland condition monitoring and research is also undertaken as part of the Paddock to Reef program.

**Supporting activities:** The Queensland Water Modelling Network (QWMN) contributes to the research and development of water models in the Reef catchments.

## Fundamental data set and data management

The Queensland Reef Water Quality Program is underpinned by the maintenance of fundamental data sets (land use, water quality and soil data as well as imagery) which enable investment planning for on-ground catchment restoration and land management activities as well as monitoring, modelling and reporting of outcomes under the Reef 2050 WQIP.

The Science and Spatial Information Management for the Reef (SSIMR) is the Queensland Reef Water Quality Program's data management system. SSIMR provides procedures, protocols and systems appropriate for the storage, management, curation, access and delivery of information and data needed for and produced by the various projects involved in the Paddock to Reef program.

## Program evaluation

The Queensland Reef Water Quality Program will be evaluated to assess the effectiveness of current governance and program management measures in delivering projects to meet objectives.

## Reporting

The results from the Paddock to Reef program are reported in the Reef water quality report card as well as in supporting technical reports and through case studies. The report card tracks progress towards the Reef 2050 WQIP targets and reports on the condition of the marine environment. It is the prime mechanism for evaluating the success of the combined Australian and Queensland government programs.

The Reef water quality report card is also supported by regional waterway health report cards that provide information relevant to local communities on the health of their waterways to drive local action through regional partnerships. Regional report cards are produced by the following regional partnerships of which the Queensland Government is a partner: Gladstone Healthy Harbour Partnership, Mackay Whitsunday Healthy Rivers to Reef Partnership, Wet Tropics Healthy Waterways Partnership, Fitzroy Partnership for River Health and the Dry Tropics Partnership for Healthy Waters (Townsville).

## Conclusion

The Queensland Government is committed to continuing efforts to restore, protect and build the resilience of the iconic Great Barrier Reef. Improving Reef water quality remains a key priority with the Queensland Reef Water Quality Program delivering a wide range of measures to address that priority. It invests in on-ground water quality improvement projects with a strong focus on innovation and supports landholders to make long-term practice change.



