

Queensland
**REEF WATER
QUALITY**



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



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Introduction

The Queensland Reef Water Quality Program is the Queensland Government’s key response to addressing water quality impacts affecting the Great Barrier Reef. It delivers activities as part of implementing the draft Reef 2050 Water Quality Improvement Plan which supports the water quality theme of the Reef 2050 Long-Term Sustainability Plan.

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

The draft 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, and aligns with the recommendations of the Great Barrier Reef Water Science 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 draft Reef 2050 Water Quality Improvement Plan;
- ensure that the 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, pesticides and sediment run-off to the Reef whilst ensuring productivity, profitability and sustainability of farm enterprises; and
- 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 2017–18 to 2021–22 (five-year investment plan) Part A describes the key areas of investment as they align to the actions under the draft 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

The Queensland Government commits \$35 million annually for Reef water quality action. In 2015, the Queensland Government provided an additional \$100 million over five years with \$90 million for Great Barrier Reef water quality improvement and \$10 million for the creation of net free fishing zones. Activities within the Queensland Reef Water Quality Program from 2017–18 to 2021–22 are primarily funded from these two sources. Total investment for the five year period of this investment plan is \$261.08 million.

Of the additional \$100 million, \$72.28 million is allocated for 2017–18 to 2019–20. This investment will fast track progress toward Reef water quality targets, taking direction from the recommendations of the Great Barrier Reef Water Science Taskforce.

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 Program.

Investment prioritisation

The Queensland Government convened the Great Barrier Reef Water Science Taskforce (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 Reef water quality targets.

The Taskforce's recommendations were accepted in-principle by the Queensland Government and are incorporated into the draft Reef 2050 WQIP. The actions under the Queensland Reef Water Quality Program align with the recommendations of the Taskforce.

Regional investment is also prioritised using the catchment management priorities and targets identified in the draft 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 leverage funding, 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.

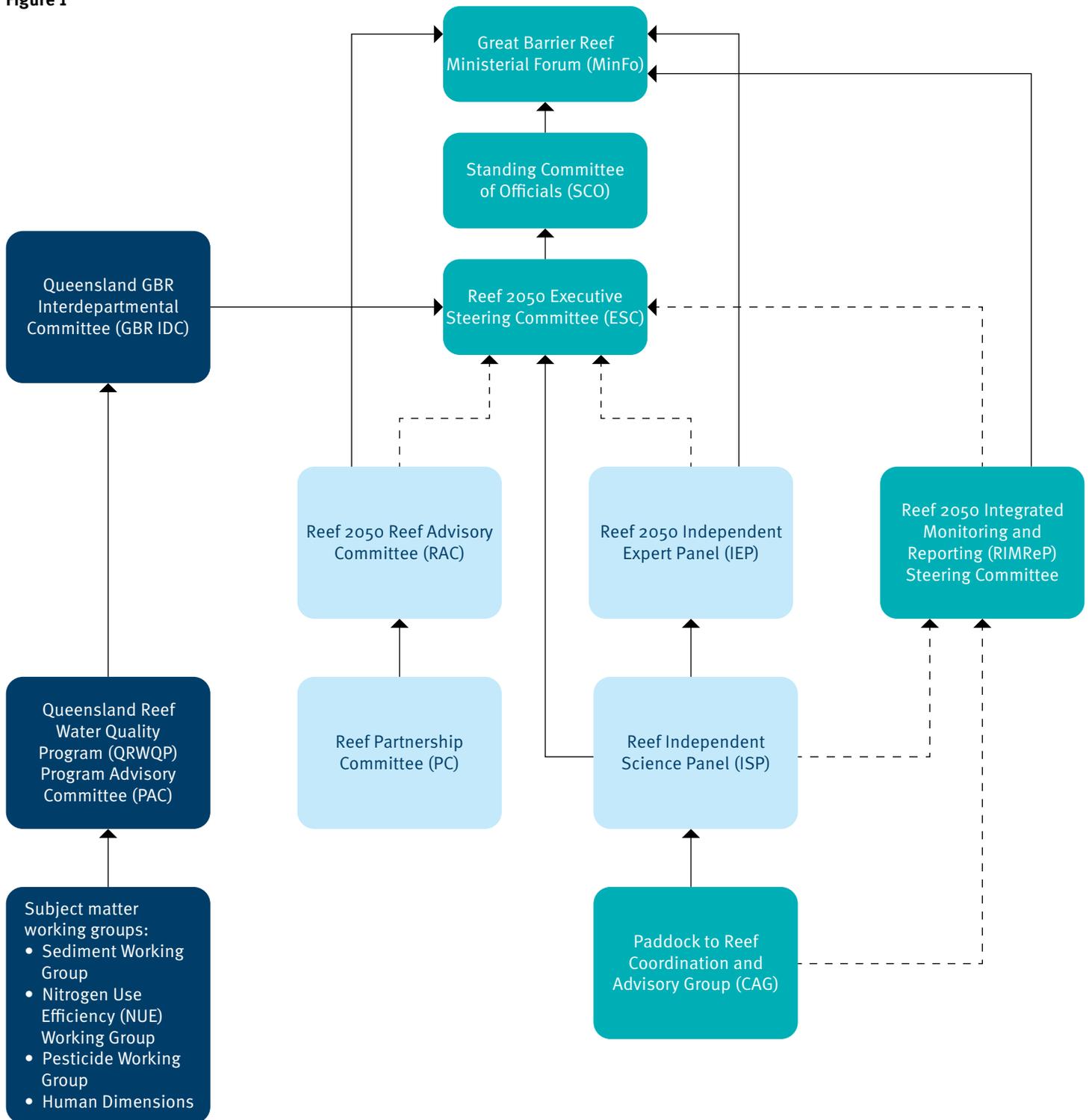
The outcomes of targeted research programs also influence investment decisions, ensuring that the program adapts and responds to new information.

Program governance

The Australian and Queensland governments work together to coordinate the implementation of the Reef 2050 Long-Term Sustainability Plan and the draft Reef 2050 Water Quality Improvement Plan.

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 manages the coordination of actions of the Reef 2050 Long-Term Sustainability Plan and the nested draft Reef 2050 Water Quality Improvement Plan.

Figure 1



Key

■ Joint government
 ■ Queensland Government
 ■ Independent

← Reports to

← - - - Advises

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 for the Queensland Government, and are managed directly by the relevant department.

The Office of the Great Barrier Reef within the Department of Environment and Science 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 Great Barrier Reef Interdepartmental Committee (GBR IDC)

The Great Barrier Reef Interdepartmental Committee (GBR IDC), chaired by the Director-General of the Department of Environment and Science and consisting of senior representatives from the relevant Queensland Government departments, is responsible for program oversight for the delivery of the Queensland Government actions in the Reef 2050 Long-Term Sustainability Plan.

Queensland Reef Water Quality Program Advisory Committee (PAC)

The Queensland Reef Water Quality Program Advisory Committee, consisting of representatives from the Department of Natural Resources, Mines and Energy, the Department of Agriculture and Fisheries and the Department of Environment and Science provides strategic advice to the GBR IDC regarding the Queensland Reef Water Quality Program and project planning.

Annual investment plans and reports

An annual investment plan is produced for the Queensland Reef Water Quality Program to set out the intended investment in the upcoming year along with an annual investment report which reports on the investment made in the preceding year. These annual reports and plans support the accountability of the Program. The 2017–18 Annual Investment Plan is incorporated in Part B of this five-year investment plan (refer to columns presenting totals for 2017–18).

Responding to the challenge:

On-ground actions to accelerate progress towards targets

Minimum practice standards

Minimum practice standards will be applied across all relevant industries and land uses in reef catchments to improve the quality of water in waterways flowing to the Reef. Achieving this will remove the highest risk practices to deliver a step-change in progress towards the water quality targets across all reef catchments.

Support for voluntary industry-led best management practice programs

The Queensland Government supports the continual improvement of the industry-led agricultural best management practice programs (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.

Accreditation offers cane producers the dual benefit of meeting the current Reef regulatory requirements under the *Environmental Protection Act 1994* and the sustainability criteria for the supply of feedstock to Queensland's growing biofuels industry. BMP module content, standards, BMP accreditation and data reporting systems are continually improved as part of the program.

Proposed changes to reef regulations

In 2017, the Queensland Government released for public consultation proposed changes to the *Environmental Protection Act 1994* relating to Reef water quality. The changes proposed are to:

- set nutrient and sediment pollution load limits for each reef catchment to target responses for managing risks to water quality
- provide the ability to apply minimum practice standards targeting nutrient and sediment pollution for key industries in Reef catchments
- require fertiliser re-sellers to keep and produce records on request of nutrient application advice provided to their clients to improve nutrient management outcomes
- establish a water quality offset framework that can apply across industry sectors as a measure to manage water quality impacts for new, expanded or intensified development in the context of the new catchment pollution load limits.

Targeted compliance program

The Queensland regulation and compliance program delivers a targeted program of enforcement of the reef regulations under the *Environmental Protection Act 1994* in the Wet Tropics, Burdekin and Mackay Whitsunday regions. In other reef catchments it uses a broader range of Environmental Protection Act tools.



Culture of innovation and stewardship

Industries and communities will be supported to build a culture of innovation and stewardship. This will build on the improvements to water quality achieved by doing more and exceeding minimum practice standards. 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 better 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 draft Reef 2050 WQIP, there will be 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 have greater 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 are assisting to 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.

Investment is being provided to CANEGROWERS for the Cane Changer Project to develop a large-scale social change program to better understand motivations and associated benefits of behaviour change to encourage farmers to adopt actions that will improve water quality outcomes. The project focuses on cane farmers in the Wet Tropics.

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 are also being delivered.

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 effectiveness of activities trialled 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 Australian Government Reef Trust)
Broad trialling of enhanced efficiency fertilisers to evaluate the technology 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 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 Advance Queensland SBIR and 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 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 to practices that improve water quality.

The Queensland Government will address the gaps in 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 specific practice change decisions.

Economic expertise will also be provided to deliver targeted and coordinated extension activities (integrating agronomy, environment, economics 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 key to 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. The projects seek to help adjust fertiliser rates in line with SIX EASY STEPS, as required for the crop. Providing agronomic assistance to growers while implementing improved fertiliser practice increases the understanding of growers and improves the basis on which they can make future decisions.

Targeted projects of direct action

Science in the Paddock projects are aimed at solving problems and testing theories that will improve our ability to implement the draft Reef 2050 Water Quality Improvement Plan 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 utilise 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; provision of policy and planning advice on wetlands and coastal ecosystem information; input into on-ground management of wetlands through extension and provision of wetlands tools such as the WetlandInfo website; and the delivery of Walking-the-Landscape whole of catchment management initiatives.

Targeted projects of direct action

A part of the Queensland Natural Resource Management investment program focuses on targeted Great Barrier Reef projects to reduce pollutants with an emphasis on sediment and nutrients reduction, as well as riparian protection, coastal wetlands rehabilitation, streambank stabilisation and gully remediation. The Queensland Natural Resource Management Program is administered by the Department of Natural Resources, Mines and Energy.

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 outcomes for the Great Barrier Reef.

Reef Islands Project

Over the next 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. Five islands have been prioritised based on an assessment undertaken by the Queensland Parks and Wildlife Service and 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 will focus on Lady Elliott Island initially. The project is a collaboration between the Queensland Government and the Great Barrier Reef Foundation with each party contributing \$3 million of matched funding over three years to achieve the objectives.

Central Queensland

Four million dollars 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 reduction to nutrient, pesticides 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 development of a Research, Development and Innovation (RDI) Strategy under the draft Reef 2050 Water Quality Improvement Plan. 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 draft Reef 2050 Water Quality Improvement Plan. Investment in projects to fill these gaps will be guided by the strategy.

Annual synthesis workshop

An annual synthesis workshop is held to coordinate and communicate research to practitioners, policy-makers and on-ground land managers to discuss ways to communicate and use science and research outputs to improve 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 key 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 draft Reef 2050 WQIP requires government to assess the effectiveness of their current investments in order to prioritise future funding and increase investment in specific areas to reach the targets. It is also underpinned by robust evaluation frameworks.

Governance

Reef 2050 Plan and draft 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 responsibilities with the Australian Government for administering the Reef 2050 Long-Term Sustainability Plan including Queensland's contribution to the joint team with the Australian Government's Department of Environment and Energy 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) is the established program for measuring and reporting progress towards the targets of the draft Reef 2050 WQIP. It is jointly funded with the Australian Government and is administered by the Queensland Government and the Great Barrier Reef Marine Park Authority through their marine monitoring program. The 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 Great Barrier Reef 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 draft Reef 2050 WQIP.

The Science and Spatial Information Management for the Reef (SSIMR) is the data management system within the Queensland Reef Water Quality Program that 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 Paddock to Reef.

Program evaluation

The Queensland Reef Water Quality Program will be evaluated to assess how effectively current governance and program management measures are in delivering the program and how effective the program has been in delivering projects to meet objectives.

Reporting

The results from the Paddock to Reef program are reported in the Great Barrier Reef Report Card and supporting technical reports as well as through case studies. The report card tracks the progress towards the draft 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 Great Barrier Reef 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).

