

Reef 2050 Water Quality Improvement Plan action report - July-December 2018

Progress with implementing the actions in the Reef 2050 Water Quality Improvement Plan is reported every six months.

A1: Minimum practice standards apply everywhere

Contributing agencies and partners: Natural Resource Management bodies, Industry, Local government

Intermediate Outcomes	Id	Actions	Status	Australian Government	Queensland Government (July 2018 - December 2018)
Minimum practice standards are met by all industries and activities.	1.1	Implement minimum practice standards for agricultural industries, which can be met either voluntarily, e.g. through industry-led best management practice (BMP) programs, or as a result of regulation.	On track / Underway		<ul style="list-style-type: none"> The Queensland Government developed the Environmental Protection (Great Barrier Reef Protection Measures) and Other Legislation Amendment Bill 2019 (Reef Bill) to target agricultural and industrial land uses in all Great Barrier Reef catchments to reduce nutrient and sediment pollution while maintaining productivity and profitability through improved land management to help meet water quality targets. The Reef Bill will establish regulated minimum practice standards for key agricultural industries in Reef catchments and was considered by the Queensland Government on 3 December 2018 for progression to the Queensland Parliament. As part of the Queensland Government's commitment to improving water quality in the Great Barrier Reef catchment compliance activities are undertaken to ensure compliance with the reef protection measures of Chapter 4A of the <i>Environmental Protection Act 1994</i> (the Act). Since early 2016, the reef compliance program has been implemented to increase adoption of the soil testing, fertiliser use, and record keeping provisions under the existing reef protection regulation. The existing reef compliance program is in the priority catchments of the Wet Tropics, Burdekin Dry Tropics, and Mackay-Whitsunday, targeting sugarcane growing with 629 total compliance activities undertaken up to Dec 2018. While non-compliance rates are high at initial grower meetings, follow-up visits indicate that the majority of growers have changed their farm practices after the initial inspection. The Queensland Government continues to support voluntary, industry-led BMP programs for cane, grazing, banana and grains to assist producers identify practices that improve long-term productivity, profitability and sustainability of their enterprise. Other activities include development of management practice standards, partnership projects to demonstrate improved practices, and support to align state and federal government programs for nutrient use efficiency, sediment and pesticide land management improvements.
	1.2	Ensure that urban, industrial and mining activities comply with requirements under the Environment Protection and Biodiversity Conservation Act 1999, Planning Act 2016, Environmental Protection Act 1994, and Waste Reduction and Recycling Act 2011.	On track / Underway	<ul style="list-style-type: none"> The Department of the Environment and Energy has a dedicated team within the Office of Compliance undertaking a compliance monitoring program, as outlined in the Office of Compliance Annual Compliance Plan 2018-19, and directed by the Department's Compliance Policy (2019). 	<ul style="list-style-type: none"> The impacts of plastic pollution on our environment and especially on our marine life are a very real concern to the Queensland Government and the community. The Queensland Government has taken action to protect our unique environment and wildlife through the introduction of a ban on the supply of single-use lightweight plastic shopping bags on 1 July 2018, and a container refund scheme on 1 November 2018. The Queensland Government continued to build capacity for erosion and sediment control, and urban stormwater quality management through the <i>Erosion and Sediment control capacity building and urban stormwater quality management</i> project. Work continues to improve the Queensland Government Water Tracking and Electronic Reporting System (WaTERS) to deliver a digital and spatial database that captures point source releases within Great Barrier Reef catchments to inform environmental regulation. Under the proposed Reef Bill, new or expanded point source environmentally relevant activities (ERAs) including sewage and water treatment plants, or aquaculture will need to avoid additional nutrient or sediment releases to ensure that new development does not negatively impact on water quality improvements made to date.
	1.3	Refine existing standards, regulations and planning frameworks as new information improves knowledge for all industries.	On track / Underway		<ul style="list-style-type: none"> <i>Proposed regulated practice standards for sugarcane growing, and new regulated practice standards</i> developed for banana growing and grazing were considered by the Queensland Government as part of progressing the Reef Bill. Policy proposals regarding changes to the Environmental Protection Regulation and Environmental Protection (Water) Policy to implement nutrient and sediment catchment load limits that will need to be considered when assessing applications under the EP Act was endorsed by the Queensland Government for progressing through legislative amendments.



A2: Culture of innovation and stewardship

Contributing agencies and partners: Natural Resource Management bodies, Healthy Land and Water, Industry, Local government, Great Barrier Reef Marine Park Authority

Intermediate Outcomes	Id	Actions	Status	Australian Government	Queensland Government
Reef communities are engaged and empowered to improve practices and behaviours beyond minimum practice standard for water quality improvement.	2.1	Support land managers, industries and local governments to adopt improved management practices, e.g. through coordinated extension, education and awareness programs.	On track / Underway	<p>The Reef Trust continued to support projects that are delivering extension and education targeted at adoption of improved practices, primarily addressing management practice adoption in cane and grazing.</p> <ul style="list-style-type: none"> Reef Alliance – Growing a Great Barrier Reef Project built agricultural extension capacity through Queensland Farmers Federation’ Pilot Agricultural Capacity Building. This included training of extension staff in Reef regions on agricultural issues such as precision agriculture or grazing management, leadership, people management, and monitoring and evaluation. The project assisted in coordinating extension officers in the Reef regions to foster a link between building capacity and water quality extension activities. The project continues to provide training, extension and on-ground support to agricultural land managers in ‘best practice management’ of their agricultural practices. Project Pioneer: Innovation in Grazing Land Management continued to work with landholders who have developed property plans and identified key on-ground projects to reduce run-off into the GBR through sustainable farm practices. Over this period, 144 participants attended grazing field day activities to raise awareness of improved management practices including weed management and pasture improvement to increase ground cover. To date 226 graziers have been engaged to complete formal training courses. F11 - Fitzroy sub catchment gully and stream bank erosion control project is undertaking an integrated catchment approach to sediment reduction associated with gully and stream bank erosion. Over the reporting period, large numbers of people (including high school students) were engaged in volunteer activities including seed collection, plant propagation, porous check dam construction, gypsum application, mulching and seeding. Workshops were held to present the issues around sediment loss and their impact on the Great Barrier Reef, and to present methods to address sediment loss and highlight the project opportunities to address erosion at a regional community level. This training and involvement in events enhance the communities understanding of environmental issues and the actions being undertaken to address impacts on the Reef. The High priority stream bank erosion control in the Mackay Whitsunday project is restoring riparian zones and stabilizing stream banks in the O’Connell and Pioneer catchments in the Mackay Whitsunday region. Over the reporting period, the project ran 11 community participation events to assist landholder understanding of whole-of-stream scale management issues. 	<p>Queensland Government continued to support landholders to make long-term farm management changes, extension and education services, increased monitoring and large-scale social change programs.</p> <ul style="list-style-type: none"> Enhanced education and extension coordination and delivery, providing greater access for farmers to enable practice change in farming communities and building long-term capacity. Farmers across Burdekin and Mackay Whitsunday have been successfully engaged in one-on-one agronomy support to reduce nitrogen application through tailor-made nutrient management plans. As a result, a nitrogen application reduction of 200 tonnes across 156 farms in just the Burdekin region has been achieved so far. Urban stormwater quality management activities are continuing, including the rollout of new technology training for urban stormwater management, along with Reef Urban Stormwater Management Group (RUSMG) meetings held in Mackay and Brisbane. Two co-design projects were initiated in Townsville and Rockhampton to restore sections of urban streams with significant community and ecosystem value. The Major Integrated Projects (MIP) continue to be implemented. Farm demonstration sites, local scale monitoring and catchment repair interventions such as bioreactors, high efficiency sediment basins and in-drain wetlands were established in the Wet Tropics. In the Burdekin, the first round of alluvial gully remediation was finalised with over 25 graziers engaged. Additionally, 10 graziers established a local monitoring group and collected the first round of water quality samples. Training continues for local government and utilities staff to support a whole-of-catchment effort. Cane Changer is breaking new ground in helping farmers manage the sustainability of their enterprises, industry, and achieve accelerated water quality improvements for the Great Barrier Reef. Cane Changer is coming up with transformative ways to better understand and recognise the factors that influence the adoption of best management practices in the cane industry, and how these practices can bolster the resilience of the cane industry. The success of Cane Changer strategies are the materialisation of ideas from the industry and by the industry. Every initiative is designed and implemented in partnership with local partners. The Wet Tropics, through Cane Changer, are leading the process of Best Management Practice adoption. There has been increased use and improved function of grazing extension tools Forage and Vegmachine for extension service providers to support graziers to make climate responsive management decisions to improve water quality.
	2.2	Empower stewardship leaders to influence peers and the broader	On track / Underway	<ul style="list-style-type: none"> The annual Reef Trust Erosion Control Forum was held in Cape York in May 2018. More than 50 practitioners in gully and stream bank erosion control, came together over three days to share learnings, stocktake progress, build community practice and discussing methods to address challenges faced along 	<ul style="list-style-type: none"> Queensland Wetlands Program continued to be implemented including, wetland demonstration on-ground case studies and wetland extension with

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		community to adopt improved practices.		<p>the way. Learnings from the forum are used to shape further Government-funded gully program work.</p> <ul style="list-style-type: none"> Through the Reef Trust Streambank and Gully program, community and landholder workshops were held to facilitate peer-to-peer learning, including community events held by Cape York NRM that have engaged 343 participants to date. The 2018 Reef Champion Awards enabled networking between participants and highlighted peer achievements. Project Catalyst Revamp - game changing farm management practices continued to enable a peer-to-peer learning platform where farmer involvement is producing cutting edge innovative solutions to current cane farming problems. The project provides growers, their families, suppliers, on ground providers and Government agencies networking opportunities which provides information on trial successes and failures, mentoring and education without fear of ridicule, negativity or being made to feel less important. Five Grower stories were published on the project website highlighting the work of project cane farmers. Project Pioneer: Innovation in Grazing Land Management provided opportunities for grazing businesses to undertake peer property visits from the Burnett Mary region in the south to Cape York region in the north, to experience life in their peers' shoes and see how things are done on each other's properties. This unique opportunity enabled learning, networking and camaraderie and associated social, economic and environmental benefits. Project Uplift Farming Systems Initiative continued to establish grower groups, a proven extension methodology to achieve farming practice change, with 13 new entities adopting Sugar Research Australia's farming system to minimise soil compaction and reduce farm water run-off. The Great Barrier Reef Marine Park Authority's Reef Guardian Grants Program invested in 25 community and stewardship projects to stimulate and empower communities to take action to enhance health and resilience of the Reef. For every one dollar granted, approximately five dollars will be leveraged into projects including direct action such as towards urban drain clean-ups and revegetation, awareness and education activities targeting specific practices and behaviours relevant to local situations and monitoring. 1294 students from 113 schools participated in 13 Reef Guardian Future Leader Eco Challenge events spanning Cooktown to Bundaberg, delivered with support from 55 partners from local councils, environmental and Indigenous ranger groups. Students acquired knowledge and skills to build their capacity to: conduct waste audits to inform action to reduce marine debris, to investigate water quality and biodiversity and to revegetate coastal ecosystems. Communication about the events within the school communities and through media reached over 130,000 people to raise awareness that everyone can play a part in caring for the coastal ecosystems and the Reef. The Great Barrier Reef Marine Park Authority's Reef Guardian Councils Highlights Report, 2017-18 was published to showcase the initiatives councils 	<p>landholders to engage local stewardship leaders and promote benefits of improved practices.</p> <ul style="list-style-type: none"> Paddock and sub-catchment water quality monitoring and 13 best practice pesticide management use demonstrations with sugarcane growers in the Tully, Innisfail-Babinda and Mulgrave regions raised awareness of practices that have the potential to reduce the water quality impacts of herbicides and insecticides used in sugarcane production, and to bring about practice change in these target catchments.

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				are taking to lead the way in practice improvement. This is a resource for sharing ideas, influencing peers and community and acknowledging the significant contribution local government is making towards protecting the values the Reef provides to coastal communities.	
	2.3	Support extension and education providers to deliver effective extension and education programs that reach a broad audience of land managers.	On track / Underway		<ul style="list-style-type: none"> Significant progress made in recruiting and coordinating management staff to encourage more effective delivery of extension programs across catchments. Pilot agricultural capacity building program developed focusing on extension training networks and interns.
	2.4	Identify and address barriers to change and practice improvement uptake through programs and policy.	On track / Underway	<ul style="list-style-type: none"> The Reef Trust Reverse Tenders are addressing barriers to change by enabling cane farmers across the Wet Tropics and Burdekin regions to implement their own cost-effective approaches for improving fertiliser application on their farms. In addition to providing considerable cost savings for participating farmers, to date the program has achieved a reduction of over 1,900 tonnes of fertiliser being lost from cane farms – meaning less run-off of dissolved inorganic nitrogen into the reef. The Reef Alliance through their Growing a Great Barrier Reef project utilised the P2R Projector as an engagement tool which helped growers to bridge the gap between farm practices and water quality outcomes in a visual and readily understandable format. Project Uplift Farming Systems Initiative continued to work with cane farmers to adopt the Sugar Research Australia's farming system to provide the opportunity for a greater impact and a different engagement point with Growers. Outcomes of the Behaviour Innovation Reports were shared with a cross section of industry stakeholders and significant growers (approximately 63 influencers). Project Catalyst Revamp - game changing farm management practices coordinated communications with participating growers and others for the broader adoption of trials via electronic media, shed meetings and field days. A total of 120 farming entities and 240 individuals attended these events during the reporting period, leading to reduced inputs of fertiliser, or pesticides and increased yield across 26,000 hectares. Project Pioneer: Innovation in Grazing Land Management continued to work with landholders who have developed property plans and identified key on-ground project activities that will achieve water quality outcomes. A total of 85 farming entities and 205 graziers were engaged during this reporting period to increase drought resilience and undertake more effective stocking rates across more than 993,000 hectares. Through the National Environmental Science Program (NESP), a research project is looking at the science of social marketing and behaviour change for improved water quality in the Great Barrier Reef. The project uses insights from the science of social marketing and behaviour change to implement (and test the efficacy of) changes to the marketing and engagement strategy 	<ul style="list-style-type: none"> Economics of management practices that improve water quality are being validated and information being provided to landholders in decision support tools and as part of the extension program. A new project initiated under the Queensland Reef Water Quality Program to validate the economics of management practice that improve water quality, and provide this information to landholders as part of the extension program. The first meeting of the Reef Economics Co-ordination Group (RECG), which is led and hosted by DAF RED Economists, was held in Brisbane and included stakeholders from Griffith, CQU, CSIRO, DES and economic consultants working in the Reef space. Economic Analysis on Variable Rate Nitrogen trial results have been completed including collation of information on agronomic, economic, and environmental benefits and implications of slow release fertilisers (SRF), controlled release fertilisers (CRF), nitrification inhibitor fertilisers (NIF), and urease inhibitor fertilisers (UIF) particularly focusing on the research in sugarcane. Targeted research about barriers and motivators of practice change continued as part of the existing programs of Cane Changer, Major Integrated Projects, Reef Water Quality Extension and Education, and Science in the Paddock programs. Key findings will assist program and policy development and delivery to address barriers to change and practice improvement.

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				<p>associated with programs designed to be rolled out under the Reef 2050 Plan. It aims to change key behaviours, particularly amongst those who have not previously engaged, to improve water quality.</p> <ul style="list-style-type: none"> Another research project under the NESP is engaging with farmers and demonstrating water quality outcomes to create confidence in on-farm decision-making. This project will combine recent hotspot identification in GBR sugarcane catchment of the Russel/Mulgrave with targeted cane farmer interaction activities (related to sub catchment and localised monitoring activities), focusing on emerging monitoring technologies (real-time water quality monitoring) to link farmer on-farm practices with feedback from sub catchment water quality measurements. The use of both scientific and citizen science monitoring approaches will deliver robust feedback loops to enable farmers to directly link their activities with water quality conditions. 	
	2.5	Provide incentives to support land managers, including Traditional Owners, with practice change.	On track / Underway	<p>Reef Trust projects continued to provide financial incentives to support land managers.</p> <ul style="list-style-type: none"> Reef Alliance – Growing a Great Barrier Reef Project provided financial incentives for on ground and innovative projects across cane, grazing, grains, horticulture, and dairy industries to enable land managers to make the necessary changes required for better on farm management practices. Project Pioneer: Innovation in Grazing Land Management provided subsidies for participants to undertake business analysis through Resource Consulting Services (RCS) Profit Probe benchmarking. This program enables participants to identify and make informed changes as a result of the latest financial and economic benchmarking. During this period, 44 new farming entities participated in Profit Probe. Laura Gullies Project, fix up and skills for the future continued to build the capacity of local Indigenous people to develop new skills and expertise in adaptively managing the landscape for erosion minimisation. Crocodile and Welcome Stations are working pastoral leases that provide jobs and training in agriculture for Indigenous people as part of a group of 14 properties. 	<p>A Reef Credits standard and guide is being developed through the Major Integrated Projects (MIP). Work continued on configuring spatially-specific credit trading simulations to include supply of water quality credits from different credit sources, together with demand for purchase of water quality credits from buyers. Potential for the supply of water quality credits from practice change in cane farming, restoration of natural wetlands, construction of treatment and from remediation of large-scale gullies have been quantified. Potential demand for water quality credits generated by tightening licence conditions for point sources (principally sewage treatment plants, aquaculture businesses and urban stormwater) have also been quantified.</p>
	2.6	Trial and implement innovative monitoring, land management and treatment system solutions that aim to deliver water quality benefits.	On track / Underway	<p>Reef Trust projects continued to trial and implement innovative land management solutions.</p> <ul style="list-style-type: none"> Project Uplift Farming Systems Initiative is assisting growers to transition to more efficient farming systems, which will improve on-farm nutrient management and improve the quality of water entering the Reef. Over the reporting period approximately 1700 ha of sugarcane was converted to the SRA farming system. The Stomping out Sediment in the Burdekin - livestock impact for gully remediation project is trialling a new grazing concept called ‘biological carpeting’. This grazing practice alongside ultra-high density grazing technique on livestock will be used to investigate the impact on the land to address gully erosion across a range of regionally representative soil types. Project Pioneer: Innovation in Grazing Land Management continued to support targeted graziers in Reef catchments to adopt practices and provide tools tailored to their circumstances that improve farm management capacity and 	<p>The Great Barrier Reef Innovation Fund addresses agricultural management practices, water treatment systems and water quality monitoring and support to the Coral Abundance Innovation Challenge.</p> <ul style="list-style-type: none"> Work progressing on development of a treatment system wetland in the Burdekin region, including monitoring its ability to reduce nitrogen run-off. Work has continued in trialling innovative water quality monitoring, agricultural management practices, and water treatment systems. Biophysical data was analysed for 20 trials of innovative practices in the cane industry. The impact of these water quality improving practices on business performance was validated. For High-intensity grazing trial sites, baseline data was established, and training for the innovative use of intensive grazing for gully remediation was conducted. Variable rate technology was successfully utilised on three farms in Wet Tropics and Burdekin regions to optimise crop development and nutrient use efficiency.

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				profitability, facilitate the transition to ‘A class’ land condition, showcase sustainable grazing businesses, and help reduce sediment entering the Reef. A whole of business approach to reducing sediment in runoff is taken by coaching graziers in multiple facets of their business, including but not limited to ground cover.	

A3: Catchment restoration

Contributing agencies and partners: Natural Resource Management bodies, Industry

Intermediate Outcomes	Id	Actions	Status	Australian Government	Queensland Government
On-ground interventions are targeted to deliver water quality improvement.	3.1	Use whole-of-system catchment management, planning and information to support prioritisation.	On track / Underway	<ul style="list-style-type: none"> Through a contract with CSIRO, approximately 5,200 km² of priority erosion areas were mapped in the Wet Tropics, Burdekin, Fitzroy and Burnett Mary Reef Regions using aerial terrain (LiDAR – Light Detection and Ranging). The data captured will help to further prioritise sediment management actions and investment in gully and stream bank erosion remediation. 	<ul style="list-style-type: none"> Statewide Landcover and Trees Study (SLATS) Report for 2016-17 and 2017-18 and all associated data was released by the Queensland Government on 20 December 2018 to monitor changes in Queensland's native vegetation. Scientific enhancements to SLATS and establishment of a vegetation condition monitoring and mapping framework for the state is underway. The data and information generated by the program will inform a range of land management and biodiversity conservation initiatives in Queensland including vegetation management, Great Barrier Reef programs, the Land Restoration Fund, fire management and planning, and conservation planning. Wetland Mapping and Extent Program released the statewide regional ecosystem data (version 11) including 2017 remnant extent, forming the foundation of the 2017 natural wetlands dataset. Delineation and attribution of over 1000 new 2017 waterbody features, and over 3000 delineation and attribution edits made to 2001, 2005, 2009, 2013 waterbody data sets to improve catchment management, planning and prioritisation.
	3.2	Use guidelines, Traditional knowledge and decision support tools to design and inform interventions.	On track / Underway	<p>Reef Alliance – Growing a Great Barrier Reef Project used the Queensland Government's Paddock to Reef Project Selector (P2R Projector) to inform reporting for cane. The tool enabled delivery partners to estimate the DIN reductions, and for extension officers to forecast and communicate the resulting water quality improvement of grower proposed changes and was found to be a very useful engagement tool as it helped growers to bridge the gap between farm practices and water quality outcomes in a visual and readily understandable format. The tool allowed extension staff and growers to fine tune projects and optimised water quality benefits and return on investments.</p>	<ul style="list-style-type: none"> The Queensland Wetlands Program continues to provide policy, governance, tools, information and stakeholder relationships in order to ensure the effective delivery of the Wetlands in the GBR Management Strategy 2016-21. Key achievements include; <ul style="list-style-type: none"> GBR Wetlands Network Annual Forum conducted Wetland education modules published on WetlandInfo site Training with GBR Natural Resource Management Bodies in Catchment story production and WetlandInfo Catchment stories have been released on WetlandInfo. Modelling underpinning the FORAGE decision support tool was significantly improved to assist land managers in grazing management.
	3.3	Trial and implement innovation in catchment repair projects to reduce sediment and nutrient delivery to the Reef.	On track / Underway	<p>Reef Trust projects continued to trial and implement innovative catchment repair projects to reduce sediment.</p> <ul style="list-style-type: none"> The Stomping out Sediment in the Burdekin - livestock impact for gully remediation project is trialling a new grazing concept called 'biological carpeting'. This grazing practice alongside ultra-high density grazing technique on livestock will be used to investigate the impact on the land to address gully erosion across a range of regionally representative soil types. 	<ul style="list-style-type: none"> Suite of gully remediation design and approaches finalised for Springvale to provide property-wide remediation including erosion management works to reduce sediment runoff as per the Springvale Erosion Management Plan. Use of new native seed collection methods with Indigenous peoples/Traditional Owners guided by a Property Erosion Management Plan for Springvale revegetation following rehabilitation works. Gully remediation works were completed at Strathalbyn using seven innovative gully remediation approaches. All gullies effectively withstood storm events prior to December 2018 reducing sediment, and datasets were collected to enable evaluation. Remote Livestock Management System 'walk over weighing' technology has been set up on three grazing properties in the Fitzroy to trial its use for improved herd and land management and water quality improvement.

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					<ul style="list-style-type: none"> • Bioreactors are a passive, low cost solution which can be deployed on the edge of farmer's fields or in irrigation ditches to reduce nitrogen pollution of waterways. Bioreactor locations were finalised and installed ahead of wet season, with measurements of effectiveness commenced. • Northern Grazing Demonstration Project for best practice and FORAGE budgeting commenced -demonstration sites have been set up on four grazing properties in the Burdekin, Fitzroy and Upper Herbert catchments.
	3.4	Modify existing urban area stormwater management and rehabilitate urban waterways.			<ul style="list-style-type: none"> • Water by Design (WbD) continues to engage and expand its urban stormwater (USW) and erosion and sediment control (ESC) network across government and industry through a range of forums and activities to help build stakeholder capacity to deliver improved USW and ESC practices. Activities achieved include: <ul style="list-style-type: none"> ○ New technology training for urban stormwater management rolled out ○ Reef Urban Stormwater Management Group (RUSMG) meetings held in Mackay and Brisbane ○ Two co-design projects were initiated in Townsville and Rockhampton to restore sections of urban streams with significant community and ecosystem value.
	3.5	Partner with voluntary stewardship groups, Traditional Owner groups, Indigenous Land and Sea Rangers and other organisations to deliver catchment repair projects.	On track / Underway	<ul style="list-style-type: none"> • A core component of Laura Gullies Project, fix up and skills for the future is for local Indigenous people to participate as Indigenous Land and Sea Corporation employees or as Ranger teams engaged to undertake works which will provide cost-effective erosion control and build local capacity. The project is building on effective local Indigenous ranger and corporate capacity to manage erosion threats on Crocodile and Welcome Stations, and the Ang-gnarra Aboriginal Lands Trust in the Cape York region. <p>For more information:</p> <ul style="list-style-type: none"> • ABC FNQ Rural Report (MP3) 	<ul style="list-style-type: none"> • The Queensland Government provided funding and support as part of the Indigenous Land and Sea Ranger Program for an additional 10 Indigenous land and sea ranger positions across four Traditional Owner groups – Yintjingga Aboriginal Corporation, Buda-dji Aboriginal Development Association Aboriginal Corporation, Dawal Wuru Aboriginal Corporation and Gidarjil Development Corporation. The rangers undertake caring for country activities and contribute to the protection of Indigenous cultural heritage improving water quality outcomes for the Great Barrier Reef. <p>For more information:</p> <ul style="list-style-type: none"> • www.qld.gov.au/LandSeaRangers
On-ground organisations, land managers, Traditional Owner groups and voluntary stewardship groups implement catchment restoration.	3.6	Support the development of ground up, multi-stakeholder programs for the delivery of catchment repair projects.	On track / Underway	<ul style="list-style-type: none"> • The Reef Trust: Great Barrier Reef Foundation Partnership continues to build on existing partnerships and initiate new collaborations. The grants will support a range of organisations and landholders in the Reef Catchment to change management practices to improve water quality. • The Reef Alliance – Growing a Great Barrier Reef project continued to deliver a cross industry and NRM based program providing a structure and framework that facilitated operational discussions, joint decision-making and a common data capture and reporting platform for partners. 	<ul style="list-style-type: none"> • The Queensland Government continues to support the development and strengthening of regional waterway health partnerships for monitoring and reporting local catchment information to the community and stakeholders. • Comprehensive water quality data set collected for nine Mackay estuaries by DES Science. Estuary pesticide monitoring program initiated in partnership with the Reef Catchments NRM.

B1: Applying the best available science and knowledge

Contributing agencies and partners: Natural Resource Management bodies, Industry

Intermediate Outcomes	Id	Actions	Status	Australian Government	Queensland Government
Gaps in science and knowledge to underpin evidence-based decision-making are filled.	4.1	Identify, prioritise and fill knowledge gaps through the Reef 2050 WQIP Research, Development and Innovation (RD&I) Strategy.	Completed	<p>The five-year Reef 2050 Water Quality Research, Development and Innovation Strategy 2017-2022 (RDI Strategy) was developed in 2018. It is a joint action of the Queensland and Australian governments. The strategy:</p> <ul style="list-style-type: none"> • prioritises the knowledge needs for the next five years to support the Reef 2050 Water Quality Improvement Plan. • identified the knowledge needs through the 2017 Scientific Consensus Statement, the previous Research, Development and Innovation strategies and consultation with science, policy and on-ground management experts, and • through engagement with over 100 science, policy and on-ground management experts and stakeholders at the 2017 Synthesis Workshop and through expert working groups, the identified knowledge needs have been refined and prioritised and are outlined in the Stage 1 report. 	
	4.2	Integrate forms of knowledge including science, policy, management, Traditional Owner and community through regular synthesis workshops and theme specific working groups to support consistent communication messages and guidance for managers.	On track / Underway	<ul style="list-style-type: none"> • The third Great Barrier Reef Water Quality Science Synthesis Workshop was held in November 2018. The event provided an opportunity for science, government and industry practitioners to interact, share ideas and insights, and collaborate to support improved delivery and implementation of Reef water quality management activities. A number of project ideas and initiatives arose as part of the workshop. • Annual Reef Trust Erosion Control Forum held in June 2018. Participants consisted of Government program delivery partners (primarily NRM groups but also including the Great Barrier Reef Foundation), technical partners (from CSIRO and Griffith University), and Australian and Queensland Government representatives. 	
Science and new knowledge are accessible and used to support policy, programs and practical on-ground management to improve water quality outcomes.	4.3	Deliver decision support tools, communication and education products tailored to specific audiences.	On track / Underway	<ul style="list-style-type: none"> • The Reef Trust Gully Tool Box, released in 2015, was reviewed by Technical Partners during this period. An updated Toolbox is due for release mid-2019. • Outcomes from the National Environmental Science Program Tropical Water Quality Hub research are documented on the website and shared via e-Newsletters and social media platforms. <p>For more information:</p> <ul style="list-style-type: none"> • List of National Environmental Science Program (NESP) Tropical Water Quality Hub projects • NESP Tropical Water Quality Hub Website 	<ul style="list-style-type: none"> • Reef 2050 Communication Network met in Townsville and attended by 40 people to facilitate communication and coordination of water quality activities across the GBR. • As part of Queensland Government overarching GBR communications strategy, funding was provided to run additional ReefBlitz events in Brisbane and regional locations in October 2018 to encourage more people to become involved in helping protect the Great Barrier Reef and minimise their waste. The events also promoted awareness of the International Year of the Reef. A citizen science field trip was run in conjunction with the Synthesis Workshop in November. • The Office of the Great Barrier Reef and Waste team partnered with the Great Barrier Reef Foundation to have a display at the Ekka in August 2018. The display gave visitors an opportunity to find out about the work the department is undertaking around marine debris, waste, plastic pollution, climate change and protecting the Reef. • Work continued on developing the 'Love the Reef' educational digital game-based app which aims to inspire a love and respect for the Great Barrier Reef, empowering primary school students to make positive changes. • STEM Matters was appointed in June 2018 to develop a range of tools identified in Science Communication Implementation Plan including videos, podcasts and explainers. The content will be made available through the Reef

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					<p>2050 Water Quality Improvement Plan website which is being redesigned and updated as part of this project.</p> <ul style="list-style-type: none">• The P2R Projector prioritisation tool was created to support groups working with farmers to improve their water quality. It assists with the process of assessing and prioritising projects for funding. The projects propose changes in agricultural management practices for key industries in the Great Barrier Reef region. It is currently being updated and due for release 2019.

B2: Coordinating and prioritising investment

Contributing agencies and partners: Natural Resource Management bodies, Industry

Intermediate Outcomes	Id	Actions	Status	Australian Government	Queensland Government
Water quality activities are boosted beyond government funding through coordination and alignment of resources and funding across all sources.	5.1	Identify opportunities for innovative financing mechanisms to amplify funding for water quality outcomes.	On track / Underway	<ul style="list-style-type: none"> Through two Reef Trust projects designed to restore priority GBR wetlands Greening Australia continued to leverage funding to match the Australian Government investment. The Reef Funding Program through the Clean Energy Finance Corporation, announced in June 2016, established up to \$1 billion in debt or equity financing available over ten years to support projects in the Reef catchment area that reduce emissions and support delivery of the Reef 2050 plan. To date total CEFC commitments of over \$370m can be attributed to the Reef Funding Program: <ul style="list-style-type: none"> \$320m is in large scale investments (Ross River, Whitsunday and Hamilton Solar Farms, Collinsville, Daydream and Hayman Solar Farms, and Clermont Solar Farm), and over \$50m in over 370 small projects through aggregation partners at 31 December 2018 6 projects with a total value of \$1.1 million specifically targeting on-farm irrigation equipment which has a positive co-benefit for water quality <p>For more information:</p> <ul style="list-style-type: none"> CEFC Annual Report 2018-19 – Reef Funding Program 	
	5.2	Identify opportunities for co-investment or alignment of funds and resources with industry, research organisations, philanthropists, Natural Resource Management bodies, community and corporate organisations to achieve water quality objectives.	On track / underway	<ul style="list-style-type: none"> The Great Barrier Reef Foundation through the Reef Trust: Great Barrier Reef Foundation Partnership drafted their Collaborative Investment Strategy, which has set a target of attracting an additional \$300 million to \$400 million from private donors and partner organisations to complement the Government's investment. The Reef Alliance – Growing a Great Barrier Reef project through its unique cross-regional and cross-industry platform enabled a collaborative approach to improve management practices and water quality in Reef regions. It has provided a practical opportunity for Reef Alliance partners to be funded and work as a group towards the common goal of improving water quality outcomes in the Reef. The project has led to a strengthening of networks between regions and commodities as well as building capacity of staff and extension delivery partners which will allow for a more informed collaboration in future projects. 	
Investment is prioritised to ensure interventions are effective and cost-efficient and delivery mechanisms are appropriate.	5.3	Prioritise investment across Reef catchments according to catchment priorities and targets.	On track / Underway	<ul style="list-style-type: none"> Through the Reef Trust Great Barrier Reef Foundation Partnership, Alluvium was engaged to revise and expand on earlier work designed to guide investment and actions for prioritising reef investments. It is anticipated that the report will be available in 2019. 	

Intermediate Outcomes	Id	Actions	Status	Australian Government	Queensland Government
	5.4	Identify the benefits and appropriate applications of different investment mechanisms.	On track / Underway	<ul style="list-style-type: none"> The National Environmental Science Program Tropical Water Quality Hub research is providing innovative research for practical solutions to maintain and improve tropical water quality from catchment to coast. A number of projects are underway including: <ul style="list-style-type: none"> Project 2.1.4 Demonstration and evaluation of gully remediation in GBR rangelands – providing a cost-benefit analysis of erosion remediation strategies and demonstrating the benefits of best-practice erosion control to graziers, with a focus on Queensland’s Burdekin region. Project 2.1.2 Scoping options for low-lying, marginal cane land to reduce DIN in priority wet tropics catchments - exploring alternative land use options to reduce nitrogen losses from marginal sugarcane land in priority wet tropics catchments. <p>For more information:</p> <ul style="list-style-type: none"> List of National Environmental Science Program (NESP) Tropical Water Quality Hub projects NESP Tropical Water Quality Hub Website 	

B3: Governance to support coordinated decision-making and accountability

Contributing agencies and partners: Natural Resource Management bodies, Industry

Intermediate Outcomes	Id	Actions	Status	Australian Government	Queensland Government
Governance arrangements are progressively and continuously adapted, improving coordination between partners and structures at all levels.	6.1	Collaborate and coordinate between the Queensland and Australian governments, in line with the Reef 2050 Plan governance structures.	On track / Underway	<ul style="list-style-type: none"> The Joint Secretariat continues to collaborate with all levels of Reef 2050 governance (Directors-Managers, Executive Steering Committee Meetings, Reef Advisory Committee (RAC) and Independent Expert Panel (IEP)) through regular meetings, and reports to the Ministerial Forum on all Reef related matters. <p>For more information:</p> <p>Advisory bodies: http://environment.gov.au/marine/gbr/reef2050/advisory-bodies</p> <p>Ministerial Forum: http://environment.gov.au/marine/gbr/protecting-the-reef/intergovernmental-agreement</p>	
	6.2	Ensure program design aligns with water quality priorities.	On track / Underway	<ul style="list-style-type: none"> Queensland Regional Water Quality Program aligned with Reef 2050 Water Quality Improvement Plan. Continued delivery of Reef Trust projects aligned with water quality priorities Reef Trust Great Barrier Reef Foundation project aligned with the Reef 2050 Plan and Reef 2050 Water Quality Improvement Plan 	
	6.3	Ensure accountability of investment to outcomes in the Reef 2050 WQIP.	On track / Underway	<ul style="list-style-type: none"> Reef Trust Investment Strategy Phase VI published <p>For more information:</p> <ul style="list-style-type: none"> Reef Trust Investment Strategy Phase VI 	<ul style="list-style-type: none"> The 2017-2018 Queensland Reef Water Quality Program Annual Report on Queensland Reef Water Quality Program was published.
	6.4	Include all stakeholders including local organisations, communities and Traditional Owners in decision-making and priority setting.	On track / Underway	<ul style="list-style-type: none"> Under the Reef Trust Great Barrier Reef Foundation Partnership project, the Foundation released its Communication and Engagement Plan for the project. <p>For more information:</p> <ul style="list-style-type: none"> Reef Trust Great Barrier Reef Foundation Partnership Project - Communication and Engagement Plan 	<ul style="list-style-type: none"> The Reef 2050 Advisory Committee meets regularly to provide strategic advice on the implementation of Reef 2050 actions, stakeholder priorities, and highlight any emerging cross sectoral issues that need to be addressed.

B4: Evaluating performance

Contributing agencies and partners: Natural Resource Management bodies, Industry

Intermediate Outcomes	Id	Actions	Status	Australian Government	Queensland Government
Progress towards Reef 2050 WQIP targets is assessed.	7.1	Monitor and model management practice and water quality improvements through the Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Paddock to Reef).	On track / Underway	<p>Great Barrier Reef monitoring programs continue to deliver monitoring of ground cover catchment loads, riparian vegetation, wetland condition and extent monitoring in GBR catchments. The Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Paddock to Reef program) Design 2018-2022 was released in late 2018.</p> <p>The Paddock to Reef program provides the framework for evaluating and reporting progress towards Reef 2050 Water Quality Improvement Plan (Reef 2050 WQIP) targets through the Reef Water Quality Report Card. Launched in 2009, the program unites more than 20 industry bodies, government agencies, Natural Resource Management bodies, landholders and research organisations—working together to measure and report on water quality factors that impact Reef health. It is jointly funded by the Australian and Queensland governments, and has continued to improve in terms of scope, methodology and application over the 10-year period of implementation.</p> <p>Monitoring and modelling occurs across a range of attributes, from paddock scale through to sub-catchment, catchment, regional and Great Barrier Reef-wide. In line with the Reef 2050 WQIP framework, the Paddock to Reef program evaluates management practice adoption and effectiveness, catchment condition, pollutant runoff and marine condition. The program areas are inter-linked and integrated through a common assessment and reporting framework.</p> <p>In the near future, the Paddock to Reef program will be integrated into the Reef 2050 Integrated Monitoring and Reporting Program (RIMReP). The program will provide a comprehensive understanding of how the broader Reef 2050 Plan is progressing and guide future management of the Reef.</p> <ul style="list-style-type: none"> The surface and groundwater monitoring network delivered by Department of Natural Resources, Mines and Energy (DNRME) provides timely and reliable flow and ambient water quality data that underpins modelling tools and loads reporting within the Paddock to Reef program. DNRME collects high-resolution satellite imagery within reef catchments that allows estimation of changes in land cover, land use change and changes in the extent of wetlands. DNRME continues to invest in high quality, high-resolution satellite imagery for the state, which is instrumental in GBR catchment monitoring and disaster mapping. Models are being rebuilt with the most up to date data sets including new management practice adoption data, land use, groundcover, gully maps to allow us to provide modelled load reduction estimates for the 2019 report card with improved confidence in estimates. This ensures the best estimate available of modelled loads and associated reductions in loads to GBR using the latest science and input data sets. Targeted project to continue the Paddock to Reef Integrated Monitoring, Modelling and Reporting Program. Activities include data collection, management and reporting, regional liaison and regional communications. This component includes funding for the cross-regional Reef coordination. The achievements of this project include: <ul style="list-style-type: none"> Annual provision of management practice adoption data. Collection of annual fertiliser and pesticide use data for relevant regional industries. Support for the DSITI reef wetlands condition-monitoring program through on-ground assessment of wetlands. Lead annual synthesis workshops and regional workshops to review and evaluate the efficacy of on-ground Reef funded activities. Production of regional communication products to disseminate Paddock to Reef results with local stakeholders. 2018 wetland assessment data quality assurance/check completed. Analysis of data for Reef Water Quality Report Card 2019 has commenced. Sample design for intensification of the Wetland Condition Monitoring Program completed. This will enable future regional scale wetland condition reporting within the Reef Water Quality report card. Statewide regional ecosystem data including 2017 remnant extent, forming the foundation of the 2017 natural wetlands dataset released. Over 1000 new 2017 waterbody features and over 3000 delineation and attribution edits made to 2001, 2005, 2009, 2013 waterbody data sets delineated. 	
Effectiveness and efficiency of program and project design is analysed and	7.2	Assess management of all industries through stewardship and management practice frameworks.	On track / Underway		<ul style="list-style-type: none"> Revised adoption benchmarks for grains, bananas, horticulture, grazing and sugarcane reviewed and endorsed by all levels of Reef 2050 Governance.

Intermediate Outcomes	Id	Actions	Status	Australian Government	Queensland Government
the lessons are understood					
	7.3	Assess the water quality and human dimensions outcomes of projects within a consistent evaluation framework.	On track / Underway		<ul style="list-style-type: none"> CSIRO was commissioned to identify a set of social indicators that can be used to measure and track the human dimensions of practice change. The Office of the Great Barrier Reef has been consulting with a range of stakeholders on the addition of the social indicators to the Paddock to Reef Integrated Monitoring, Modelling and Reporting Program.
	7.4	Evaluate the effectiveness of programs, governance mechanisms and adaptations.	On track / Underway	<ul style="list-style-type: none"> Projects contributing to the Reef 2050 WQIP continued to report through the Monitoring, Evaluation and Reporting Tool (MERIT) 	<ul style="list-style-type: none"> First program evaluation for the Queensland Reef Water Quality Program (QRWQP) was conducted and a report was produced which identifies areas of improvement in terms of effectiveness; efficiency; appropriateness; program management; and legacy of the QRWQP.
Program and project designs are modified to build on lessons learned from implementation.	7.5	Report progress towards targets, objectives and outcomes.	On track / Underway	<ul style="list-style-type: none"> Reef water quality outcomes publication was released in November 2018, highlighting major investments for the Reef. 	
	7.6	Communicate regionally relevant information for management decisions and local communities.	On track / Underway	<ul style="list-style-type: none"> Regional waterway health report cards released for Wet tropics, Mackay Whitsunday and Fitzroy. Support provided for Regional Report Card Partnerships to produce Regional Report Cards. New Dry Tropics Partnership for Healthy Waters established. Queensland Government has continued monitoring of the regional ecosystems (ambient) health for Reef catchments for input into Regional Report Cards. Comprehensive water quality data set collected for Mackay, Wet Tropics and Dry Tropics (Black/Ross Basins only), estuaries by DES Science. An estuary pesticide monitoring program was initiated in partnership with the Reef Catchments NRM. Arrangements are now well advanced to start collection of water quality and other data in streams and estuaries in the Black Basin area north of Townsville. Modelling of freshwater fish species also continued in these regions. Fish communities sampled at 26 sites in the Mulgrave-Russell river region. <p>For more information: Regional report cards</p>	
	7.7	Make data and information publicly available through a range of communication products.	On track / Underway	<ul style="list-style-type: none"> A more refined and interactive version of the Reef Report Card developed to be published on Water Quality Improvement Plan website. <p>For more information: Interactive report card</p>	