Reef Water Quality Protection Plan 2013

Securing the health and resilience of the Great Barrier Reef World Heritage Area and adjacent catchments

Australian Government

Queensland Government

Image credits: Tourism Queensland; Reef Catchments; Burnett Mary Regional Group; Terrain Natural Resource Management; Queensland Government Department of Agriculture, Fisheries and Forestry; Queensland Government Department of Environment and Heritage Protection; Paul Dymond.

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Foreword

As one of the world's greatest natural attractions, the Great Barrier Reef is precious to all Australians, especially Queenslanders, who are proud to have such an iconic and breathtaking reef on their doorstep. The reef supports a range of industries including tourism, recreation, commercial fishing and scientific research that collectively inject around $5.7 billion per year into our regional economies.

The quality of water entering the reef has deteriorated over the past 100 years and continues to have a detrimental effect on the marine ecosystem. Recent scientific evidence suggests that declining water quality is linked to outbreaks of crown-of-thorns starfish, which accounted for 42 per cent of the coral cover decline on the Great Barrier Reef over the past 27 years. Sediment, nutrients and pesticides leaving agricultural land and draining into the reef lagoon remain the largest contributors to elevated pollutant levels.

Over the past 10 years, significant efforts have been made to improve the quality of water entering the Great Barrier Reef through the Reef Water Quality Protection Plan (Reef Plan). We acknowledge the hard work of landholders, regional natural resource management organisations, industry, conservation groups and government agencies to identify and implement improved land management practices throughout the reef catchments.

Reef Plan was updated in 2009 and has been commended, including by the World Heritage Committee, for its ambitious targets, clear actions and strong accountability.

Water quality modelling suggests that as a result of the hard work of all partners, the amount of nutrients, sediment and pesticides leaving catchments will be reduced. This is a significant achievement towards halting and reversing the decline in water quality. However, improving water quality is a major task that will take considerable time and effort. It is critical that we continue the momentum to secure the resilience of the Great Barrier Reef and improve its outstanding universal value.

Reef Plan 2013 has a renewed focus on best practice, more coordinated capacity building services and continued collaborative effort by both governments in close partnership with industry and landholders.

We acknowledge that much of the research to understand what level of management change is required to deliver a healthy reef is leading edge and is being conducted for the first time, particularly at this scale. We are committed to refining our approach and targets as new information emerges.

Hand in hand, we will continue to work with industry to improve water quality.

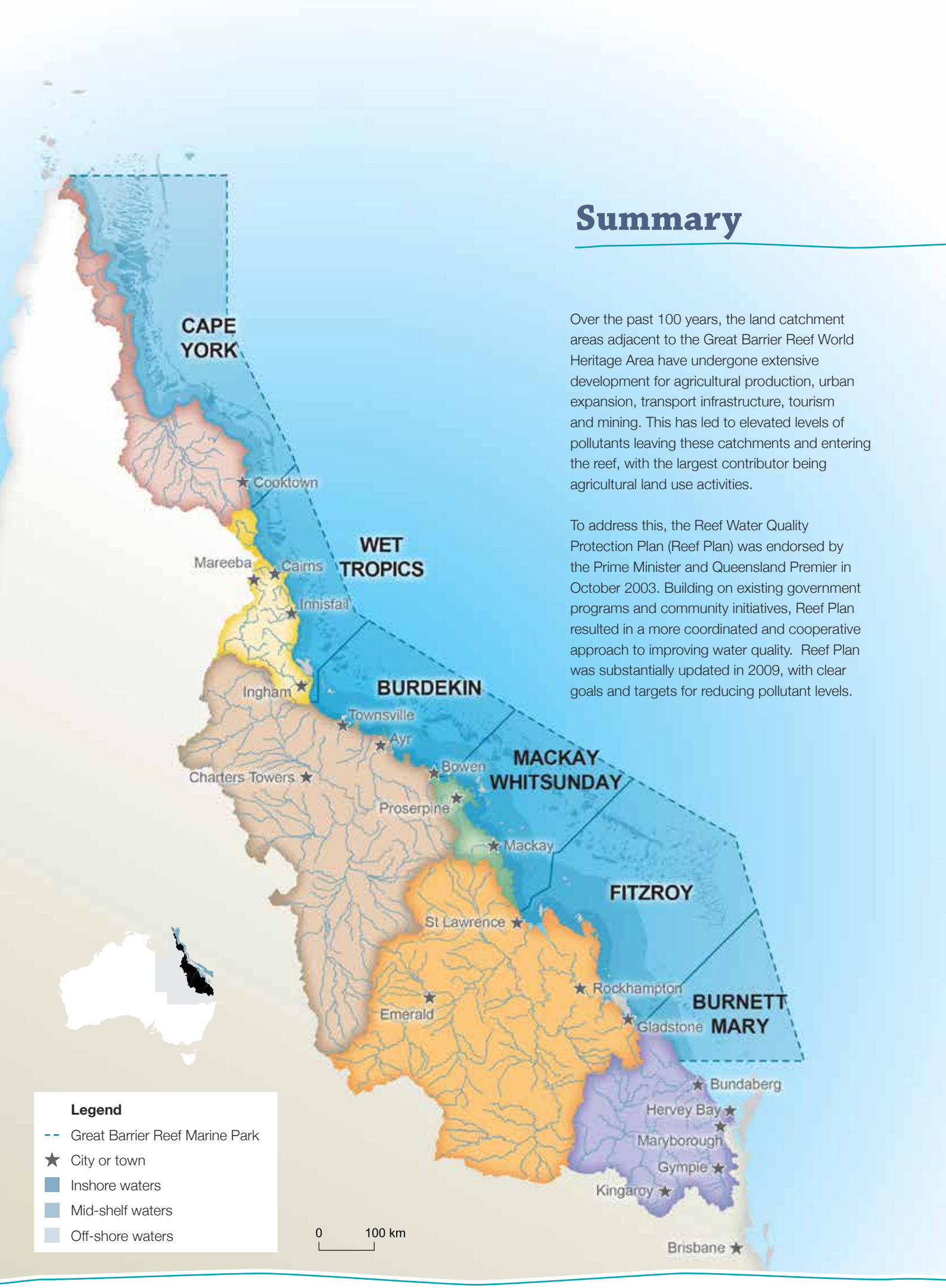
Hon Campbell Newman MP
Premier of Queensland

Hon Mark Butler MP
Minister for the Environment, Heritage and Water

Summary

Over the past 100 years, the land catchment areas adjacent to the Great Barrier Reef World Heritage Area have undergone extensive development for agricultural production, urban expansion, transport infrastructure, tourism and mining. This has led to elevated levels of pollutants leaving these catchments and entering the reef, with the largest contributor being agricultural land use activities.

To address this, the Reef Water Quality Protection Plan (Reef Plan) was endorsed by the Prime Minister and Queensland Premier in October 2003. Building on existing government programs and community initiatives, Reef Plan resulted in a more coordinated and cooperative approach to improving water quality. Reef Plan was substantially updated in 2009, with clear goals and targets for reducing pollutant levels.



The Queensland and Australian Governments collectively invested $375 million over five years to deliver Reef Plan 2009. This included the Australian Government's Reef Rescue program and the Queensland Government's water quality program. The success of Reef Plan 2009 and its supporting programs have been widely recognised, both nationally and internationally.

There is scientific evidence that poor water quality continues to have a detrimental impact on reef health. Long term monitoring of reefs by the Australian Institute of Marine Science shows the Great Barrier Reef has lost half its coral cover in the past 27 years. The loss was due to storm damage (48 per cent), crown-of-thorns starfish (42 per cent), and bleaching (10 per cent)[1]. Current scientific evidence indicates that elevated nutrient levels are linked to outbreaks of crown-of-thorns starfish. Improving water quality will potentially reduce the frequency of future outbreaks and allow coral cover to recover. Improving water quality will also build resilience in inshore coastal and seagrass areas which support significant biodiversity such as turtles and dugongs, and drive fisheries productivity.

The positive commitment by the agricultural industry and other partners to improved land management practices over the past five years cannot be understated. In the first two years of Reef Plan 2009 delivery, 34 per cent of sugarcane farmers, 25 per cent of horticulture farmers and 17 per cent of graziers adopted improved practices. Modelling is indicating that these changes will translate into between a six and 15 per cent reduction in key pollutants. It is critical that the momentum built since 2003 is maintained to secure long term improvements to reef health.

Based on the latest information drawn from new catchment modelling, the Reef Plan 2013 goals and targets have been refined. Reef Plan targets are now linked to the load reductions expected using best practice land management. The exception is the nutrient target (remaining at 50 per cent) which will be difficult to meet even using best practice. It will require new thinking and approaches to deliver substantial nutrient reduction in the Wet Tropics and Burdekin regions.

New actions have been identified for the next five years, with a focus on working more closely with industry through extension, incentives and best management practice programs to accelerate the uptake of improved practices. This approach will include a much more coordinated and integrated effort at the regional level.

Priorities have also been reviewed and refined for the next five years, one of the most critical of which is reducing nutrient runoff in the Wet Tropics and Burdekin catchments. While the greatest focus will be placed on these regions, the importance of continuing the improvements in other areas is also recognised, particularly to help improve seagrass condition and protect inshore reefs.

The Paddock to Reef Integrated Modelling, Monitoring and Reporting Program (Paddock to Reef program) will continue to be a critical component of Reef Plan 2013 to ensure the water quality benefits of innovative new practices can be evaluated and progress against targets reported.

The Australian and Queensland Governments have collectively committed a further $375 million over the next five years to help achieve the Reef Plan 2013 goals and targets. This will primarily be delivered through the Australian Government's Reef Rescue program and the Queensland Government's roll out of best management practice programs.

1 De'ath, G. Fabricius, K. Sweatman, H. and Puotinen, M. 2012. The 27–year decline of coral cover on the Great Barrier Reef and its causes. Proceedings of National Academy of Sciences.

Reef Plan history

2001 The Great Barrier Reef Ministerial Council accepted a report by the Great Barrier Reef Management Authority on the decline in water quality in the Great Barrier Reef and the importance and urgency in addressing the issue.

2002 An independent panel of experts prepared A Report on the Study of Land Sourced Pollutants and their impacts on Water Quality in and adjacent to the Great Barrier Reef.

2002 The Productivity Commission examined and evaluated a number of policy options to address declining water quality entering the reef.

2003 The Reef Water Quality Protection Plan was released for public consultation. Following this consultation, the plan was revised and endorsed by the Great Barrier Reef Ministerial Council.

2005 An audit of Reef Plan was conducted by Howard Partners Pty Ltd and the report formed the basis of the Report to the Prime Minister and the Premier of Queensland—Progress to Date, Challenges and Future Directions.

2007 A Reef Water Quality Partnership was established between regional natural resource management organisations and the Australian and Queensland Governments to enable coordinated, scientifically robust and collaborative target setting, monitoring and reporting arrangements.

2008 A task force of scientists advised what scientific advances had been made in understanding reef water quality issues in the Scientific Consensus Statement on Water Quality in the Great Barrier Reef and said that current management interventions were not effectively solving the problem.

2008 A Reefocus Summit was held to seek stakeholder views on an updated Reef Plan.

2009 The Reef Water Quality Protection Plan 2009 was endorsed by the Australian and Queensland Governments.

2010 An audit of Reef Plan was conducted by Lloyd Consulting which showed that progress on actions was positive.

2011 The First Report Card was released, setting the 2009 baseline against which progress would be measured.

2013 The 2010 Report Card was released, showing good progress towards targets.

2013 The Scientific Consensus Statement was updated by leading scientists with the latest information to inform future management.

2013 Release of the 2011 Report Card, showing continued positive progress towards targets.

2013 The Reef Water Quality Protection Plan 2013 was endorsed by the Australian and Queensland Governments.

Introduction

The Great Barrier Reef is a World Heritage Area, internationally recognised for its outstanding universal value. The long term conservation of the reef for future generations requires collective action by community organisations, regional natural resource management organisations, landholders, conservation groups and all levels of government.

In considering the state of conservation of the Great Barrier Reef World Heritage Area in 2012, the World Heritage Committee "welcomed the initial positive results of Reef Plan and associated measures to address major long term impacts on the property from poor water quality, and requested the State Party, in collaboration with its partners, to maintain, and increase where necessary financial investment and sustain the positive trend beyond 2013".

There is ongoing support from both the Australian and Queensland Governments to ensure the quality of water entering the reef from adjacent catchments has no detrimental impact on the health and resilience of the Great Barrier Reef. Reef Plan 2013 is a major part of the two governments' response to the World Heritage Committee.

Sustainable and profitable farming activities and a healthy and resilient reef can coexist. Both contribute significantly to Queensland and Australia's social and economic profile. The reef contributes around $5.7 billion[2] to the Australian economy through tourism, recreation, commercial fishing and scientific research, supporting significant regional employment. The beef, sugarcane and horticulture industries in reef catchments contribute approximately $3.7 billion a year in gross value of production[3] and also support significant regional employment.

2 Deloite Access Economics 2013. Economic contribution of the Great Barrier Reef. Prepared for the Great Barrier Reef Marine Park Authority.

3 Australian Bureau of Statistics, Value of Agricultural Commodities Produced, Australia (cat. no. 7503.0).

What is Reef Plan?

Reef Plan is a joint commitment of the Australian and Queensland Governments. The plan is a collaborative program of coordinated projects and partnerships designed to improve the quality of water in the Great Barrier Reef. It identifies actions that will help minimise the risk to the reef from a decline in the quality of water entering the reef from adjacent catchments, including improving land management in reef catchments to reduce non-point source pollution.

Reef Plan sets ambitious but achievable targets for improved water quality and land management practices, and identifies actions to improve the quality of water entering the reef (Figure 1). The plan is a significant part of the overall strategy of both governments to protect and preserve the reef. It incorporates and supports the actions of industry, community groups and government that impact on reef health and links with a number of other legislative and planning initiatives.

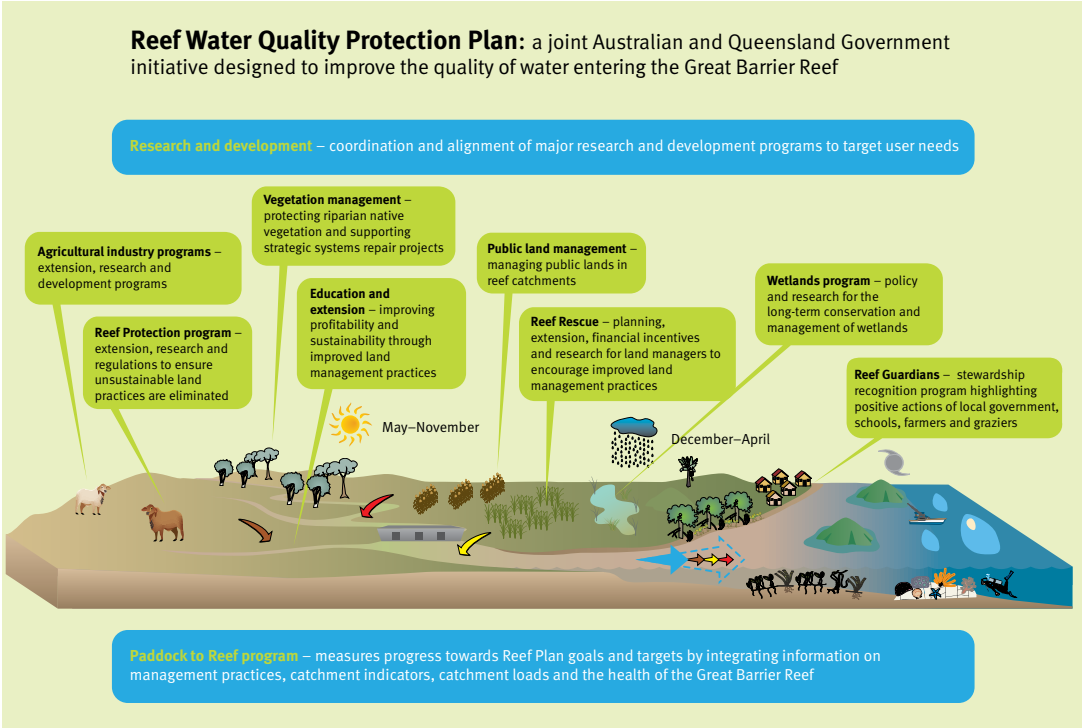


Figure 1: Key components of the Reef Water Quality Protection Plan 2013

Farmer Profile

Robin's pesticide application has been reduced by two-thirds since working with consultants on the Fitzroy Basin Association's Grains Best Management Practice program.

"I realised I'd been using the incorrect nozzles and applying much more pesticide than I needed. (The new practices) improved my pesticide application so that it was being applied directly to my crop and not drifting into sensitive areas like waterways."

Robin Murphy, grains farmer, Fitzroy region.

Image courtesy of Fitzroy Basin Association.

Scope

Reef Plan's primary focus is to continue addressing diffuse source pollution from broadscale land use.

The latest modelling and monitoring supports previous research which indicates that the vast majority of loads of sediment, nutrients and herbicides are derived from diffuse agricultural sources (Figure 2), in particular dryland grazing and sugarcane[4]. Therefore, Reef Plan 2013 remains predominantly focused on working with landholders to address diffuse sources of pollution from broadscale land use.

Other sources of pollution also need to be managed such as urban stormwater runoff, sewage, industrial pollution and water releases from mines. For point sources of pollution, regulatory and other requirements are already in place to manage discharge and runoff through legislation, policies and conditions on environmental approvals. Major improvements have also been made to minimise water quality impacts from urban areas, for example through major investments to upgrade sewage treatment plants, which now contribute less than four per cent of the total nutrients to the reef.

Diffuse source pollution is pollution that comes from a wide range of different sources and cannot be directly attributed to one point of dispersal, such as a pipe or waste outlet.

Broadscale land use includes agriculture, such as grazing, cropping, horticulture and forestry, and other ownership of public land (e.g. national parks and reserves).

Urban environments include areas in and around cities and high growth population centres within the Great Barrier Reef catchment.

The primary focus of this plan on diffuse source pollution from broadscale land use will be complemented by some foundational work over the next five years to further reduce diffuse source pollution from urban environments. Incorporated into this plan are a number of actions that integrate with other water quality issues such as urban runoff and coastal and riverine ecosystem health.

Figure 2: Sources of pollution

4 See 2013 Scientific Consensus Statement for more detailed information on particular pollutants and regions.

Reviewing Reef Plan

Ten years of Reef Plan

In 2013, Reef Plan reached its tenth anniversary. The original Reef Plan, established in 2003, laid the groundwork for improving water quality by setting out a clear objective to halt and reverse the decline in the quality of water entering the reef by 2013. It outlined a comprehensive suite of actions to be delivered through government policies and industry and community initiatives.

An independent audit in 2005 highlighted that while progress was being made, two of the challenges were improving the speed of uptake of best management practice and measuring uptake. The 2008 Scientific Consensus Statement reaffirmed this conclusion and stated that current management actions were not effectively solving the problem. To address this, an updated Reef Plan was established in 2009, which included 11 key actions designed to accelerate the uptake of best management practice through a combination of incentives, extension services and a regulatory safety net. It included ambitious targets, clear accountability for delivery of actions and a strong monitoring program to evaluate progress.

An independent audit of Reef Plan 2009 was undertaken in late 2010 and early 2011 to assess progress in implementing actions. The audit found that progress towards the desired outcomes was positive overall and the partners involved in the program felt positive, engaged and committed. The audit found there had been good progress in implementing the 11 actions; however, it also highlighted some areas for improvement, including a higher level of resourcing and greater attention to and collaborative effort around extension initiatives.

Extension seeks to turn education into action. This involves a range of processes that enable change through facilitating the desired set of social, cultural and technical conditions, which build the capacity and resilience of individuals, businesses and learning networks. Extension officers aim to assist producers evaluate, trial, adapt, adopt, integrate, review and innovate to enhance enterprises.

With Reef Plan's 10-year anniversary in 2013, it was timely to look back, consider the lessons learned and build on the successes. The review focused on what is required to achieve Reef Plan's long term goal of ensuring that by 2020 the quality of water entering the reef from broadscale land use has no detrimental effect on the health and resilience of the Great Barrier Reef.

Reef Plan 2013 commits to working to deliver this long term goal by 2020. This, again, is an ambitious goal but is underpinned by considerable momentum developed over the past 10 years and improved science and knowledge which will support the collective efforts of partners to improve the resilience of the reef over the next five years.

Achievements to date

Key achievements of Reef Plan 2009

Investment

The Australian and Queensland Governments invested more than

$375 million over five years for Reef Plan activities

including

$200 million by the Australian Government for the Reef Rescue program

Reef Rescue has leveraged significant co-investment, with land managers contributing on average

$1.80 in-kind labour for each $1

provided through Reef Rescue

$175 million by the Queensland Government for a range of programs including regulations, extension and research

Actions

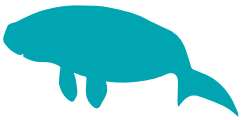
Since the release of Reef Plan 2009, significant progress has been made across several areas including...

implementation of the Reef Rescue program which has, after four and a half years, helped more than...

2300 farmers improve land management practices across more than **1,000,000 hectares**

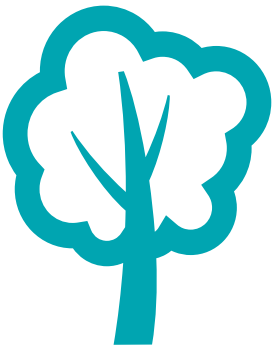
1100 graziers improve groundcover management through water quality grants, extension and training

engagement with



40 Traditional Owner groups through sea country management activities, such as Traditional Use of Marine Resource Agreements

new agreements and Queensland Government funding of **$8.6 million** to establish **Best Management Practice Programs** in partnership with industry, signalling a transition to co-management



there are now **230 Nature Refuges** within the reef catchments, totalling **1,009,372 hectares**

protection of wetlands of high ecological significance from high impact earthworks

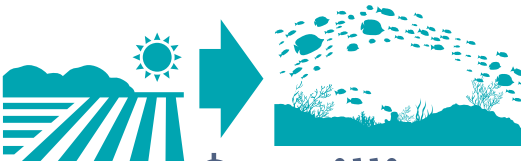
Queensland Government Reef Water Quality Program

implementation of the Queensland Government Reef Water Quality program which included a suite of actions including regulation, extension and

32 new research projects

16 new research projects through the Australian Government **National Environmental Research Program**

18 new research projects through Australian Government **Reef Rescue research and development** program



implementation of the **$9 million** a year **Paddock to Reef program** which is a highly innovative approach to integrating monitoring and modelling at paddock, catchment and marine scales

200 individual producers were engaged in more than **430 extension and coordination activities** as part of a pilot program to enhance extension

Delivering Reef Plan 2009

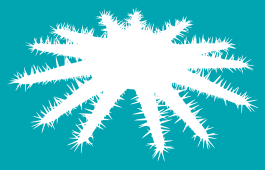
Goals and targets

Progress towards Reef Plan goals and targets is measured through the Reef Plan report cards. Annual report cards have confirmed the positive trends seen in management practice change and showed that estimated average annual pollutant loads reduced in the first two years (2009-2011) – nitrogen by seven per cent, sediment by six per cent and pesticides by 15 per cent. These results showed for the first time a reduction in pollutant loads – a significant achievement following a long history of declining water quality. The reductions in pollutant loads were driven by the significant uptake of improved practices by landholders. Between 2009 and 2011, 34 per cent of sugarcane growers, 17 per cent of graziers and 25 per cent of horticulture producers adopted an improved practice.

While progress in the adoption of improved practices on the ground has been encouraging, it will take time for these achievements to translate into improved conditions in the marine environment. In fact, the marine condition has declined in recent years because of the impact of larger and more frequent floods and episodic events in adjacent catchments. The flood events are thought to have triggered another crown-of-thorns starfish outbreak.

Crown-of-thorns starfish outbreaks

Current scientific evidence indicates that elevated nutrient levels are linked to outbreaks of crown-of-thorns starfish. When a dramatic increase in nutrient levels in the water coincides with these animals' spawning season (November to January), the larval crown-of-thorns starfish are able to develop, grow and survive at much higher than normal rates, due to an increase in phytoplankton, which is the main food source for crown-of-thorns starfish larvae. Higher survival means higher numbers of starfish developing into juveniles, at which stage they start feeding on coral.



Modelling potential future improvements

Cutting edge catchment modelling, used to estimate pollutant load reductions for report cards, was used in early 2013 to test whether the load reduction targets would be achieved under a range of different management practice adoption scenarios. The results indicated that the sediment and pesticide targets of Reef Plan 2009 are achievable if there is widespread adoption of best practice in cane and grazing, but delivering a major reduction in nitrogen would be challenging on a reef-wide scale.

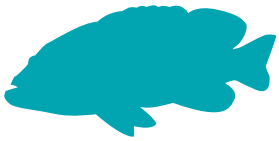
The results of the modelling scenarios demonstrate how much more advanced the knowledge around water quality is compared to five years earlier, and, combined with the recent relative risk assessment[5] help indicate where efforts should be focussed to maximise the return on investment.

Scientific Consensus Statement 2013

The establishment of Reef Plan in 2003 and the update in 2009 was supported by a body of scientific evidence showing a decline in reef water quality. As a result of major investments in research and development through the National Environmental Research Program, Reef Rescue, Queensland Government and other programs, there continue to be significant advances in scientific understanding of the problem and solutions.

To ensure that new knowledge was integrated into the implementation of management actions, an updated Scientific Consensus Statement was prepared to inform Reef Plan 2013. A taskforce of key scientists contributed to the statement and it was reviewed by the Reef Plan Independent Science Panel.

5 Brodie, J. et al. 2013 (in review). Assessment of the risk of pollutants to ecosystems of the GBR including differential risk between sediments, nutrients and pesticides and between land uses, industries and catchments. Project funded by Queensland Government Department of Environment and Heritage Protection as part of the Reef Plan Scientific Consensus Statement 2013.



Key conclusions from the Scientific Consensus Statement

The overarching consensus is that **key Great Barrier Reef ecosystems are showing declining trends in condition due to continuing poor water quality, cumulative impacts of climate change and increasing frequency and intensity of extreme events.**

The evidence base is synthesised in a series of five supporting chapters and the following conclusions are based on those detailed reviews:

1. The decline of marine water quality associated with terrestrial runoff from the adjacent catchment is a major cause of the current poor state of many of the key marine ecosystems of the Great Barrier Reef.
2. The greatest water quality risks to the Great Barrier Reef are from nitrogen discharge, associated with crown-of-thorns starfish outbreaks and their destructive effects on coral reefs, and fine sediment discharge which reduces the light available to seagrass ecosystems and inshore coral reefs. Pesticides pose a risk to freshwater and some inshore and coastal habitats.
3. Recent extreme weather– heavy rainfall, floods and tropical cyclones – have severly impacted marine water quality and Great Barrier Reef ecosystems. Climate change is predicted to increase the intensity of extreme weather events.
4. The main source of excess nutrients, fine sediments and pesticides from Great Barrier Reef catchments is diffuse source pollution from agriculture.
5. Improved land and agricultural management practices are proven to reduce the runoff of suspended sediment, nutrients and pesticides at the paddock scale.

Independent Science Panel remarks

The Independent Science Panel (the panel) was established in 2009 to provide multidisciplinary scientific advice to the Australian and Queensland Governments on implementing Reef Plan. The panel also oversaw and reviewed the 2013 Scientific Consensus Statement.

In reviewing the evidence and conclusions of the Consensus Statement, the panel noted that:

1. There has been excellent progress over the past four years with greater scientific understanding and measurement of ‘catchment to reef’ processes and progress by the farming community towards land management practices that reduce pollutant loads to the Great Barrier Reef.
2. Water quality modelling, supported by appropriate validation, indicates that early adopters of best practice land management have reduced total pollutant loads - a significant step towards the goal of halting and reversing the decline in water quality to the reef.
3. The recent relative risk assessment is a major achievement allowing the development of cost-effective, regionally-specific management actions to improve water quality. The leading example is the recommendation to reduce nitrogen loads from northern rivers. This will reduce the frequency and severity of primary outbreaks of crown-of-thorns starfish arising from floods in this area, which propagate to many other reefs in the central Great Barrier Reef over 15-year cycles.
4. While current management interventions are starting to address water quality in the Great Barrier Reef, sustained and greater effort will be needed to achieve the ultimate goal of no detrimental impact on the health and resilience of the reef. In addition to continuous improvement, transformational changes in some farming technologies may be necessary to reach some targets.
5. Conditions in terrestrial catchments are most strongly connected with marine receiving waters during floods but the extreme rainfall causing major floods is often episodic and may be separated by decadal droughts. Consequently, there are inherent and complex lags in this system which must be recognised in performance evaluations of Reef Plan. This challenge is best met by investing in continued development of coupled catchment-reef models and the essential collection of adequate data to calibrate and validate the models.
6. The Consensus Statement has identified new knowledge needed to help achieve the ultimate goal of Reef Plan. These are outlined in the supporting chapters of the Consensus Statement and will assist with identifying future research priorities. Future efforts should focus on synthesising the knowledge gained and communicating the results to landholders and decision makers. The Consensus Statement provides an excellent platform for this work.

Delivering Reef Plan 2009

Paddock to Reef program review

A coordinated and comprehensive monitoring and reporting program is essential to evaluate the performance of Reef Plan. The Paddock to Reef program, funded jointly by the Australian and Queensland Governments, is a collaboration involving industry, regional natural resource management organisations, research organisations and government. The Paddock to Reef program integrates information on management practices, catchment indicators, catchment water quality and the ecological health of the Great Barrier Reef.

A review of the Paddock to Reef program was undertaken in 2012 to evaluate the strengths and weaknesses of the program and ensure it continues to effectively measure the progress of Reef Plan. The key strengths of the program are its collaborative nature, comprehensiveness and ability to integrate a range of monitoring and modelling information on management practices, catchment indicators, catchment loads and the health of the reef. The management practice adoption component was considered a major weakness of the program due to the lack of clear processes and quality controls. However, respondents indicated that ultimately this dataset may prove the most powerful in terms of informing management. The importance of finer scale data at the sub-catchment scale is also recognised and would assist in better informing regional management priorities. The review, workshops and subsequent working groups will inform an improved Paddock to Reef program design and proposed implementation beyond 2013.

Stakeholder involvement in updating Reef Plan

Reef Plan 2013 was developed in close consultation with stakeholders. The Partnership Committee, which includes representatives from industry, conservation groups, natural resource management bodies and government, was instrumental in its development.
The Independent Science Panel provided ongoing scientific support and advice. This consultative approach will continue during the implementation of Reef Plan 2013.

Farmer Profile

Aaron has used new technology to combine both economic viability and environmental sustainability.

"With the use of my computer or smart-phone I can log onto my farm computer, check the probes, stop/start irrigations, and also decide whether to fertilise or not - all done remotely. This technology allows me to farm in a smarter way and produces less runoff."

Aaron Linton, cane farmer, Burdekin region.
Image courtesy of NQ Dry Tropics.

Our desired future

The **Great Barrier Reef** will be **healthy** and **resilient** and **support world class tourism** and other **industries reliant** on the reef.

Reef Plan's **world leading approach** to **reducing catchment runoff** will be an example to which **other countries can aspire.**

The program will **be adaptive** and **continually improving** as science **advances**.

Cutting edge research, development **and innovation will drive** some of the most **sustainable farming in Australia.**

Queensland will be known for its **profitable and sustainable farming enterprises** run by **farmers and graziers** who are acknowledged as **good stewards of the land.**

Governments, industry, conservation groups and local communities will be working **hand in hand** to **improve** water quality.

Goals and targets

Reef Plan's long term goal is to **ensure that by 2020 the quality of water entering the reef from broadscale land use has no detrimental impact on the health and resilience of the Great Barrier Reef.**

Targets for land management and water quality improvement have been set to help identify a pathway towards that goal.

Both the goal and targets are considered ambitious and give all partners something to which to aspire. Some will be more challenging to meet than others, but overall, they seek to move land management to best practice in as wide an area as possible which will have positive water quality benefits for the reef.

The actions outlined in Reef Plan 2013 are designed to achieve progress towards the targets and ultimately the long term goal. Guiding principles help focus management actions and signal that priorities have been reviewed and refined with regard to water quality improvement, with a focus on highest risk pollutants and areas. The guiding principles also recognise that achieving best practice on its own may not be enough to achieve the long term goal and that more innovation will be needed, particularly for nutrient management.

Water quality targets

When targets were originally set in 2009, they were based on the best available evidence at the time, including regional Water Quality Improvement Plans, and were designed to be ambitious. Since then, scientific knowledge and monitoring and modelling information has advanced significantly. As a result, the targets have been refined based on this improved information. There is still, however, a gap in knowledge about what load reductions in which pollutants will be required to maintain reef health and achieve the Great Barrier Reef Marine Park Authority marine water quality guidelines at a reef-wide scale. It is expected that this information will be available within the life of Reef Plan 2013 and will help to further refine Reef Plan targets over time.

In the meantime, refined targets have been set for the next five years, generally based on the estimated load reductions that can be achieved through delivery of best management practice systems. The exception is the nitrogen target, which remains ambitious and may not be achievable using current best practice alone and may require new thinking and approaches in the Wet Tropics and Burdekin regions. The 'priority areas' referred to in the targets are defined for the purposes of reporting in Appendix 1. Progress will be reported for all regions where relevant, with increased focus on the priority areas.

Land management and catchment targets

The land management target relates to the implementation of best management practice systems across each of the industries. The focus is on management 'systems', rather than individual practices, which on their own may not lead to a complete system change. The target is also based on area of land rather than on the number of farmers in recognition that the water quality benefit will be maximised when a larger area of land is under improved management.

The groundcover target has been refined based on a range of independent studies which indicate that a cover level of 70 per cent is required to minimise erosion by water[6]. It is recognised that cover may vary spatially and temporally and the

6 Lang, RD (1979). The effect of ground cover on surface runoff from experimental plots. Journal of the Soil Conservation Service of NSW 35 (2), 108-114. McIvor, JG, Williams, J and Gardener, CJ (1995). Pasture management influences runoff and soil movement in the semi-arid tropics. Australian Journal of Experimental Agriculture, 35 (1), 55-65. Bartley, R, Corfield, JP, Abbott, BN, Hawdon, AA, Wilkinson, SN, and Nelson, B (2010a). Impacts of improved grazing land management on sediment yields, Part I: hillslope processes. Journal of Hydrology 389 (3–4), 237-248. Silburn DM, Carroll C, Ciesiolka, CAA, deVoil, RC and Burger, P (2011). Hillslope runoff and erosion on duplex soils in grazing lands in semi-arid central Queensland. I. Influences of cover, slope, and soil. Soil Research 49, 105–117.

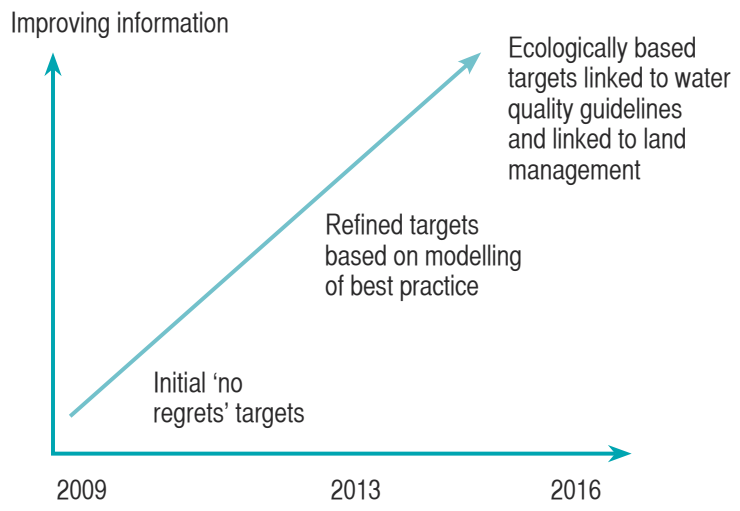
target may be ambitious in drought conditions. Future monitoring will look to report the 'patchiness' of cover to provide this contextual information. Work is underway to better define regional targets and communicate information on cover to land managers. As monitoring and information on land management indicators improve, the target will be refined as needed.

The wetlands target has also been revised to allow for the values and ecological processes of wetlands to be monitored, rather than just extent. At this point, it is not possible to assess the condition of riparian areas, so the target remains based on extent.

Line of sight to regional targets

Reef-wide targets are important to monitor the progress of Reef Plan broadly. However, each region is different in terms of land use, current management practices and other physical attributes like soil type, terrain and climate. Each region, therefore, contributes differently to the overall targets. A number of regions have previously established regionally specific water quality and groundcover targets through Water Quality Improvement Plans. To ensure consistency with the broader Reef Plan targets, water quality improvement planning processes should consider Reef Plan's long term goal and use consistent modelling and monitoring information to set regional targets that align with Reef Plan.

Continuous improvements in targets



Water quality science is continually improving and as new information comes to hand targets will need to be refined to take this into account. The intent is to ensure longer term that water quality targets are ecologically based and linked to water quality guidelines and reef health. Through the eReefs project, a receiving waters model will be developed to help provide the missing link between existing catchment models and marine water quality guidelines. The model is expected to be completed in 2015. Targets will be reviewed once this information is available.

Farmer Profile

Rod has successfully trialled new innovations on his property in order to reduce runoff, adapting 'Weedseeker' technology commonly used in cropping to his cane farm, resulting in reductions of up to 27 per cent in herbicide application and saving him roughly $10 to $12 per hectare on the cost of herbicide.

He is actively involved in the Paddock to Reef program and has a monitoring site on his property.

Rod Lamb, cane farmer,
Mackay Whitsunday region.

Goals and targets

Long Term Goal

To ensure that **by 2020 the quality of water** entering the reef from broadscale land use **has no detrimental impact** on the **health and resilience** of the **Great Barrier Reef.**

Water quality targets* (2018)

At least a **50 per cent reduction** in anthropogenic end-of-catchment **dissolved inorganic nitrogen** loads in priority areas.

At least a **20 per cent reduction** in anthropogenic end-of-catchment loads **of sediment and particulate nutrients** in priority areas.

At least **a 60 per cent reduction** in end-of-catchment **pesticide loads** in priority areas.

Land and catchment management targets* (2018)

90 per cent of sugarcane, horticulture, cropping and grazing lands are managed using best management practice systems (soil, nutrient and pesticides) in priority areas.

Minimum **70 per cent late dry season groundcover** on grazing lands.

The extent of **riparian vegetation is increased.**

There is **no net loss** of the extent, and an improvement in the ecological processes and environmental values, of **natural wetlands.**

Guiding principles

Innovative approach	Identify, integrate with best management practices and implement innovative practices that will deliver substantial change in anthropogenic nutrient, sediment and pesticide runoff.
Targeted approach	Continue to reduce pollutant loads, particularly by targeting water quality improvement to the highest risk pollutants in the highest risk regions.
Whole-of-catchment	Protect and enhance key areas of the region, including wetlands and riparian areas, which have a water quality protection function and an intrinsic value in their own right.

* Please note targets are based on comparisons with the 2009 baseline.

Actions

Three priority work areas have been established to improve water quality outcomes:

1. **Prioritising investment and knowledge**—Prioritise, coordinate and integrate programs to maximise reef water outcomes.
2. **Responding to the challenge**—Landholders adopt management systems that maximise reef water quality improvements while maintaining and enhancing resilience, business performance and environmental outcomes. Government policies and programs that support Reef Plan goals and targets are maintained.
3. **Evaluating performance**—The efficiency and effectiveness of Reef Plan is measured through monitoring, evaluation and reporting.

There are nine key actions grouped by priority work areas. The actions are relatively broad and encompass a number of deliverables. This provides flexibility and adaptability to ensure other activities can be undertaken that contribute to achieving the targets. The lead organisation is responsible for coordinating implementation and reporting progress to ensure actions are completed and milestones met. Many of the actions and deliverables will require a partnership approach.

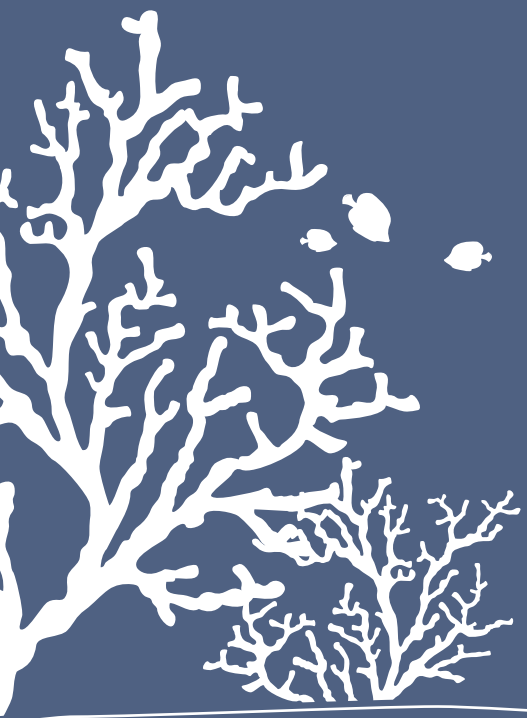
The actions in Reef Plan 2013 build upon activities that have occurred over the past 10 years of Reef Plan.

Prioritising investment and knowledge

Desired outcome

Prioritise, coordinate and integrate programs to maximise reef water quality outcomes.

To achieve this outcome, issues and risks need to be clearly assessed and defined at the appropriate scales, and actions prioritised using best available information. The priorities for research, development and innovation need to be determined over the short and long term.



Action	Deliverables	Timeframe	Lead organisation/s[7]	Contributors[8]
1. Develop, implement and maintain a Research, Development and Innovation Strategy to identify research and development priorities and encourage identification of innovative ways of reducing nutrient, pesticide and sediment runoff.	Develop a five-year Research, Development and Innovation strategy on the most cost effective and critical research and development priorities and update as required.	December 2013	DPC	DSEWPaC, DAFF, GBRMPA, DNRM, DSITIA, DEHP, QDAFF, research organisations, regional NRM organisations, Independent Science Panel.
2. Coordinate and integrate agreed research, development and innovation priorities into research and development programs.	Establish a research, development and innovation coordination group to identify priorities and integrate and communicate programs of work.	July 2013	DPC	DSEWPaC, DEHP, GBRMPA, DAFF, QDAFF, research organisations, industry groups, Independent Science Panel, WWF
	Help determine the pollutant load reductions required to meet marine water quality guidelines, by completing a receiving water model as part of the eReefs project.	June 2015	Great Barrier Reef Foundation	BoM, Queensland Government, DSEWPaC, CSIRO, DPC
	Ensure resources are identified for the synthesis and transfer of knowledge between research and monitoring programs and end users.	December 2013	DPC	DEHP, DSITIA, research organisations, industry groups, DSEWPaC, QDAFF, GBRMPA, DAFF
	Prepare an evaluation report outlining the delivery of Research, Development and Innovation priorities.	Biennially	DPC	DSEWPaC, DAFF, research organisations, Independent Science Panel
3. Prioritise and align investments based on risk assessments of key pollutants, source areas and the risk they pose to Great Barrier Reef ecosystems, as well as information on priority areas for rehabilitation.	Investment through Reef Plan is informed by an investment prioritisation process which identifies priority pollutants, industries and areas.	December 2013	**DSEWPaC**, DAFF, DPC, DNRM, DEHP	Reef scientists, GBRMPA, DSITIA, QDAFF, industry groups, regional NRM organisations, research organisations, Independent Science Panel, WWF

7 The lead organisations are those that have a direct lead role in delivery of the action or deliverable. Where there is shared responsibility, the organisation highlighted in bold is responsible for reporting on delivery.

8 Contributors are those organisations or agencies that contribute to delivery of the action or deliverable, or that provide advice to inform implementation.
DPC – Queensland Government Department of the Premier and Cabinet; DSEWPaC – Australian Government Department of Sustainability, Environment, Water, Population and Communities; DAFF – Australian Government Department of Agriculture, Fisheries and Forestry; DNRM – Queensland Government Department of Natural Resources and Mines; DEHP – Queensland Government Department of Environment and Heritage Protection; QDAFF – Queensland Government Department of Agriculture, Fisheries and Forestry; BOM – Bureau of Meteorology; GBRMPA – Great Barrier Reef Marine Park Authority; DSITIA – Queensland Government Department of Science, Information Technology, Innovation and the Arts; DSDIP – Queensland Government Department of State Development, Infrastructure and Planning; LGAQ – Local Government Association of Queensland; NPRSR – Queensland Government Department of National Parks, Recreation, Sport and Racing; NRM – Natural Resource Management.

Prioritising investment and knowledge

Action	Deliverables	Timeframe	Lead organisation/s[7]	Contributors[8]
3. Prioritise and align investments based on risk assessments of key pollutants, source areas and the risk they pose to Great Barrier Reef ecosystems, as well as information on priority areas for rehabilitation. (continued.)	Review investment prioritisation and risk assessment process based on new research, monitoring and knowledge.	As required	**DSEWPaC,** DAFF, DEHP	DEHP, DPC, DAFF, DNRM, GBRMPA, QDAFF, industry groups, regional NRM organisations, research organisations, WWF
	Agree on a coordinated Reef Plan investment strategy for implementing Reef Plan.	December 2013	**DPC**, DSEWPaC	QDAFF, DEHP, DNRM, DSITIA, DAFF
	Prioritise coastal, urban and wetland rehabilitation activities that improve water quality and Great Barrier Reef health in order to inform state, national and regional programs of work.	June 2014	GBRMPA	DSEWPaC, DEHP, regional NRM organisations, DPC, DNRM, industry groups, research groups, WWF
	Undertake a mid-term review of Reef Plan goal timeframe and targets once a receiving waters model is complete and information is available to consider ecologically based water quality targets. Review other targets in light of new information.	January 2016	**DPC**, DSEWPaC	DSEWPaC, DEHP, DAFF, GBRMPA, QDAFF, DSITIA, DNRM, industry groups, regional NRM organisations, WWF, Independent Science Panel.

Farmer Profile

David and Adele O'Connor's property has been in their family for over 125 years. They have implemented an intensively managed rotational grazing system, enabling them to monitor the pastures and their cattle on a regular basis and assess how the property is performing within the ecosystem. They have also performed extensive soil tests, invested in new equipment and have fenced according to land type to allow for more efficient grazing and prevent patch grazing in areas preferred by stock.

"The most important thing about these changes to our grazing and cropping systems are the improved long term sustainability and resilience of the property," said David.

David and Adele O'Connor (pictured with their daughters), graziers and grain farmers, Fitzroy region.
Image courtesy of AgForce.

Responding to the challenge

Desired outcome

Landholders adopt management systems that maximise reef water quality improvements while maintaining and enhancing resilience, business performance and environmental outcomes.

Government policies and programs that support Reef Plan goals and targets are maintained.

Within the overall management system, Reef Plan focuses on the suite of complementary practices that need to be implemented in a systematic way to achieve cost effective pollutant reductions.

Programs that proactively engage landholders to engender change need to be developed, implemented and continuously improved. The focus is on voluntary adoption programs, such as extension, training, planning, incentives and Best Management Practice programs, to stimulate a permanent move towards practices and systems that achieve cost effective reductions in pollutant loss. A key to achieving this is through targeted and coordinated delivery across the range of programs at a Great Barrier Reef-wide, regional or catchment scale, responding to regional priorities.

Action	Deliverables	Timeframe	Lead organisation/s	Contributors
4. Increase understanding of farm management practices and systems, economics and water quality benefits.	Review existing commodity specific management practices and identify the most critical, cost effective and profitable management practices and systems.	June 2014 and updated biennially thereafter	**QDAFF**, DEHP	Management Practice Advisory Group, industry groups, regional NRM organisations, DSITIA, CSIRO, private providers, research organisations, DSEWPaC, DAFF
	Use this information to prioritise investment of the most critical, cost effective and profitable practices and systems at a regional/catchment scale.	Ongoing	Regional NRM delivery agents[9]	DSEWPaC, DAFF, QDAFF, DEHP, DNRM, industry groups
5. Deliver targeted and coordinated extension, best management practice and incentive activities to maximise uptake of management practices and systems.	Update Extension and Education Strategy in light of best available science and new and emerging initiatives.	June 2014	QDAFF	Management Practice Advisory Group, DEHP, regional NRM organisations, industry groups, DSEWPaC, DAFF
	Formalise a ReefNet network of catchment, regional and reef-wide groups to share information and facilitate coordination of activities.	June 2014	QDAFF	Industry groups, DEHP, DSEWPaC, DNRM, regional NRM organisations, private providers
	Work with industry and government to ensure that activities such as extension, incentives and best management practice are targeted and coordinated at the regional level to help accelerate long term management system change.	June 2014 and review annually	Regional NRM delivery agents	Regional NRM organisations, industry groups, QDAFF, DEHP, DNRM, DSEWPaC, DAFF
	Develop and implement best management practice programs for sugarcane and grazing and continue the horticulture, grains and cotton best management practice programs.	June 2014	**Industry groups**, regional NRM organisations	DEHP, QDAFF
6. Maintain and enhance policies and programs that support Reef Plan goals and targets.	Adaptively manage the delivery of the second phase of Caring for our Country Reef Rescue to support Reef Rescue and Reef Plan goals and targets.	Ongoing	**DSEWPaC**, DAFF	Regional NRM organisations, industry groups
	Adaptively manage the delivery of the Queensland NRM investment program to support Reef Plan goals and targets.	Ongoing	DNRM	DSEWPaC, DPC, DEHP, DSITIA, QDAFF
	Maintain and report annually on new land management agreements in reef catchments where leases trigger the Queensland's State Rural Leasehold Land Strategy.	Annually	DNRM	QDAFF, DSITIA
	Maintain Queensland reef protection legislation until best management practice programs have effect.	Review June 2014	DEHP	QDAFF, industry groups, DPC

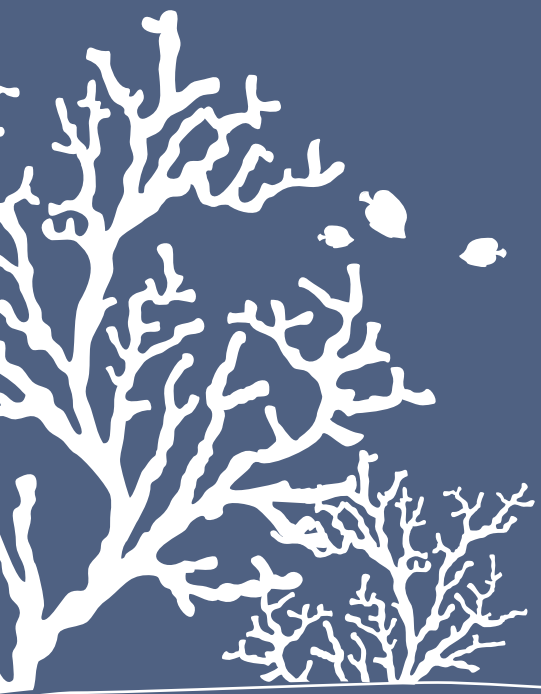
9 This could encompass multiple organisations at the regional level.

Action	Deliverables	Timeframe	Lead organisation/s	Contributors
6. Maintain and enhance policies and programs that support Reef Plan goals and targets.	Review Queensland reef protection legislation in line with Australian Pesticide and Veterinary Medicines Authority chemical reviews, and as best management practice programs have effect.	Review June 2014	**DEHP**, QDAFF	Industry groups, regional NRM organisations, DPC, QDAFF
	Maintain wetlands protection and healthy waterways protection through the single state planning policy.	December 2013	DEHP	DSDIP
	Statutory regional planning process to consider Reef Plan goals and targets.	Ongoing	DSDIP	QDAFF, GBRMPA, DEHP, DPC, DNRM, LGAQ
	Water Quality Improvement Planning process (aligned with Healthy Waters Management Plan guideline under the Environment Protection Policy Water) to consider Reef Plan's long term goal and use consistent modelling information to set regional and subregional water quality and management action targets that align with Reef Plan.	June 2014 and updated as required	Regional NRM delivery agents	DSEWPaC, DPC, DNRM, DEHP, LGAQ
	Foster and recognise stewardship activities within farming, grazing, councils and schools across the Great Barrier Reef catchment that help achieve Reef Plan outcomes.	Ongoing	GBRMPA	DSEWPaC, LGAQ, regional NRM organisations
	Ensure consistency between grazing, cane and other industry best management practices and GBRMPA's Reef Guardian program outcomes.	June 2014	GBRMPA	DEHP, DAFF, DPC, DSEWPaC, regional NRM organisations.
	Integrate and complement Reef Plan with any relevant policies and programs which emerge from the comprehensive strategic assessment of the Great Barrier Reef World Heritage Area and adjacent coastal zone and the associated long term plan for sustainable development.	June 2015	**DSEWPaC**, DPC	GBRMPA, DSDIP, DPC, DEHP
	Establish an agreed framework for reef water quality offsets that delivers more strategic outcomes, including a net improvement to the outstanding universal value of the Great Barrier Reef World Heritage Area.	June 2014	DEHP	GBRMPA, DSEWPaC, DAFF

Evaluating performance

Desired outcome

The efficiency and effectiveness of Reef Plan is measured through monitoring, evaluation and reporting. The continuation of a coordinated approach through the Paddock to Reef Integrated Monitoring, Modelling and Reporting Program will be critical to delivering this outcome.



Action	Deliverables	Timeframe	Lead organisation/s	Contributors
7. Develop and implement an updated Reef Plan Monitoring and Evaluation Strategy to measure the efficiency and effectiveness of Reef Plan.	Update the Reef Plan Monitoring and Evaluation Strategy.	December 2013	DPC	DSEWPaC, DNRM, DEHP, QDAFF, DAFF, GBRMPA, DSITIA, regional NRM organisations, research organisations, industry groups
	Prepare Reef Plan report cards to report on the progress towards Reef Plan goals and targets.	Annually (by September the year after data is collected)	DPC	DNRM, DAFF, DEHP, QDAFF, GBRMPA, DSITIA, DSEWPaC, regional NRM organisations, research organisations, industry groups
	Report on effectiveness of Reef Plan implementation.	Annually by September each year	DPC	IOC
	Undertake independent audit and evaluation of Reef Plan.	June 2016	**DPC**, DSEWPaC	Partnership Committee
	Report on integration of the Paddock to Reef program with other relevant monitoring and reporting programs in the Great Barrier Reef region as part of an Integrated Monitoring Framework.	Annually	**GBRMPA**, DPC	DSEWPaC, DNRM, DEHP, DSITIA, regional NRM organisations
8. Implement an updated Paddock to Reef Integrated Monitoring, Modelling and Reporting (Paddock to Reef) Program.	Update the Paddock to Reef program design.	July 2013	IOC	Independent Science Panel, Partnership Committee, Coordination and Advisory Group
	Review Paddock to Reef program design.	Annually	IOC	Independent Science Panel, Coordination and Advisory Group
	Implement the updated Paddock to Reef program including monitoring and annual reporting.	December 2013	DPC	DSEWPaC, DAFF, DNRM, DEHP, QDAFF, GBRMPA, DSITIA, regional NRM organisations, research organisations, industry groups
	Industry uptake of management practices and systems, under an agreed framework, that can input directly into Paddock to Reef modelling and reporting against targets.	December 2013	**QDAFF**, Industry	DSEWPaC, DAFF, DNRM, regional NRM organisations, industry groups, DEHP
	Annual fertiliser and pesticide use data collection arrangements are agreed.	June 2014	Regional NRM delivery agents	QDAFF, DNRM, Agri-business, product suppliers, Canegrowers, DSEWPaC, DEHP
	Fertiliser and pesticide use data collected and reported.	Annually, from July 2015	Regional NRM delivery agents	QDAFF, DNRM, Agri-business, product suppliers, Canegrowers, DSEWPaC, DEHP

Action	Deliverables	Timeframe	Lead organisation/s	Contributors
8. Implement an updated Paddock to Reef Integrated Monitoring, Modelling and Reporting (Paddock to Reef) Program.	Paddock scale water quality monitoring and modelling to measure effectiveness of management practices, including a focus on critical practices that reduce pollutant losses significantly.	Annually	**DSEWPaC**, DNRM	Regional NRM organisations, DSITIA, research organisations
	Catchment water quality loads monitored.	Annually	DSITIA	DNRM, regional NRM organisations, NPRSR
	Catchment water quality loads modelled.	Annually	DNRM	DSITIA, research organisations
	Groundcover and wetlands and riparian vegetation monitored.	Annually for groundcover, four yearly for riparian and wetlands	DSITIA	DNRM, DEHP
	Marine water quality and ecosystem health monitored.	Annually	GBRMPA	DSEWPaC, AIMS, research organisations, QDAFF, GBR Foundation.
9. Improve data and information management to support Reef Plan data sharing, assessment and reporting.	Test automation of the Reef Plan report card.	June 2014	DPC	GBR Foundation, research organisations, DSEWPaC
	Store and maintain paddock and catchment data within the Spatial and Scientific Information Management for Reef (SSIMR) environment.	June 2014	DNRM	DSITIA, DSEWPaC, DEHP, DAFF, QDAFF, GBRMPA, DPC, regional NRM organisations, research organisations, industry groups.

Farmer Profile

Tony and his brother and sons are second and third generation cane farmers. They adjust the amount of nutrients applied from paddock to paddock based on soil testing rather than just blanket application at a standard rate. They are also actively involved in trialling new and innovative practices.

"My son is keen to stay on the farm and I want to leave it to him in better condition than it was when I took it over from my father. I think my Dad would be proud of what we are doing now."

Tony Bugeja, cane farmer, Mackay Whitsunday region.
Image courtesy of Reef Catchments.

Implementing Reef Plan

Reducing the impacts of land use on reef water quality is not solely the responsibility of governments. Achieving the goals of Reef Plan will rely on a partnership involving all levels of government, industry, community groups and individual landholders.

The Australian and Queensland Governments will incorporate Reef Plan goals, targets and actions into relevant planning processes (e.g. business and strategic plans) to ensure actions are achieved in appropriate timeframes with maximum efficiency. The lead organisations are responsible for driving implementation of the actions and working with the identified stakeholders to achieve outcomes.

Overseeing implementation

Reef Plan has developed efficient institutional arrangements (Figure 3) that will continue to ensure actions are implemented in a timely way and properly coordinated across agencies and programs.

The key decision-making body for implementing the plan is the **Great Barrier Reef Ministerial Forum** (the forum). The forum is comprised of two Ministers each from the Australian and Queensland Governments with responsibility for matters relating to the environment and marine parks, science, tourism and/or natural resource management. The forum considers various sources of information related to Reef Plan implementation, including views of stakeholders and scientific and government advice. A number of committees have been established to provide information to the forum. The committees ensure a coordinated and cohesive approach to implementation and appropriate commitment of resources to implement individual actions.

The **Partnership Committee** consists of stakeholders, including industry groups, conservation organisations, regional natural resource management organisations and government officials, with an independent chair. The Partnership Committee ensures a consultative approach to implementing Reef Plan at the operational level. It oversees and drives implementation of Reef Plan by contributing to developing implementation plans and monitoring appropriate progress against actions. The Partnership Committee provides advice to the Intergovernmental Operational Committee on the operational implementation of Reef Plan.

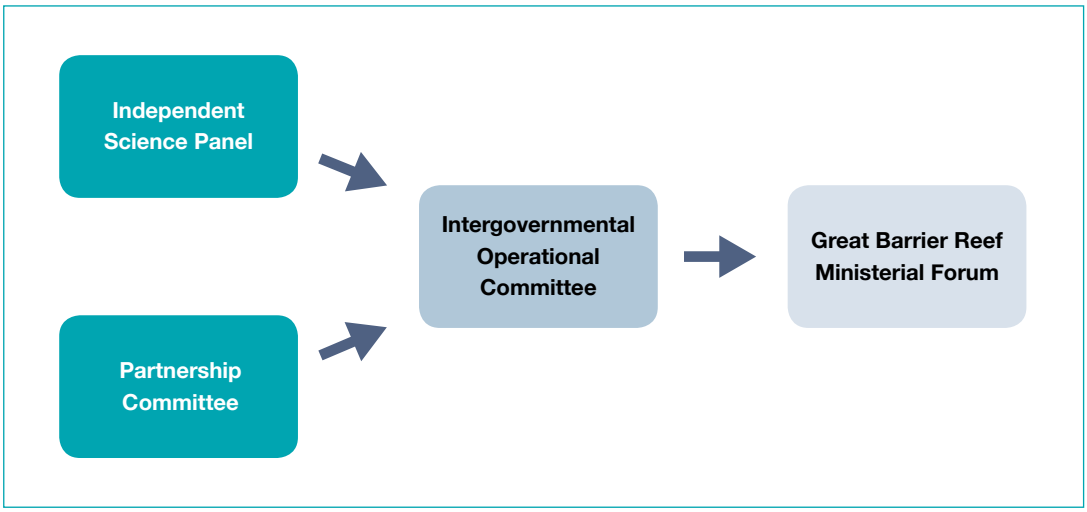


Figure 3: Reef Plan governance

The independent chair also provides an annual report to the Great Barrier Reef Ministerial Forum on the operation of the committee, raising any emerging issues identified by stakeholders. This ensures stakeholder comments are fed through to the Ministerial level in an independent context.

The **Independent Science Panel** provides scientific advice to inform adaptive management decisions. The panel is made up of six members with relevant scientific expertise and has an independent chair with a scientific background. The panel provides an advisory and review role on matters referred to it by the Intergovernmental Operational Committee.

The **Intergovernmental Operational Committee** (IOC) oversees the operational implementation of Reef Plan. Members are nominated senior officers from:

- Australian Government Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC)
- Australian Government Department of Agriculture, Fisheries and Forestry (DAFF)
- Great Barrier Reef Marine Park Authority (GBRMPA)
- Queensland Government Department of the Premier and Cabinet (DPC)
- Queensland Government Department of Environment and Heritage Protection (DEHP)
- Queensland Government Department of Agriculture, Fisheries and Forestry (QDAFF)
- Queensland Government Department of Natural Resources and Mines (DNRM)
- Queensland Government Department of State Development, Infrastructure and Planning (DSDIP).

The IOC may also establish working groups to deal with emerging issues or specific tasks. This will ensure the appropriate agencies and stakeholders are involved in specific aspects of Reef Plan implementation.

These committees will continue to be supported by a secretariat based in DPC that works closely with representatives from DSEWPaC.

A number of smaller advisory groups have also been established to support specific parts of the program, including the Paddock to Reef Coordination and Advisory Group, the Management Practices Advisory Group and the Research and Development Coordination Group.

Appendix

Appendix 1

Identifying priority areas for management

A water quality relative risk assessment[10] was undertaken in 2012 and 2013 to investigate the relative risk of degraded water quality from different pollutants and different regions to coral reefs and seagrasses in the Great Barrier Reef. The table below presents the results of the risk assessment at the regional level. The results of the risk assessment have been used to focus management efforts in Reef Plan 2013 and identify priority areas for monitoring of targets. While the risk assessment focuses on the three priority pollutants, it does not detract from the importance of also addressing the threats posed by other pollutants which enter the Great Barrier Reef. Equally, water quality improvement is critical across all the natural resource management regions, not just the priority ones. While reporting against targets will occur for all of the Great Barrier Reef regions, increased focus will be on the priority areas.

Region	Overall relative risk	Priority pollutants for management		
		Nitrogen	Pesticides	Sediment
Cape York	LOW			
Wet Tropics	VERY HIGH			
Burdekin	HIGH	*		
Mackay Whitsunday	MODERATE			
Fitzroy	HIGH			
Burnett Mary	UNCERTAIN**			

* Lower Burdekin and Haughton focus
** Most reefs and seagrass meadows in this region were not included formally in the analysis and therefore the validity of the result has high uncertainty.

10 Brodie, J. et al. 2013 (in review). Assessment of the risk of pollutants to ecosystems of the GBR including differential risk between sediments, nutrients and pesticides and between land uses, industries and catchments. Project funded by Queensland Government Department of Environment and Heritage Protection as part of the Reef Plan Scientific Consensus Statement 2013.

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