Management overview Chapter 3

"Achieving Reef Plan goals relies on building strong partnerships between all levels of government, industry, natural resource management agencies and individual landholders."

Photo courtesy of Queensland Government



3.1 Taking action

The Reef Water Quality Protection Plan was first endorsed by the Australian and Queensland Governments in 2003 with the aim of halting and reversing the decline in water quality from broad scale agriculture. In 2009, both governments reaffirmed this commitment by endorsing an updated Reef Water Quality Protection Plan (Reef Plan 2009) which is designed to accelerate actions that will improve the quality of water flowing from paddocks to the reef and build resilience in the reef in the face of climate change.

3.2 Commitment

Reef Plan 2009 is a joint initiative of the Australian and Queensland Governments and is being achieved in close partnership with landholders and community groups. Reef Plan 2009 outlines 11 key actions that must be implemented to ensure key targets are met. These actions include financial incentives to landholders to improve practices, implementation of regulations and policies that improve land practices and conserve key areas, more effective education and extension and creating a better understanding of the problem through research and monitoring.

The Australian and Queensland Governments have committed significant funding and resources to initiatives which contribute to improved reef water quality through Reef Plan. The Australian Government has committed \$200 million over five years to the Caring for our Country Reef Rescue program. The Queensland Government has committed \$175 million over five years, which includes a \$50 million package to support the new Reef Protection package (legislation, research, extension and support).

3.3 Reef Plan, Reef Rescue and Reef Protection initiatives

Reef Plan 2009 is the overarching strategy that identifies the collective actions required to address the decline in reef water quality. It encompasses a range of major initiatives such as the Australian Government's Reef Rescue initiative and the Queensland Government's Reef Protection package. It was developed collaboratively by the Australian and Queensland Governments, industry, regional bodies and conservation groups.



Figure 3.1 – How investment drives action and progress towards Reef Plan goals and objectives.

3.4 Working together

Reducing the impacts of land use on reef water quality is not solely the responsibility of governments. Achieving Reef Plan goals relies on building strong partnerships between all levels of government, industry, natural resource management agencies and individual landholders. Governments are working with landholders through extension staff, regional bodies, industry groups and Reef Plan committee members to ensure a coordinated and cohesive approach to improving reef water quality. The Paddock to Reef integrated monitoring, modelling and reporting program relies upon the cooperation between all partners to ensure that monitoring data is integrated and effective and can demonstrate the effectiveness of management changes.

3.5 Goals and targets

The success of Reef Plan actions must be measured to ensure that the investment provided by all the partners has achieved the desired outcomes. To provide a meaningful measure of success, it is imperative to set targets. These targets provide all investors, including the Australian public, with a common understanding of the expected outcomes.

Goals and targets have been identified for the short term (2013) and the medium term (2020).

Reef Plan goals

Immediate goal – To halt and reverse the decline in water quality entering the reef by 2013.

Long term goal – To ensure that by 2020 the quality of water entering the reef from adjacent catchments has no detrimental impact on the health and resilience of the Great Barrier Reef.

Achievement of Reef Plan's goals will be assessed against the following quantitative targets established for land management and water quality outcomes.

Reef Plan targets

By 2013 there will be a minimum:

- 50 per cent reduction in nitrogen and phosphorus loads at the end-of-catchments
- · 50 per cent reduction in pesticides at the end-of-catchments
- 50 per cent late dry season groundcover on dry tropical grazing land.

By 2020 there will be a minimum:

 20 per cent reduction in sediment load at the end-ofcatchments.

Note: The pollutant reductions relate to the load contributed by human activities (called the anthropogenic load) and do not include the naturally occurring load in river systems.

By 2013:

- 80 per cent of landholders in agricultural enterprises (sugarcane, horticulture, dairy, cotton and grains) will have adopted improved soil, nutrient and chemical management practices
- 50 per cent of landholders in the grazing sector will have adopted improved pasture and riparian management practices
- there will have been no net loss or degradation of natural wetlands
- the condition and extent of riparian areas will have improved.

Reef Plan water quality targets are a sum of the targets of the Australian and Queensland Government targets. The specific five-year outcomes, due for completion in 2013, for the Reef Rescue initiative are to reduce the discharge of:

- dissolved nutrients and chemicals from agricultural lands to the Great Barrier Reef lagoon by 25 per cent
- sediment and particulate nutrients from agricultural lands to the Great Barrier Reef lagoon by 10 per cent.

This First Report and subsequent reports will track progress towards all Reef Plan targets.

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3.6 Progress on Reef Plan Actions

Since the release of Reef Plan 2009, significant progress has been made, demonstrating the effectiveness of reaffirming the government's commitment to the plan. Figure 3.2 summarises progress to July 2010.

Action	Deliverable	Completed / on target	Satisfactory progress	Delayed / limited progres	Not due
Develop, implement and maintain a Research, Development and Innovation Strategy for agreed reef water quality priorities.	 A three-year Research Development and Investment Strategy for agreed reef water quality priorities by September 2009. An updated Research Development and Investment Plan by July each year. 	~	~		
Coordinate and integrate agreed research and development priorities into programs of work.	 An evaluation report outlining the extent of uptake of research and development priorities by research providers by July each year. 				
Prioritise and align investments for reef water quality based on catchment scale and reef- wide risk assessments of key pollutants and source areas.	 Reef Rescue investment for 2009–2010 and onwards is delivered based on a multi-criteria analysis. The Queensland Integrated Waterway Monitoring Risk Assessment is used to inform cooperative agreements and other water quality monitoring activities for 2009–2010. A prioritisation process to guide investment in future water quality initiatives (other than Caring for our Country) is agreed by September 2009 for funding 2009–2010 and beyond. A Reef Plan Investment Strategy is developed and implemented by September 2009 to coordinate investments across programs, while acknowledging the different objectives of the various programs. 	 ✓ ✓ ✓ ✓ 			
Identify improved land management practices to maximise reef water quality improvements.	 Improved land management practices for high-risk catchments are identified based on best available knowledge by September 2009. Improved land management practices are revised based on new information and made available to all land managers by June 2010. Evaluate the actual costs and benefits of adopting improved land practices that have been identified and promoted to landholders by June 2011 and June 2013. 	V	√		
Implement improved land management practices that maximise reef water quality improvements as part of property level management systems.	 Landholders implement improved land management practices. Report annually by industry sector on uptake of improved land management practices as part of industry-led property level management systems. Develop and implement a strategy to coordinate improvement of water quality management on public land in reef catchments by December 2009. 	~	✓ ✓		
Provide coordinated education and extension services to landholders to assist with uptake of land management practices that maximise reef water quality improvement.	 Undertake education and extension services targeting water quality improvement on an ongoing basis. Review extension and education services with recommendations for improvement and resourcing by December 2009. Review recommendations and implement appropriate changes to the extension and education program by June 2010. Develop an education and extension strategy for coordination of activities across different programs and agencies by December 2009. 	✓ ✓ ✓			

Action	Deliverable	Completed / on target	Satisfactory progress	Delayed / limited progre	Not due
Review existing, and develop and implement new regulations and policies for improving reef water quality and the conservation and protection of wetland and riparian areas with emphasis on property level planning and action.	 Implement the following new or amended regulations: reef regulatory package to be developed by mid-2009 and implemented by 2010 wetlands regulation implemented in priority areas by December 2009. Implementation of Land Management Agreements commences by September 2009 in high priority reef catchments where leases trigger the Delbessie Agreement requirements. Annually report on the implementation of conservation agreements and covenants in high priority reef catchments. Reef Plan objectives incorporated into existing statutory regional plans, planning policies and Coastal and Water Resource Management Plans by June 2010 and into new plans as they are developed. 	 ✓ ✓ ✓ ✓ 	~		
Develop, review and implement non- regulatory policies and incentives for improving reef water quality and the conservation and protection of wetland and riparian areas.	 Reef Rescue investment strategies are updated annually. Reef Rescue outcomes and targets met by June 2013 with annual reporting on progress. New cooperative agreement and NRM program for 2009–2013 agreed by September 2009. 	√ √ √			
Develop and implement a Reef Plan Monitoring and Evaluation Strategy to measure the efficiency and effectiveness of the Reef Plan.	 A Reef Plan Monitoring and Evaluation Strategy is endorsed by September 2009. Reef Plan targets are monitored, reported and reviewed annually. Reef Water Quality Report prepared to report annually on implementation of Reef Plan and water quality and associated ecosystem health. Independent audit and evaluation report undertaken by June 2010. Undertake further independent audits prior to June 2013 as necessary. 	✓ ✓	✓ ✓		~
Develop and implement an integrated and coordinated paddock to Reef monitoring (modelling) and reporting program as part of the Reef Plan Monitoring and Evaluation Strategy.	 Integrated paddock to reef monitoring and reporting program designed and implemented by September 2009 including the following components: monitoring of uptake of improved management practices paddock scale water quality monitoring and modelling to measure effectiveness of management practices catchment and sub-catchment water quality and land condition monitoring and modelling program wetland mapping marine water quality and ecosystem health monitoring and modelling. 	✓ ✓ ✓ ✓	~		
Improve data and information management to support data sharing, assessment and reporting.	 A scoping document on information management needs and a review of existing systems by September 2009. Improved information management system implemented by December 2009. 	V	\checkmark		

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3.7 Paddock to Reef program

The Paddock to Reef program (Figure 3.3) has been established to measure progress towards Reef Plan's goals and targets. The program is an ambitious initiative that integrates multiple lines of evidence to directly link management practice change to water quality and ecosystem health. This program builds upon similar approaches around the world which have linked management practices to water quality improvement (e.g. Garbrecht and Starks, 2009; Cullum et al.,2006). The Paddock to Reef program will detect changes in management practices and water quality at the end-ofcatchment over short time frames (i.e. a few years). Detecting changes further downstream requires the ability to deal with lag times associated with the movement of pollutants from the paddock to the reef. It also requires the ability to deal with the high variability in the climate, both spatially across vast catchments, over time and between seasons. These challenges are currently addressed through a range of modelling and monitoring approaches.



Figure 3.3 – Conceptual model of the Paddock to Reef program showing the processes for monitoring, modelling and reporting on Reef Plan goals.

Linking management actions and water quality and ecosystem health can be achieved by modelling (supported by monitoring management practices and water quality) the pollutants from paddocks, transported downstream by rivers, delivered to estuaries and ultimately to coral reefs further offshore. This approach requires the ability to link the monitoring and modelling outputs at each scale and then across these scales. A range of modelling and monitoring tools and techniques have been identified and work programs developed for each of the following key components of the design:

- Management practice adoption—collecting management practice information over time for each main agricultural industry within each region will determine the extent of change in land management practices.
- Paddock monitoring and modelling—paddock monitoring, modelling and rainfall simulation monitoring will assess the water quality improvements from the adoption of management practices.
- Catchment indicators—a range of landscape attributes including groundcover, wetland and riparian areas have a significant influence on water quality. Remote sensing technologies are being used to measure status and change of these key catchment indicators.
- Catchment water quality—catchment monitoring and modelling activities will improve the ability to measure the change in water quality loads at sub-catchment and end-ofcatchment scales.
- Marine—assessing the health of key marine ecosystems (inshore coral reefs and intertidal seagrasses) and the condition of water quality in the inshore Great Barrier Reef lagoon.

The key monitoring sites for the Paddock to Reef program are shown in Figure 2.1.

At the heart of the Paddock to Reef program is the philosophy of continuous improvement. To achieve this, the monitoring data that is collected will be used to continually improve the models. Similarly, research, development and innovation initiatives will be aligned to improve the methods and results of the program over time (Appendix 1).

3.8 Who is involved?

The Paddock to Reef program is a \$35 million program over four years funded by the Australian and Queensland Governments. Implementation of the program is a collaborative effort between governments, key industry partners, research organisations, regional natural resource management bodies and individuals.

Key Partners:

Queensland Department of the Premier and Cabinet

Queensland Department of Environment and Resource Management

Queensland Department of Employment, Economic Development and Innovation

Great Barrier Reef Marine Park Authority

Australian Department of Sustainability, Environment, Water, Population and Communities

Contributors:

AgForce Queensland

Australian Centre for Tropical Freshwater Research

Australian Department of Agriculture, Fisheries and Forestry

Australian Institute of Marine Science

Bureau of Sugar Experiment Stations

Burnett Mary Regional Group

Canegrowers

Cape York Sustainable Futures

CSIRO

Fitzroy Basin Association

Growcom

Meat and Livestock Australia

NQ Dry Tropics

Queensland Farmers Federation

Reef and Rainforest Research Centre

Reef Catchments Natural Resource Management

Terrain Natural Resource Management

University of Maryland, United States of America

The University of Queensland