

# **Rivers to Reef: A cooperative, whole-of-catchment approach to sustainable agriculture for the Great Barrier Reef**

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*Declining water quality is one of the major threats to the Great Barrier Reef Marine Park and World Heritage Area. This decline is largely attributed to activities on and around the adjacent land, rivers and coastal regions (known collectively as the Great Barrier Reef Catchment). A key strategy for addressing declining water quality is the Reef Water Quality Protection Plan (the Reef Plan), which was launched by the Australian and Queensland Governments in December 2003. The goal of the Reef Plan is to “halt and reverse the decline in water quality entering the Reef within 10 years”. The Reef Plan identifies nine strategies and 65 actions to address declining water quality from diffuse sources of pollution, mainly runoff from agricultural land. The strategies cover sustainable agricultural practices and better land-use decisions to reduce the load of pollutants (sediment, nutrients and chemicals) entering the Reef, as well as the conservation and rehabilitation of ecosystems which play a role in removing water-borne pollutants from rivers before they discharge into the Reef. The Reef Plan is being implemented through partnerships between the Australian, Queensland and local governments, regional natural resource management bodies, industry, the general community, and educational and research institutions. Successful implementation of the Reef Plan will help to ensure the long-term sustainability of the Great Barrier Reef, and the ecosystems, industries and communities it supports.*

The Great Barrier Reef (the Reef), the largest coral reef ecosystem in the world, extends over 2000km along the Queensland coast. It is one of the richest, and most complex ecosystems on earth, containing over 3000 reefs and other important habitats. The Reef is also an important source of income for Australia, with tourism contributing over \$5 billion annually to the Australian economy, commercial fishing contributing \$149 million and recreational activity \$610 million (Access Economics, 2005). The Great Barrier Reef Marine Park (the Marine Park) was gazetted in 1975, and World Heritage Area status was conferred in 1981, in order to protect this unique environment.

In the early years of the Marine Park, management focused almost exclusively on marine activities, such as tourism and fishing. Land-based point-sources of marine pollution, such as sewage, were managed through existing local and state regulations, and through a cooperative arrangement for established tourist resorts on offshore islands. In the late 1990s a new threat was identified for the Reef originated from outside the Marine Park boundaries. This threat was declining water quality from diffuse sources of pollution, such as agriculture.

The decline in water quality entering the Reef is due to activities occurring in the coastal regions adjacent to the Reef. In the 200 years since European settlement, there has been extensive land modification in the Reef catchment, comprising urban development, intensive and extensive agriculture, aquaculture, mining and mineral processing, and other industrial activities. There is evidence of a four-fold increase in the sediment loads in rivers draining to

the near shore regions of the Marine Park, and a three-fold increase in nutrient loads. Common agricultural pesticides are also reaching the Marine Park. These pollutants promote algal growth, reduce reproductive success and recruitment of corals, weaken coral structure and enhance the survival of predators, such as the Crown of Thorns Starfish and black smut.

The Reef Water Quality Protection Plan (Reef Plan) was released in December 2003, with a goal of “ halting and reversing the decline in water quality entering the Reef within 10 years” (The State of Queensland and Commonwealth of Australia, 2003). The Reef Plan is being implemented through a partnership between the Australian, Queensland and local governments, regional natural resource management (NRM) bodies, industry, the general community and educational and research institutions.

The Reef Plan has two key objectives: to reduce the load of pollutants from diffuse sources from entering the Reef (by improved land use and management practices), and to rehabilitate and conserve areas of the Reef catchment that have a role in removing water borne pollutants (such as wetlands and riparian areas). There are a number of strategies to ensure these objectives are met, ranging from voluntary self-management, education and extension programs for farmers, to consideration of economic incentives, regulatory frameworks, and improved NRM planning. These strategies are complemented by activities to improve research and information sharing, develop partnerships, identify priorities and targets for reduced pollutant loads, and monitoring and evaluating progress towards implementing Reef Plan in order to achieve its goal.

After several years of implementation, there have been some significant achievements under Reef Plan. A significant achievement is the formation of working partnerships between the federal, state and local governments, industry and regional NRM bodies. These partnerships have achieved a renewed focus on the common goals and aspirations for Reef water quality across political jurisdictions. Reef Plan implementation is facilitated administratively by three layers of inter-governmental groups: from the chief-of-staff/chairman level (Intergovernmental Steering Committee), to senior executive officer level (Intergovernmental Operational Committee), down to officer level (Intergovernmental Working Group). A secretariat has been established in the Queensland Department of the Premier and Cabinet to provide support for these groups and to help in the facilitation of the Reef Plan activities.

The Intergovernmental Steering Committee (ISC) generally meets annually to consider progress with Reef Plan implementation. The ISC reports to the Prime Minister and Premier of Queensland, through the Great Barrier Reef Ministerial Council.

The Intergovernmental Operational Committee (IOC) meets quarterly (with bi-monthly out-of-session deliberations) and reports annually to the ISC. The IOC oversees the day-to-day implementation of the Reef Plan.

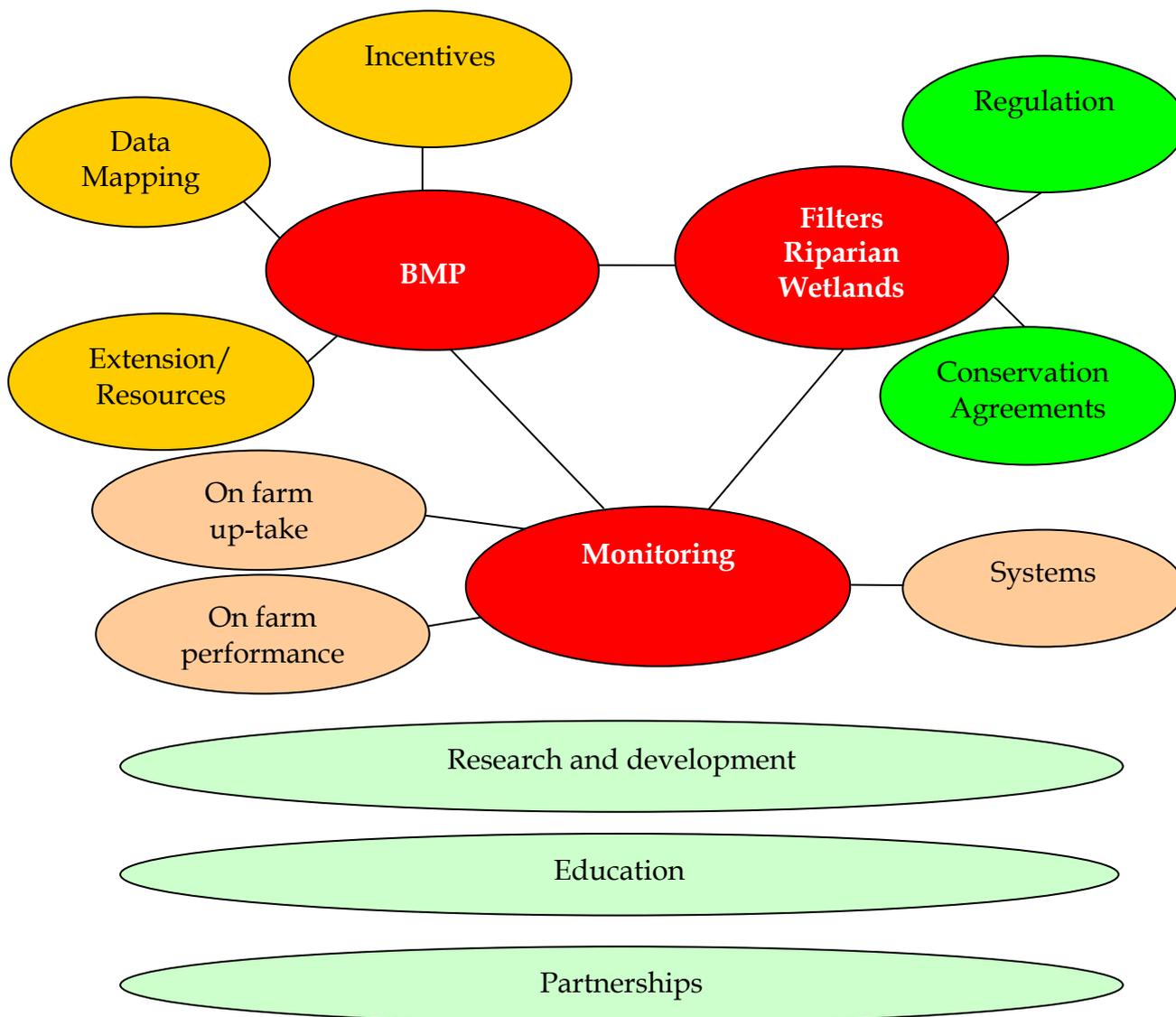
The Intergovernmental Working Group (IWG) meets fortnightly and is responsible for the day-to-day implementation of the Reef Plan’s 65 actions. The IWG has developed a traffic-light report system, to advise IOC of general progress with Reef Plan action implementation and a database to record the activities each agency is undertaking in order to meet Reef Plan objectives. The IWG ensures inter-agency communication is maintained on each of the 65 actions that require a partnership approach for successful implementation.

In addition to these administrative partnerships, other partnerships have been formed to ensure the success of certain key actions, such as integrated freshwater and marine water quality monitoring programs. The Reef Water Quality Partnership is an agreement between the Australian and Queensland Governments and regional NRM bodies to collaborate and coordinate their programs on monitoring, target setting and reporting. In addition, government is working to establish a similar partnership with agricultural industry bodies to ensure this important group are appropriately engaged and supported.

The Reef Plan focuses on a number of key areas. These are best-management practice by agricultural industries in the Reef catchment, the conservation and rehabilitation of wetlands and riparian areas and monitoring of the effectiveness of Reef Plan's implementation (see Figure 1). The success of these key areas requires research and development, education and partnerships within and between organisations.

Actions to achieve best management practices (BMP) in agriculture are mainly led by agricultural industries. Agricultural activities within the Reef catchment include sugar-cane, horticulture, grains, cotton, dairy, beef and some agro-forestry.

Since Reef Plan's inception, agricultural industries within the Reef catchment have commenced a number of initiatives to improve industry natural resource management and minimising adverse environmental impacts from farming practices. This work has required significant investment by industries, on behalf of their members, and has involved partnerships, mutual support and trust to ensure cross-industry initiatives are progressed into the future (Queensland Farmers' Federation et al, 2005). For example, in mid-2003 the major members of the Queensland Farmers' Federation (CANEGROWERS, Cotton Australia, Growcom and the Queensland Dairyfarmers' Organisation) commenced work on the Farm Management Systems Initiative. This work is captured in a strategic policy framework for action through the signing of a Memorandum of Understanding between Australian Farmers Federation and the Queensland Government on Farm Management Systems (FMS). Through this program, Queensland Farmers' Federation members are developing and implementing FMS programs, and a draft framework and guide to the common elements of the programs is developed.



*Figure 1: Alignment of Reef Plan actions into key “themes”, linking BMP, wetlands, and monitoring, and representing how these activities are underpinned by research and development, education and partnerships.*

The strategy to rehabilitate and conserve wetlands and riparian areas is implemented through the Queensland Wetlands Program (QWP). The Australian and Queensland Governments jointly contribute to the Natural Heritage Trust Wetlands component of this program. An additional component, the Great Barrier Reef Coastal Wetlands Protection Program, is funded by the Australian Government. A wetland prioritisation decision support system has been developed by the QWP and a pilot program for on-ground delivery of wetland conservation has been established (The State Government of Queensland and the Australian Government, 2005). Queensland’s wetlands, including those within the Reef catchment, have been mapped and classified and a wetland inventory database developed. In addition, wetland management profiles have been prepared and an information review/gap analysis has been conducted to improve the understanding of Queensland’s wetlands. Importantly, these actions have been supported by communication and education products to improve general community awareness and understanding of the important role of wetlands for water quality and downstream ecosystem health.

Monitoring is a critical component for the success of the Reef Plan. Ongoing evaluation of Reef Plan aims to “analyse the effectiveness of the actions that are implemented to stabilise and improve the quality of water entering the Reef and provide an opportunity to initiate improvements” (p.28, State of Queensland and Commonwealth of Australia, 2003). Monitoring focuses on the measurement of uptake of BMP, plus the status of water quality in the catchment and in the down-stream marine environment. Monitoring programs are being developed by regional NRM bodies within the Reef catchment and the Queensland and Australian Governments. The challenge is to ensure these monitoring programs provide a complete picture of ecosystem and water quality health, from the top of the catchment to the Reef.

Research is an integral component of the monitoring programs, and of the Reef Plan’s overall success. Research and information management has been included as a Reef Plan strategy to ensure the best scientific data is available to assist with Reef Plan implementation. Research includes both the bio-physical aspects of water quality from the Reef catchment and the socio-economic impacts associated with Reef Plan actions and improved water quality.

While each agency has a role to play in communication and education, the integrated nature of Reef Plan has required information distribution on topics that affect a wide range of stakeholders and cover multiple jurisdictions. As a result, there is a dedicated Communications Officer to ensure Reef Plan’s achievements are distributed among the community. There is a proposed awareness campaign, a dedicated Reef Plan website ([www.reefplan.qld.gov.au](http://www.reefplan.qld.gov.au)), displays and a regular column in the weekly regional NRM email newsletter “The Bugle”. The Reef Plan Communication Strategy is currently under revision, to capture all the new opportunities that have arisen since the beginning of Reef Plan implementation. Importantly, Reef Plan communication and education is seen to be the role of all Reef Plan implementers, such as community awareness raising programs (for example, Townsville and Thuringowa’s “Creek to Coral” program, Healthy Waterways Programs in the Central and Mackay-Whitsunday regions), and the Great Barrier Reef Marine Park Authority’s (GBRMPA) “Reef House”.

The GBRMPA has played an instrumental role in establishing programs aimed at improved Reef water quality. In 2001, the GBRMPA released the *Great Barrier Reef Catchment Water Quality Action Plan* (GBRMPA, 2001), which highlights the changes in water quality entering the Great Barrier Reef. As a result of this work, in 2002 the Queensland Government commissioned an independent panel of experts to review the scientific evidence linking land use, water quality and Reef degradation, and at the same time the Australian Government asked the Productivity Commission to undertake a study and report on industries, land use and water quality in the Reef catchment. Based on these two reports, the Australian and Queensland Governments agreed there was an overwhelming case for halting and reversing the decline in water quality entering the Reef. The GBRMPA then worked with other federal and state government agencies, industries, researchers and the community, to develop the Reef Plan. The GBRMPA now has an important role in the partnerships that aim to ensure the Reef Plan’s successful implementation.

The GBRMPA’s key action under Reef Plan is to “implement a water quality and ecosystem health long-term monitoring program in the Great Barrier Reef lagoon to track the effectiveness of the Reef Water Quality Protection Plan” (Action I4, State of Queensland and Commonwealth of Australia, 2003). The GBRMPA has now established a long-term monitoring program, including a *Report on the Status and Trends of Water Quality and*

*Ecosystem Health in the Great Barrier Reef World Heritage Area* (Australian Government et al, 2005), and the first *Marine Monitoring Annual Report 2004-05* (GBRMPA, 2005). Using information from the this monitoring program, the GBRMPA has been in a position to start developing environmental health values, to inform the identification of objectives and targets in the Reef catchment to ensure the sustainability of Great Barrier Reef marine ecosystems.

The GBRMPA have also been key players in the development and implementation of the Queensland Wetlands Program in relation to the Reef Catchment. The GBRMPA, with support from the Queensland Wetlands Program and the Regional NRM Bodies, have established a permanent exhibit at the Reef HQ aquarium in Townsville to educate locals and visitors about the important role of wetlands in water quality. The exhibit is located next to the living reef exhibit, to symbolise the connectivity between freshwater ecosystems and the water entering the Great Barrier Reef. In addition, the GBRMPA have developed a number of education tools, such as an interactive computer program that has been distributed to 6 locations throughout the Reef catchment to ensure visitors and locals understand the importance of wetlands for Reef health. The education tools also include a wetlands curriculum for teachers and an interactive web-based tool for school children ([www.reefed.gov.au](http://www.reefed.gov.au)).

Reef Plan communication and education has received wide ranging support from the GBRMPA, and has not just focused on wetland education. Support has included funding for the Central Healthy Waterways Campaign in 2004 and 2005, and articles in the GBRMPA's quarterly *Searead* newsletter.

The GBRMPA is also focused on effective community partnerships and engagement. The GBRMPA has a dedicated Community Partnerships team that includes staff located at four regions within the Reef catchment (Cairns, Townsville, Mackay and Rockhampton). The GBRMPA also receives strategic advice to guide its water quality and coastal development programs from the Reef Water Quality Advisory Committee (WRAC). The WRAC comprises representatives covering a wide range of areas, including federal, state and local governments, industry, non-government organisations, Landcare, coastal developers, and the community. In addition, GBRMPA has Local Marine Advisory Committees (LMAC) located at 11 sites along the GBR coast, from Gladstone to Cooktown. These LMACs comprise members of the local community, who advise the GBRMPA on regional specific issues relating to Marine Park management.

In summary, the Reef Plan is a long-term, visionary document that sets an ambitious goal of halting and reversing the decline in water quality entering the Great Barrier Reef within 10 years. While sustained improvement to water quality is likely to take a concerted effort over many lifetimes, the current administrative arrangements and progress towards integrated monitoring and reporting programs bode well for the Great Barrier Reef. Future generations will be the judge of our success, but the cooperative partnerships that have been established under the Reef Plan can only lead to improved water quality, from summit to sea, in the Reef catchment and World Heritage Area.

## References

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