



Image courtesy of the Great Barrier Reef Marine Park Authority

Healthy land, healthy waterways, healthy Reef

# Progress 2006–2007

## Creating successful implementation partnerships around priority Actions

### The Reef Water Quality Partnership

The Reef Water Quality Partnership (RWQP) was established in July 2006 and is supported by a Memorandum of Understanding between regional NRM bodies in Reef catchments and Australian and Queensland Government representatives. The role of the RWQP is to coordinate water quality target setting, monitoring, and reporting.

RWQP partners are as follows (see Glossary on page 51 for details of acronyms):

- Australian Government partners: DEW, DAFF, GBRMPA
- Queensland Government partners: NRW, EPA, DPI&F, DPC
- Regional NRM body partners: Terrain NRM, BDTNRM, FBA, MWNRM, BMRG.

Industry peak bodies, while not formal members of the Partnership, assist the delivery of programmes to accelerate adoption of improved land management practices for water quality. Periodic meetings have been held with industry groups and the foundation for a collaborative approach to delivering on-ground change is being investigated.

The main product that the RWQP will produce is a Reef Water Quality report that will show progress against targets for land management, water quality and marine ecosystem health. This is a large and complex task that will take many years to fully develop. During the 2006–07 year, research for the report has been undertaken by the Marine and Tropical

Sciences Research Facility (MTRSF) in North Queensland. The first interim report, which will be delivered in 2008, will be a useful tool to develop future reports.

A number of additional projects, such as reviews of environmental reporting, marine water quality modelling and a cost-benefit analysis of water quality protection in the GBR, have been identified as priorities and resources successfully sought to progress these initiatives.

Target setting, monitoring and reporting are integral to the success of Reef Plan and are essential to ensure that the right science is available to support these aims. The huge scale and complex dynamics of the GBR and its catchments make this a challenging task. There is a need to



Image courtesy of the Great Barrier Reef Marine Park Authority

establish the essential water quality values to protect the Reef, and determine what can be done in catchments to achieve that level of water quality.

The information provided through these processes will inform policy development and resource management decisions, the result of which will be an improved water quality in the Reef lagoon in the future.

The information provided through the RWQP's work will largely determine if Reef Plan's goal to halt and reverse the decline in water quality entering the Reef lagoon by 2013 is being achieved.

A Management Committee oversees the Partnership through strategic policy advice and programme direction, and by coordinating the activities of the partner organisations. The Management Committee members are senior government officers and the chief executive officers of regional NRM bodies. During the 2006–07 year, the Partnership began developing a Strategic Plan that will identify priority activities when finalised.

A Scientific Advisory Panel (SAP) was established to ensure scientific rigour around water quality target setting, monitoring and reporting processes.

It includes scientists with expertise in land management, water quality and marine ecosystems, and from institutions such as the CSIRO, universities and government agencies. See related case study (page 17) for further information.

A Regional Implementation Group (RIG) links the science with on-ground management practices and ensures that outcomes are practical and can be implemented. It includes managers of Water Quality Improvement Plans (WQIPs) from regional NRM bodies and local government, as well as regional Queensland Government representatives.

During 2006–07, the RIG was very active in sharing information and ideas across regions that are developing WQIPs. The RIG has focused on developing methods to set targets, and to ensure there is a consistent approach to industry management practices across regions.

To support the RWQP, specific projects are funded from various sources and are undertaken to meet strategic priorities that are common across the regions.

RWQP members contribute to projects that are coordinated by the Partnership. A small support team, which is currently

funded from the Natural Heritage Trust (NHT), facilitates the operation of the Partnership.

Contributing partners include:

- regional NRM bodies, that set targets and lead the delivery of on-ground works through the WQIPs
- DEW, a major investor in planning and science to support regional implementation through the CCI
- DAFF, a partner in the delivery of regional NRM programmes
- GBRMPA, which manages the GBR Marine Park and World Heritage Area and monitors and reports on water quality impacts
- NRW, the lead Queensland agency for NRM, manages, monitors and reports on land and water resources
- EPA, which leads the development of Reef water quality reporting, with NHT support
- DPI&F, which supports industry research and development
- DPC, which provides the Secretariat and coordinates Reef Plan reporting policy development.

The RWQP contributes to Reef Plan Actions H1, H2, I4, I5, I6.

Some SAP members and other experts involved in the review of the MMP



Image courtesy of CSIRO

## The Scientific Advisory Panel

The Scientific Advisory Panel (SAP) was set up in November 2006 to support the work of the Reef Water Quality Partnership (RWQP). They meet quarterly to provide independent scientific advice to the RWQP Management Committee.

There are 16 members of the SAP with a broad range of expertise, including marine and freshwater ecology, ecological risk assessment, land management, water quality monitoring, water quality modelling, social science, resource economics and science communication. Members are not only from within Reef catchments and other areas of Queensland, but also from other parts of Australia and other countries.

The recent inclusion of socio-economic perspectives in April 2007 has broadened the scope of the SAP. The diversity of the SAP's membership enables the consideration of issues from all perspectives, so that advice provided to the Management Committee is comprehensive, well-balanced and independent.

The SAP is chaired by Professor Barry Hart, director of Water Science Pty Ltd and Emeritus Professor at Monash University. Professor Hart has led the SAP in seeking answers to questions critical to the success of Reef Plan, including:

- What levels of water quality do we need to protect coral reefs and seagrass beds?
- How is reef water quality related to catchment management?

- If we adopt best management practices in agricultural industries, will that be good enough to improve water quality?
- How do we measure progress in large catchments when the flood events that impact reefs only occur every few years?
- What is the relationship between changes in land management practices and the state of corals, reefs and seagrass beds?

SAP members agree that finding the answers to these questions is important, not only for Reef Plan but for the ongoing protection of water quality beyond 2013. The advice from the SAP will assist in determining the most appropriate management and tools to facilitate successful implementation of priority actions in Reef Plan relating to target setting, monitoring and reporting.

The Management Committee identifies priority issues for the SAP; for example, information is needed to explain to the community and landholders what is happening with Reef water quality, and how changes in water quality can be recognised.

The SAP helps to integrate relevant monitoring, modelling and reporting programmes, and strengthens the link between biophysical and socio-economic issues, which inform water quality target setting at a regional level.

During the 2006–07 year, the SAP undertook a rigorous peer review of the design of the Marine Monitoring Programme (see page 18). Their recommendations assisted GBRMPA in refining a comprehensive and improved monitoring programme for the next four years. The review focused on the capacity of the programme to contribute to linking ecosystem status, water quality, catchment activities and management intervention.

SAP members have established good relationships with the Regional Implementation Group through regular meetings. The SAP is also becoming familiar with a range of relevant research projects conducted through the Marine and Tropical Science Research Facility (MTRSF) and CSIRO that support Reef Plan implementation.

The enthusiasm of all SAP members is a great advantage, particularly among new members with social and economic expertise who have commenced the development of a socio-economic framework to inform planning and management in the GBR catchment.

The SAP has many challenges for the future, but the groundwork has been laid during 2006–07 for them to provide solid advice on mechanisms to progress the integration of biophysical and socio-economic knowledge and information from the catchment to the Reef, and to inform management decisions.

# Progress 2006–2007

## Setting targets and monitoring and reporting results

### Marine Monitoring Programme

The Reef Plan Marine Monitoring Programme (MMP) was established in 2005 to help assess the long-term effectiveness of Reef Plan in reversing the decline in GBR water quality.

The GBRMPA is responsible for long-term water quality, ecosystem and socio-economic monitoring programmes in the GBR lagoon, and management of the MMP.

The MMP is funded by the Australian Government to 2011. Monitoring providers with a long-term track record of monitoring and research in the GBR Marine Park also contribute in-kind resources to the programme.

The MMP has three sub-programmes: inshore marine water quality monitoring, marine biological monitoring, and socio-economic monitoring.

#### Inshore marine water quality monitoring

Marine water quality monitoring is carried out in the inshore waters of the GBR (within twenty kilometres of the coast) to assess change over time in concentrations of key water quality indicators. Monitoring of marine water quality is required to establish the extent of improvements in lagoon water resulting from any reductions in pollutant loads discharged from GBR catchments.

#### Marine biological monitoring

Land-based water quality pollutants can have negative impacts on the marine ecosystems that make up the GBR Marine Park. Monitoring of the major marine ecosystem types recognised as being most at risk from land-based pollutants (coral reefs and seagrass meadows) is carried out to ensure that any change in their status is identified.

#### Social and economic monitoring

The flow-on effect of the tourism industries that rely on the continued health of the GBR for long-term economic sustainability, underpins a significant and growing proportion of Queensland's regional economy. Declining water quality directly threatens sustainability of the GBR's natural capital and therefore the ongoing prosperity of the industries and the communities that rely upon them.

Monitoring of pollutant loads discharged by major GBR rivers is also an integral component of the Monitoring Programme. Catchment monitoring is coordinated and run by NRW. Catchment water quality

monitoring helps assess change over time in concentrations and loads of land-sourced pollutants that have the potential to harm GBR ecosystems. This information can help illustrate the effectiveness of activities undertaken by communities and governments in the GBR catchment to reduce the transfer of pollutants to the GBR.

During the 2006–07 year, the GBRMPA prepared an Annual Marine Monitoring Report 2006, reporting on data available from December 2004 to April 2006. The data collected provides baseline information on regional inshore marine water quality and inshore reef and seagrass health. This is essential to help assess future changes in water quality and the long-term effectiveness of Reef Plan.

Key findings of the report, and the full report, can be found on GBRMPA's website: [www.gbrmpa.gov.au](http://www.gbrmpa.gov.au)

Components of the MMP are undertaken by volunteer samplers; for example, fieldwork for marine pesticide sampling, chlorophyll a monitoring and intertidal seagrass monitoring.

A review of the MMP was completed in mid-2007 to ensure that monitoring continues to be appropriately coordinated across the GBR catchments and inshore and offshore marine environments. The review has also helped ensure that future marine monitoring can be aligned with monitoring activities carried out as part of local catchment management strategies. If this can be achieved, it will be possible to document the anticipated improvement in catchment and marine water quality and to provide support for current and future catchment-based activities under Reef Plan.

This activity supports Reef Plan Action I5.



Scientist Melanie Shaw shows a tourism operator how to deploy a pesticide sampling device



Image courtesy of the Great Barrier Reef Marine Park Authority

## Monitoring for pesticides

As part of the MMP, tourism operators, education institutions and the Queensland Parks and Wildlife Service are working with the GBRMPA to monitor the levels of pesticides in inshore Reefs of the GBR Marine Park.

Every month at more than ten inshore reef and island sites, volunteers deploy and collect passive samplers from GBR waters. These samplers are sent off to be analysed, and provide scientists and Marine Park managers with definitive data on pesticide concentrations in inshore areas of the GBR.

Along with the advantages of being a continuous, cost-effective way of testing, passive samplers can also measure very low concentrations of pesticides.

This is particularly important to provide information on sources and long-term changes in the use and management of pesticides applied on the land.

One operator in the region, Ron Cusick, general manager of Frankland Islands Cruise and Dive, said that by being involved in the Programme they feel their company is helping manage the GBR for the future and that they can now directly address issues such as poor water quality.

The passive sampling component of the MMP is an excellent example of how the community and industry are working with scientists and Marine Park managers to monitor water quality in the GBR with the aim of improving it in the future.

This collaborative approach ensures that data on pesticide concentration can be collected throughout the Marine Park.

As at June 2007, there were 13 sites where volunteers deploy and collect passive samplers. This is a significant increase on the previous year. Some of the sites have now been monitored for two years with the help of tourism companies such as Fitzroy Island, Frankland Island Cruise and Dive and Voyagers Australia.

The 2006 Annual Marine Monitoring Report confirmed low concentrations of pesticides are present in inshore waters of the GBR. The passive sampling programme will play a vital role in tracking the reduction in pesticides as land-based activities change and become more sustainable.

## Water Quality Improvement Plans

(WQIPs) are catchment- and regionally-based management plans that build on and enhance the water quality management components of the regional NRM plans and Reef Plan. They seek to improve water quality by reducing the loadings of major pollutants to waterways entering the Reef lagoon.

First, WQIPs define the environmental values of the waterways as identified by the local community. They then establish water quality targets and objectives that can be incorporated into regional NRM plans. An adaptive management process is then implemented to achieve the desired outcomes of improving the overall water quality within the coastal catchments discharging to the Reef lagoon.

The regional NRM groups, in collaboration with local councils, are leading the development of WQIPs in the GBR with assistance from GBRMPA, CSIRO, EPA, NRW, DPI&F and local communities.

The NHT-funded Coastal Catchments Initiative (CCI) provides the major source of funding for the development of WQIPs. The CCI aims to address sources of land-based pollution to coastal water quality 'hotspots' through the development and implementation of WQIPs across Australia.

Each WQIP is guided by a steering committee that can include representatives from the relevant regional NRM body, government agencies, industry groups, community groups and science providers. A broad group of representatives from

across the community is also consulted throughout the development process to ensure that the best available local, Indigenous, social, economic and scientific knowledge is brought together.

Water quality improvement plans are prepared in accordance with the:

- Australian Government's *Framework for Marine and Estuarine Water Quality Protection*
- Queensland Government's water quality management framework in the *Environmental Protection (Water) Policy 1997* (EPP Water)

and, where relevant

- National Principles for the Provision of Water for Ecosystems.

Since our understanding of catchment processes, land use impacts and management strategies is continually improving, the implementation of WQIPs will be managed to ensure they reflect the most current information available.

WQIPs are being developed at different rates and on different scales across the Reef catchment. Draft WQIPs will be publicly released for the consideration of both the key implementers and the wider community as a whole.

A WQIP for the Mossman and Daintree basins has already been completed by Douglas Shire Council and is now in the implementation phase, while the following

catchments progressed the development of WQIPs during 2006–07:

- Barron Basin, Cairns urban area and Trinity Inlet by Terrain NRM
- Tully, Murray and Hinchinbrook Island basins by Terrain NRM
- Burdekin and Haughton basins by Burdekin Dry Tropics NRM
- Ross and Black basins by Townsville and Thuringowa City Councils
- Proserpine, O'Connell, Pioneer and Plane basins by Mackay Whitsunday NRM
- Burnett, Baffle and Kolan basins and Elliott sub-basin by Burnett Mary Regional Group for NRM.

When completed, the WQIPs will define environmental values and water quality objectives and targets for incorporation into the regional NRM plans, as well as assist in achieving Reef water quality targets. The WQIPs will also identify the priority management practices for water quality improvement, establish management practice targets and identify ways to implement these practices.

The development of WQIPs has improved our understanding of the relationship between land use, management practices, water quality and GBR ecological health.

This activity supports Reef Plan Actions A3, A4, D4, G1, H1, I6 and I8.

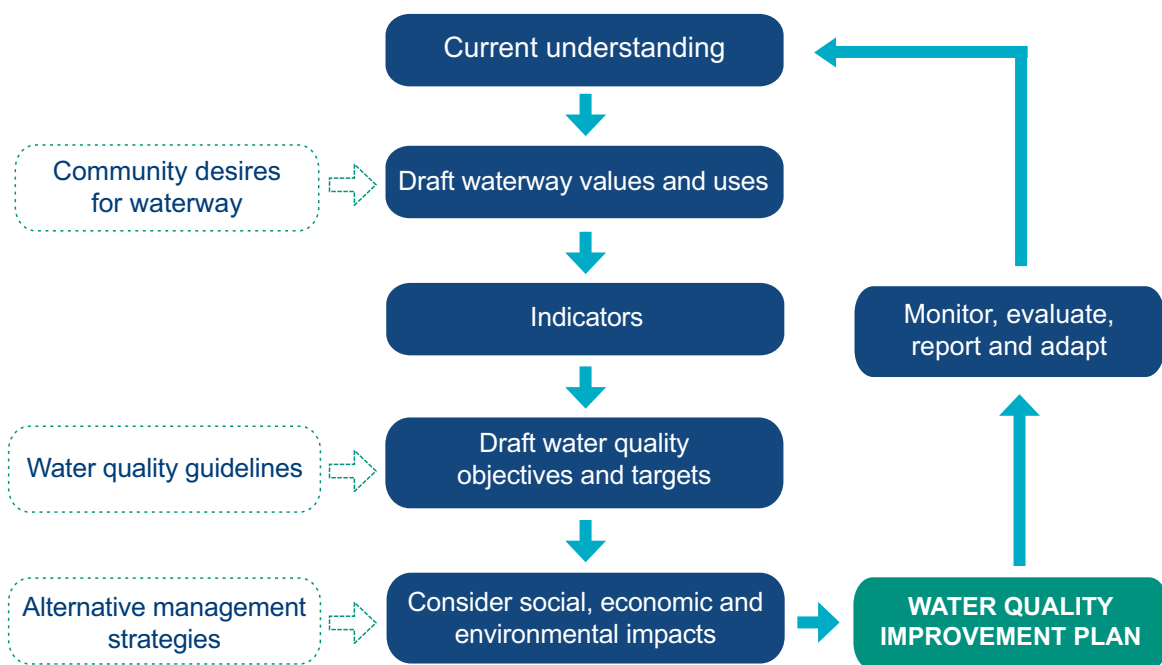


Figure 2 Process for developing a Water Quality Improvement Plan



Members of the Cardwell Shire Floodplain Programme after a boat tour of the Tully River



Image courtesy of CSIRO

## Tully Water Quality Improvement Plan

During the 2006–07 year, the Cardwell Shire Floodplain Programme (CSFP) and Terrain NRM worked on a draft Tully WQIP, covering the Tully and Murray River basins and neighbouring coastal areas from Mission Beach to Cardwell. Developed under Reef Plan, the main aim of the Tully WQIP is to reduce sediment, nutrient and pesticide loads in the water entering the GBR.

CSFP Chairman Bill Shannon said that developing the draft plan was a team effort between local industry, Traditional Owners, community groups, the Cardwell Shire Council, state and federal governments, and scientists.

“The Tully WQIP is the result of a community effort — finding local solutions to local problems — and it’s based on the best available science,” Mr Shannon said.

### The science

The Tully WQIP has been underpinned by a major scientific research effort that

has provided up-to-date facts about water quality issues in the region, as well as uncovering some innovative new solutions.

Over the last two years, more than 30 scientists have been involved in over 20 different research projects in the Tully-Murray region. The CSIRO, James Cook University, and various state and federal government agencies have also been involved in the research project.

The research teams worked under the guidance of the CSFP’s steering committee, in cooperation with local stakeholders. The research programme was divided into three parts:

1. Social, cultural and economic values of local waterways were identified by consulting with the local community. A series of interviews, surveys and workshops were run to find out how people use local waterways and the Reef, and what they value about them.

Based on this information, local water quality objectives were identified to protect these values.

2. To assess current water quality, scientists analysed water-samples collected around the catchment and the Reef, combined the results with computer modelling to calculate total sediment and nutrient loads in the river systems, and compared sediment, nutrient and herbicide concentrations and loads to draft water quality targets.
3. In close cooperation with industry groups such as CANEGROWERS, Agforce, Growcom, and forestry companies, scientists and landholders investigated and tested a variety of current and possible future management practices to improve water quality.

The results of this scientific work can be downloaded at [www.terrain.org.au/wqip](http://www.terrain.org.au/wqip)

Members of the Giringun Aboriginal Corporation, Claude Beeron and Clarence Kinjun, were actively involved in the Tully WQIP



Image courtesy of CSIRO

### The plan

The overall aim of the Tully WQIP is to achieve a significant reduction in pollutant loads to the GBR lagoon by 2013. To achieve this, the plan will include management actions that landholders, governments, council, and community groups can undertake.

To choose the most suitable actions, a detailed analysis was carried out, weighing up the costs and benefits to landholders, the effect on the overall economy of the region, and the difference each possible action could make to water quality.

From this, the Steering Committee and scientists chose a range of actions that made sense both economically and environmentally. A few of the high-priority actions proposed in the plan are:

#### **Six Easy Steps for sugarcane**

The Six Easy Steps process, developed by BSES Ltd, can be tailored for the

Tully-Murray region and with full adoption a 23 per cent reduction in nitrate loads could be delivered at the end-of-river. Other fertiliser management strategies such as N-replacement and nitrogen fixation will also be investigated.

#### **Fertiliser rates for horticulture**

In horticulture, efforts can be geared towards expanding current nutrient management programmes and establishing soil-specific recommendations for nutrient application in bananas (similar to the BSES Six Easy Steps process).

#### **Improved best management practices for herbicide application**

All agricultural and forestry industries can support uptake of recommended practices for herbicides and Chemcert® accreditation, as well as exploring alternative options of herbicide management.

#### **Promote zero tillage for sugarcane, and zonal tillage for bananas**

Increasing uptake of zero tillage in sugarcane and zonal tillage in bananas can reduce sediment delivery, although effects on yield and gross margin need to be investigated.

#### **Revegetate stream-banks and restore wetlands**

Restoring and replanting vegetation on stream banks and wetlands in identified priority 'hotspots' can reduce sediment and nutrient losses.

#### **Water quality monitoring**

Progress in implementing the Tully WQIP will be assessed through monitoring the uptake of recommended practices, as well as plot-scale, catchment-scale and Reef water quality monitoring.

The draft plan will outline effective and economical ways to work with landholders to improve water quality in local creeks, rivers and wetlands, and out to the GBR.

# Progress 2006–2007

## Targeting land use practices to water quality issues

### Reef Extension Project

The Reef Extension Project is a three-year initiative jointly funded through the National Heritage Trust (NHT) and National Action Plan for Salinity and Water Quality (NAP). The project seeks measurable increases in the voluntary uptake of sustainable management practices within primary production systems that improve the quality of water leaving farms and entering the GBR.

The Reef Extension Project targets the grazing, horticultural and sugarcane growing sectors of the Terrain (formerly FNQNRM) and Burdekin Dry Tropics Regions, and is central to meeting a number of departmental, peak industry and community-based obligations as defined within Reef Plan.

The Reef Extension Project comprises dedicated, sector-specific extension

specialists working in collaboration with producers and key regional and industry stakeholders to develop and implement education programmes. Project staff also facilitate producer trials of sustainable agricultural practices, which are tailored to particular land uses, locations and pollutants.

Over the 2006–07 year, the Reef Extension Project focused on engaging with producers to translate improved management practices and sustainability principles into production systems, while balancing enterprise profitability, and integrating with regional incentive schemes and allied project initiatives.

Producer demonstration trials, established in the grazing, banana and sugarcane sectors, helped to demonstrate the economic and Reef water quality benefits of new generation farming systems that

incorporate endorsed Best Management Practices (BMP). Specific emphasis was placed on those practices that address key diffuse source pollutants such as sediments, nutrients and agricultural chemicals.

Within the Tully and Burdekin River catchments, significant effort has also gone into supporting the development of WQIPs and broader alignment with Nutrient Management Zones (NMZs) (see page 20 regarding WQIPs and page 46 regarding NMZs). This has involved engaging with producers, industry and science service providers to consolidate industry-specific BMP and develop targets (management practice and load-based) to ensure the ecological values of receiving waterways and the Reef are maintained.

A benchmarking exercise run in partnership with the Tully WQIP established a point



of reference against which future farming system improvements and industry progress can be gauged.

The successes of the project were profiled through a variety of print media and presented at several regional, national and international forums, including the North Queensland Beef Research Conference 2007, the Seventh Annual Australian Industry Banana Congress 2007, and the Australian Society of Sugarcane Technologies Conference 2007.

Challenges for the Reef Extension Project have included industry recovery from the impacts of Tropical Cyclone Larry, and staff turnover within the Wet Tropics component of the project.

The project outcomes to be achieved at the conclusion of the Reef Extension Project in 2008 are:

- an agreed systematic approach accepted by regional NRM bodies, peak industry bodies and governments, in the delivery of improved land and water management practices as they apply to production systems
- increased adoption of ecologically sustainable land, water and BMP in agricultural production systems leading to reduced sediment, nutrient and pesticide exports from priority catchments adjoining the GBR
- improved integrity of important habitat areas within, and adjacent to, farming systems.

The Reef Extension Project contributes to Reef Plan's objectives through the translation of improved management practices and sustainability principles into production systems, while balancing enterprise profitability; and ensuring the maintenance and improvement of high value habitat within or adjacent to production systems, in particular riparian and wetland environs.

The project specifically targets Reef Plan Action B1; however, outputs from the project are also contributing to the achievement of other Reef Plan Strategies, including A (self-management approaches), C (economic incentives), F (research and information sharing), and G (partnerships).

A natural spring at Mellaluka Station, Clermont



## Profitable Beef Business – North Queensland Grazing Systems project (Research to Reality)

The Queensland Burdekin Catchment Research to Reality (R2R) project supports three producer teams from across the catchment. The Belyando, Northern Speargrass and Collinsville teams consist of 17 businesses managing 648 223 hectares of rangelands and approximately 160 000 cattle. The project is principally funded by the Burdekin Dry Tropics NRM, DPI&F, and the Beef CRC for Genetic Technologies – Beef Profit Partnerships Programme.

The aim of the project is to accelerate the rate of adoption of sustainable technologies and to help graziers enhance the profitability and sustainability of their enterprises so they can remain viable well into the future.

To do this, R2R staff work with teams of graziers to expand their knowledge

and skills through practical learning and research activities. The aim is to empower graziers to develop, test and implement new technologies and practice change on their own properties. By building capacity in this way, R2R supports graziers to achieve business success while also improving or maintaining land condition and water quality.

R2R provides a unique opportunity for Burdekin graziers to take the lead in developing solutions to key local issues. Project activities include land condition analysis, business analysis, options analysis, engaging specialists, study tours, and conducting trials on property test sites. The wider grazing industry can also learn from this project through participation in team field days, the DPI&F website, and fact sheets developed from team projects.

The R2R project was designed to achieve outcomes for the Pilot Reef Extension Programme within the Burdekin rangelands. That is:

- to increase the adoption of ecologically sustainable land management practices leading to reduced sediment, nutrient and pesticide exports
- to work in collaboration with regional NRM and peak industry bodies
- to develop and implement education and extension programmes to improve land and water management practices
- to increase landholder awareness of the value of wetlands and riparian habitat in maintaining water quality and ecological health.

NR&W staff Tracy Whiting and John Armour sampling soil nutrients at a Tully PDS



## Developing and implementing sustainable horticultural production systems for the coastal Wet Tropics

The coastal Wet Tropics region of Queensland is home to the majority of Australian production of banana and papaya, with a collective production area of approximately 10 500 hectares and farm gate value of approximately \$290 million annually.

Because of the region's high annual rainfall (2500–4000 millimetres) and its close proximity to the GBR and world heritage listed Wet Tropics rainforests, local horticultural industries must manage for a number of potential environmental impacts arising from their production systems.

DPI&F, through the pilot Reef Extension Project, is working with these industries to assist the development and implementation of production practices that are good for business as well as the environment.

The project has been very successful in eliciting practice change on-farm by taking a farming systems approach that works collectively with key producers. The key steps in the process include:

1. Working with producers to identify the different aspects of their farming system that potentially have negative impacts on runoff water quality; for example, nutrient and pesticide use, and sediment movement.
2. Assisting producers to document current farm practices that manage these risks, and to identify possible improvements to existing practices or the need for innovative new practices.
3. Assisting producers with follow-up assistance to pursue improvements and implementation of these identified farm practices.
4. Promoting the adoption of these changed practices within the broader industry, including key stakeholders such as industry service providers, using Producer Demonstration Sites (PDS) to demonstrate practice change and implementation.

During the 2006–07 year, key banana producers identified and documented a

range of banana production practices that improve runoff water quality while maintaining or improving profitability. The document that resulted has been used to inform significant projects such as the Tully WQIP, and is available to and used by producers as reference material.

Five PDS across the Tully and Innisfail districts were established during the 2006–07 year. They demonstrated the adoption of BMP for nutrient, sediment and pesticide management. Groups of producers visited these sites to find out how to improve management practices on their own properties.

In addition, DPI&F are continuously developing software tools that help producers implement BMPs for nutrient use. As a result, around 20 per cent of the banana production area in the Wet Tropics is using a purpose-built database, known as Banaman, for keeping records associated with nutrient use and diagnostic testing.

## Vegetation Management

Broadscale clearing of remnant native vegetation ended in Queensland on 31 December 2006, fulfilling a 2004 Queensland Government election commitment.

The end of broadscale clearing contributes positively to the water quality of reef catchments by reducing sedimentation rates and aiding the filtration of excess nutrients and pesticides.

Changes in land use that potentially compact the soil, such as broadscale land clearing, can result in increased runoff during rainfall events and increased erosion. Increased vegetation cover may reduce runoff rates and improve the infiltration of water into the soil.

Amendments to the *Vegetation Management Act (1999)* fulfilled a range of policy agendas of which Reef Plan was only one; however, changes to the Act contributing to the end of broadscale clearing has been a significant step towards keeping sediment out of waterways flowing to the GBR.

Incentive schemes such as the Vegetation Management Structural Adjustment Package was designed to assist landholders affected by new vegetation management laws relating to broadscale clearing. Applications for the Vegetation Management Structural Adjustment Package closed in February 2007 with 1610 applications for financial assistance lodged for consideration.

The Vegetation Incentives Programme, which is part of the adjustment package, will protect around 24 000 hectares of high conservation value, non-remnant vegetation. This programme was

integrated with the Blueprint for the Bush Environmental Partnerships Scheme (EPS). The first round tender call for the EPS resulted in the protection and management of 78 836 hectares under perpetual nature refuge agreements from 64 tenders.

The end of broadscale clearing and associated vegetation management arrangements address ways to encourage landholders to adopt sustainable management practices, and establish

conservation areas on parts of their properties that have high environmental values with potential to improve water quality outcomes.

Activities are now in place to report changes in vegetation clearing rates following the cessation of broadscale clearing.

This activity contributed to Reef Plan Actions C1, C6, D3 and E2.



## Grazing Land Management

In partnership with Meat and Livestock Australia, DPI&F has led a consortium of organisations including NRW, CSIRO Sustainable Ecosystems and Tropical Savannas CRC to develop Grazing Land Management (GLM) education workshops. The aim of the GLM workshops is to contribute to improving the productivity and health of the grazing lands of northern Australia, through the application of appropriate management strategies.

Improved land condition equates to improved ground cover, which reduces erosion. Practices such as adjusting stock numbers, fencing riparian zones and waterways, modifying grazing management, and using an appropriate amount of fertiliser for sown pastures ensures that land condition is either improved or maintained, resulting in reduced sediment loss to waterways.

The GLM workshops consist of a series of interactive sessions, conducted over three-day or four-day periods, where participating graziers begin to develop a plan for managing their grazing lands based on ecological principles. A follow-up day is scheduled about six months after the initial workshop to gauge how the implementation of the plan is progressing.

DPI&F is responsible for the customisation of regionally specific packages. As at June 2007, the customised GLM workshops relevant to Reef Plan were at varying stages of development throughout Queensland, as outlined in the table below.

GLM workshops have been designed to cater for the information needs of graziers in northern Australia. By exploring various elements that affect grazing

lands, participants gain a better overall understanding of the grazing ecosystem. They examine climatic conditions, along with grass, cattle and fires, and then examine components that include soils and plants along with the role graziers themselves play in the grazing ecosystem.

After this, participants examine the tools available to manage land condition, improve the level and evenness of use, and enhance diet quality. These tools are:

- managing grazing
- using fire
- managing tree-grass balance
- using sown pastures
- managing weeds.

Table 1 Number of GLM workshops in 2006–07

Region	Status	Funding body
Burdekin	Developed. Four workshops delivered.	Meat and Livestock Australia
Mackay Whitsunday	Under development. Pilot workshop presented in May 2007.	Queensland Wetlands Programme (see page 41)
Far North Queensland	Under development. To be developed by March 2008.	Queensland Wetlands Programme
Fitzroy	Developed. Five workshops delivered.	National Action Plan for Salinity and Water Quality and Meat and Livestock Australia.
Burnett	Developed. Five workshops delivered.	Meat and Livestock Australia
Wetlands Module	Completed 2006. A module has been developed to be delivered in association with GLM workshops to provide graziers with tools and information to improve wetland management practices. The module is to be delivered in the Burnett Fitzroy and Burdekin regions only.	Queensland Wetlands Programme



Finally, all the management aspects are combined in a grazing land management plan customised for each participant's individual property.

The course builds on the participating graziers' understanding of their properties and the way they manage them. Throughout the workshop, participants are given detailed explanations of principles and concepts that apply to the grazing lands of northern Australia. Where possible, local examples from research or on-property demonstrations are used to illustrate the relevance and practical application of these principles and concepts to the graziers' properties. The skills and knowledge that participants bring to the course are highly valued, and they are encouraged to participate in debates, discussions and demonstrations that take place throughout the workshop.

Participants receive a workbook, a technical manual and tools to help with their grazing land management, including spreadsheets, regional land type sheets, tools to calculate carrying capacity, a plant identification book and other useful publications.

Graziers attending GLM workshops are made aware of issues influencing water quality, including:

- use of pesticides and fertilisers
- maintaining high levels of ground cover
- matching stock numbers to feed supply
- using best management practices such as spell grazing and off-stream watering points
- protecting wetlands and riparian vegetation.

Through the development and implementation of a grazing land

management plan, graziers play a significant role in meeting the objectives of Reef Plan by reducing the load of pollutants from diffuse sources in the water entering the GBR, and rehabilitating and conserving areas of the GBR catchment that have a role in removing waterborne pollutants.

Workshop participants are informed about catchment issues and encouraged to link their property plans at the sub-catchment and catchment level. Where possible, regional NRM Group officers are given the opportunity to attend workshops.

The customisation of regionally specific GLM workshops is aligned to Reef Plan Actions A3 and A4.

GLM workshop participants Megan and Terry Dunne



## Farm Management Systems

The Australian Government, through DAFF, led the development of a National Framework for Environmental Management Systems (EMS). The National Framework provides a set of principles that describe the broad parameters needed to achieve consistency and acceptance across the agricultural sector. It also describes the relationships and roles of the range of participants in environmental management in agriculture – including landholders, industry groups, community groups, and governments at the local,

state and national level. The Framework emphasises that the adoption of an EMS by a business is voluntary and that the roles of government and industry groups are to facilitate the provision of information and assistance.

The Australian Government has undertaken a number of initiatives to progress the adoption of EMS by agricultural industries. The Pathways to Industry EMS Programme, funded through NHT, provided financial support to industries to drive

the adoption of EMS. The Queensland Farmers' Federation (QFF) received funding to enhance the dairy, horticulture and nursery production industries' EMS and promote on-ground adoption of EMS.

In Queensland, EMS is realised in Farm Management Systems (FMS), which are voluntary property and business level management processes used by producers to identify and manage risks that may occur in their farming operation, including – but not limited to – environmental risks.

FMS aim to achieve continuous improvement in the management performance of producers by focusing attention on implementing recommended management practices and reviewing progress made against targets.

A partnership agreement between the Queensland Government and QFF is intended to support and promote the adoption of FMS by Queensland's intensive agricultural industries. Within the Queensland Government, DPI&F, NRW and EPA are responsible for FMS implementation.

The QFF continue to facilitate consistency and collaboration between member FMS programmes. QFF are also progressing partnership arrangements with key stakeholders, having signed a Memorandum of Understanding with the Queensland Regional NRM Groups Collective during 2006–07. Partnership work has also included the Australian Government and the conservation sector.

FMS support Reef Plan Actions A3 and A4.



A canegrower showing good management practices such as dual row, minimum tillage, and controlled traffic

Image courtesy of CANEGROWERS

Sam and Steve Lizzio are among banana growers who have been involved in the Growcom Nutrient Management Zones programme on their North Queensland farm

Image courtesy of Growcom

## Nutrient management module for horticulture

Growcom's Farm Management System (FMS) is a software programme developed to assist growers in responding to the numerous pressures placed on their operations – from water availability to nutrient management. The Growcom FMS is in modular format with each module focusing on potential risk areas and opportunities for improvement.

Managing nutrient and pesticide inputs and ensuring optimum soil health can lead to improved water quality. Improved water use efficiency reduces run-off, which also has water quality benefits.

Each module of the FMS includes 25 questions for the grower to answer – with assistance from a Growcom field officer – about their current management practices. This identifies potential risks and opportunities to improve their current practices. The programme then generates an action plan where the grower works towards target dates.

While FMS is being rolled out in horticulture regions across Queensland,

the main activity in the Reef catchment is occurring in the Wet Tropics and in the Bundaberg regions. Local Growcom staff are undertaking these activities.

Development of the FMS programme has been funded through a variety of sources, including Growcom's internal funding, the Queensland Government's Rural Water Use Efficiency Initiative (refer to page 33), the Regional Group Collective's Systematic Approach to Sustainable Agriculture Across Queensland project and DAFF's Pathways to Industry EMS Programme (refer to page 31). The roll out of the nutrient module in Far North Queensland is being funded by the NHT. DEW funded the Growcom nutrient management project during 2006–07.

The FMS provides a targeted and systematic approach to provide growers with the right advice on how to manage risks and access opportunities. While improved NRM is an important outcome, the FMS focuses on ensuring that productivity is optimised, which is the key incentive for growers to change

their management activities. The FMS is an extension of the Farmcare Code of Practice approach developed by Growcom (the Queensland Fruit and Vegetable Growers) nearly ten years ago.

The actions recommended within the Growcom FMS assist in reducing the amount of nutrients, sediments and pesticides entering our waterways, which in turn helps to reverse the decline in reef water quality.

During 2006–07, the nutrient module was established in a trial phase with extensive work being conducted as part of the Growcom nutrient management project.

In the next stage of the project, banana growers will implement the recommended actions provided by the Growcom FMS. These will be monitored and there will be opportunities for the positive outcomes to be extended to other growers.

Papaya/pawpaw growers will also be involved, with growers working through the FMS module.