



Performance Story Report 2

Evaluation of Investment in the Reef Catchments Reef Rescue Project
August 2011

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Table of Contents

| | |
|--|----|
| Executive Summary..... | 3 |
| Section 1: Background | 4 |
| The Performance Story Report | 5 |
| Step 1: Planning workshop – development of the program logic | 7 |
| Key Evaluation Questions | 8 |
| Step 2: Data Trawl..... | 9 |
| Step 3: Social Inquiry Process | 9 |
| Step 4: Science Panels/Reviews | 10 |
| Step 5: MERI Performance Summit Workshop | 11 |
| Section 2: Results chart..... | 12 |
| Section 3: Implications | 22 |
| 3.1 Addressing the Evaluation Questions | 22 |
| Progress towards achieving immediate and intermediate outcomes..... | 23 |
| Increased support and resources from Reef Rescue partners and industry for planning and farm management | 23 |
| Increased extension and communication of A&B Class practice by Reef Rescue partners and industry | 24 |
| Increased support and resources from Reef Rescue partners and industry for landholder uptake of A&B Class practice | 26 |
| Project proposal, assessment, prioritisation and approval process..... | 27 |
| Improved Farm record keeping including development of regional support tools..... | 28 |
| On ground implementation by farmers and graziers through Reef Rescue contributing towards 3 year target..... | 30 |
| Property plans developed by every farmer and grazier involved in Reef Rescue | 31 |
| Property planning and on ground implementation by farmers and graziers | 31 |
| Monitoring uptake of improved practice adoption through industry | 32 |
| Improved profit by adopting A&B Class land management practices..... | 32 |
| Improved In-stream Water Quality..... | 33 |
| Broadscale adoption of A&B Class land management practices across the GBR – 1300 farmers and 650 pastoralists over an area of 3.8 million hectares over next 3 years | 35 |
| 3.2 Lessons learned..... | 36 |
| 3.3 Improvement | 37 |

| | |
|--|----|
| | 2 |
| Section 4: Instances of Significant Change | 40 |
| Section 5: Final Impact Statement | 43 |
| Cane | 43 |
| Grazing | 47 |
| Horticulture..... | 50 |
| Estimated Load Reductions..... | 51 |
| Section 6: Appendix | 53 |
| Appendix 1: Grazing Case Studies..... | 53 |
| Case Study 1 | 53 |
| Case Study 2 | 55 |
| Case Study 3 | 57 |
| Appendix 2: Cane Case Studies..... | 59 |
| Case Study 1 | 59 |
| Case Study 2 | 61 |
| Case Study 3 | 63 |
| Case Study 4 | 65 |
| Case Study 5..... | 67 |
| Appendix 3: Horticulture Case Studies | 69 |
| Case Study 1 | 69 |
| Case Study 2..... | 71 |
| Appendix 4: Cane Industry Case Studies..... | 73 |
| Case Study 1 | 73 |
| Case Study 2 | 75 |
| Case Study 3 | 77 |
| Case Study 4 | 79 |
| Case Study 5..... | 81 |
| Case Study 6..... | 83 |

Executive Summary

From the development of the Mackay Whitsunday Water Quality Improvement Plan in 2008, a range of specific improved land management practices (A & B class) for intensive agricultural land uses were identified. These practices were based on the best available science and information at the time with regards to being able to improve on-farm environmental and economic sustainability. Over the first 2 years of Reef Rescue, there have been some modifications and changes to the definition and implementation of these practices with regards to Mackay Whitsunday's ABCD industry frameworks. The Reef Catchments Reef Rescue Plan delivery process continues to be focused on the increased adoption of these improved land management practices across the relevant agricultural commodities in the region.

The Reef Catchments Reef Rescue MERI Plan was approved in January 2010 and has a timeline until June 2012. In August 2010, the first Reef Catchments Reef Rescue Performance Story Report was developed and evaluated the first 2 years of Reef Rescue delivery into the region. This identified that many of the foundation activities were initially started during the Sustainable Landscapes Program (completed June 2008) and these have been further developed and improved upon over the first 3 years of Reef Rescue. During this time, Reef Catchments has been able to continue to progress through the Reef Rescue program logic as anticipated in the MERI plan. The key partnerships and processes developed in Year 1 and 2 with a range of regional industry service providers have continued into Year 3 and have been an important factor in helping to achieve the majority of the immediate outcomes identified in the Reef Rescue program logic.

The successful development of these foundation processes and achievement of immediate and some intermediate outcomes has seen an increase in Year 3 from Caring for our Country in the investment in incentives for water quality improvement. This has resulted in increased support for land managers to uptake A & B class management practices and this includes for planning and farm management, which is a key part of implementing the improved practices. These water quality grants being provided to landholders and industry have helped to progress and achieve more of the intermediate outcomes identified in the Reef Rescue program logic.

The delivery of Reef Catchments Year 3 Reef Rescue project has continued to be very successful even under the extremely long and intense wet season experienced during the year. The magnitude of the wet season has had significant impact upon farmers and graziers ability to implement the A & B class management practices. One reason is from simply not being able to access paddocks or blocks to be able to complete the work within the planned timeframe. Stand over cane and yield reductions from water-

logging and other issues have led to reduced cash flow. While the wet season has had an impact on achieving some outcomes such as completing on-ground projects it has allowed more work to be done on other milestones and outputs such as communication activities or extra industry wide projects.

Section 1: Background

The delivery of the Reef Rescue Water Quality Grants in Mackay Whitsunday Region continues to focus on the efficient processes and maintenance of the strong stakeholder partnerships developed during the first 2 years to achieve the common goal of improved reef water quality. These partnerships includes the continued support of established industry working groups and precision planning consultants to work with landholders to ensure delivery of intended Caring for our Country targets and outcomes.

The Reef Rescue Water Quality Grants focused on a range of specific improved management practices (A & B class) for intensive agricultural land uses. The increased adoption of these practices can improve the water quality of the Great Barrier Reef lagoon by reducing nutrient, pesticide and sediment loads during run-off events. From the Mackay Whitsunday Water Quality Improvement Plan (2008), estimated load reductions in the Mackay Whitsunday region based on an increased uptake of A and B class management practices could be up to:

- 25% for dissolved inorganic nitrogen
- 20% for residual herbicides (ametryn, atrazine, diuron and hexazinone)
- 20% for particulate nitrogen and phosphorus
- 30% for filterable reactive phosphorus
- 5% for suspended sediment

In Year 3 of Reef Rescue in the Mackay Whitsunday Region, \$6,660,466 was provided to specifically fund water quality grants and partnership projects. With a minimum of 50% of funding matched by land managers and industry, over \$13.2 million was invested into the region to support and implement the adoption of the improved land management practices. Over the first 3 years of Reef Rescue, Caring for our Country has invested in the Mackay Whitsunday region a total of \$19,968,591 with 91% or \$17,380,466 made available specifically for water quality grants and partnership projects to support and invest in the dominant agricultural industries to adopt improved land management practices.

Key outcomes from the first 3 years of delivery of the Reef Rescue project water quality grants/incentives in the Mackay Whitsunday region have been:

- Wide scale adoption by farmers and pastoralists of soil, nutrient, pesticide, irrigation and stormwater management practices linked to regional industry ABCD frameworks and practice improvement.
- The development and support of individual and mill based farm input and practice recording and reporting systems that can outline industry practice trends such as current adoption rates.
- A flexible streamlined delivery of incentive funds via a process that links funding levels to water quality improvement outcomes to maintain a high return on investment and a clearly defined public benefit.

The Reef Catchments Reef Rescue program commenced in 2008 and is now in its fourth year, July 2011 – June 2012. There are 5 years in total allocated for Reef Rescue.

The Performance Story Report

A Performance Story Report is an evaluation approach which provides a statement of the progress that has been achieved in maintaining or improving NRM goals or targets. The Performance Story is supported by evidence at each level of outcome developed in the program logic. This is a participative process which matches quantitative evidence from a data trawl, and qualitative evidence through science and review panels, of the adoption of improved management practices (A & B class) for intensive agricultural land uses. This Performance Story Report will:

- identify the intended outcomes as outlined in the Program Logic
- report on the achievements against these expectations
- discuss what was learned and what will be changed and improved
- describe the steps taken to ensure the quality and relevance of the data presented.

The first performance Story Report process developed a structured approach to using evaluation to help achieve outcomes and consisted of a five part participatory process and report structure. The process steps used to develop the first report were as follows:

- Step 1: Planning workshop
- Step 2: Data Trawl
- Step 3: Social inquiry process
- Step 4: Science/Review panels
- Step 5: Evaluation summit

To ensure that the key Caring for our Country outcomes are being achieved; monitoring, evaluation, reporting and improvement (MERI) activities have been identified and undertaken. In the Mackay Whitsunday region emphasis has been placed on using the Australian Government's MERI framework to complete this process. This information has been used to inform all stakeholders involved in the project of its progress and success to date.

The MERI framework was used in an adaptive approach to evaluate progress. Program logic, planning and collaboration were undertaken with the:

- key commodity working groups
- industry working groups
- reef and catchment science and implementation groups

These groups performed the function of a collaborative advisory panel which culminated in the first Reef Catchments Reef Rescue Performance Summit, consistent with the MERI framework. Participants were invited to synthesise key evaluation findings and identify areas of most significant change and develop recommendations for future activities and investment.

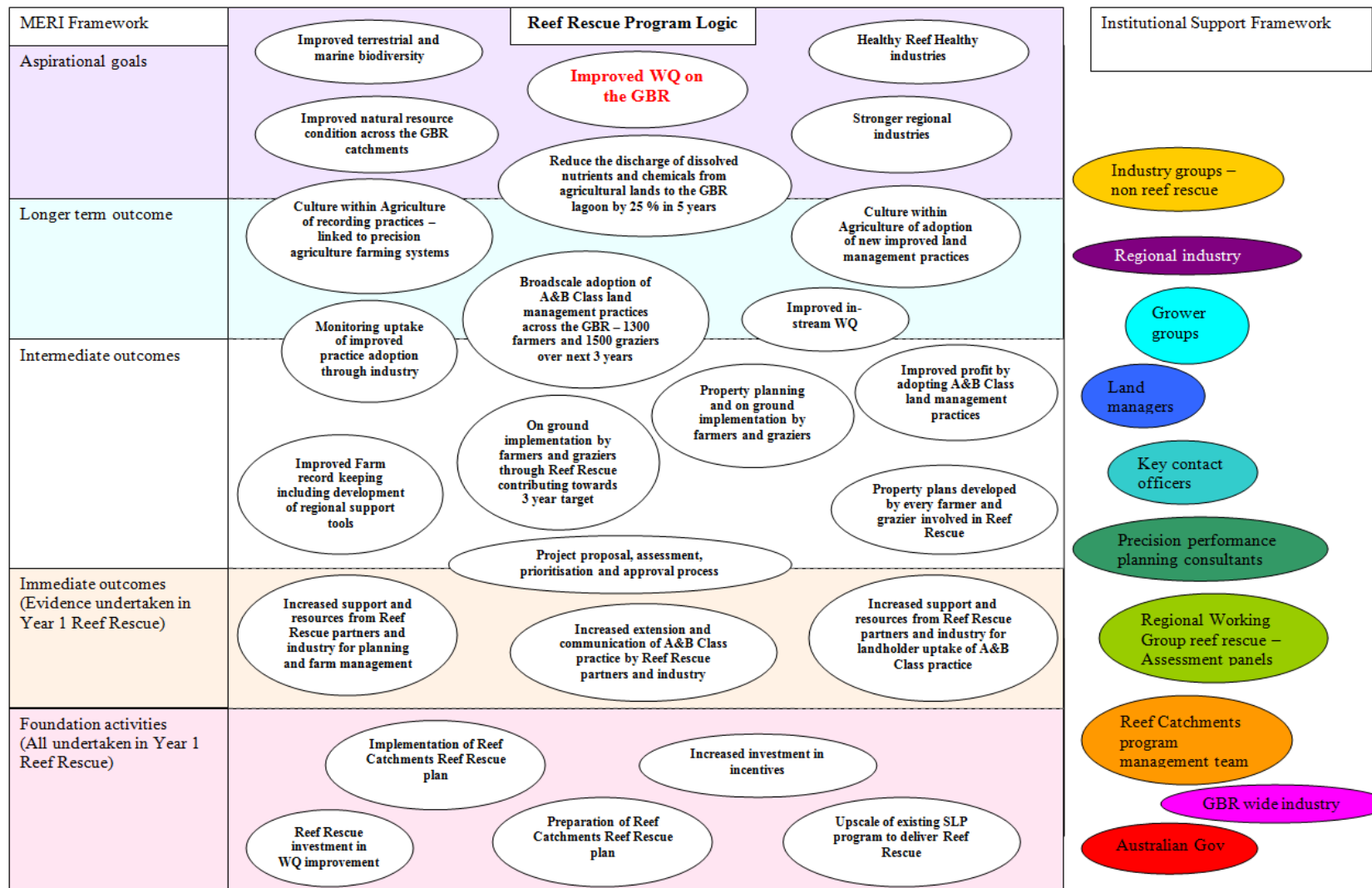
The second Performance Story Report has continued to utilise the same process as the first. Assessment criteria developed to identify key performance indicators have again been reported against in this document. The social inquiry and the performance summit were again conducted to establish from land managers, industry staff and other experts how they perceived the delivery of Reef Rescue is going and the outcomes it is trying to achieve. To ensure fresh ideas or perspectives were obtained, all people identified to answer this year's social inquiry and to attend the performance summit had not participated in the previous year's evaluation.



Plate 1 Looking down the Pioneer Valley from Eungella Township

Step 1: Planning workshop – development of the program logic

Figure 1 Program logic for Reef Rescue Water Quality Grants in Mackay Whitsunday Region



Key Evaluation Questions

The key evaluation questions were developed to determine how well the project is proceeding in line with its original design and identify the sources of information (lines of evidence) that will answer these questions. In the case of the Reef Rescue Water Quality Grants the key evaluation questions needed to answer the Caring for our Country targets which are:

- To increase the number of farmers who have adopted land management practices that will improve the quality of water reaching the reef lagoon by a further 1300 over three years.
- To increase the number of pastoralists who have improved ground cover monitoring and management in areas where run-off from grazing is contributing significantly to sediment loads and a decline in the quality of water reaching the reef lagoon by a further 650 over an area of 3.8 million hectares over three years.

The key evaluation questions identified in the planning workshop used to guide this study were then aggregated into the following four categories:

1. Impact

- In what ways and to what extent has Reef Rescue delivery in the Mackay Whitsunday region had on adoption of improved land management practices that improve water quality entering the GBR lagoon?
- What, if any, unanticipated positive or negative changes have resulted from delivery of Reef Rescue in the Mackay Whitsunday region?

2. Effectiveness

- In what ways and to what extent has the Reef Rescue project in the Mackay Whitsunday region contributed to the Caring for our Country “Protecting the Reef” targets?
- What other activities/strategies might be more effective in the Mackay Whitsunday region for achieving the Caring for our Country “Protecting the Reef” targets?

3. Appropriateness

- To what extent have delivery process, technical advice and training been appropriate in engaging land managers to adopt land management practices that achieve water quality improvement outcomes?
- Who adopted what, in what situations and why?

4. Efficiency

- To what extent has the Mackay Whitsunday Reef Rescue delivery process and program attained the highest value out of available resources?
- What other ways could we invest or improve our Reef Rescue delivery process for greater return?

Step 2: Data Trawl

The data trawl focuses on obtaining and collecting existing relevant scientific data or information on helping to achieve the outcomes identified in the regions Reef Rescue program logic. This is carried out by Reef Catchments Reef Rescue project management, who examine all existing reports, documents and other sources such as the database associated with the previous Sustainable Landscapes program and the first 3 years of Reef Rescue. Wider information was also examined including other NRM regions resources. The information collected through this process is helping to show evidence that the outcomes are being met through the Reef Rescue program.

Step 3: Social Inquiry Process

As identified in the MERI plan, there are a range of monitoring activities that have been established and will be continued through the duration of the project.

Reef Rescue Participant Interviews

Based on the key evaluation questions developed in the planning workshop, a participatory questionnaire (written, phone or web based) was developed for Year 3 to survey land managers and industry staff. In total, 70 people were contacted to participate in the survey being delivered by an independent local communication consultant, PROSE PR. These surveys were transcribed and presented at the performance summit workshop for analysis and discussion. In Year 4, another 70 interviews will be completed following the same evaluation questions and using the same process options.

Of the 70 land managers and extension staff invited to take part there were 60 respondents including:

- 39 from the cane industry
- 12 from the grazing industry
- 2 from the horticulture industry, and
- 7 industry extension and support officers

Case Studies

16 case studies were written including; 5 cane individual, 6 cane industry, 3 grazing and 2 horticulture (please refer to Appendix 1 - 4). The Case studies included asking some of the same questions asked during the participant surveys. Year 4 will see a further 18 case studies completed.

Economic Analysis

Economic analysis and modelling of landholders adopting A and B class cane and grazing management practices for water quality improvements has continued to be supported and implemented in the region through a range of initiatives such as Project Catalyst and Reef Wise Farming. It is intended to continue to utilise the information from these projects in Year 4 and to negotiate to possibly get 'real life' scenarios analysed, that could be included in future Performance Story Reports.

MERI Performance Summit

The MERI Performance Summit is an annual event and will allow all invited participants (interviews, case studies, Reef Rescue industry service providers and regional working group members) to look at the evidence collected and review comments to date. Participants will be able to provide comments or add more feedback to the evidence collected.

Step 4: Science Panels/Reviews

Reef Catchments Program Management reviews

Reef Catchments program management reviews regularly the evidence collected and also the MERI performance story to provide feedback linked to the outcomes in the program logic. This includes staff working on Reef Rescue, Paddock to Reef, Healthy Waterways, Pest Management and Fire Management.

Reef Catchments Scientific Panel reviews

As well as Reef Catchments program management staff, some key partners and stakeholders linked to the organisation also reviews the MERI performance story and evidence collected to provide feedback linked to the program logic. This includes DERM, DEEDI, CQU, GBRMPA and JCU staff.

Regional Working Group reviews

Each year the grazing and sugar regional industry working groups reviews the MERI performance story and evidence collected and provides feedback linked to the outcomes in the program logic.

Step 5: MERI Performance Summit Workshop

The second Reef Catchments Reef Rescue MERI Performance Summit Workshop was held on the 1st of June 2011 and drew together land managers who were Reef Rescue incentive recipients, Reef Rescue delivery staff, Industry Working Group members, Reef Rescue participant interviewees and selected individuals from associated industry partners. Following a brief introductory session, which provided a synopsis of the Reef Rescue delivery process, an overview of the past year was provided for each industry plus an overview of Reef Rescue's first 3 years in the Mackay Whitsunday region. Participants were shown the program logic results chart and were invited to analyse the progress of Reef Catchments in achieving these outcomes. Participants were also invited to comment on where improvements could be made and to help identify gaps in the delivery process.

Following this, the participants were divided into three groups and given 20 of the participant interviews to review. Each of the three groups were asked to choose the three interviews which best reflected the overall delivery of Reef Rescue. The three chosen interviews from each of the three groups were then shared with the whole group. From the nine interviews which were presented, a further selection process was undertaken where by all three groups were asked to select the three 'best' interviews out of these nine. These three became the interviews that have been included in the Performance Report Story.

The remainder of the workshop was spent identifying what participants saw as being the key issues that had been raised during the workshop. Feedback was then sought from the participants about what they thought had worked well during the workshop and what had been learned.

The Reef Catchments Reef Rescue MERI Performance Summit Workshop actively engaged Reef Rescue delivery staff, grant recipients and industry in the actual analysis of the data. As a result of the participants actively being involved in developing the recommendations there is ownership of the results and much greater potential for the recommendations being implemented.

Section 2: Results chart

The results chart shows how investment in Reef Rescue has contributed to a range of NRM outcomes in the Mackay Whitsunday region.

| MERI Framework | Reef Rescue Program Logic Components | Evidence Collected | Reef Catchments Taskforce Review Comments 2011 | Performance Summit / Review Comments 2011 |
|-----------------------|--|---|--|--|
| Foundation Activities | Increased investment in incentives | 5 Year Reef Rescue program funded by Australian Government through Caring for our Country with \$146 million of the \$200 million going to water quality grants. | Successful delivery of the first 3 years of Reef Rescue. Delivery of third year has been affected by weather events but still effective at encouraging grower uptake of A & B class practices. | Delivery good, need to keep the momentum going |
| | Upscale of existing SLP program to deliver Reef Rescue | Adaption of SLP process for Reef Rescue – milestones, activity information, property planning. Includes major upgrade to the SLP database to include the automated processing and input of Expressions of Interest and project proposals recording of milestones, issuing of payments and outputting of reports to cope with the greater volume of projects in Reef Rescue. SLP paperwork has been modified and converted into .pdf forms to enable quick processing into the Reef Rescue Database. Development and maintenance of regional Industry partnerships to deliver on-ground support | Regular Cane and Grazing Regional Working Groups meetings have helped to deliver Reef Rescue and get industry ownership and involvement in the process. | Needs consistency across Industry (Central v Burdekin) in eligibility activities – leads to misinformation and confusion Strengthened linkages between industry Good or positive intension of Reef Rescue seen by growers compared to regulations. |
| | Preparation of Reef Catchments Reef Rescue plan | 08/09, 09/10 and 10/11 Reef Catchments Reef Rescue Regional Delivery plans developed and delivered. 08/09 Reef Catchments Reef Rescue Budget \$5,808,125 09/10 Reef Catchments Reef Rescue Budget \$5,580,000 +\$1,200,000 2010/11 Reef Catchments Reef Rescue budget | Successfully completed 08/09, 09/10 & 10/11 Reef Rescue and is currently delivering on planned outputs and outcomes for 11/12 Reef Rescue. Investment set to continue until 2013. | Message mixed between QLD Canegrowers and regional Canegrowers Projects that could be taken over two years with a few payments of the allocated incentive during this time would see more |

| MERI Framework | Reef Rescue Program Logic Components | Evidence Collected | Reef Catchments Taskforce Review Comments 2011 | Performance Summit / Review Comments 2011 |
|--------------------|--|---|---|--|
| | | \$7 380 466 = Total \$ 19 968 591 | Processes in place to deal with increase in funding | uptake. |
| | Reef Rescue investment in WQ improvement | Indicative Budget of around \$7.93 million/year for 11/12 and 12/13. | | Need to keep the grants money coming. Reef Rescue good at showing grower commitment to the environment |
| | Implementation of Reef Catchments Reef Rescue plan | | | Need to show eligibility criteria upfront as this will result in better applications |
| Immediate Outcomes | Increased extension and communication of A&B Class practice by Reef Rescue partners and industry | <p>ABCD frameworks for Cane, Grazing and Horticulture developed showing the different management practice classes. Focus of Reef Rescue is the adoption of B class management practices. Cane has had a review in late 2009 and updated its ABCD in mid-2010. Grazing completed its ABCD management framework in late 2010</p> <p>Evolution of eligible activity list and information for Cane, Grazing and Horticulture for the Mackay Whitsunday region</p> <p>GBR wide industry projects (Canegrowers, Growcom, QFF, RGC) – newsletters, fact sheets, case studies, state-wide newsletter articles</p> <p>Regional Industry Working Groups – direct communication with all of the main industry service providers in the region and their participation in development of regional ABCD frameworks. Includes smaller Technical Working Group.</p> <p>Key Contact Officers (Canegrowers, Reef Catchments,</p> | <p>Well organized showcase for when State Minister Kate Jones visited the region to see Reef Rescue on ground works.</p> <p>Hosted Caring for our Country Queensland Coordinators Claire Howlett and Peter Cotsell.</p> <p>Industry and growers case studies demonstrate that Reef Rescue incentives have been effective at encouraging uptake of A & B class practices</p> <p>Participant interviews feedback underscored that the industry partners</p> | <p>More publicity of Reef Rescue results e.g. graphical representation of grower adoption or chemicals reduced.</p> <p>Labelling (ABCD) good to work out incentives /priorities. Sometimes the truth hurts.</p> <p>More information needed to show urban effect on the reef.</p> <p>Education of urban households on impacts of chemical runoff. Sharing of information reef wide (ABCD)</p> |

| MERI Framework | Reef Rescue Program Logic Components | Evidence Collected | Reef Catchments Taskforce Review Comments 2011 | Performance Summit / Review Comments 2011 |
|----------------|--|--|--|---|
| | | <p>Growcom) – regional newsletter articles, landholder letters, field days. 985 Cane EOI's, 324 Grazing EOI's and 36 Horticulture EOI's</p> <p>Reef Catchments – newsletters, case studies, website, field days (Reef Rescue focus at 2011 BSES field day), participant interviews, banners, posters, landholder signs, radio, television interviews and video promotions.</p> | <p>have been effective at communicating and providing extension for A&B class management practices</p> <p>There has been regular Reef Rescue publicity in local newspapers, radio and television.</p> <p>Produced editions 4 & 5 Reef Rescue Newsletters</p> <p>Produced new pop –up banners to display at events for Cane, Grazing and Horticulture.</p> <p>EOI's continue to come in so interest is still high across the region.</p> <p>Held grower forum to encourage cane grower communication for trial and adoption of A class practices.</p> | <p>Publicity has been good at promoting what growers and graziers have been doing to improve water quality and the environment. However, need more publicity within the non-farming community - Tired of the environmental vandal label.</p> <p>Reef Rescue needs to be available to Stage 3 or beyond. Better to fund eligible projects; even if land manage had funding before, than no funding. 1 tonne of sediment is 1 tonne of sediment doesn't matter if the grower is stage 1 or 3.</p> |
| | <p>Increased support and resources from Reef Rescue partners and industry for landholder</p> | <p>5 Precision Planning Consultants (Plane Creek Productivity Services, Agriserv (Mackay Area Productivity Services and BSES), Canegrowers Proserpine, DEEDI, Growcom) – support for Stage 1 and 2 project development and milestone completion</p> <p>3 Key Contact Officers (Canegrowers, Reef Catchments, Growcom) – EOI coordination, phone</p> | <p>There have been more resources and support provided for landholder uptake of A and B class management, but has in the last year been limited by the natural disasters effecting Queensland.</p> | <p>Support has been appreciated and has made the whole process easier. From EOI to project completion the process works well.</p> <p>Industry wide projects are</p> |

| MERI Framework | Reef Rescue Program Logic Components | Evidence Collected | Reef Catchments Taskforce Review Comments 2011 | Performance Summit / Review Comments 2011 |
|----------------|---|---|---|---|
| | uptake of A&B Class practice | <p>calls and queries, support Stage 2 applicants</p> <p>Regional Industry Working Groups – development and approval of Industry wide projects to support growers, graziers and producers adopt A and B class management practices. Examples are AgDat for both Cane and Grazing, and design and fabricate new mill mud applicators. Have had 45 Cane Industry, 13 Grazing Industry and 1 Horticulture Industry projects over the past 3 years.</p> | <p>Many of the B class management activities now have industry wide support or resources available to make it easier or cheaper for growers to adopt.</p> | <p>an excellent way to get industry service providers involved and working and supporting growers with the positive changes that need to be made.</p> |
| | Increased support and resources from Reef Rescue partners and industry for planning and farm management | <p>Precision Planning Consultants (Plane Creek Productivity Services, Agriserv, Mackay Area Productivity Services and BSES, Canegrowers Proserpine, DEEDI, Growcom) support for the development of a property plan and annual input (nutrient, chemical etc.) plans.</p> <p>Development of Current Practice Benchmarking process (report, action plan) for Cane and Grazing (developed by DEEDI and Reef Catchments) and utilisation of Growcom WQ FMS module to assist in property planning</p> <p>Regional Industry Working Groups – development and approval of Industry wide projects to support growers, graziers and producers in property planning and farm management. Example is AgDat remote.</p> | <p>Continued support for land managers in the development of Property Plans. Reef Rescue participants must complete these plans and would most likely have not done them if not involved.</p> | <p>Need to include accountants and consultants in the RR Family.</p> <p>Not a high priority component of the Reef Rescue process with regards to the land managers.</p> <p>Reef Regulations has meant there is more a focus on keeping records rather than using them for planning.</p> |
| | Project proposal, assessment, prioritisation and approval process | <p>Regional Industry Working Groups – participation in the development and approval of the prioritisation process for water quality grant projects. Cost/benefit analysis included in prioritisation process following a review by Jon Rolf (CQU) on SLP. High Priority 50%, Moderate 40%, Low 30% and Very Low 20%.</p> | <p>Almost all of the MERI survey participants said they would not have adopted change or it would have occurred over a much longer time</p> | |

| MERI Framework | Reef Rescue Program Logic Components | Evidence Collected | Reef Catchments Taskforce Review Comments 2011 | Performance Summit / Review Comments 2011 |
|------------------------------|---|---|---|---|
| | | <p>Maximum Funding amounts placed on certain Irrigation, Stormwater and Riparian Management (fencing and off-stream watering points increased for 11/12 and 12/13 to reflect price increase and RWG priority) activities. Participation in the approval of individual and industry wide projects.</p> <p>Reef Catchments – development of all relevant documents including EOI, Project Proposal Form, Milestones and Schedule of Operations for all activities. Reef Rescue Incentives Database has been upgraded to use electronic .pdf project proposal form and can develop all contracts and manage all milestone payments.</p> <p>Training was provided to all Key Contact Officers and Precision Planning Consultants in using the new electronic forms and information provided on the prioritisation process.</p> <p>Reef Catchments – participant interviews, case studies. Review of budget for grazing projects changed how fencing costs were determined and pasture/Stocktake monitoring was funded</p> | <p>frame if Reef Rescue was not around or only funded at 20%.</p> <p>Developed a new .pdf to allow faster processing of applications for the AgDat remote units.</p> <p>Continued development of eligible activities to support growers and graziers adopt A and B class management practices</p> | |
| Intermediate Outcomes | Property plans developed by every farmer and grazer involved in Reef Rescue | To be involved in Reef Rescue, every grower, grazer and producer must complete a current practice benchmark report/action plan (or FMS module) and a property plan. If a grower is involved in a nutrient, chemical or irrigation project, than they must complete a relevant management plan for that activity. PPC's have developed templates and process. | PPCs undertaking current practice review before and during developing the project proposal. Complete an action plan showing other activities they could adopt and link these to Reef Rescue funding. | <p>Interaction between PPC and grower as important as plan</p> <p>In grazing more time at the beginning of project instead of at the end – So more PPC follow up and involvement.</p> <p>Documents need to be digitized so that they may be used and combined</p> |

| MERI Framework | Reef Rescue Program Logic Components | Evidence Collected | Reef Catchments Taskforce Review Comments 2011 | Performance Summit / Review Comments 2011 |
|----------------|---|--|---|--|
| | | | | with other data in the future. AgDat useful - Dusty records on the shelves are useless. |
| | On ground implementation by farmers and graziers through Reef Rescue contributing towards 3 year target | <p>Reef Rescue database is designed to track the number of projects/landholders/activities undertaken and demonstrate progress towards achieving the 3 year targets</p> <p>08/09 Sugar 119 Projects involving 170 growers Grazing 50 Projects involving 50 graziers Horticulture 7 Projects involving 7 producers</p> <p>09/10 Sugar 195 Projects involving 242 growers Grazing 53 Projects involving 53 graziers Horticulture 6 Projects involving 6 producers</p> <p>10/11 Sugar 203 projects involving 246 growers Grazing 31 projects involving 31 graziers Horticulture 6 projects involving 6 producers</p> <p>All of the projects combined are impacting on around 127 100 ha = 14% of the Mackay Whitsunday Region</p> | <p>Continued development of the database to include new and relevant data which can be compared between years.</p> <p>Development of Database manual and guide for users.</p> <p>On track to reach participation targets in 2 key regional industries: <u>Cane</u> - 690 new growers and 260 repeat growers. <u>Grazing</u> - 280 new graziers and 60 repeat graziers</p> | <p>Support and adoption has been good and visible on ground.</p> <p>Database is not always accurate: Loss of data from EOI's, Forms not always transferred correctly, Milestones /Schedules are not correlating so far.</p> <p>Want to see more publicity on areas and projects.</p> |
| | Improved Farm record keeping including development of regional support tools | <p>Reef Regulations has now made growers and graziers keep and maintain records on nutrient and chemical applications.</p> <p>Regional Industry Working Groups - development and approval of Industry wide projects to support growers, graziers and producers in property planning and farm management. Example is AgDat (web based and remote) for cane and grazing.</p> | Further development of AgDat for both cane and grazing including extension roles supporting growers for increased adoption and support across industries | <p>Support for AgDat training and remote unit greatly appreciated due to increased operation of systems</p> <p>AgDat is still not available to graziers. Graziers actually need to</p> |

| MERI Framework | Reef Rescue Program Logic Components | Evidence Collected | Reef Catchments Taskforce Review Comments 2011 | Performance Summit / Review Comments 2011 |
|----------------|--|---|--|---|
| | | Grazing and Cane current practice benchmark report/action plan identifies areas for improvement in record keeping | | interpret their inputs/outputs as they don't have a yield map like cane |
| | Property planning and on ground implementation by farmers and graziers | There have been many farmers who have adopted A and B class management practices without receiving Reef Rescue funding. Early estimates are around 15% of growers and graziers will do this. Will need to closely monitor the uptake after Reef Rescue has finished – Part of Paddock to Reef management practice adoption is to determine the level of voluntary adoption. | Industry benchmarking currently underway for Cane and Grazing to provide data on land managers reason or process for A and B class management adoption – that is Reef Rescue, Reef Regulations or voluntary. | <p>Farm plans are no good if they are never read by anyone. Far more important is discussion between PPC and growers about what can be achieved and what needs to be done</p> <p>Farm plans easy - Can't go simpler</p> <p>Still needing more advertisements put out into groups</p> <p>Need better understanding of the use of planning to the growers</p> <p>Planning is blanketed for areas; need a sub-catchment or soil type approach.</p> |
| | Improved profit by adopting A&B Class land management practices | Support provided for Grazing and Cane Economic Analysis of the implications in adopting A and B class management practices for water quality improvement. This has been through Project Catalyst, Reef Regulations, Reef Rescue and Industry based projects. GBR wide industry projects (Canegrowers, AgForce, | There are savings and efficiency gains that can be made once in the steady state of implementing A and B class practices but there is a capital cost involved | <p>Confusion on A class profitability</p> <p>Input savings through implementing B class practices.</p> |

| MERI Framework | Reef Rescue Program Logic Components | Evidence Collected | Reef Catchments Taskforce Review Comments 2011 | Performance Summit / Review Comments 2011 | | | | | | | | | |
|---|---|---|---|---|--------------------|---------|----|----|---------|-----|-------------------|--|---|
| | | <p>Growcom, QFF, RGC) – case studies, state-wide newsletter articles</p> <p>Reef Catchments – case studies, participant interviews</p> <table border="1" data-bbox="734 464 1144 619"> <thead> <tr> <th></th> <th>Case Studies</th> <th>Participant Survey</th> </tr> </thead> <tbody> <tr> <td>2009/10</td> <td>11</td> <td>50</td> </tr> <tr> <td>2010/11</td> <td>10*</td> <td>70 (60 completed)</td> </tr> </tbody> </table> <p>* 2010/11 + 6 additional Industry case studies done</p> | | Case Studies | Participant Survey | 2009/10 | 11 | 50 | 2010/11 | 10* | 70 (60 completed) | <p>during the transition process that can be a barrier to land managers adopting them.</p> | <p>The more you make the easier it is to farm better i.e. more environmentally responsibly.</p> |
| | | Case Studies | Participant Survey | | | | | | | | | | |
| 2009/10 | 11 | 50 | | | | | | | | | | | |
| 2010/11 | 10* | 70 (60 completed) | | | | | | | | | | | |
| <p>Monitoring uptake of improved practice adoption through industry</p> | <p>The development of AgDat (web based or remote) by Agtrix for Mackay Sugar and Plane Creek Mills for data recording, management, analysis and reporting. Includes funding support through Reef Rescue.</p> <p>Growcom has completed a WQ FMS module with 23 producers in the region and will redo them at later dates to see practice change over time.</p> <p>The development of AgDat for the grazing industry. Land condition assessment and Remote Sensing imagery.</p> <p>GBR wide industry projects (Canegrowers, AgForce, Growcom, QFF, RGC) – baseline projects</p> <p>Completion of Current Practice Benchmarking reports for Cane and Grazing.</p> <p>Industry service providers – such as Productivity and</p> | <p>Investment continued in AgDat with development of AgDat remote and support role established providing assistance to growers in Mackay and Plane Creek.</p> | <p>Support happening now</p> <p>Reef Regulations is a driver for keeping records</p> <p>There has been an expectation that industry data will be provided to support Reef Rescue and Paddock to Reef yet there is no contract or financial support for or with the custodians of this data.</p> | | | | | | | | | | |

| MERI Framework | Reef Rescue Program Logic Components | Evidence Collected | Reef Catchments Taskforce Review Comments 2011 | Performance Summit / Review Comments 2011 |
|-----------------------------|--|--|---|--|
| | | Extension Services in sugar | | |
| Longer term Outcomes | Broad scale adoption of A&B Class land management practices across the GBR – 1300 farmers and 650 graziers over next 3 years | <p>From feedback through the RGC and QFF, across the regions to date there has been:</p> <ul style="list-style-type: none"> • 1509 new farmers involved • 625 new graziers involved | On target to reach five year goals. Year 3 wet season slowed adoption | <p>Should have a sign post at every farm that has achieved a green tick of competency and adoption.</p> <p>Does this include land managers that have only received training?</p> |
| | Culture within Agriculture of adoption of new improved land management practices | <p>Too early to have collected any credible evidence to show we have achieved these Longer Term Outcomes through our Program Logic.</p> <p>There is some evidence to suggest that there is a better culture today within Agriculture of adopting new improved land management practices, technologies and activities like recording practices if there is a clear benefit for them or support like incentives provided. SRDC, GGIPs, Projects Catalyst, Reef Rescue R & D projects</p> | Continues to be high levels of adoption across industries. | <p>Good word of mouth communication between cane growers about adoption successes. Pathways not so well developed in the grazing industry.</p> <p>Reef Rescue better to change adoption than regulations</p> |
| | Improved in-stream WQ | Too early to have collected any credible evidence to show we have achieved these Longer Term Outcomes through our Program Logic. There is some evidence to show there is an improvement at a paddock scale level and so modelling will be needed to show end of catchment reductions. | Results from Paddock to Reef due to be released in around August 2011 | Need to publicise to the non- farming local community to show what is being done to improve the environment |
| | Reduce the discharge of dissolved nutrients and chemicals from agricultural lands to the GBR lagoon by 25 % in 5 years | <p>Paddock to Reef Monitoring and Modelling program (DERM, CSIRO, DEEDI, Reef NRM's) combined with the Marine Monitoring program (GBRMPA) will provide reports on improvements in the future. First report to be released early June 2011. 18% reduction in run off from controlled traffic</p> | Second Paddock to Reef report due in November 2011 | |

| MERI Framework | Reef Rescue Program Logic Components | Evidence Collected | Reef Catchments Taskforce Review Comments 2011 | Performance Summit / Review Comments 2011 |
|---------------------------|---|--|---|---|
| | | system. 23% reduction in sediment from Controlled Traffic system. | | |
| Aspirational Goals | Improved natural resource condition across the GBR catchments | Too early to have collected any credible evidence to show we have achieved our Aspirational Goals through our Program Logic. | Continue to monitor and collect data over time to assess the improvement in Water Quality reaching the Great Barrier Reef Lagoon. | Generally interested to find out how the adoption of A and B class practices is impacting on the water quality entering the GBR lagoon. |
| | Improved terrestrial and marine biodiversity | There is information on current conditions (2007 – 2009) across the GBR catchments on a variety of topics (water quality, industry outputs, current practices etc) through a range of reports - State of the Region reporting, Industry annual reports, Water Quality Improvement Plans, ABS Surveys etc and this will be used as baseline from when Reef Rescue started to show improvements. | Baselines beginning to be identified that future gains will be reported against. | |
| | Stronger regional industries | | | |
| | Healthy Reef Healthy industries | | | |
| | Improved WQ on the GBR | | | |

Section 3: Implications

Reef Catchments has a proven track record in incentive delivery for sustainable agricultural outcomes. This is demonstrated with the delivery of the Sustainable Landscapes program (2005-2008) and the first three years of Reef Rescue (2008-2011).

Reef Rescue is clearly achieving the Caring for our Country targets which are:

- To increase the number of farmers who have adopted land management practices that will improve the quality of water reaching the reef lagoon by a further 1300 over three years.
- To increase the number of pastoralists who have improved ground cover monitoring and management in areas where run-off from grazing is contributing significantly to sediment loads and a decline in the quality of water reaching the reef lagoon by a further 650 over an area of 3.8 million hectares over three years.

While Year 3 of Reef Rescue has been the most difficult to date with the extreme and unusually long wet season, Reef Catchments continued to successfully encourage and engage land managers to adopt A and B class management practices. While Year 3 had a number of projects drop out or more commonly scaling down throughout the year, in the Mackay Whitsunday Region there has still been wide spread adoption across all industries. There are also a number of EOI's, particularly in grazing, opting to hold off on their projects and start in Year 4.

In Year 3 of Reef Rescue, another 41,100 ha of new land started implementing A and B class management practices helping to improve the water quality entering the Great Barrier Reef Lagoon. This was made up of:

- 327 sugar sub-projects involving 246 growers
- 51 grazing sub-projects involving 31 graziers
- 9 horticulture sub-projects involving 6 producers

All of the projects combined over the first 3 years of Reef Rescue are impacting on some level around **127,100 ha** of new land. On some of this land, there have been a range of activities implemented, which is actually helping to achieve sediment, chemical and nutrient load reductions reaching the Great Barrier Reef Lagoon.

3.1 Addressing the Evaluation Questions

Increased investment in incentives

Significant investment has continued to be directed from the Federal Government into Reef Rescue as the flagship initiative for the increased adoption of improved land management practices that improve water quality of the Great Barrier Reef lagoon. This has been supported by funding from other sources for improved sustainable agriculture and land management along the coastal catchments.

In Year 3 of Reef Rescue, of the funding received by Reef Catchments from Caring for our Country, \$6,660,466 was specifically for water quality grants and partnership projects. With a minimum of 50% funding being matched by land managers and industry partners a total in excess of \$13,320,932 has been invested by agriculture in the Reef Catchments region to adopt improved land management practices. In Years 4 & 5, approximately \$7,141,500 per year has been allocated to water quality grants and partnership projects.

The increases in funding directed to Reef Catchments to deliver Reef Rescue over the past 3 years has seen an increase across all industries in the number of land managers implementing A and B class management practices. An increase in the funding of the final two years will result in more land managers adopting improved practices. The early adopters have led the way over the past 3 years, the task now will be engage the fence sitters or slow starters to get involved. With the economic analysis being undertaken and the results from Paddock to Reef providing greater evidence of the benefits of Reef Rescue many of these fence sitters will be encouraged to hop down and give it a go before funding runs out.

One of the roles of the extension officers over the following two years will be to increase communication with the local industries so that these messages from the economic analysis and Paddock to Reef are shared and highlighted to encourage use of the increase in investment.

Upscale of existing SLP program to deliver Reef Rescue

The existing SLP delivery process has been adapted and upgraded to deliver the Reef Rescue Water Quality Incentives. Milestones, activity information, property planning and paperwork have all been modified and linked to a new Reef Rescue project database. This includes having an automated input process for all EOI's, project proposals and issuing of payment. There is also improved reporting and milestone tracking to cope with the greater volume of projects being delivered through Reef Rescue. This has been successfully completed and continues to evolve as the need arises.

Progress towards achieving immediate and intermediate outcomes

Increased support and resources from Reef Rescue partners and industry for planning and farm management

Reef Rescue has continued in Year 3 to fund the placement of 5 Precision Planning Consultants within local industry service providers to work directly with farmers and graziers involved in Reef Rescue. Precision Planning Consultants (Plane Creek Productivity Services, Agriserv, Canegrowers Proserpine, DEEDI and Growcom) support the development of a property plan and farm risk assessment and annual input (nutrient, chemical etc.) plans linked to funded activities. The development of the Current Practice Benchmarking process (report, action plan) for Cane and Grazing (developed by DEEDI) and utilisation of Growcom WQ FMS module has assisted in property planning. The Regional Industry Working Groups have developed and approved industry wide projects which support growers, graziers and producers in property planning and farm management such as AgDat remote.

Local sugar industry service providers have increased their efforts to support farmers with property planning and collection of current practice activities for growers not involved in Reef Rescue to date. Some of this data will be aggregated through Paddock to Reef with regards to management practice adoption.

Reef Catchments has been successful in continuing to implement a commercial project, "Project Catalyst" which looks at the planning support required for implementation of A class cane practices. A grower forum was held in May 2011 in Mackay to facilitate grower communication about the benefits and challenges of moving to A class management practices with a number of growers presenting on their particular change in management practice.

The support for the Regional Industry Working Groups (Cane and Grazing) by Reef Catchments continues to promote the flow of information and ideas between Industry, extension staff and land managers. This ensures continual evolution of Reef Rescue to best deliver the goal of water quality improvement while strengthening relationships between those involved in the project. The membership of both the Grazing and Cane Industry Working Group is reviewed annually to ensure adequate representation from all relevant partners.



Plate 2 AgDat Grazing and Taggle tracking equipment demonstration day for local graziers at Tedlands grazing property at Koumala.

Increased extension and communication of A&B Class practice by Reef Rescue partners and industry

Reef Rescue has continued to fund the placement of 3 Key Contact Officers (KCOs) within local industry service providers to coordinate extension and communication activities and manage Expressions of Interest from local farmers and graziers. The role of the 3 KCOs is acting as the first point of contact for any land managers interested to become involved. KCOs are aware of the eligibility criteria for their industry and are involved in the development and changes to these criteria. KCOs can therefore answer any questions by land managers seeking to know whether the activity they would like to implement would be eligible to receive funding. Another part of the KCO role includes providing regular updates and information in regional and state-wide newsletters and to the regional working groups.

The ABCD frameworks for the Mackay Whitsunday Region have been developed and reviewed for Cane, Grazing and Horticulture showing the different management practice classes. There has been industry endorsement of the A & B class management practices for the region with the focus of Reef Rescue the adoption of B class management practices. Cane had a review in late 2009 and updated its ABCD framework in early 2010 while the grazing ABCD was reviewed in early 2010 and updated with endorsement from the Grazing Regional Working Group in late 2010.

Evaluation of Investment in the Reef Catchments Reef Rescue Project - Performance Story Report August 2011

There has been a continual development of eligible activity lists and information for Cane, Grazing and Horticulture for the Mackay Whitsunday region. The promotion of GBR wide industry projects (Canegrowers, AgForce, Growcom, QFF, RGC) in newsletters, fact sheets, case studies and state-wide newsletter articles has continued to promote Reef Rescue. Regional Industry Working Groups have direct communication with all of the main industry service providers in the region and participated in development of regional ABCD frameworks. Key Contact Officers (Canegrowers, Reef Catchments and Growcom) have produced regional newsletter articles, landholder letters and have attended numerous field days.

In Year 3 of Reef Rescue there have been over 240 Cane EOI's, 99 Grazing EOI's and 11 Horticulture EOI's received demonstrating that extension and communication of A&B Class practice is being successful in the Mackay Whitsunday Region. In total for the first 3 years of Reef Rescue, 985 EOI's have been received for cane, 324 for grazing and 36 for Horticulture.

Reef Catchments has continued to create high exposure for Reef Rescue and the adoption of A and B class management practices by producing newsletters, case studies, website information, attending field days, conducting participant interviews, radio and television interviews, and, creating banners, posters and landholder signs.

In June 2011 Reef Catchments held a second MERI performance Summit to engage land holders and industry staff to assess the delivery of Reef Rescue in the region. This year there was an effort to attract many of the 'fence sitters' or the slow starters to the summit rather than the early leaders to assess how they have found the process. On the day 19 land managers and Industry staff attended providing valuable feedback as to the strengths of the delivery and also areas where they believe improvements can be made.



Plate 3 Reef Rescue field day held at North Eton with farmers, industry and the then State Minister for Environment Kate Jones

Increased support and resources from Reef Rescue partners and industry for landholder uptake of A&B Class practice

To support the development of Reef Rescue projects five Precision Planning Consultants (PPC's) have been employed (Plane Creek Productivity Services, Agriserv (Mackay Area Productivity Services and BSES), Canegrowers Proserpine, DEEDI, Growcom). PPC's provide support for Stage 1 and 2 project development and milestone completion including management planning. Three Key Contact Officers (Canegrowers, Reef Catchments and Growcom) have also been employed to communicate Reef Rescue and help in EOI coordination, phone calls and queries from land managers and to support Stage 2 applicants in their project proposals.

Regional Industry Working Groups; made up from local industry experts, service providers and land managers, have assisted in the development and approval of industry wide projects to support the adoption of A and B class management practices.

Following on from the development of the Grazing ABCD Management Framework a review was conducted of the activities which are eligible to receive funding from Reef Rescue. A continual evolution of the eligible activities enables support to be provided to land managers where the greatest benefits will be gained. During the review new activities such as pasture renovation gully management and new nutrient and chemical management activities were identified and are currently being developed. This process enabled Reef Rescue to better target the grazing industry in Mackay Whitsunday regions tailoring the delivery to enable the greatest benefits for both water quality and for the grazier.

In the Mackay Whitsunday region, 22 industry wide projects in cane and 2 industry projects in grazing have been funded to continue to provide support and resources for the accelerated adoption of A & B class management practices.

An area of support identified to be missing by the first MERI Performance Story was the support needed to assist and encourage grower uptake of the AgDat data management system. In Year 3 of Reef Rescue an extension and coordination position was developed with some support through Reef Rescue to promote and encourage growers to adopt the AgDat and the AgDat remote recording systems. This was linked to another industry project offering training through Canegrowers on the use of the system via the web with 31 growers completing the course in early 2011.



Plate 4 Cane Industry Project looking at WeedSeeker® technology and shielded sprayers

Project proposal, assessment, prioritisation and approval process

The Regional Industry Working Groups participate in the development and approval of the prioritisation process for Reef Rescue water quality grant projects. A cost/benefit analysis including prioritisation process was included following a review by Jon Rolf (CQU) on the Sustainable Landscapes Project. This identified the level of funding that should be provided based on the projects priority:

- High 50% incentive
- Moderate 40% incentive
- Low 30% incentive
- Very Low 20% incentive

Maximum funding amounts were placed on certain Irrigation, Stormwater, Riparian Management (fencing and off-stream watering points), Gully Management and Grazing Land Condition Improvement activities, to maintain the most effective cost benefit ratio between private versus public benefit.

The Reef Rescue delivery methodology was based on the proven model developed for the Sustainable Landscapes Program and has been fine-tuned and improved during the first 3 years of Reef Rescue. For Reef Rescue the project proposal and site assessment procedures were updated and new project prioritisation developed based on the latest information available and previous projects. This included getting industry support and endorsement through the Reef Rescue Regional Industry Working Groups for the prioritisation process. Reef Catchments developed all relevant documents including EOI, Project Proposal Form, Milestones and Schedule of Operations for all activities and these have been updated for Year 3 and will be maintained for Year 4. The Reef Rescue Incentives Database has been upgraded to use electronic project proposal forms and can support all contracts, milestone payments and reporting requirements.

Training has been provided to all Key Contact Officers and Precision Planning Consultants in using the new electronic forms and information provided on the prioritisation process. This has streamlined the process to allow for a larger number of land managers to be involved without the delay that would have been experienced using the old system.

Reef Catchments conducted participant interviews and case studies in Year 2 and continued to do this in Year 3. This helps to get direct feedback from the participants on the process used to deliver Reef Rescue. Comments from these interviews has shown the importance of having PPC's and KCO's to support participants through the process and to answer any questions they have about it. Participants have also expressed the view that the ease of the process and the support received ensured that they went ahead with the project and would consider doing again. If the process was too difficult including too much paperwork many believed they would have dropped out.

A review of the budget for grazing projects has also been carried out to account for the increase in the cost of materials. This resulted in a change to how much incentive was provided for fencing and the inclusion of pasture and stocktake monitoring within the Reef Rescue process.

Reef Operatives meetings has allowed discussions with the other NRM groups delivering Reef Rescue on the proposal and assessment processes they have used and Reef Catchments has used this information to change and improve our delivery method.

Improved Farm record keeping including development of regional support tools

The introduction of the new state government Reef Regulations in 2010 has meant that every cane farmer and some graziers must now keep basic records of all nutrient and chemical inputs. While having an impact on the delivery of Reef Rescue through grower concerns and misunderstanding of the different initiatives, Reef Regulations is helping achieve this outcome much quicker than would have been expected without them.

In 2009-2010, the development of AgDat for grazing was started through product designer Agtrix. In 2010-2011, Agtrix are being supported to partner with another private company, Taggle Pty Ltd to link real time spatial mapping of cattle on a property the same as AgDat remote would map where a tractor/equipment has been applying fertilizer and chemicals. This will allow graziers to track cattle across farms and within paddocks to assess grazing pressure and adapt appropriately where overgrazing is occurring. The placement of tags on fences will also allow graziers to see if farm fences are open to prevent cattle wondering out of paddocks and into waterways or roads.

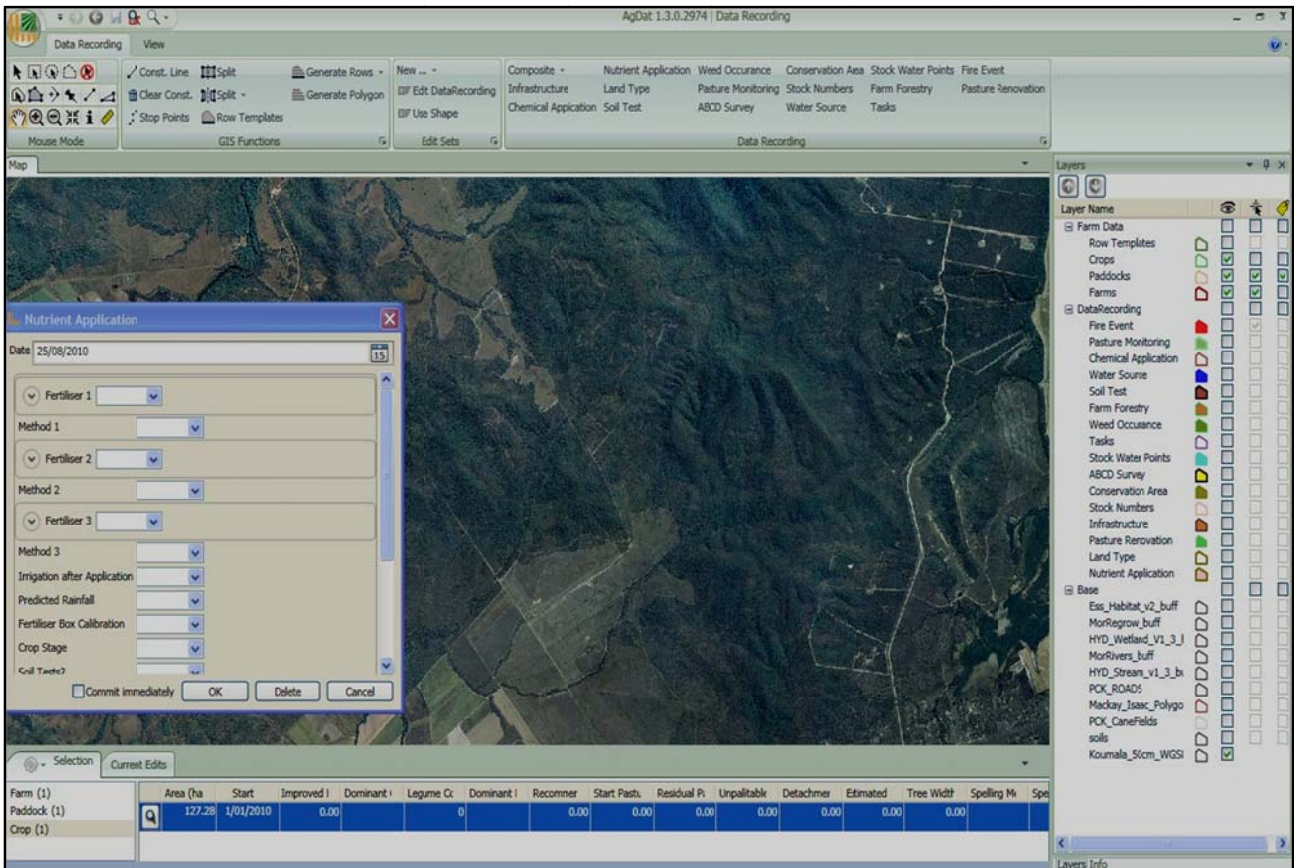


Plate 5 Display of the web based Grazing AgDat being developed to support graziers in record keeping and farm planning

A grazing and cane current practice benchmark report/action plan identifies areas for improvement in record keeping and to identify key priority actions. Benchmarking current practices and planning future actions allows land managers to better manage their business by identifying areas of improvement and goals to work towards. Having this written down ensures nothing is forgotten and the plan can be continually developed tracking changes and achievements.

For cane in 2010-11, there were a range of industry wide projects funded supporting the use of AgDat for data recording by the local industry. This includes some new AgDat remote units, an upgrade of the existing AgDat remote units, a web interface for Plane Creek mill area, a dedicated AgDat support officer to link it all together and increase AgDat use by growers, a local support person for Plane Creek growers, a local support person for Proserpine growers and web based training for growers by Canegrowers. Any growers interested in using AgDat are now supported through the whole process from application to training to actually using AgDat on their property.

A new AgDat proposal form has also been developed to fast track the uptake of AgDat remote for the cane industry. The new form incorporates all information required in the project proposal and land manager details form into a one page .pdf.

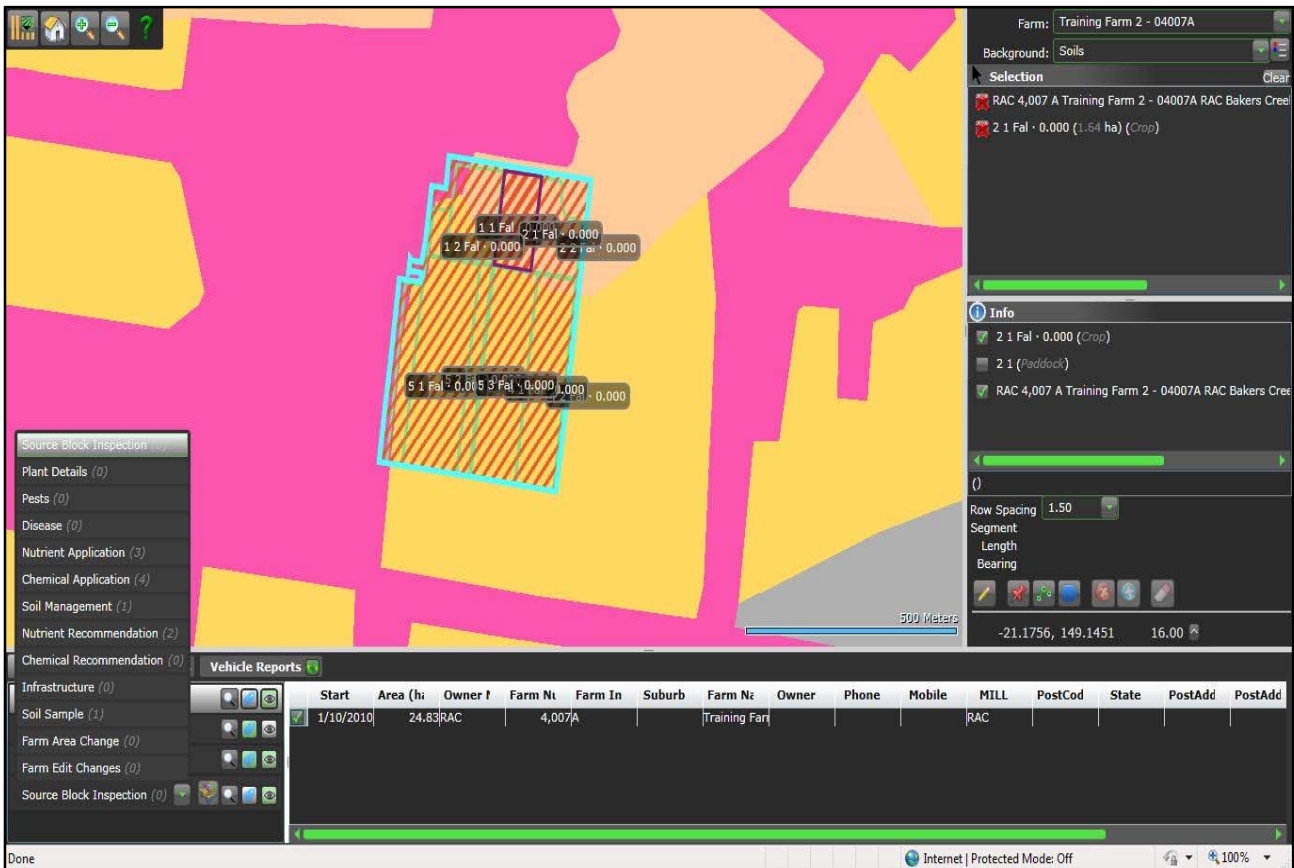


Plate 6 AgDat display of soils types across a paddock

On ground implementation by farmers and graziers through Reef Rescue contributing towards 3 year target

The provision of incentives has accelerated the adoption of the on-ground implementation of A & B class management practices by many farmers and graziers. Through the interviews and case studies, many participants have stated that while they had planned to do the work they would not have been able to achieve the results that they have over the past year for up to 5-10 years or if the incentive offered was only 20%. With the impact the weather and season had on farm cash flows, this would have meant the majority of participants in Year 3 would not have done anything without the incentives and possibly would have looked at prioritising other actions on farm to implement over the next few years.

With the proven implementation of on ground works by farmers over the past 3 years, many other land managers are becoming comfortable utilising the same or similar equipment or have become interested in doing something similar through Reef Rescue.

The Reef Rescue database is designed to track the number of projects / landholders / activities undertaken and demonstrate progress towards achieving the Reef Rescue Caring for our Country targets. Reef Rescue in the Mackay Whitsunday region was well on the way for reaching the 3 year target however the extent of the wet season during Year 3 resulted in land managers reducing the number of sub-projects being implemented or projects dropping out altogether. This was particularly evident in the grazing industry with only 51 sub-projects by 31 graziers during year 3. Most of the grazing activities being undertaken are exposed to the weather such as fencing and constructing watering points. This has resulted in a reduced number going ahead with their project as graziers were unable to access their paddocks. To overcome this, in areas where graziers were able to complete work such as riparian fencing, they were able to implement more (10km instead of 5km) than may previously had been allowed to be funded. However there are a number of

graziers that have indicated that they will be proceeding with planned activities over the next two years of Reef Rescue.

The cane industry was also adversely affected by the weather over the past year. While the target numbers of land managers worked with was reached, the number of projects being undertaken by each farmer was reduced. In the first two years farmers often undertook 2 – 3 activities or sub - projects, in Year 3 however a higher number of farmers only undertook one sub – project.

Please refer to Section 5 Final Impact Statement for more details on Reef Rescue outputs.

Property plans developed by every farmer and grazier involved in Reef Rescue

To receive Reef Rescue funding property plans must be completed by all participants with the support of the relevant industry based Precision Planning Consultants (PPCs). This includes identifying current practice, a farm risk assessment and development of an action plan for adopting A and B class management practices on farm for soil, nutrient, chemical and water (irrigation/stormwater). Many of the participants have stated that they would not have been able to complete the property plan without the support provided through Reef Rescue.

For cane, all farmers who are doing a nutrient, chemical or irrigation management activity must also complete an annual input management plan. For example, a grower receiving funding for a shielded sprayer unit to apply knockdowns must also produce a chemical management plan showing weed pressure, target weeds, product being used and rate, water rates, application method and timing. Growers are helped through this management plan by the PPCs to ensure that it is understood and filled in correctly.

The Grazing Precision Planning Consultant role includes supporting graziers in property planning through farm risk assessment, action planning and information sharing. The development of the Concepts for Sustainable, Profitable and Productive Grazing Workshop in Mackay has seen an increase in the support for the development of property plans. The provision of property maps has also been a key component in getting the graziers to complete farm planning. The graziers that have provided feedback on the maps have said that they are a great resource for the management of their property. The maps provide a visual reference which can be adapted over time to make decisions and monitor change.

The development of the current practice book has helped growers and graziers benchmark their current practice and allow the precision planning consultants to develop recommendations with them. The action plan book has helped them to prioritise on ground activities and develop an implementation plan for now and into the future. The development of property plans by every farmer and grazier is included as a component of the Reef Rescue contract signed by them.

Property planning and on ground implementation by farmers and graziers

There have been many farmers who have adopted A and B class management practices without receiving Reef Rescue funding. Early estimates are around 15% of growers and graziers have done this prior or during Reef Rescue. The Paddock to Reef (P2R) program has identified a need to closely monitor this uptake to identify all actions leading to water quality improvements, whether it is from Reef Rescue, Reef Regulations or voluntary adoption.

While on-ground changes are happening without Reef Rescue funding, the level of property planning is very minimal. The development of Current Practice Benchmarking process (report, action plan) for Cane and Grazing has helped in getting increased participation by landholders, but there is still limited involvement from non-Reef Rescue participants. The increased adoption of

using AgDat by growers and industry service providers will allow for better property planning into the future.

Monitoring uptake of improved practice adoption through industry

An increase in the monitoring of the uptake of practices has been achieved through the development of the Cane and Grazing Current Practice Booklets. The Current Practice Booklets have been produced to assist farmers and graziers in the development of property plans and outlines their current best practices and future action plans in an easy to follow ABCD framework. Local industry service providers are looking to utilise this process in the future to collect data from non-Reef Rescue participants.

Local industry service providers such as Productivity Boards already collect a large amount of grower information annually that can be linked to the ABCD framework. This information includes row spacing, tillage operations, legume fallows etc. Through the Paddock to Reef program, there is a component looking at collecting management practice adoption information and this data will be sourced through the regional NRM groups and local industry providers at an aggregated level linked to the WQIP sub-catchments.

Mackay Sugar and Plane Creek Mill are currently utilising AgDat as a record keeping tool but it can also be used to collect aggregated data sets for adoption of A & B practices within the WQIP sub-catchments. Proserpine Mill is still looking to adopt AgDat in the near future, but there are some business issues that need to be dealt with first.

AgDat has been developed for the grazing industry as a record keeping tool which can also be used to collect aggregated data sets for adoption of A & B practices within the WQIP sub-catchments. This is currently being trailed on a number of properties, but increased utilisation may not happen until into the future.

Improved profit by adopting A&B Class land management practices

Regional Industry Working Groups approved funding support in Years 1 & 2 for Grazing and Cane Economic Analysis of the implications in adopting A and B class management practices for water quality improvement. Initial findings were presented in July 2010 for Cane and October 2010 for grazing, and both showed that for medium to smaller properties, the capital cost of adopting B class management practices may be too great for them and without the use of Reef Rescue incentives may never be able to change. For larger properties, once in a steady state of implementing B class practices they are more likely to be better off financially, but the capital cost could make this change over a 10 year period rather than 1-2 years with Reef Rescue incentives.

As identified in the MERI plan, there is the need to complete case studies of growers who have implemented works and this will include looking at the economic benefits for the growers and graziers. During Year 3, through the Industry wide grants and Project Catalyst, DEEDI have completed economic reviews and profit probes with a number of cane and grazing land managers. The information gained from these studies are supporting the validation of adopting of A and B class management activities and have helped develop a range of model farms so that growers and industry service providers can look at different scenarios for adopting the improved land management practices and the options that would best suit their situation.

Through the Paddock to Reef program, CSIRO & DEEDI have completed economic analysis on the moving through the ABCD management framework for sugar in the Mackay Whitsunday, Burdekin and Wet Tropic regions. The final report showed that for the Mackay Whitsunday region there is a financial burden in adopting B class management practices.

Improved In-stream Water Quality

The Paddock to Reef monitoring and modelling project has been collecting water quality data over the last few years and will inform us of the water quality improvements from the activities that are being supported through Reef Rescue. There has already been some preliminary feedback from the project at the Paddock, Multi-Block and Multi-Farm level and some of the results released to date have shown A and B class management practices do provide measureable water quality improvements over C and D class management practices. More information will be provided through the Paddock to Reef project with an aim to be able to identify regional water quality improvements at a later date.

The majority of landholders involved in Reef Rescue have a creek or river flowing past or through their property or farm. Many talk about the connection they have had during their lifetime whether it be playing in when they were younger or now using the water for irrigation, stock or domestic purposes. No one has said that they want to see the water quality or quantity decline in these waterways as they will be relying on them into the future. The following photos are of local waterways that are located on or next to farmers and graziers involved in Reef Rescue.



Plate 7 Sandy Creek at Homebush, south west of Mackay.



Plate 8 Eden Lassie Creek, south of Bowen.



Plate 9 Marion Creek at Ilbilbie, south of Sarina.



Plate 10 O'Connell River at Bloomsbury, north west of Mackay

Broad scale adoption of A&B Class land management practices across the GBR – 1300 farmers and 650 pastoralists over an area of 3.8 million hectares over next 3 years

This target is for growers and graziers receiving funding or training through Reef Rescue across all of the GBR catchments. In the Mackay Whitsunday Region in Year 3, the numbers are:

- 140 new projects involving 160 new farmers
- 69 repeat projects involving 92 repeat farmers
- 25 new projects involving 25 new graziers
- 6 repeat projects involving 6 repeat graziers

Over the 3 years in the Mackay Whitsunday Region, the numbers are:

- 417 new projects involving 526 new farmers
- 129 repeat projects involving 161 repeat farmers
- 116 new projects involving 116 new graziers
- 12 repeat projects involving 12 repeat graziers

From feedback through the RGC and QFF, across the regions to date there has been:

- 1509 new farmers involved
- 625 new graziers involved

3.2 Lessons learned

Information about evaluations undertaken, lessons learned and unanticipated outcomes.

One of the key components of Reef Catchments Reef Rescue MERI plan is collating the recommendations and discussions from evaluations and reviews of the program to identify all outcomes and any lessons learned. The MERI plan for this region has attempted to allow all the different levels (grant participants, delivery agents, industry service providers, regional body etc) of Reef Rescue stakeholders to be involved in this process. This has continued to provide good coverage of feedback and comments on the program from all of the different pathways of involvement and participation.

The second MERI Performance Summit has again been the major evaluation undertaken for Reef Rescue in our region during 2010/2011. Most of the comments and feedback from this workshop and lessons learned have helped to develop our Year 3 Reef Rescue MERI Performance Story. From the summit and other reviews conducted, some of the important and relevant lessons learned include:

1. All of the participants and stakeholders involved continue to agree and support the water quality grants/incentives process as a way to promote positive change and get the improved land management practices adopted. It is even more important when trying to get this change in the shortest time possible by the most amounts of farmers and graziers. This is even more critical after this financial year with all of the natural disasters impacting on farming enterprises cash flows and other resources and time needed to repair damage to homes, infrastructure and production area.
2. In a bit of a change from previous years, there has been more support shown to continue providing funding for repeat or Stage 2 farmers and graziers as long as they are implementing eligible activities. There was even discussion and recommendations from the reviews that this should be open up to Stage 3 if funding is available and there are water quality benefits able to be achieved.
3. For the MERI participant interviews, it was much easier and convenient for the majority of people involved to do it on-line and write down their responses rather than in a phone interview style. From the reviews, feedback showed that they thought there was also more content provided then what was given just over the phone.
4. There were many comments about the good awareness of Reef Rescue in the Cane Industry however there is still some misinformation or “myths” about eligibility of certain activities such as needing to be on controlled traffic to get funding for any activity. It is only for soil management projects that this is a criteria. Reef Rescue is still not as well known for Grazing as the extension networks are not as well established in the Mackay Whitsunday Region.
5. While land managers have been impressed with the project to date and very much appreciated the funding assistance provided, almost all have indicated that they would not have been able to undertake their planned activities if the incentive offered had only been 20% of the total cost of the project investment.
6. All land managers have been affected by the extreme wet weather throughout most of the 2010/11 year. This has resulted in a significant number of potential participants holding off during Year 3 of Reef Rescue. A number of participants that have continued to go ahead with their project have had trouble finishing the work on time. Grazing participants have been more affected than the cane participants in terms of undertaking works as many cane activities

could be completed in sheds while grazing works are more exposed to the elements such as erecting fencing and constructing watering points.

7. With the maximum amount of funding for irrigation equipment improvements the same whether upgrading to low pressure or high pressure overhead irrigation, many growers said they may as well just go to high pressure as the total project costs will be lower. Unfortunately the water quality benefits are not as great or harder to achieve if they limit themselves to this practice.
8. The cost of stormwater structures such as sediment/detention basins has increased greatly over the past couple of years. Also, the wet season of 2010/11 has shown that poorly designed stormwater structures can create problems for dealing with excess stormwater leading to flooding and failure of existing structures.
9. Regional Industry service providers, extension staff and land managers are very interested in the load reductions of the sediment, herbicide and nutrient management practices being implemented through Reef Rescue as well as any productivity or economic benefits that have been identified and reported.
10. There is a feeling from growers and local industry service providers that there have been mixed messages coming from Queensland Canegrowers compared to the Regional Canegrowers with regards to Reef Rescue.
11. There has been feedback from the graziers that they would like to have some more support in implementing improved land management practices and completing their property planning and mapping so that they get the full benefits from what they are trying to do. This includes spending more time at the beginning of the project to ensure graziers are fully aware of what is required of them and to also help with the current practice booklet and action plan.
12. There is continued confusion on the adoption of A class practices and the associated economic and environmental benefits. Many growers want to be A class, but in the ABCD framework, A class practices are innovative and not yet fully validated. For the growers that understand the ABCD framework, they are less motivated in investing money to adopt in A class practice management when the benefits are unknown.

3.3 Improvement

Information about improvements or changes as a result of lesson learned from monitoring and evaluation and how these are reflected in the MERI plan / program logic.

Reef Rescue has continued to be a very successful program in the Mackay Whitsunday region. Even with this success, implementing the MERI plan and Performance Summit has again highlighted areas that need to be maintained, reinforced or improved to help make the program even more efficient and effective in the last 2 years of Reef Rescue.

The following improvements and changes have been or are continuing to be discussed and the MERI plan and program logic changed or updated as required.

1. For the remaining 2 years of Reef Rescue, the key target is to maintain the current high level of Reef Rescue allocated funds to water quality grants. In Year 3, over 90% of the funding was allocated to individual water quality grant projects, industry wide projects and partnership projects. In years 4 and 5, 90% of the funding has been allocated to individual water quality grant projects (more new and some repeat farmers and graziers), industry wide projects (more

resources available for farmers and graziers to adopt A & B class cane management practices) and partnership projects (support for farmers and graziers wanting to be involved in Reef Rescue). The end result is that we can still support a large number of farmers and growers to adopt the improved management practices while they are still recovering from a bad season.

2. The majority of water quality grants (around 80 to 85%) will continue to be targeted at new farmers and graziers. There are still excellent water quality outcomes from funding repeat/Stage 2 participants and so this will continue. If there are some stage 3 participants with good eligible projects, these may get funded if resources are available but is not a high priority activity.
3. From having the MERI participant interview questions on-line we received some excellent responses back when compared with just the phone interviews used the year before. There are still some issues with people only responding with a yes or no answer but overall gave much better feedback so will be used again in Years 4 and 5.
4. Cane Key Contact Officer (KCO) has completed a range of communication activities (article, letter and presentations) helping to get the right information about Reef Rescue eligibility into the region and do some "myth busting". Reef Catchments is now delivering the grazing KCO role and the aim is to increase the level of communication, understanding and participation by the local grazing industry in Years 4 and 5 of Reef Rescue. The KCO role will also be supporting Stage 2 graziers in participating in Reef Rescue.
5. To maintain the current prioritisation process and current maximum funding levels for eligible Reef Rescue projects and for this to be reviewed annually. Land managers have indicated that they are happy to work with the current levels of incentives provided which for cane is roughly investing \$2 for every \$1 provided by Reef Rescue.
6. Reef Catchments, extension staff and project managers have been flexible in the completion dates of participant projects. A number of projects have now had their extension dates extended through to September-December 2011 to allow these projects to be complete. A land manager is not able to submit a Stage 2 project until they have completed the outstanding project.
7. The eligibility activities were reviewed by the Cane Regional Working Group and have increased the maximum incentive offered for low pressure overhead irrigation to \$30,000 and maintained the incentive for high pressure at \$20,000. This reflects the improved benefit to water quality and water efficiency from low pressure compared to high pressure.
8. Stormwater eligible activities were reviewed by the Cane Regional Working Group and increased the incentive for constructing stormwater structures from \$10,000 to \$20,000 to reflect the increase in the cost of design and excavation works. However, the prioritisation of this activity is still maintained at a lower priority for funding and to receive the full incentive new stormwater structures must be built to a minimum standard and include capturing first flush events.
9. Continued monitoring through Paddock to Reef will provide validation for the adoption of A and B class management practice. As these results become available Reef Catchments has and will continue to promote these details through communication activities and case studies. The Cane Regional Working Group has had Paddock to Reef presentations on the water quality outcomes from the paddock trials and the productivity results from these.

10. Matt Kealley from Queensland Canegrowers is now invited along to the Cane Regional Working Group (CRWG) meeting to liaise and communicate between Queensland Canegrowers, Mackay Canegrowers, Canegrowers Proserpine and the RWG.
11. There were negotiations with DEEDI to provide more resources into the region but this stopped at only being able to have Reef Rescue funded roles in Mackay. This meant a decision was made by Reef Catchments and the grazing regional working group to have Reef Catchments deliver the grazing PPC role. From some of the savings from doing this and an increase in funding for grazing in Years 4 and 5, Reef Catchments will be employing 2 new extension staff to increase the support available to land managers. Of these two positions, 1.5 FTE will be available to work as Precision Planning Consultants with the remaining 0.5 FTE working to develop and support Grazing Industry projects such as AgDat. These new PPC's will be advised to spend more time with graziers at the beginning to help them through the project proposal stage. This is to include time spent developing the project e.g. walking any fencing for GPS points and then filling in the current practice booklets. PPC's then need to continually follow up to see how the projects are progressing throughout the year.
12. Reef Catchments is continuing to support Project Catalyst which is looking into the cost/benefit of adopting A class practices. As new information or results are gathered, this needs to feed back to industry and growers so that it can be developed further and one day A class management practices may become B class.

Section 4: Instances of Significant Change

The following 3 vignettes were chosen out of the 60 completed interviews conducted by the participants of the Reef Rescue MERI Performance Summit workshop as representing the most significant changes occurring as a result of the investment in Reef Rescue.

What is a vignette?

Vignettes are used to elicit responses, interpretations and judgments about a particular set of circumstances or context within a research setting. When used in qualitative social sciences, vignettes offer a method for simulating complex events, outcomes and/or problems and use these to explore people's perceptions, opinions, beliefs and attitudes. For Reef Rescue, the vignettes were extracted directly from the participant's interviews.

Vignette #1 Reef Rescue accelerating practice change

This sugarcane grower was introduced to the Reef Rescue program by another sugarcane farmer. They were motivated to become involved in the initiative by the chance to move to 1.8m controlled traffic farming at an affordable price.

The grower was not planning on conducting the activities on their property before becoming involved in Reef Rescue and is confident that they would not have made the changes at the same rate on their own.

"We would not have financially been able to," the grower said. "In two years we have been able to change over (to the new system) completely, thanks to Reef Rescue." The main benefits that the grower is hoping to achieve from the activities they are implementing through Reef Rescue include reduced farming costs, less erosion, reduced reliance on pre emergence chemicals and less stool compaction.

An unexpected outcome that the grower experienced involved the GPS guidance system. "The GPS system has made farming easier and more pleasing," the grower said. "The tractor is self-steering and less tiresome and we are able to concentrate on the job being done instead of concentrating on steering," the grower said. "We are able to attend to business matter or calculations while working." The grower said that the Reef Rescue delivery team support available to landholders very helpful in the planning and project proposal component of Reef Rescue as well as the decision making and completion of paper work. "We probably would not have been able to get involved in Reef Rescue without the Reef Rescue delivery team as it would have proven much more difficult to apply, especially when one is busy in the crushing season," the grower said.

The grower does not think they would have adopted the changes on their farm if they were only able to receive a maximum of 20% in funding. "In my case, when GPS systems dropped in price from \$50,000 to \$35,000 and then with the 40% incentive from Reef Rescue, it made it viable to go to a controlled traffic system," the grower said.

The grower believes that the Reef Rescue program has been successful to date. "Not only have I been able to switch over to a 1.8m controlled traffic system, some of the farmers that I contract plant for have also switched to the 1.8m system," the grower said.

This vignette was considered significant by the participants at the MERI performance summit workshop for the following reasons:

- It provides a real farmer perspective
- It illustrates the importance of Reef Rescue incentive funding and how it has helped to accelerate land management practice change
- It highlights the importance of a supportive delivery team to assist land managers through the application process
- It demonstrates that if the % of Reef Rescue funding was reduced the rate of practice adoption would decline
- It highlights that Reef Rescue is achieving both environmental and financial long term benefits

Vignette #2 Reef Rescue recognises farmer's efforts

This sugarcane grower found out about Reef Rescue whilst listening to the Rural Report on ABC Radio. They saw the program as an opportunity to be innovative in how they managed their land and to become more sustainable in the future, so they decided to get involved.

The grower said they were already planning on conducting the activities on their property before they became involved in Reef Rescue. "We had been wanting to move to a controlled traffic system for some time, because soil compaction was a real issue for our soil type," the grower said. "We have also wanted to use a legume crop, such as soybeans, for even longer. For us, both projects go hand in hand. The projects seemed out of reach due to the high capital cost in setting up both of these changes to our farming practice."

The grower is confident that they would have had no chance in making the changes at the same rate, without Reef Rescue's assistance. There are a number of changes that the grower is hoping to achieve from the activities they are conducting through Reef Rescue. "We are hoping that we have moved to a more sustainable way of farming. We are hoping that we are going to be able to use less fertiliser and chemicals for the same, or even increased, production," the grower said. "We are also hoping that by going to a 2.4m system, we will save a considerable amount of fuel and time."

"On our farm alone, the harvester will travel more than 500km less once we have changed from 1.6m to 2.4m row widths. We will also only work about 60% of our paddock, compared to around 120% previously. "There are numerous advantages in going the way that we have." The grower said that through their involvement with Reef Rescue, they have realised that younger farmers are more optimistic about the future of the sugarcane industry. "Some of the changes are a bit beyond older farmers, so there will be a more tech-savvy farmer in the future." The grower believes that the Reef Rescue delivery team support available to landholders was essential in the planning and project proposal component of Reef Rescue and that the help with the paperwork side of the application was greatly appreciated.

"(Becoming involved in the program) would have been incredibly difficult without the Reef Rescue delivery team - probably beyond the average farmer," the grower said.

The grower said they probably would not have adopted the changes on their farm if they were only able to receive a maximum of 20% in funding. "Even at 40% it was a bit touch and go. Thankfully, it coincided with a good year. There was more we would have liked to do, such as several sediment settling ponds, but it was not viable for us to do so," the grower said. "If we could have received some funding for an excavator, about 12 ponds could have been built." The grower believes that Reef Rescue has been very successful to date.

This vignette was considered significant by the participants at the MERI performance summit workshop for the following reasons:

- It highlights that growers are keen to adopt new practice management however are limited to the speed at which they can change by available funds.
- It demonstrates that Reef Rescue funding is essential in accelerating that practice change.
- That if the incentive offered was smaller change would not occur.
- It demonstrates that Reef Rescue eligible activities fit areas of concern for land managers i.e. controlled traffic and legume fallows
- It highlights that delivery support is essential for the project to be taken up by land managers.
- It demonstrates that by moving to wider rows time and money can be saved.
- It demonstrates that practice change can reduce inputs while maintaining or increasing production.

Vignette #3 Reef Rescue accelerating practice change

This grazier was alerted to the Reef Rescue initiative by one of the programs project officers. They were motivated to get involved because they wanted to do something about their grazing management and impacts.

"A lack of available funds forced this to be a lower priority", the grazier said. "The fact that Reef Rescue was able to provide the financial support, made this happen".

The grazier said that while they were already planning on conducting the activities on their property before becoming involved in Reef Rescue, they would definitely not have been able to make the changes at the same rate on their own.

"I knew that I could be doing a better job, but the lack of available funds forced me to shelve these activities", the grazier said.

There are a number of benefits that the grazier is hoping to achieve from the activities they are conducting through Reef Rescue, including better control of grazing distribution, protection of the waterways and banks as well as the ability to integrate wet season spelling.

The grazier said there were no unexpected outcomes during their involvement with Reef Rescue, and that they knew the activities would be beneficial.

The grazier believes that the Reef Rescue delivery team support available to land holders was useful in the planning and project proposal component of Reef Rescue and that they probably would not have been able to get involved in the program without the team's support.

"(The delivery team) was very professional and able to offer good advice", the grazier said.

The grazier said they would not have adopted the changes if they were only able to receive a maximum of 20% in funding.

"The 20% would not have enabled me to do what was needed to be done", the grazier said.

"I was time rich, but cash poor".

The grazier believes that Reef Rescue has indeed been successful to date.

This vignette was considered significant by the participants at the MERI performance summit workshop for the following reasons:

- It represents the perspective held by those graziers that completed the survey.
- It demonstrates that there is a willingness to change, however change is limited by cash flow.
- It highlights that without Reef Rescue change would not happen at the rate it is currently taking place.
- It shows that a cash incentive is the best way to encourage rapid practice change
- It highlights that together with water quality improvements, the sustainability of the grazing industry is also being improved.
- It shows the importance of good support in delivering the project, without which the grazier would not have been involved.

Section 5: Final Impact Statement

The delivery of the Reef Catchments Reef Rescue project has been very successful over the first 3 years. The outcomes achieved in the project to date have exceeded some of the original expectations. Around 43% of the growers in the sugar industry have been directly involved in adopting land management practices that will improve the quality of water reaching the reef lagoon and combined with other growers they support and do contracting for, this represents around 81% of the cane production area being impacted on in the Mackay Whitsunday region. Roughly 8% of the graziers have improved ground cover monitoring and riparian management and this is impacting on 43% of the intensive (non-native forest) grazing land in the Mackay Whitsunday Region. For horticulture, 35% of the producers in the region have adopted land management practices that will improve the quality of water reaching the reef lagoon, representing 73% of the production area in the Mackay Whitsunday region. Combined all of the projects are impacting on around 127,100 ha which is around 14% of the mainland Mackay Whitsunday NRM region.

Cane

The Reef Rescue sugar water quality grants have been very successful at encouraging growers and industry to adopt A & B class soil, nutrient, pesticide and irrigation management practices. During Year 3, 240 Expressions of Interest were received to be involved in Reef Rescue. Out of the 240 EOI's funding was available to work with 157 new growers and 89 repeat growers with 327 sub-projects undertaken. The 157 new participants represent around 13% of the cane enterprises in the Mackay Whitsunday region and combined with the Stage 2 growers are impacting on approximately 19% of the land under cane production. The 327 sub-projects undertaken by both new and repeat farmers include:

- 115 soil subprojects (machinery modifications for controlled traffic, zonal tillage units, GPS guidance, legume planters)
- 82 nutrient subprojects (nutrient management plans, improved application such as sub-surface compost application, variable rate technology)
- 99 chemical subprojects (shielded sprayer units for applying knockdowns, high clearance spray equipment)
- 31 irrigation and stormwater subprojects (tail-water recycling, low pressure overhead irrigation equipment)

The total project costs for cane in Year 3 was \$10,385,810 with Reef Rescue contributing 34% to the total cost. On average, the total project cost was \$51,161 with \$17,848 provided by Reef Rescue.

To date over the first 3 years of Reef Rescue, 510 new land managers have undertaken practice change to implement A and B class management on their properties. Of these 510 growers, 154 have now also been involved in stage 2. The new growers represent around 43% of the cane industry in the region and combined with the other Stage 2 grower activities are impacting on 81% of the available cane land. In total 323 soil, 199 nutrient, 214 chemical and 80 irrigation and stormwater subprojects have been undertaken. The total cost of all these projects over the past 3 years is \$26,991,992 of which Reef Rescue has contributed 34%. On average over the 3 years, the total project cost was \$51,609 with \$17,412 provided by Reef Rescue.



Plate 11 High clearance spray rig with retracted boom funded through Reef Rescue

Over the past year, 22 Industry projects have been carried out at a total cost of \$3,608,233 with Reef Rescue providing around 40%. On average, the total project cost was \$164,010 with \$64,813 provided by Reef Rescue.

It is estimated that these 22 projects impact on the total available cane land of roughly 120,000 hectares under production each year. These projects have either directly improved current practice by providing resources or have added to current knowledge through validation which will allow for better management in the future.

One industry project is the fabrication of a number of back of truck 3-row Mill Mud spreaders. Traditionally mill mud has been applied at a broadcast rate of 150 wet tonnes per hectare. With the manufacture of these spreaders mill mud can now be applied at a rate of 50 wet tonnes per hectare and this is applied directly on the bed or growing zone. All of the mill mud from Mackay Sugar will be applied with this method (7500 ha) and some in Proserpine (2500 ha). To compliment this project another industry project was funded to develop new nutrient guidelines to use when applying this new lower rate of mill mud. In the past, the nutrients gained from mill mud may not have been accounted for when looking at crop nutrient requirements. With the move towards precision agriculture farming, it is important to account for these inputs in a farms nutrient management plan for both economic and environmental benefits.

Another industry project funded was the purchase of a range of new controlled traffic zonal tillage equipment to incorporate into the trial, demonstration and extension project delivered by Agriserv on adopting principles of the new farming system. This includes the ability to use a range of zonal tillage equipment to identify what would suit their farm before purchasing or manufacturing their own. In the July 2011 Canegrowers State-wide newsletter, there was an article on a Proserpine

grower who said that he finally built his own zonal tillage machine after trialling one through the Agriserv project.

One innovative project undertaken in Year 3 was the support and development of the WeedSeeker® technology for use in the cane industry. This includes fitting sensors; which detect weeds in the inter-row, to shielded sprayers on a high clearance spray rig. In other industries, WeedSeeker® has resulted in a reduction of up to 80% in the use of chemicals to control weeds.

Other industry projects include the development of an AgDat support role to help growers use the data management system and get access to equipment such as AgDat remote. This will help grower's to enter and record input and operations data into a program which will help to make better informed decisions and keep accurate records. There was the continuation of the break crop extension officer to help coordinate and encourage the use of break crops. This includes coordinating the use of a legume planter available to any grower that would like to trial a break crop before committing to purchase one themselves.

The 3 sugar precision planning consultants based with Mackay Area Productivity Services, Plane Creek Productivity Services and Canegrowers Proserpine and the key contact officer based at Canegrowers Mackay were included in the tally of industry projects for Years 1 and 2 but not in Year 3.



Plate 12 Example of one of the cane projects funded through Reef Rescue is a 3-row zonal ripper and GPS guidance for a controlled traffic zonal tillage system.

Table 1 Reef Rescue Cane Total Outputs Year 3

| Sugar | Year 3 | Total |
|---|-----------------------|-------------------------|
| EOI | 240 | 985 |
| Projects | 137 new and 66 Repeat | 401 new and 122 repeat |
| Landholders | 157 new and 89 Repeat | 510(154 are now repeat) |
| New Landholders % of industry (1200) | 13% | 43% |
| Impacted Area Ha | 23,748 | 96,843 |
| Impacted Area % of Industry Area | 19% | 81% |
| Total Project Cost | 10,385,810 | 26,991,992 |
| Total Reef Rescue Contribution \$ | 3,623,275 | 9,106,725 |
| Total Reef Rescue Contribution % | 35% | 34% |
| Soil - Numbers | 115 | 323 |
| Soil - Hectares | 27,048 | 81,497 |
| Soil - % of Industry | 12% | 68% |
| Total Soil Project Costs | 4,112,279 | 15,782,009 |
| Total Reef Rescue Soil Contribution \$ | 1,555,683 | 5,441,051 |
| Total Reef Rescue Soil Contribution % | 38% | 34% |
| Nutrient - Number | 82 | 199 |
| Nutrient - Training | 33 | 95 |
| Nutrient - Hectares | 15,362 | 41,051 |
| Nutrient - % of Industry Area | 10% | 34% |
| Total Nutrient Project Cost | 1,519,012 | 3,106,706 |
| Total Reef Rescue Nutrient Contribution \$ | 596,796 | 1,208,506 |
| Total Reef Rescue Nutrient Contribution % | 39% | 39% |
| Chemical - Number | 99 | 214 |
| Chemical - Training | 14 | 65 |
| Chemical- Hectares | 20,936 | 40,562 |
| Chemical - % of Industry Area | 9% | 34% |
| Total Chemical Project Cost | 2,755,001 | 4,840,412 |
| Total Reef Rescue Chemical Contribution \$ | 1,024,972 | 1,813,548 |
| Total Reef Rescue Chemical Contribution % | 37% | 37% |
| Irrigation/Stormwater - Number | 31 | 80 |
| Irrigation/Stormwater- Hectares | 3,459 Ha | 7,757 Ha |
| Irrigation/Stormwater- % of Industry Area | 3% | 6% |
| Total Irrigation/Stormwater Project Cost | 2,020,784 | 4,630,466 |
| Total Reef Rescue Irrigation/Stormwater Contribution \$ | 451,277 | 963,364 |
| Total Reef Rescue Irrigation/Stormwater Contribution % | 22% | 21% |
| Industry Projects | 22 | 45 |
| Impacted Areas Ha | 120,000 Ha | 120,000 Ha |
| Impacted Areas % of Industry Area | 100% | 100% |
| Total Industry Project Costs | 3,608,233 | 11,200,099 |
| Total Reef Rescue Industry Contribution \$ | 1,425,888 | 4,279,353 |
| Total Reef Rescue Industry Contribution % | 47% | 39% |

Grazing

The Reef Rescue Grazing water quality grants provided incentives to support graziers and industry to adopt A & B class pasture, nutrient, and riparian management practices. In Year 3 of Reef Rescue 99 Expressions of Interest were received to be involved in grazing projects. Of these 99 EOI's, 26 new land holders (roughly 1% of the regional industry) and 6 repeat land holders were funded to undertake 51 sub-projects. These 51 sub-projects impacted on a total of 13,785 hectares or 18% of the available intensive pastoral land which is now under improved land management practices. The 51 sub-projects include:

- Improved Pasture Management through 26 pasture monitoring sites, 56 nutrient monitoring sites and 41.55 kms of land type fencing
- Improved Riparian Management through 67.82 kms of riparian fencing, 41 off-stream watering points and improved management on 435 ha.



Plate 13 Over 100kms of land type and riparian fencing has been erected in the Mackay Whitsunday region in 2010-2011

A total cost of \$1,484,407 was spent to improve grazing and riparian land management with Reef Rescue contributing \$576,250 or 39%. On average, the total project cost was \$47,884 with \$18,588 provided by Reef Rescue.

Over the past 3 years of Reef Rescue in the Mackay Whitsunday region 324 EOI's have been received to be involved resulting in 136 new land holders and 12 repeat land holders undertaking a total of 280 sub-projects. These sub-projects have impacted on 32,543 hectares of land which are now under improved land management. In total these 280 sub-projects include:

- Improved Pasture Management through 167 pasture monitoring sites, 164 nutrient monitoring sites and 104.65 kms of land type fencing
- Improved Riparian Management through 147.92 kms of riparian fencing, 130 off-stream watering points and improved management on 627 ha.

The total cost of all grazing activities under Reef Rescue in the past 3 years is \$3,156,679 of which Reef Rescue has contributed \$1,367,324 or 43%. On average, the total project cost was \$24,661 with \$10,682 provided by Reef Rescue.

In year 3 of Reef Rescue Grazing in the Mackay Whitsunday region, 2 industry projects were also carried out. One industry project aims to continue investigating the use of a new cattle tag to spatially locate animals within a property for use within the AgDat data framework. The tag developed by an Australian company, Taggle Pty Ltd provides an initial demonstration of the capabilities of advanced spatial mapping applications to the grazing industry. The potential of cattle tracking for land managers has long been recognised for its potential applications in the monitoring and management of stock in sensitive areas such as riparian zones and gullies, identifying grazing pressure and virtual fencing.

The primary purpose of the project is to support the sustainability of the grazing industry through the collection and provision of relevant and current information relating to on and off farm activities such as the application of pesticides, stock rotation and mustering. AgDat has the facility to gather, collate and analyse this operational data and to generate appropriate performance indicators that will promote wider adoption of Best Management Practices.

The other industry project that was undertaken was a Rapid Condition Assessment (RCA) to assess the overall condition of grazing land and to act as a benchmark for future condition assessments. Over four main grazing land types in the Mackay Whitsunday Region, 200 points were identified and rated according to ground cover, weed pressure, tree cover, erosion and fire history. An overall rating according to these parameters was allocated using an ABCD scale. As land condition decreases productivity decreases and the land becomes less resilient to pressure. Monitoring the change in land condition over time allows changes to be identified and management to be adapted. The total cost of the two grazing industry activities in Year 3 Reef Rescue is \$1,293,000 of which Reef Rescue has contributed \$128,000 or 10%.



Plate 14 The Fogarty's manage River Run which is implementing a range of Reef Rescue activities

Table 2 Reef Rescue Grazing Total Outputs Year 3

| Grazing | Year 3 | Total |
|--|---------------------|-------------------------|
| EOI | 99 | 324 |
| Projects | 32 | 128 |
| Landholders | 26 new and 6 repeat | 116 (12 are now repeat) |
| New Landholders % of industry (1900) | 1% | 8% |
| Impacted Area Ha | 13,785 Ha | 32,543 Ha |
| Impacted Area % of Industry Area | 18% | 43% |
| Total Project Cost | 1,484,407 | 3,156,679 |
| Total Reef Rescue Contribution \$ | 576,250 | 1,367,324 |
| Total Reef Rescue Contribution % | 39% | 43% |
| Groundcover - Trainging | 19 | 71 |
| Gorundcover - Hectares | 11,354 Ha | 29,644 Ha |
| Landtype Fencing kms | 41.55 kms | 104.65 kms |
| Pasture and Stock Monitoring Sites | 26 | 167 |
| Nutrient Monitoring Sties | 56 | 164 |
| Riparian Hectares | 435 | 627 |
| Riparian Fencing Kms | 67.82 kms | 147.92 kms |
| Off-stream Watering points | 41 | 130 |
| Industry Projects | 2 | 13 |
| Total Industry Project Costs | 1,293,000 | 3,619,880 |
| Total Reef Rescue Industry Contribution \$ | 128,000 | 801,856 |
| Total Reef Rescue Industry Contribution % | 10% | 22% |

Horticulture

The Reef Rescue horticulture water quality grants have been very successful at encouraging producers and industry to adopt A & B class soil, nutrient, pesticide and irrigation management practices. In year 3 of Reef Rescue 11 Expressions of Interest were received of which 3 new and 3 repeat farmers were funded. These 6 producers implemented 9 projects impacting on 366 hectares of land. This represents 27% of the total area under horticultural production in the Mackay Whitsunday region. The projects funded include:

- 2 improved soil management projects focusing on inter-row management
- 1 improved nutrient management project focusing on fertigation
- 1 improved chemical management project focusing on applying knockdown chemicals
- 3 improved irrigation/ stormwater management projects focusing on improved application.

The total cost of projects undertaken in year 3 of Reef Rescue in the horticulture industry was \$176,153 with Reef Rescue contributing \$64,563 or 37%. On average, the total project cost was \$29,358 with \$10,760 provided by Reef Rescue.

Over the past 3 years for Horticulture in the Mackay Whitsunday region there have been 36 EOI's to be involved of which Reef Rescue has supported and funded 16 new and 7 repeat producers to undertake 34 sub-projects. This has impacted on a total of 986 hectares of land or 73% of the total area under horticultural production. The projects funded include 10 soil, 6 nutrient, 6 chemical and 10 irrigation/stormwater sub-projects. In total for the region over 3 years under Reef Rescue, \$507,196 has been spent to improve horticulture land management practices with Reef Rescue contributing \$208,211 or 41%. On average, the total project cost was \$22,052 with \$9,052 provided by Reef Rescue.



Plate 15 An example of a Reef Rescue funded horticulture project is a side throw mulch mower for maintaining good inter-row ground cover and mulching for weed control.

Table 3 Reef Rescue Horticulture Total Outputs Year 3

| Horticulture | Year 3 | Total |
|---|--------------------|---------------------|
| EOI | 11 | 36 |
| Projects | 6 | 23 |
| Landholders | 3 new and 3 repeat | 16 New and 7 repeat |
| New Landholders % of industry (45) | 7% | 35% |
| Impacted Area Ha | 366 Ha | 986 Ha |
| Impacted Area % of Industry Area | 27% | 73% |
| Total Project Cost | 176,153 | 507,196 |
| Total Reef Rescue Contribution \$ | 64,563 | 208,211 |
| Total Reef Rescue Contribution % | 37% | 41% |
| Soil - Numbers | 2 | 10 |
| Soil - Hectares | 35 Ha | 353 Ha |
| Soil - % of Industry | 3% | 26% |
| Total Soil Project Costs | 50,770 | 147,711 |
| Total Reef Rescue Soil Contribution \$ | 22,485 | 70,956 |
| Total Reef Rescue Soil Contribution % | 44% | 48% |
| Nutrient - Number | 1 | 6 |
| Nutrient - Hectares | 11 Ha | 72 Ha |
| Nutrient - % of Industry Area | 1% | 5% |
| Total Nutrient Project Cost | 40,300 | 47,422 |
| Total Reef Rescue Nutrient Contribution \$ | 16,120 | 19,681 |
| Total Reef Rescue Nutrient Contribution % | 40% | 41% |
| Chemical - Number | 1 | 6 |
| Chemical- Hectares | 120 Ha | 315 Ha |
| Chemical - % of Industry Area | 9% | 23% |
| Total Chemical Project Cost | 14,283 | 49,201 |
| Total Reef Rescue Chemical Contribution \$ | 5,713 | 13,602 |
| Total Reef Rescue Chemical Contribution % | 40% | 28% |
| Irrigation/Stormwater - Number | 3 | 10 |
| Irrigation/Stormwater- Hectares | 331 Ha | 398 Ha |
| Irrigation/Stormwater- % of Industry Area | 17% | 29% |
| Total Irrigation/Stormwater Project Cost | 23,500 | 215,061 |
| Total Reef Rescue Irrigation/Stormwater Contribution \$ | 10,245 | 93,972 |
| Total Reef Rescue Irrigation/Stormwater Contribution % | 43% | 43% |
| Industry Projects | | 1 |
| Total Industry Project Costs | | 100,000 |
| Total Reef Rescue Industry Contribution \$ | | 50,000 |
| Total Reef Rescue Industry Contribution % | | 50% |

Estimated Load Reductions

The focus of the Reef Rescue Water Quality Grants is to promote a range of specific improved management practices (A & B class) for intensive agricultural land uses that will improve the water quality of the Great Barrier Reef lagoon. The increased adoption of these practices will improve water quality by reducing nutrient, pesticide and sediment load running off the landscape and entering the Great Barrier Reef lagoon. Based on the expected uptake of A and B class management practices the load reduction targets identified in the Mackay Whitsunday Water Quality Improvement Plan (2008) for Reef Rescue in the Mackay Whitsunday region are:

- 25% for dissolved inorganic nitrogen

- 20% for residual herbicides (ametryn, atrazine, diuron and hexazinone)
- 20% for particulate nitrogen and phosphorus
- 30% for filterable reactive phosphorus
- 5% for suspended sediment

To date based on the activities which have been funded in the first 3 years in Reef Rescue the estimated load reductions are presented in Table 4. It must be noted that the load reductions presented in Table 4 are estimates that are based on Reef Catchments models linked to the Reef Catchments Mackay Whitsunday Water Quality Improvement Plan (2008), which have yet to be verified by the Paddock to Reef Monitoring and Modelling Program and may be subjected to change at a later date.



Plate 16 Field day at Paddock to Reef monitoring site at North Eton

Table 4 Estimated Load Reductions from first 3 years of Reef Rescue in Mackay Whitsunday

| 2008 - 2011 Reef Rescue total Estimated Load Reductions from Current Individual Water Quality Grants | Mackay Whitsunday WQIP Load Reduction Target 2014 | % of WQIP 2014 target |
|--|---|-----------------------|
| Suspended sediment load reduced by approximately 158,424 t/yr. | 8,000 t/yr. | >100% |
| Particulate Nitrogen load reduced by approximately 336 t/yr. | 360 t/yr. | 93% |
| Particulate Phosphorus load reduced by approximately 171 t/yr. | 150 t/yr. | >100% |
| DIN(Dissolved Inorganic Nitrogen) load reduced by approximately 163 t/yr. | 550 t/yr. | 29% |
| FPR (Filterable Reactive Phosphorus)load reduced by approximately 31 t/yr. | 100 t/yr. | 31% |
| Total Pesticides load reduced by approximately 1144 kg/yr. | 1910 kg/yr. | 60% |

Section 6: Appendix

Appendix 1: Grazing Case Studies

Case Study 1

REEF RESCUE

2011

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Albert Volker

RIPARIAN MANAGEMENT

Reef Rescue helped Albert & Nita Volker manage pasture on their property more efficiently by separating land types by constructing 0.75kms of land type fencing. The Volkerrs also undertook pasture and stook monitoring on two land types to monitor improvements in their pasture over time.

Reef Rescue has helped the Volkerrs to achieve better pasture management over their grazing paddocks with .75km of land type fencing and pasture monitoring sites. Albert Volker states; "Reef Rescue prompted us and provided us the opportunity to divide these land types. It has motivated us to keep doing more of it."

Without the opportunity, financial assistance and support from Reef Rescue and support officers, the Volkerrs do not believe they would have divided their land types. Ease of management has resulted from fencing land types, this has helped to control grazing pressures by supporting pastures during early establishment along

with weed management in monitoring and selectively controlling weed species.

Before their involvement with NRM groups, the Volkerrs have been proactive in managing their property. This includes tackling erosion from gully heads caused originally from cattle access to water in the creeks. Also controlling weed invasions such as Lantana by investing not only precious dollars but also labour, machinery and that ever pressing issue: time.

Reef Rescue riparian fencing incentives have assisted in helping to keep ground cover on gully heads and allowing the Volkerrs to keep cattle out for most of the time.



About the farm...

Situated in the lush valleys between the Pioneer Peaks National Park and the picturesque Mt Juke bluff, is Albert and Anita Volker's 203 ha family property. Traditionally cane farmers the Volkerrs have owned their block since 1966, and originally used cattle only for the purpose of maintaining fire breaks around the cane. Now, less than 75 ha of cane remains and is share farmed with his brother and nephews. They are now steadily transforming their cane paddocks to improved pastures and to date have 133 ha now supporting their 100 head Brahman/Droughtmaster beef herd.



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The Volkers believe that through Reef Rescue, fencing off these potentially dangerous landscapes to not only cattle, workers and machinery has potentially saved lives. Albert and Anita plan to continue with their management and control of weed invasions and gully restoration. Albert and Anita also follow up their pasture management with spot spraying and regularly monitoring for new invasions of species for example Sporobolus grasses such as Giant Rats tail and Giant Parramatta Grasses.

“Reef Rescue prompted us and provided us the opportunity to divide these land types. It has motivated us to keep doing more of it.”

Being more in control of pasture management decisions helps the Volkers when targeting cattle markets. Albert and Anita generally sell their weaned cattle through the local Sarina sales, with the older cows and bulls being culled on temperament, fertility and age and sold direct to the Baker Creek Borthwick’s abattoirs. The Volkers have been involved with the Natural Resource Management groups over previous years and would recommend Reef Rescue to others thinking about this kind of work.



OUTCOMES



Better nutrient management and increased ground cover



Improved management of stock to reduce soil disturbance in riparian areas



Improvement management of stock in wet season

Reef Catchments

Reef Catchments is the regional NRM body who oversees the Reef Rescue program in the Mackay Whitsunday region for the federal government.

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Case Study 2

REEF RESCUE

2011

www.reefcatchments.com.au (07)4988 4200



Don McNichol

RIPARIAN MANAGEMENT

Reef Rescuer helped Don & Michelle McNichol manage their property more effectively by constructing 200m of riparian & 500m of land type fencing. The McNichols also undertook three soil tests to help manage fertiliser inputs on their property.

Since purchasing Sheldon Park in 2007 Don & Michelle McNichol have been continually making improvements to the once Lantana and Sickpod infested property. To help in the implementation of some of these improvements the McNichol's applied for Reef Rescue funding for riparian and landtype fencing off stream watering points and soil testing.

Sheldon Park is a 25Ha property that is used to its potential through the embryo program the McNichol's run. Each year around 40 heifers are purchased around 15 -18 months and implanted with an embryo of stud quality genetics. The Heifers are then preg tested at 10 weeks,

those with a positive reading are sold back to the embryo source and the empty heifers sold to a local butchery.

The 200m riparian fencing completed stretches the entire creek frontage of the property. Don explains, "We didn't want the cattle drinking out of the creek. We wanted to bring the cattle up to an off stream watering point". "Now we just put them in there to keep it trimmed back and make sure we don't disturb the ground cover and cause any erosion".

The riparian fencing installed by Don will also help to improve the quality of the riparian vegetation along his creek helping to add to the stability of the bank and reduce the risk of sediment loss.



About the farm...

Don and Michelle have owned Sheldon Park a 25Ha property located in the Plane Creek Catchment for just over 4 years. Don and Michelle have worked extremely hard in this time to turn around the block from a lantana and sickpod infested block into a productive grazing property.

The McNichols run an embryo program where empty heifers are purchased each year, implanted with embryos and then sold on again after a successful preg test.



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Don McNichol standing next to a riparian Fence helped funded by Reef Rescue

In addition to the riparian fencing, land type fencing was installed to split the creek flats from the steeper ridge country.

“We wanted to separate the pasture types on the different country and manage them separately”. “We have poorer pasture on the ridge country, this allows us to maintain good ground cover on both land types”. “It also allows us to move cattle off the flats in the wet season and stop them from bogging it up”.

The McNichols also conducted three soil tests funded

by Reef Rescue, which helps to make informed decision when it comes to fertilizer inputs.

“Soil testing has insured we don’t apply any nutrient we don’t need, we just replace what the cattle are taking out”. “Our nutrient program and land type fencing has made a noticeable difference to the thickness of our pastures and increased

our mulch layer”. “These good pastures are helping to resist Giant Rat Tail grass from establishing from seed up the catchment”.

“We have poorer pasture on the ridge country, this allows us to maintain good ground cover on both land types.”



OUTCOMES



Riparian fencing to improve bank stability and reduce sediment loss



Soil testing assists in the reduction of nutrient losses



Improved pasture management

Reef Catchments

Reef Catchments is the regional NRM body who oversees the Reef Rescue program in the Mackay Whitsunday region for the federal government.

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Case Study 3

REEF RESCUE

2011

www.reefcatchments.com.au (07) 4988 4200



Gavin Linthwaite

RIPARIAN MANAGEMENT

Reef Rescue helped Gavin & Katrina Linthwaite to construct 1.2km of riparian fencing and 3.2km of land type fencing to separate his property into its different land types. The Linthwaites also received funding to purchase a blade plough to control woody weeds on their property.

Gavin and Katrina Linthwaite own and manage the property Mt Funnel, a 5000 acre grazing property. The property is boarded by both Rocky Dam Creek and Cape Palmerston National Park and has been in the Linthwaite family for over 30 years. The Linthwaite's run 500 breeders and turn off 300-400kg steers destined for the feedlot. The herd consists of predominantly Brahman cattle with some smaller numbers of Brangus and Charolais.

Through funding provided by Reef Rescue Gavin has constructed 1.2 km of riparian fencing along Rocky Dam Creek. The fencing will help improve water quality by increasing bank

stability, which in turn will lower sediment entering the waterway and also improve the condition of riparian vegetation.

Gavin explains "the fencing helps control cattle around the creeks and to graze it when you want to graze it and not have them in there all the time". The riparian area on the property maintains a large body of pasture insuring good ground cover year round.

Gavin has also implemented 3.2km to date of land type fencing to separate his property into its different land types. "The land type fencing helps us manage the cattle and split when we have cattle on the hills or on the flats to maintain our pasture. It also helps



About the farm...

Gavin and Katrina Linthwaite own and manage the property Mt Funnel, a 5000 acre grazing property. The property is boarded by both Rocky Dam Creek and Cape Palmerston National Park.

The Linthwaite's run 500 breeders and turn off 300-400kg steers destined for the feedlot.



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us to implement our fire management program that relies on effective stock management. A added bonus of the fencing is the ease of mustering and managing cattle on the property".

Gavin has also received Reef Rescue funding for improved pasture management. With this Gavin purchased a blade plough which will allow him to control woody re-growth within his pastures without the use of herbicides such as tebuthiuron.

"The land type fencing helps us manage the cattle and split when we have cattle on the hills or on the flats to maintain our pasture. It also helps us to implement our fire management program".

The Linthwaite's are planning to implement additional riparian, land type fencing and watering points through the Reef Rescue program as a stage two participant. Gavin has recommended Reef Rescue funding to other graziers looking to complete activities like those completed on Mt Funnel. "We would not have completed all of these activities as soon as we did without Reef Rescue. These are all activities we wanted to do & the Reef Rescue funding helped us to do it".



OUTCOMES



Riparian fencing to improve bank stability and reduce sediment loss



Reduced chemical application



Maintaining pasture to maintain ground cover and reduce sediment loss

Reef Catchments

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Appendix 2: Cane Case Studies

Case Study 1

REEF RESCUE

2011 www.reefcatchments.com.au (07)4868 4200



Andrew Pratt



IMPROVED FARMING SYSTEM USING CONTROLLED TRAFFIC

REEF RESCUE HELPED ANDREW PRATT IMPLEMENT AN IMPROVED FARMING SYSTEM ON HIS FARMS THROUGH THE USE OF GPS GUIDANCE ON CONTROLLED TRAFFIC, WITH ZONAL TILLAGE OPERATIONS AND THE USE OF KNOCKDOWN CHEMICALS WHERE PRACTICAL. WITH THE FUNDING, ANDREW WAS ABLE TO MODIFY EXISTING EQUIPMENT AND PURCHASE SOME NEW EQUIPMENT TO MAKE THE CONVERSION POSSIBLE.

After trialling some different row spacings, in 2005 Andrew began the conversion to a 1.85m Controlled Traffic system and has around 80% of his farms converted.

During that time he has modified tractors and other equipment to suit the new row spacings. With the help of Reef Rescue over the last 2 years, Andrew has also purchased a zonal rotary hoe, 3 GPS units to go on 2 tractors and the harvester and a new minimum tillage wide shute planter. Andrew says "that the final piece of equipment needed will be a new zonal ripper once we are ready to plant back into our controlled traffic rows and this is when I hope to see real savings in time and money with

the reduction in ground preparation".

Along with improving soil management, Andrew has been looking at ways to improve his nutrient and chemical management on farm as well. Andrew said "we use mainly liquid fertiliser across our farm and only use sub-surface granular at planting or to finish off if necessary. Our liquid contractor through Reef Rescue had variable rate equipment and new flow meters installed and so we get the benefit of this technology as well as a more accurate application on the growing zone".

For chemicals, Andrew also received funding to purchase a 4-row shielded sprayer boom to replace using residual chemicals in the inter-row with knockdown



About the farm... Andrew is a 4th generation farmer and with his father Neil have 350 ha over 3 farms under cane production. The farms are bordered or crossed by a range of creeks which are all part of the St Helens Creek Sub-Catchment near Calen, which is around 55 kms North-West of Mackay. Andrew is also part of a harvesting and planting group that manages another 490 ha in the local area. In the 1920's after the railway line went through, the family farm was the first to grow cane in the North Coast district and was once one of the biggest farms in North Queensland. The remnants of the old Bruce Highway that ran directly in front of his house can still be seen today.



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chemicals. "This will help not only save dollars but I am told there will be a benefit for water quality" said Andrew. One key action he already does is to utilise his high clearance spray rig to apply knockdowns at out of hand stage and to use his 2 centre pivots to irrigate in both chemical and nutrient applications across his farms.

For Andrew, Reef Rescue really helped speed up what he was trying to achieve on his farms from probably over a 5-10 year period to perhaps a 2-3 year period. Andrew says "we may have done something like the zonal tillage unit, but would not have been able to get the GPS units or buy a new minimum tillage planter as quickly as we did without

"REEF RESCUE REALLY HELPED SPEED UP WHAT HE WAS TRYING TO ACHIEVE ON HIS FARMS FROM PROBABLY OVER A 5-10 YEAR PERIOD TO PERHAPS A 2-3 YEAR PERIOD".

the Reef Rescue grants we received". It also helped to get his partners and some of his neighbours to convert to the new system at the same time

which means dollar saving for all involved and the flow on benefits for water quality.

Outcomes

- Reduced risk of sediment losses with a Controlled Traffic minimum tillage system reducing erosion.
- Reduced risk from residual chemical losses with the replacement of residuals with knockdowns where practical.
- Improved soil structure and soil health helping reduce run-off and increase infiltration.



OUTCOMES



Reduced risk of sediment losses



Reduced risk from residual chemical losses



Improved soil structure and soil health

Reef Catchments

Reef Catchments is the regional NRM body who oversees the Reef Rescue program in the Mackay Whitsunday region for the federal government.

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Case Study 2

REEF RESCUE

www.reefcatchments.com.au (07)4968 4200



IMPLEMENTING A CONTROLLED TRAFFIC FARMING SYSTEM

REEF RESCUE HELPED GARY LAY TO COMPLETE THE IMPLEMENTATION AND CONVERSION TO A CONTROLLED TRAFFIC FARMING SYSTEM. WITH THE FUNDING, GARY WAS ABLE TO HELP FINISH MODIFYING HIS EXISTING EQUIPMENT AND PURCHASE SOME NEW ONES LIKE GPS GUIDANCE AND ZONAL TILLAGE EQUIPMENT.

Gary is a 3rd generation farmer and manages 250ha across 3 farms within the Sandy Creek Sub-Catchment, around 20 km South-West of Mackay. One farm is on Drapers Creek which joins Sandy Creek just downstream from Eton. The second one is right on Sandy Creek at Homebush and the third near Oakenden on Rock Creek, which joins Sandy Creek downstream of the Homebush Road Bridge. Gary was the winner of the 2010 Mackay Sugar Reef Rescue Productivity Award for implementing a range of eligible activities that can benefit both the farm and the environment.

In 2006, Gary first started to convert his farm from a 1.5m system to a 1.8m Controlled Traffic system. Gary says "after this year's planting, all of his farms will be fully converted over to the new system as well as all of his farming equipment". Reef Rescue has helped with many of these modifications including widening out spraying and fertilising equipment, the purchase of a zonal rotary hoe and the installation of GPS guidance. Gary adds "one of the

keys to the new system as outlined by the Sugar Yield Decline Venture is the utilisation of rotational legume fallows to help break the monoculture of cane and provide nitrogen for the following cane crop" and so he also received funding for a legume planter to help do this every year when the weather permits.

Along with improving soil management, Gary has been adopting a range of practices to improve his nutrient and chemical management on farm as well. This has included using EM mapping and soil testing to identify different productivity zones across his farms and to match his nutrient inputs to these zones. Gary says "we will utilise the lower banded mill mud rates on our fallows where the beds will be, utilise the nitrogen that has been fixed from the legumes and then only top up any other nutrients required at planting".

For chemicals, Gary also received funding to modify his high clearance spray rig by fitting a second 400 L tank



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and better nozzles so that he can apply knockdowns in the inter-row and over the crop at out of hand stage. Gary says "with the move to a minimum tillage system, residual herbicides for weed control particularly in plant cane is important and I have switched to using some of the more UV stable ones that are currently available. As weed pressure is reduced, I may be able to use more knockdowns across the farms".

Gary said that Reef Rescue really helped to achieve quicker the changes he has wanted to make and complete on his farms. "We would have done some of the activities hopefully over the next few years, but others would have been delayed if done at all" he added. One pleasing aspect about Reef Rescue

"WE WILL UTILISE THE LOWER BANDED MILL MUD RATES ON OUR FALLOWS WHERE THE BEDS WILL BE, UTILISE THE NITROGEN THAT HAS BEEN FIXED FROM THE LEGUMES AND THEN ONLY TOP UP ANY OTHER NUTRIENTS REQUIRED AT PLANTING".

Gary said was that he was easily able to do all of the paperwork and milestones associated with the project which at first he thought would be a barrier. He finished off saying that he knows of quite a few growers who have taken up the incentives to make changes so it must be having some impact.

Outcomes

- Reduced risk of sediment losses with a Controlled Traffic minimum tillage system reducing erosion and run-off.
- Reduced risk from residual chemical losses with the replacement of residuals with knockdowns where practical.
- Improved soil health and reduced nutrient inputs from utilising legume fallows.



OUTCOMES



Riparian fencing



Blade Plough



Pasture monitoring

Reef Catchments

Reef Catchments is the regional NRM body who oversees the Reef Rescue program in the Mackay Whitsunday region for the federal government.

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Case Study 3

REEF RESCUE

2011

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Lance and Ashley Quod



IMPLEMENTING AN EFFICIENT AND IMPROVED FARMING SYSTEM

REEF RESCUE HELPED LANCE AND ASHLEY CONTINUE TO MAKE BIG CHANGES ON THEIR FARM INCLUDING THE ADOPTION OF GPS GUIDANCE ON CONTROLLED TRAFFIC, ZONAL TILLAGE OPERATIONS AND THE USE OF KNOCKDOWN CHEMICALS WHERE PRACTICAL. WITH THE FUNDING, THEY WERE ABLE TO MODIFY EXISTING EQUIPMENT TO SUIT THEIR NEW SYSTEM AND PURCHASE SOME NEW EQUIPMENT TO MAKE IMPLEMENTING POSSIBLE.

In 2007, Lance and Ashley commenced the change to a 2m dual row controlled traffic system. Lance said "this has been on GPS since 2008 and we have now converted around 90% of the farm". "With the Reef Rescue support we were able to put up a GPS base station and install a unit, modify our existing equipment such as add an elevator extension on the harvester and develop zonal tillage machinery" he added. This included a zonal rotary hoe and a 3-row bed former. They also purchased a legume planter and will try and plant legumes each year as a green manure crop to benefit the following cane crop. When it comes to replanting into the controlled traffic beds, Ashley explained "we plan to direct drill legumes through the trash, spray out the cane, zonal rip/hoe and bed form and then hopefully plant, meaning big savings in time

and money in ground preparation".

They have been implementing other activities to improve their management practices on farm as well. This includes using a high clearance tractor and the fitting of shields to their existing spray rig so that they can utilise knockdown chemicals in the inter-row and at the out of hand stage for weed control. They also installed a variable rate controller for chemical applications so that they can implement a range of weed control strategies between blocks based on weed pressure, yield and crop stage. Ashley adds "vines are an issue and it may be necessary in some blocks to use different spraying programs".

For nutrient management, they have used EM mapping (90% of farm done) and GPS



About the farm...

Lance (3rd generation) and his son Ashley farm 170 ha (40 ha leased) of cane at Crystal Brook, which is around 105 kms northwest of Mackay and 5 kms West of Proserpine.

The home farm, which was expanded fully into cane in 1911, is next to the Proserpine River. Even though it is so close to the river, the farm drains into Lagoon or Pig Creek and is actually part of the Lethe Brook Sub-Catchment, which connects to the river down in the estuary section. Cyclone Ada in February, 1970 caused wide spread damage along the river and many large trees were lost.



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referenced soil testing and Lance said "this helped to identify productivity zones and we saw a real benefit in doing this for our farm". They then use a 3-row stool splitter to apply the nutrients required in those zones based on its crop yield potential, the BSES 6 Easy Steps recommendations and the fallow history such as if they used mill mud or a legume fallow.

Both Lance and Ashley said that the Reef Rescue funding helped speed up the change process instead of waiting 5-7 years to be able to do maybe only some of the activities. Lance said "if you could only get 20%, then it would have totally changed our planning and process for what we could do". With regards to the Reef Rescue

"IT WASN'T TOO HARD TO FOLLOW THE STEPS AND WAS EASIER THAN HE THOUGHT IT WOULD BE".

process, Ashley said "it wasn't too hard to follow the steps and was easier than he thought it would be", while Lance added "that it might be more complicated for some of the older farmers but the support mechanisms were well resourced at least".

Outcomes

*Reduced risk of sediment losses with a Controlled Traffic system reducing run-off and sediment loads.

- Reduced risk of residual chemical losses from using knockdown chemicals where practical in the farming system.
- Reduced risk of sediment losses with zonal tillage operations improving soil structure and reducing erosion.



OUTCOMES



Reduced risk of sediment losses



Reduced risk of chemical losses



Reduced risk of sediment losses with zonal tillage

Reef Catchments

Reef Catchments is the regional NRM body who oversees the Reef Rescue program in the Mackay Whitsunday region for the federal government.

Contact Phil Trendell at Reef Catchments on (07) 4968 4200 or email: phil.trendell@reefcatchments.com.au www.reefcatchments.com.au



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Case Study 4

REEF RESCUE

2011

www.reefcatchments.com.au (07)4968 4200



Peter Hackett

IMPROVED EFFICIENCY AND ACCURACY IN NUTRIENT AND CHEMICAL MANAGEMENT

REEF RESCUE HELPED PETER TO MAKE CHANGES TO THE WAY HE PLANS AND THEN APPLIES HIS NUTRIENTS AND CHEMICALS ACROSS HIS FARM. WITH THE FUNDING, HE WAS ABLE TO MODIFY EXISTING EQUIPMENT AND PURCHASE SOME NEW EQUIPMENT AND VARIABLE RATE TECHNOLOGY TO MAKE IMPLEMENTING HIS NEW SYSTEM POSSIBLE.

Through Reef Rescue, Peter was able to get some support to change and improve his chemical and nutrient management on farm. With regards to chemical management, Peter said "the main thing I am trying to do is break down the seed bank of weeds in the paddock, particularly for vines". To do this, Peter starts to get on top of weeds in the fallow and then during the cane crop with the use of his High Clearance Spray Rig applies knockdowns up to the out of hand stage. If the weed pressure is high, he may then use it to band residual for grass and vine control into the stool. Peter says "the high clearance rig has a variable rate controller and has the ability to spray 2 chemicals in one operation but at the moment I prefer to spray one chemical and then if required come back and spray a second chemical in another pass and make sure both jobs are done as

accurately with the minimum amount of product".

Another focus for Peter was to upgrade his 7-row liquid fertiliser applicator to have a Viper Pro variable rate controller, a new flow meter and high floatation tyres. Peter says "I contract fertilise around 5000 ha a year, but more importantly it is set up to do what I need on my farm". Peter added that "I wouldn't go back to the old system of application, but you do need specific flow meters to be able to use the variable rate technology". Through EM mapping and soil testing, Peter has identified productivity zones within his farm. He then develops his nutrient input plans for these based on the soil test results, fallow history (mill mud or legumes) and crop yield potential. Peter said "last year we had 3 different nutrient blends and these were used at 6 different rates to match



About the farm...

Peter is a 3rd generation farmer, who has 153 ha of cane near Koumala, around 50 km South of Mackay.

The farm is part of the Rocky Dam Creek Sub-catchment and is where his dad in the late 1960's started to grow cane on 50 ha of virgin land. In 2006 they purchased another farm and moved permanently into the area.

The farm drains through a series of smaller creeks and wetlands before entering Rocky Dam creek in the estuary section. Peter won the 2010 Plane Creek Reef Rescue Productivity Award.



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specifically what we needed to apply”.

For soil management, Peter has also commenced converting to a controlled traffic system with GPS guidance. Peter says “we have some rows at 1.6 and 1.7m and in 2009 planted some at 1.83m and started modifying machinery to suit this and reduce compaction across the farm”. As part of this system he also tries to plant a rotational legume crop as green manure and to benefit soil health.

Peter said “that without Reef Rescue funding he would not have been able to do all of the activities he has”. He added “with the funding I was also able to do it better than if I did it all on my own, which means

I’m doing the best job possible straight away”. Peter was happy with the Reef Rescue process used and the support available when you first get involved. “When I went for Stage 2 funding, I understood the process and was able to look after everything much easier which was pleasing” Peter finished off with.

“WITH THE FUNDING I WAS ALSO ABLE TO DO IT BETTER THAN IF I DID IT ALL ON MY OWN, WHICH MEANS I’M DOING THE BEST JOB POSSIBLE STRAIGHT AWAY.”.

Outcomes

- Reduced risk of nutrient losses with controlled accurate application of fertiliser into the growing zone
- Reduced risk of residual chemical losses from using knockdown chemicals where practical in the farming system.

- Targeted nutrient and chemical applications based on precision planning and variable rate technology



OUTCOMES



Reduced risk of nutrient losses



Reduced risk of residual chemical losses



Targeted nutrient and chemical applications

Reef Catchments

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Case Study 5

REEF RESCUE

2011

www.reefcatchments.com.au (07)4968 4200



IMPROVED FARMING SYSTEM USING CONTROLLED TRAFFIC

REEF RESCUE HELPED WAYNE VICKERS MAKE BIG CHANGES ON HIS FARM INCLUDING THE ADOPTION OF GPS GUIDANCE ON CONTROLLED TRAFFIC, VARIABLE RATE NUTRIENT APPLICATION AND THE USE OF KNOCKDOWN CHEMICALS WHERE PRACTICAL. WITH THE FUNDING, WAYNE WAS ABLE TO MODIFY EXISTING EQUIPMENT AND PURCHASE SOME NEW EQUIPMENT TO MAKE THE CONVERSION POSSIBLE.

With the support of Reef Rescue in 2009, Wayne started to convert to a 1.83m wide single row controlled traffic system. He planted 45 ha in the first year without GPS and then in 2010 through Reef Rescue installed GPS guidance as well. After the 2011 planting, Wayne estimates he will have 30% left to convert. Wayne explains "that I am keen to reduce compaction and improve my soil structure and water infiltration across the farm".

Wayne has also purchased a legume planter and says "I will try and plant legumes each year if the season suits and may harvest or use as a green manure crop". When it comes to replanting into his controlled traffic beds, Wayne hopes to be able to just direct drill his legumes, spray out the cane, rip and bed renovate and then hopefully be able to plant.

Wayne has also been looking at ways to improve other management practices on farm as well. This includes fitting shields to his existing spray rig so that he can utilise knockdown chemicals in the inter-row for weed control and using GPS guidance for fallow spraying to remove any overlap in application. "We have also modified our fertiliser box to be a 3-row stool splitter and fitted Variable Rate technology to be able to tailor what is needed in each block based on soil tests, the BSES 6 easy steps recommendations and some local knowledge" Wayne added.

As well as making these changes, Wayne also invested in purchasing a second Centre Pivot for the farm with some support through Reef Rescue. This means that with his lateral booms, he will have around 190 ha under some form of low pressure overhead



About the farm... Wayne is a 5th generation farmer and has 209 ha of cane near the township of Marian, which is around 25 kms West of Mackay as you head up the Pioneer Valley. It is the site of the original home farm that in the 1890's was the first to be turned into sugar cane in the area and the bridge that crosses the river is named after the Vickers family. The farm is bordered on the southern side by the Pioneer River and also drains into Reeves Creek, which is part of the Pioneer River Main Channel Sub-Catchment. The river here is still fast flowing with many rocky outcrops and narrow channels formed.



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irrigation. Wayne said "My aim is to harvest about a ¼ of the area under the pivot and then fertilise and irrigate in within 24 hours. This will get it down into the soil so that the plant can use it". Wayne added "I use the trash blanket for the initial weed control and then will come in later and spray any herbicides that are required based on the weed pressure and irrigate in within 48 hours".

Wayne says "that if it wasn't for the incentives from Reef Rescue, I would never have been able to make the change to a controlled traffic farming system and would have had to weigh up the options of what I should invest in". He adds "Reef Rescue made it viable to make many changes in a short time, it was easy to get involved

and if you did find it difficult there were people there to help you along the way".

Outcomes

"REEF RESCUE MADE IT VIABLE TO MAKE MANY CHANGES IN A SHORT TIME."

- Reduced risk of sediment losses with a Controlled Traffic minimum tillage system reducing erosion and run-off.
- Reduced risk from nutrient losses with accurate site specific sub-surface granular application with variable rate technology
- Reduced risk of losses from irrigating in all nutrient and chemical applications while increasing its effectiveness.



OUTCOMES



Reduced risk of sediment losses



Reduced risk from nutrient losses



Reduced risk of losses from irrigating

Reef Catchments

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Appendix 3: Horticulture Case Studies

Case Study 1

REEF RESCUE

2011

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Gray Plantations

ADOPTION OF IMPROVED HORTICULTURE PRACTICES

REEF RESCUE HELPED GRAHAM WESSLING IMPLEMENT IMPROVED LAND MANAGEMENT PRACTICES ON TWO MACADAMIA FARMS HE MANAGES IN THE MACKAY WHITSUNDAY REGION. WITH THE FUNDING, GRAHAM WAS ABLE TO IMPLEMENT A RANGE OF SOIL, CHEMICAL AND IRRIGATION ACTIVITIES THAT BENEFIT NOT ONLY THE BUSINESS BUT THE ENVIRONMENT AS WELL.

Over the first 3 years of Reef Rescue, Graham applied for Reef Rescue funding to support a range of projects he was keen to implement on the 2 farms. This included soil, chemical, irrigation and storm water activities.

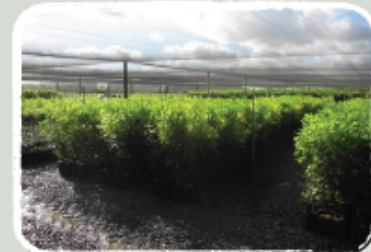
Graham says "that a key first action on both farms was the implementation of drainage improvements including some redesign work, grassing drains and installing hardened crossings to reduce the risk of erosion and any sediment losses".

Another focus was to install soil moisture probes including the downloading equipment and software to improve irrigation and fertigation scheduling and reduce the risk of any run-off from over watering. For improved chemical management, Graham is utilising a control

droplet applicator (CDA) sprayer with GPS guidance and also a double sided covered weed spray applicator under the trees which he says "not only reduces the risk of spray drift but the total amount of herbicide applied".

As in most tree crops, macadamias, which is a native species, also have quite a few stages in the production process before being able to successfully harvest a commercial crop.

Graham says that it takes around 2 years for a seedling in the nursery to be ready for planting and so it is technically Year 3 before the trees are even planted. He said that they are trying a higher density planting method of 6m x 2.5m (667 trees/ha) compared to the conventional 8m x 4m (312 trees/ha).



About the farm...
Graham Wessling works for Gray Plantations which owns and manages a 141 ha farm near Homebush (20km South-West of Mackay) and also another 116 ha for Red Eye Macadamia near Oakenden (25km South-West of Mackay). Both farms are bordered by Rock Creek which is part of the Sandy Creek Sub-Catchment. Having spent 36 years in Northern NSW, Graham said "Gray Plantations first established a nursery in the region in 2005 which can now hold 100 000 seedlings and planted the first trees in April 2008 on what was originally cane farms". In 2011, there are a combined total of 80 ha planted with the majority of both farms to go under macadamia production.



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Operations include laser leveling, ripping and mounding up (150mm) and establishing drip trickle tape for irrigation and Rhodes grass as an inter-row crop. Graham says "that once the trees are more established around Year 4, a grass that is more shade tolerant will need to be used".

After 3.5 years in the ground, the trees will hopefully flower well around Aug-Sept and the following year gets enough nuts for a commercial harvest. This means changes on farm with the drip trickle tape being hung in the trees and the need for a clean area under the trees to allow access and harvesting from the ground.

Fertigation is used and nutrient requirements change with respect to tree age/stage. Graham says "that there is still some weed control needed and a variety of pests to deal

"THERE IS STILL SOME WEED CONTROL NEEDED AND A VARIETY OF PESTS TO DEAL WITH BUT WITH GOOD MANAGEMENT YOU MAY GET 60 YEARS OR

with but with good management you may get 60 years or more production".

Reef Rescue has helped Graham implement a range of key activities on the farms. Graham says "that if it was a high priority, it may still have been done but for most it has been brought forward 4 - 5 years by getting the funding". Graham also stated that at first it seemed a bit daunting to get involved but was really helped out by Anna Geddes from Growcom in the proposal process.

Outcomes

- Reduced risk of sediment losses from improved ground cover and drainage management
- Reduced risk of chemical losses by using knockdown herbicides and reducing applications
- Improved irrigation management helping reduce the risk of any run-off



OUTCOMES



Reduced risk of sediment losses



Reduced risk of chemical losses



Improved irrigation management

Reef Catchments

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Case Study 2

REEF RESCUE

2011

www.reefcatchments.com.au (07)4968 4200



Tibby Dixon

IMPROVED INTER-ROW MANAGEMENT

REEF RESCUE HELPED TIBBY DIXON IMPLEMENT IMPROVED INTER-ROW MANAGEMENT ON HIS LYCHEE FARM. WITH THE FUNDING, TIBBY WAS ABLE TO MAINTAIN EXCELLENT GROUND COVER BETWEEN HIS LYCHEE ROWS AND UTILISE THE RESIDUE AS MULCH AND ORGANIC MATTER UNDER THE TREES.

In 2010, Tibby applied for Reef Rescue funding to purchase a zero turn 35hp side throwing mulch mower to take advantage of the mulch left behind by directing it under the lychee trees. Tibby says that the main reason for doing this was to maintain a good ground cover on the inter-row to reduce the risk of any soil erosion and the subsequent weed control under the trees will reduce the reliance on herbicides. The mulching under the trees will also improve soil health & structure by increasing organic matter and the improved water retention, which will decrease the need for irrigation applications. Tibby added that it will allow us to mow in all weather conditions without causing impact to our inter-rows which reduces the potential of erosion and sediment runoff.

For lychees, there are quite a few stages in the production process before being able to successfully harvest a commercial crop. In Year 1, the establishment stage involves preparing the ground for planting by ripping and then making sure there is phosphorous available for good root development. Tibby also says weed control is very important at this stage and because of the risk of chemicals impacting on the young trees; sugar cane mulch is used and works very well over the first few years. Varieties that are used on the farm include Taiso (first commercial varieties into Australia), B3 (No.1 at present) and some new varieties from China.

By Year 3 some varieties may produce, but it is more likely to be Year 5 before any fruit can be seen and maybe even Year 7 before being



About the farm...

Tibby Dixon owns and manages a Lychee farm close to Campwin and Sarina Beaches around 30 km South-East from Mackay. The estuary section of Plane Creek is not too far away from the 50 ha property, with around 20ha under Lychee production.

Tibby says that when they first moved to the property 32 years ago it was originally a cane farm and in 1979, the first 265 trees were planted on 9m x 9m spacings. In 2011, Tibby explained how they have completely changed their planting design and they now use 8m x 2m spacings and have around 6500 trees. This means smaller trees, but they are easier and safer to harvest.



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able to get enough for a commercial harvest. Tibby says that it is also very season dependant and for a good crop you need cold, dry weather during the flowering period. With his new planting design of 8m x 2m, trees are on average around 2m tall and so he doesn't need ladders or cherry pickers to get the crop off. During the production stage, Tibby utilises leaf and soil analysis to determine nutrient requirements and uses fertigation to match what the crop needs at specific time such as before flowering or after fruit set.

Reef Rescue has helped Tibby implement a very beneficial activity on his farm. He says that he was always very keen to look at doing it

"THE MAIN REASON FOR DOING THIS WAS TO MAINTAIN A GOOD GROUND COVER ON THE INTER-ROW TO REDUCE THE RISK OF ANY SOIL EROSION".

but the cost was a barrier and he would not have been able to do it for example if he could only get 20% funding. Tibby says that as a keen fisherman he is very interested in what other reef users and land uses are doing as part of the solution. Down the track he is keen to look at improving his drainage system to maximize the benefit of his existing storm water structures.

Outcomes

- Reduced risk of sediment losses from maintaining a good inter-row ground cover
- Reduced risk of chemical losses by reducing herbicide applications
- Improved soil health improving infiltration and water retention



OUTCOMES



Reduced risk of sediment losses



Reduced risk of chemical losses by reducing herbicide applications



Improved soil health improving infiltration and water retention

Reef Catchments

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Appendix 4: Cane Industry Case Studies

Case Study 1



Precision Application of Mill Mud

Mackay Sugar's John Markley plays a pivotal role in mill mud applicator development

Mud has long been used by cane farmers as a source of nutrients that can be cheaply added back on to paddocks. A by-product of the milling process, mill mud is particularly high in nitrogen, phosphorus and calcium and is produced at a rate of roughly 10% of the sugar cane milled.

However, mill mud can contribute to elevate levels of nutrients in streams and waterways, if applied at high rates and run off

occurs. Increased levels of nutrients can have adverse effects on fresh water and marine environments including coral and sea grass communities.

In the past mill mud has been spread on the field in a very ad hoc manner at a nominal rate of 150 tonnes of wet mud per hectare (t/ha) with large variability in application rates of between 0 – 300t/ha.

As each grower is allocated a set tonnage of mud by the mill according to the cane they produced, poor application can result in only small coverage and may require significantly more

fertiliser to be purchased and applied.

Mackay Sugar has considered this an inefficient application method resulting in increased cost for growers and reduced water quality benefits for the Mackay region.

With funding from Reef Rescue, Mackay Sugar has designed and commissioned new spreaders to aid in the precision application of mill mud.

The new spreaders apply mud directly onto the middle of the rows rather than a blanket spreading done in the past.

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Old distribution



New applicator



New distribution on row

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www.reefcatchments.com.au

Mud is also able to be applied to three rows at a time reducing compaction on the inter-rows and reducing fuel and time costs. "Mud is now applied at a reduced rate of 50t/ha effectively tripling the land one manager can service with their allocation of mud" said Mackay Sugars productivity Coordinator John Markley.

Distributing the mud over the field in this manner also reduces the chance of run-off; which has been problematic in the past, by:

- 1) Placing the mud in the centre of the row which is elevated;
- 2) Ensuring no mud is distributed onto the wheel tracks where the ground is more likely to have been compacted and is therefore more prone to water run off; and
- 3) Incorporating mud into the soil soon after application when planting occurs.

The development of the spreaders allows growers to apply mud to more hectares and as a result may see a reduction in their costs of fertiliser as mill mud is provided back to the growers at a cost significantly lower than traditional fertilisers.

Mackay Sugar originally commissioned three prototypes and after some initial design problems commissioned four more newly modified applicators. Reef Rescue has just now provided Mackay Sugar further funding to build seven more applicators and modify the three original prototypes taking the total to 14 applicators for the Mackay region. "We hope to have these ready by early May" said John.

With the fourth year of Reef Rescue due to start in July 2011, eligible activities have been expanded to include the construction of mill mud pads. Growers will now be eligible to receive up to 50% of the cost of the mud pad up to a maximum of \$10 000. With this incentive and 14 new applicators this will no doubt result in more efficient use of Mill mud, insuring increased efficiency for growers and an improvement in water quality entering the stream and waterways.



Applicator new design

If you are interested in finding out more about Mill Mud Applicators please contact John Markley of Mackay Sugar on ph: (07) 4953 8571 email: J.markley@mkysugar.com.au

Case Study 2

2011 Mill Mud Nutrient Trials



Using mill mud with nutrient program can reduce fertiliser application

Integrating mill mud to nutrient program can reduce fertiliser application

Another industry project funded through Reef Rescue aims to better understand what nutrients are available to the cane crop from mill mud when it is applied to paddocks at low rates.

Independent Agricultural Resources (IAR) has been working with Mackay Sugar and AgriServ to run field trials using 0, 50 and 100 tonnes of wet mud per hectare with the aim of quantifying the rates of release of key nutrients and their availability to the crop. The

trials also aim to demonstrate how mill mud can be tailored to be a component of a balanced nutrient program.

Current knowledge is limited as to how mill mud can be used as part of a nutrient program by growers. Understanding the nutrient components of mill mud and how they are available and taken up by the crop will allow growers to include these nutrients in their fertiliser planning, allowing a reduction in fertiliser application rates while maintaining productivity. "If mill mud can be used at low rates through precision application with sound knowledge as to what is

being applied then there is a great opportunity for growers to save money on fertiliser inputs" said Rob Sluggett from IAR.

This year IAR established five trial sites in two plant cane and three ratoon crops. Unfortunately the two plant cane sites failed due to the wet weather. Testing undertaken included testing the nutrient content of the mud as it was applied and then again during the life of the trial, soil analysis to examine nutrient movement and availability to the crop, leaf analysis of the growing crop was undertaken on several occasions to examine the adequacy of nutrient

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uptake by the plant. As a result of the unusually long and heavy wet season, regular sampling of banded mud applied to the stool on one trial site was able to be sampled after 600mm, 1500mm and 3000mm of rain over the season. This will give an improved understanding of how quickly heavy rain can leach nutrient out of the mud. Each remaining trial will be harvested this year, additional soil sampling and residual mud sampling undertaken and this will assist with knowledge of what was not taken up by the plant and is remaining in the soil for the following season.

Table 1: Example Nutrient Budget for a Ratoon Trial Site

| Products | Budgeted Mill Mud Nutrient Contribution | | | | Additional Fertiliser Top Up Targets | | | |
|-----------------------------|---|-----|----|---|--------------------------------------|----|----|----|
| | N | P | K | S | N | P | K | S |
| Banded Mud 100t/ha + top up | 62 | all | 30 | 7 | 111 | 0 | 66 | 17 |
| Banded Mud 50t/ha + top up | 31 | all | 15 | 3 | 140 | 0 | 80 | 20 |
| Nil Mud - full fertiliser | - | - | - | - | 170 | 18 | 98 | 24 |



The results to date have shown:

- Through leaf sampling, adequate nutrient are taken up by the crop
- Mud applied to the top of the stool was more protected from nutrient loss than when applied to the inter-row after rain events
- Nutrient content of mill mud can be inconsistent especially when mixed with ash

“Unfortunately this year the trial sites have been heavily affected by the unusually long wet season” said Rob. “We have extended the trials for a further year and will be running on new sites”.

Much of the information gained from the year, even though heavily affected by rain, will still be useable and valid, however a second year of testing will enable productivity services to advise growers with more confidence as to how mud can complement a nutrient program. The first year has also highlighted some unasked questions such as how much mud gets pick up during harvesting which will be looked at this year as part of the trials.

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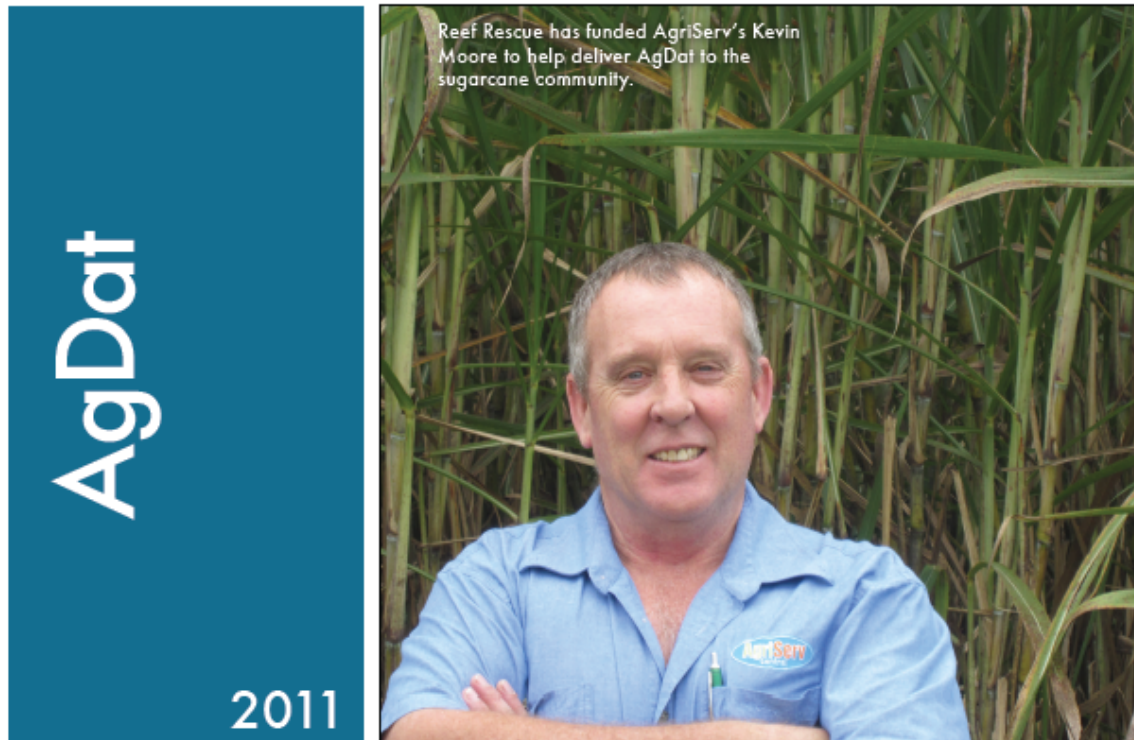
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Contact Chris Dench at Reef Catchments on (07) 4968 4200 or email: chris.dench@reefcatchments.com.au www.reefcatchments.com.au

If you are interested in finding out more about Mill Mud Nutrient Trials please contact Rob Sluggett of IAR on ph: 0459 688 844 Email: robert.john7@bigpond.com



Case Study 3



Reef Rescue Case Study: AgDat

Kevin Moore's role with AgriServ helps to deliver AgDat to the sugarcane growers.

Funding provided through Reef Rescue has been essential in developing a new farm management recording system currently being implemented in the Mackay Whitsunday region. AgDat and the AgDat remote unit allows growers to easily and accurately record any work undertaken on a property to ensure the most efficient management is being carried out, both economically and environmentally.

To ensure growers receive adequate support Reef Rescue is also funding Kevin Moore from AgriServ to help develop and deliver the project to the cane community.

Developed by Agtrix in conjunction with MAPS and Mackay Sugar, AgDat enables growers to record farm activities at a spatial level. "Information on nutrient, chemical and irrigation applications can be recorded together with administration details and any farm management changes allowing for more informed decision making and

better comparisons between years" said Kevin.

"Through AgDat growers will also be able to view a range of other data from various sources including pest and disease records, planting records, mill data and environmental data all adding to best farm management practices".

When recording daily management activities such as the application of chemicals, AgDat can display each paddock with a running total of exactly how many kg's of active ingredient have been applied per hectare for each chemical and aggregate this throughout the year.

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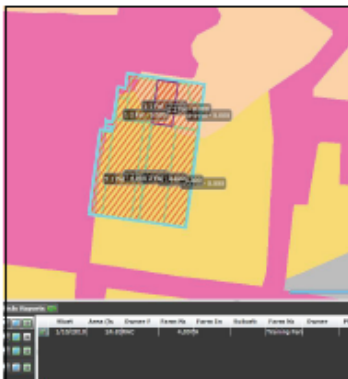


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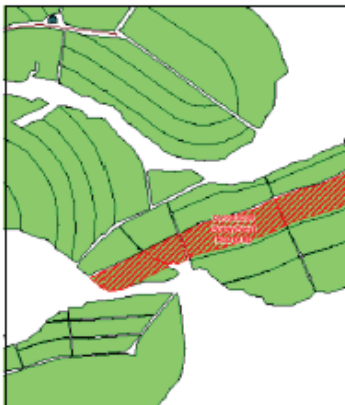




Aerial photo of a paddock



Changing soils across a paddock



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This will result in more efficient use of chemicals and less chance of over application resulting in run off into streams and waterways.

When using AgDat, growers enter the data via a secure logon through a web interface to the server housed at secure local CDN's. Each grower creates their own unique log on and only they can access and view their own property and information. All grower information is separate and cannot be viewed by anyone with a log on. Information entered into AgDat can be exported to an Excel spread sheet which can be kept as a hard copy for records and used as evidence of compliance for Reef Regulations.

While AgDat information needs to be entered while at a home PC or laptop, currently being developed is an AgDat remote unit which allows growers to record applications in the field. The remote unit which looks similar to GPS monitors common in tractors today allows growers to enter data from easy to use drop down options as it is done.

Growers are provided with all the options in the remote unit available in the AgDat programme which is transferred back to the web interface through an internal Sim Card. "Allowing growers to enter information as it is occurring with have huge time saving benefits for growers" said Kevin.

The remote unit has a GPS tracking built into it to record exactly where on their property the grower has been working. This eliminates the possibility of covering any area with more than is desired. Growers can then log on from their home computer and see the work they have done that day.

"We have had good feedback for the growers that have been trailing the unit" said Mr Moore. The AgDat remote unit is eligible under Reef Rescue's Water Quality Grants with growers eligible for up to 50% funding.

As part of the support role funded through Reef Rescue, Kevin Moore has been working to develop further the potential of the AgDat system and to provide support to growers that might want to start using AgDat.

Currently Kevin is organising AgDat training courses for growers that wish to learn how to use the web based system. These courses, also funded through Reef Rescue, are being run by CANEGROWERS have been oversubscribed to date." More courses will be run in the future" said Kevin.

If you are interested in finding out more about AgDat contact Kevin Moore from AgriServ on ph (07) 4968 6835 email: kmoore@maps.org.au

Case Study 4



Weedseeker® selective spraying technology

The cane industry is at the forefront of innovation when it comes to developing or adapting technology to benefit growers and the environment. Recently BSES Limited has been collaborating with Mackay grower, Rod Lamb, in a project funded through Reef Rescue to modify the Weedseeker® selective spraying system for in-crop use in sugarcane.

Currently a blanket spray approach is the most common method used to control weeds in the inter-row, using either

knockdown or residual herbicides. With the advent of Reef Rescue funding, the use of shielded sprayers in combination with glyphosate has become a more common method for inter-row weed control. Weedseeker® systems are commonly used in broadacre applications with sensors fitted to broadacre boom sprays. This project aims to adapt this system so that it works successfully in an inter-row shielded spraying system.

Weedseeker® selective spraying technology uses weed sensing technology to detect weeds and fire herbicide on detection which greatly reduces the volume

of chemical needed to spray a field. Light emitting diodes emit infra-red and visible red light which is projected downwards. Light reflected back is captured and analysed to see if it matches the light spectrum of green plants.

If the reflected light is identified as being from a green plant then the spray nozzle, located behind the sensor, fires a small amount of herbicide as it passes over the plant.

Using the Weedseeker® in other crops has resulted in a reduction of up to 80% of herbicide applied. "Adapting to use this

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technology for the cane industry will potentially result in substantial savings for the grower greatly reducing the volume of herbicide applied to their fields. The Weedseeker® will also prove beneficial to the environment, minimising the potential for herbicide run off leaving the farm" said Phil Ross from AgriServe.

The Weedseeker® technology has been adapted for the cane industry by attaching sensors to spray shields or hoods which are commonly used to reduce spray drift allowing the in-crop use of non-selective systemic herbicides such as glyphosate. With herbicide being applied directly onto the plant and the majority of what is sprayed being directly absorbed by the plant, farm run off of the chemical sprayed using the Weedseeker® technology will be minimised to almost a negligible amount.



Currently the last few modifications are being made to adapt this technology to the cane industry. "We have had to change a number of things to adapt the Weedseeker® from broad acre agriculture to the Cane industry" said Mr Ross from AgriServe. "We aim to start field trials in the next few weeks and it should be ready to demonstrate to other growers soon after that, all going well".

Field trials will be conducted to assess at what level of weed pressure the technology is economically viable. If the weed pressure is high the nozzles will be firing non - stop making the Weedseeker® no more effective than current hooded sprayers.



Reef Catchments

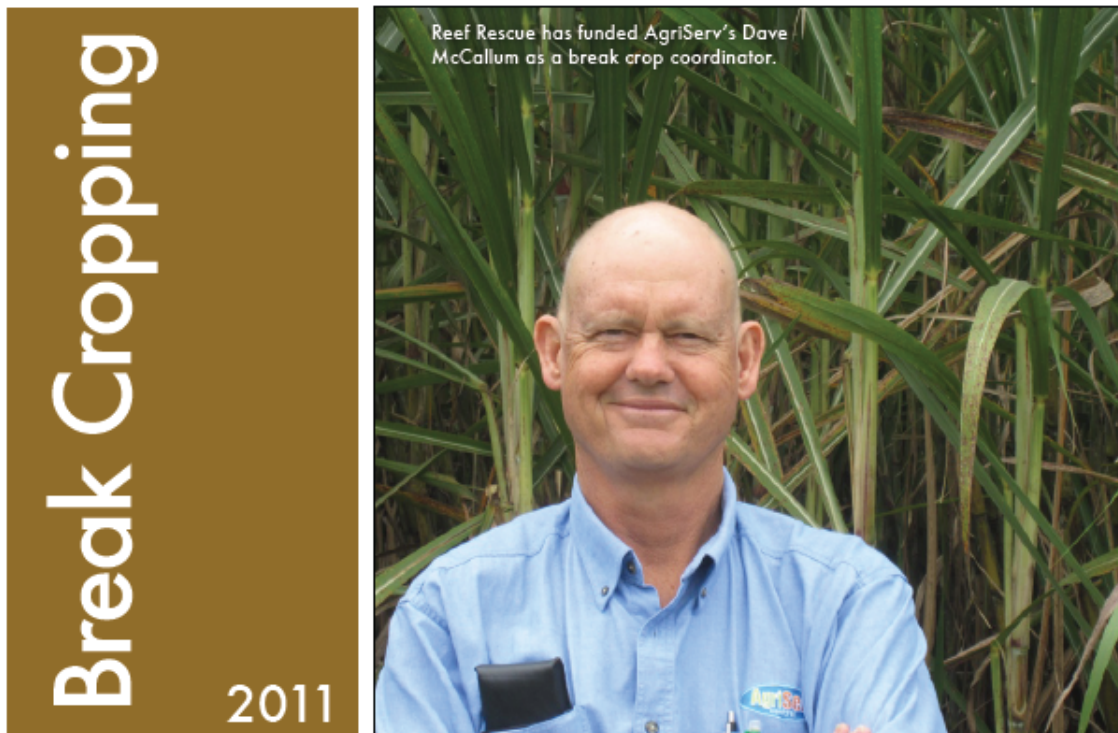
Reef Catchments is the regional NRM body who oversees the Reef Rescue program in the Mackay Whitsunday region on behalf of the federal government.

Contact Chris Dench at Reef Catchments on (07) 4968 4200 or email: chris.dench@reefcatchments.com.au www.reefcatchments.com.au



If you are interested in finding out more about the Weedseeker® spraying technology contact Phil Ross from AgriServe.
Phil Ross: ph (07) 49636823 email: PRoss@bses.com.au

Case Study 5



Reef Rescue Case Study: Break Cropping

Dave McCallum's role as a break crop coordinator is funded by Reef Rescue

Break cropping is the term associated with introducing a crop rotation into a main crop or monoculture. By introducing a break crop a number of benefits can result for the land manager including increasing nutrients back into the soil, particularly nitrogen, and providing a secondary income source for the grower.

Break crops also provide a number of environmental benefits such as providing cover to bare ground during fallow, reducing the

loss of soil and particulate nutrients, and breaking the cycle of weeds, pests and disease associated to the main crop.

For the past few years Reef Rescue has funded AgriServ to provide the services of Dave McCallum as a break crop coordinator.

Dave's role as coordinator is to provide information and advice to growers on break crops. This includes assisting in securing inputs such as seed, coordinating the use of planters; including contractors and harvesting equipment, running variety trials and answering any questions growers may have if they

are interested in trialling a break crop. Dave also coordinates the bookings for the BSES legume planter which growers are encouraged to use if they would like to trial a season of a break crop before deciding to purchase a planter themselves.

In the Mackay Whitsunday region, break crops, and in particular legume break crops, are increasingly being used to provide cover during fallow and increasing soil nutrients. Using nitrogen fixating crops such as soya bean can greatly reduce the amount of additional nitrogen required to be applied in the following season.

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Break crop plants:



"The results speak for themselves" said Dave McCallum. "One survey undertaken in 2008/2009 estimated a saving of 80 000kg of nitrogen from planting 868 ha of soybean. Break crops can be either harvested to provide a secondary income source for growers or they can be worked back into the soil for an added nutrient gain.

"This reduction in the amount of additional nitrogen applied and the benefits of providing ground cover during the wet season help tremendously in reducing the loss of particulate nitrogen lost through soil run off, the nitrogen is then available to be used by the following crop" said Dave.

The number of hectares of legumes planted in the Mackay Whitsunday Region has increased significantly over the past four years. In the 2007/08 season, 600ha of break crops were planted. This increased to 3033ha in 2009/2010. In the 2010/2011 season, 4000ha were expected to be planted; however due to the constant rain since August that number has been lower than predicted. "Having extra planters in the region means that planter availability is no longer the issue it was a few years ago. We started out with 30 soybean planters in the region four years ago and now have around 100 which shows how popular break crops are becoming." said Mr McCallum.

While soybean is the most commonly used break crop in the Mackay Whitsunday region there are other crops that can be used including mungbeans, peanuts, lablab, and cow and chick pea. While all of these crops fix nitrogen, some crops can increase the number of nematodes in the soil. It is best to talk to Dave to find out what would be best for your soil.

Legume planters are an eligible activity under Reef Rescue funding. If you would like to trial a season of break cropping, contact Dave and book the use of the planter in time for the next fallow season.

Reef Catchments

Reef Catchments is the regional NRM body who oversees the Reef Rescue program in the Mackay Whitsunday region on behalf of the federal government.

Contact Chris Dench at Reef Catchments on (07) 4968 4200 or email: chris.dench@reefcatchments.com.au
www.reefcatchments.com.au

If you are interested in finding out more about break crops and the use of legume planters contact Dave McCallum of BSES on ph: (07) 4963 6834 email: DMcCallum@maps.org.au

Case Study 6

Zonal Tillage

2011



Zonal tillage improves soil structure and reduces compaction

AgriServ provides expertise and equipment to trial on farms

Zonal tillage in sugarcane farming refers to when only the row area is cultivated and not the entire field in preparation for planting. It is widely agreed that zonal tillage provides a number of benefits for the soil and the grower. Zonal tillage improves soil structure as less passes are needed to prepare the bed for planting. Also, when combined with controlled traffic which reduces compaction, water absorption increases. This improvement in soil structure and

reduction in compaction reduces the loss of soil and particulate nutrients from the field. Zonal tillage also saves time from less passes and lowers fuel costs as lower axle load machines can be used.

BSES Mackay has been running a project to promote the use of zonal tillage on cane farms since 2004 with great success. With funding from Reef Rescue (previously SRDC) the project showcases zonal tillage by providing the opportunity for growers to trial equipment before committing to a zonal tillage and controlled traffic farming system.

AgriServ provides the equipment on site with technical expertise to demonstrate how the equipment works. The equipment can then be left on site to trial for a couple of days allowing land managers to assess whether the equipment is suitable for their farm and soil types. This service is provided free of charge and includes delivery and removal of equipment from site, demonstrations and technical guidance, and the overall maintenance of the equipment.

"Each farm is different so what works on one farm doesn't necessarily work for another" said Brad Hussey Project manager for

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BSES Mackay. "The project enables growers to trial a range of zonal tillage equipment to find what works best for their farm".



Equipment available to trial includes:

- 3 row wavy disk cultivator with crumble roller
- Single row wavy disk cultivator with crumble roller
- Bed renovator
- Zonal ripper
- Zonal rotary hoe

If the trial proves to be useful and the equipment suited to the farm, land managers can then make an informed decision to purchase or build the equipment. Zonal tillage is an eligible activity under Reef Rescue Water Quality Grants and as such land managers could be eligible for up to 50% of the cost of the project. As zonal tillage is a soil management activity, to be eligible growers must be on or convert to controlled traffic farming where your row spacing's match your wheel spacing's.

"The project has been hugely successful to date in demonstrating the benefits of zonal tillage, we aim to continue to provide this service and investigate possible new equipment and modifications" said AgriServ Extension Officer Gae Plunkett. Continuing to update and provide equipment that demonstrates best management practices ensures land managers are using the most sustainable methods both economically and environmentally.

If you are interested in seeing how zonal tillage equipment would work on your farm contact AgriServ and arrange a time to have the equipment delivered to your farm.



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Contact Chris Dench at Reef Catchments on (07) 4968 4200 or email: chris.dench@reefcatchments.com.au
www.reefcatchments.com.au



If you are interested in finding out more about the Zonal Tillage contact Brad Hussey from AgriServe on ph (07) 4963 6803 email: BRussey@bses.com.au