Performance Story Report 3

Evaluation of Investment in the Reef Catchments Reef Rescue Project

August 2012

Reef Catchments Reef Rescue Delivery Team

This project is supported by Reef Catchments, through funding from the Australian Government's Caring for our Country program

CARING FOR OUR COUNTRY Queensland Government

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Contents

Executive Summary

The Performance Story Report provides an the opportunity to analyse and evaluate the delivery of the Reef Rescue program in the Mackay Whitsunday Isaac regions using program logic and assessment criteria. It is also used to highlight the outputs and achievements of Reef Rescue from the past year of delivery and the total outputs since Reef Rescue commenced in 2008.

The program logic and assessment criteria used to evaluate the delivery of the program were developed at the outset of the program as a framework to be reported against through the duration of the program. The program logic provides a time frame for the outcomes of Reef Rescue with the final result being improved water quality on the Great Barrier Reef (GBR). The assessment criteria provide a range of questions to assess how the delivery is progressing against the program logic. Previous reports have all been developed using this framework as a way to identify and improve on the delivery in the region.

Lessons learned from the delivery of the program to the region are addressed in the document, providing the opportunity to highlight any issues which have come about in the past year. The incorporation of lessons learned into the delivery of the program; where appropriate, has allowed for the continued adaption of the program ensuring the best outcomes for water quality and for the participants.

Over the past year Reef Rescue in the Mackay Whitsunday Isaac regions has continued to deliver water quality benefits to the Great Barrier Reef through the promotion of improved land management practices.

During the past year 183 new land managers in the sugarcane, grazing and horticulture industries have undertaken work that will have a direct and positive impact on the quality of water leaving their properties. In year four over $4 Million was provided to individual land holders to adopt best management practices with a further $2.5 Million provided as industry and partnership grants. Year four total project costs, including land holder, industry and government contribution totals nearly $18 Million dollars which has been invested to improve the water quality of the GBR lagoon.

Over the past four years of Reef Rescue, Caring for our Country has invested more than $27 Million in the Mackay Whitsunday Isaac regions with around 90% made available specifically for water quality grants and partnership projects. This has allowed Reef Catchments to work with 770 agricultural land holders to improve uptake of Best Management Practices and create partnerships with industry to ensure the continued water quality outcomes after Reef Rescue has finished.

This investment into the region over the past four years has resulted in significant reductions of key pollutants. The load reductions detailed in this document, generated using models linked to the Mackay Whitsunday Water Quality Improvement Plan, highlight the success of the Reef Rescue program in accelerating practice change to improve water quality.

Key outcomes from the first 4 years of delivery of the Reef Rescue water quality grants/incentives in the Mackay Whitsunday Isaac region have been:

Continuing 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 (20 – 50%) to water quality improvement outcomes to maintain a high return on investment and a clearly defined public benefit.

The Reef Rescue program commenced in 2008 and has now started its fifth and final year, July 2012 – June 2013.

Section 1: Background

The delivery of the Reef Rescue water quality grants in the Mackay Whitsunday Isaac regions continues to promote improved farming management practices with the focus on efficient processes and the maintenance of strong stakeholder partnerships. These partnerships include the continued support of industry working groups and precision planning consultants to work with landholders ensuing delivery of intended Caring for our Country targets and outcomes.

Improved management practices promoted through Reef Rescue (A & B class) for intensive agricultural land uses were identified and reviewed by industry experts and developed into ABCD Frameworks to provide positive water quality outcomes. Evidence currently being collected through the Paddock to Reef program supports these practices as a means of improving the water quality of the Great Barrier Reef lagoon. Promoted practices are having a positive impact at reducing nutrient, pesticide and sediment loads during run-off events.

The Performance Story Report provides Reef Catchments with the opportunity to feedback to stakeholders on the delivery and outcomes of the program. Feedback from those involved within the region is displayed in the Results Table in Section 2 and also Section 3.2: Lessons Learned. These comments are used to continually improve the program to achieve the best results for all involved. The outputs for each agricultural commodity are covered in Section 5: Final Impact Statement. In this report we have updated the previous year's results in the summary for each commodity. This has meant that figures in this report for each industry may not correspond exactly to previous Performance Story Reports. This is due to a number of reasons such as projects withdrawing after receiving contract extension after the big wet season of 2010/11.

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. This 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.
- highlight the outcomes of the past year and for the past four years in the region

The 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 Performance Story reports are as follows:

- Step 1: Planning workshop (Held at the outset of the program)
- 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 Isaac regions emphasis has been placed on using the Australian Government's MERI framework to complete this process.

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.

This Performance Story Report continues to utilise the same process as the previous reports including a data trawl, social enquiry, reviews and a performance summit. Key performance indicators have again been reported against to provide consistency between reports.

The social inquiry and a performance summit established how land managers, industry staff and other experts believed the delivery of Reef Rescue is going against the outcomes it is trying to achieve. The performance summit provides the opportunity to provide feedback and ideas with new participants invited each year. This year a few strategic participants were invited back to provide feedback on whether previous lessons learned have been incorporated into the program

Cane property set amongst rainforest in the Mackay Region

grazing property with Sarina Range in the background

Cape Palmerston

Great Barrier Reef (Photo provided by AIMS)

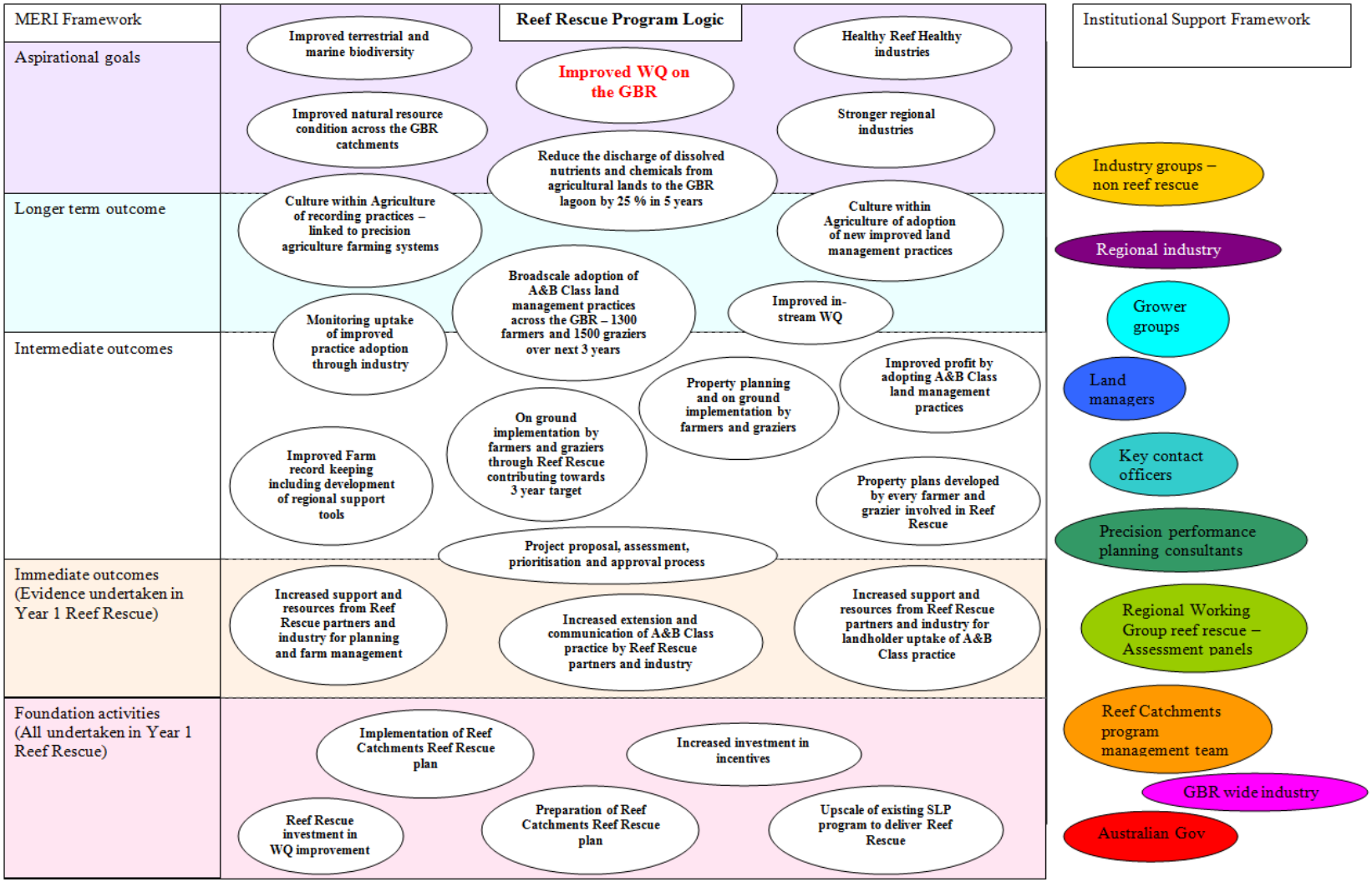
Step 1: Planning Workshop

Planning workshops were conducted at the commencement of the Reef Rescue program to articulate, test and approve the underlying assumptions and methodologies used in the program. The planning workshop was run with the Reef Rescue management team along with input from the different Regional Industry Working Groups.

During the planning workshop the program logic model was created (Pg. 10). This is the rationale behind the program and diagrammatically represents the hierarchy of the water quality grants activities and output. This included immediate, intermediate, long term and aspirational goals of the program and the links between them. The program logic developed for the delivery of the Reef Rescue Water Quality Grants forms the basis from which the evaluation questions were developed and for the framework on which evidence is presented in the Results Chart (Section 2) of this report.

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. The questions are also used as a way to 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 land 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 Reef Rescue Land Manager Database. Wider information is 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 during Year 3 and continued in Year 4 to survey land managers and industry staff. The survey provides the opportunity for land holders to give honest feedback on the program which can then be used to improve management in the following year. 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 in the form of vignettes for analysis and discussion.

Of the 70 land managers and extension staff invited to take part there were 53 respondents including:

- 34 from the cane industry
- 11 from the grazing industry
- 1 from the horticulture industry, and
- 6 industry extension and support officers
- 1 from dual enterprise of cane and grazing

Case Studies

16 case studies were written including; 5 cane individual, 5 cane industry, 4 grazing and 2 horticulture (please refer to Appendix)The Case studies included asking some of the same questions asked during the participant surveys. Year 5 will see a further 16 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, Paddock to Reef and a range of R&D projects supported by either Reef Rescue (Federal) or Reef Protection Plan (State). It is intended to continue to utilise the information from these projects during Year 5 and to negotiate to possibly get ‘real life’ scenarios analysed, that could be

included in future Performance Story Reports. This includes the development of some model cane farms through Project catalyst and an extension tool for growers and industry to utilise.

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 through the MERI process 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 review the MERI Performance Story and evidence collected to provide feedback linked to the program logic. This includes staff from DERM, DEEDI and CQU.

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 third Reef Catchments Reef Rescue MERI Performance Summit Workshop was held on the 31st of May 2012 and drew together land managers who were Reef Rescue incentive recipients, Reef Rescue delivery staff, Industry Working Group members and selected individuals from associated industry partners. While the day is designed to facilitate feedback from the attendees it also provides the opportunity to showcase the outputs from the past year and for the past four years of the project. During this presentation on the outputs participants are shown the program logic results chart and were invited to make comment on where improvements could be made and help identify any gaps in the delivery.

After the initial presentation of the outputs from the Mackay Whitsunday Isaac, participants broke up into groups to discuss what they believed as the good, the bad and where there is room for improvement on the delivery of the program. Under each heading butchers papers was filled in by each table with each table presenting back to all participants. Comments from this have been used to populate the Results Chart in Section 2 below.

Following this, the groups were again used to read through the participant interviews that had been provided. Each of the 5 groups was asked to choose the two or three interviews which best reflected the overall delivery of Reef Rescue. The chosen interviews from each of the groups were then shared with the whole group. From the interviews which were presented, a

further selection process was undertaken where by all groups were asked to select the three 'best or most representative' interviews out of these. These three became the interviews that have been included in the Performance Report Story as vignettes in section 4.

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.

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 2012	Performance Summit / Review Comments 2012
Foundation Activities	Increased investment in incentives Upscale of existing SLP program to deliver Reef Rescue	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. 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. Continued coordination of regional Industry partnerships to deliver on-ground support	Successful delivery of 4 years of Reef Rescue. Delivery of 4th year has been affected by some cash flow issues but still effective at encouraging grower uptake of A & B class practices. Regular Cane and Grazing Regional Working Groups meetings have helped to deliver Reef Rescue and get industry ownership and involvement in the process.	Would not have been able to do the projects or they would have taken longer without the funding Reef Guardian Farmers through GBRMPA – we need better incorporation – they should acknowledge Reef Rescue support Prepared for regulations – we were in a much better position Reef Catchments does a good job at building and managing knowledge networks Is there an option for retailer representation on the regional working group?
	Preparation of Reef Catchments Reef Rescue plan	08/09, 09/10, 10/11 and 11/12 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	Successfully completed 08/09, 09/10, 10/11 & 11/12 Reef Rescue and is currently delivering on planned outputs and outcomes for 12/13 Reef Rescue.	Incentives driving change – that wouldn't occur with less than 20% funding – farmers would not undertake the projects Help other regions improve – the reef goes across regions` – reef rescue is carried out differently in each region- Share

MERI Framework	Reef Rescue Program Logic Components	Evidence Collected	Reef Catchments Taskforce Review Comments 2012	Performance Summit / Review Comments 2012
	Reef Rescue investment in WQ improvement Implementation of Reef Catchments Reef Rescue plan	2010/11 Reef Catchments Reef Rescue budget $7 380 466 2011/12 Reef Catchments Reef Rescue budget $7 535 000 = Total $ 27 503 591 Indicative Budget of around $8.3 million 12/13.	Processes in place to deal with increase in funding in Year 5 Full complement of Reef Rescue delivery staff from beginning of financial year and all staff now have experience in delivery of the program.	the Mackay processes Improve relationships between NRM groups, work together more closely
Immediate Outcomes	Increased extension and communication of A&B Class practice by Reef Rescue partners and industry	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 had a second review in late 2010 and updated its ABCD again. Grazing completed its ABCD management framework in late 2010 and this has been maintained. Evolution of eligible activity list and information for Cane, Grazing and Horticulture for the Mackay Whitsunday region. Update again in 2011/12. GBR wide industry projects (Canegrowers, Growcom, QFF, RGC) – newsletters, fact sheets, case studies, state-wide newsletter articles 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. Key Contact Officers (Canegrowers, Reef Catchments, Growcom) – regional newsletter articles, landholder letters, field days. 1000 Cane EOI's, 432 Grazing EOI's and 45	Well organised showcase for Bonsucro field trip with international visitors from across the sugar industry (from growers to corporate representatives). Hosted UNESCO World Heritage representatives during GBR tour and Australian Government Reef Rescue representatives. Industry and growers case studies have continued to demonstrate that Reef Rescue incentives have been effective at encouraging uptake of A & B class practices Participant interviews underscored that industry partners and extension staff	Good raising awareness of: • environmental costs and benefits • farm efficiency • how we can farm better We can tell our own story now, we have the data to respond to our critics More options for horticulture – particularly tree crops –it's an issue for MW numbers Look for more opportunities for sharing ideas – sharing ideas – some other areas • Farm walks (field day) • Talking to other farmers about innovations being adopted

MERI Framework	Reef Rescue Program Logic Components	Evidence Collected	Reef Catchments Taskforce Review Comments 2012	Performance Summit / Review Comments 2012
		Horticulture EOI's to date. Reef Catchments – newsletters, case studies, website, field days (Reef Rescue focus at 2012 BSES field day), participant interviews, radio, television interviews and video promotions.	have been effective at communicating information on eligible A&B class management practices and providing relevant extension. There has been regular Reef Rescue publicity in local newspapers, radio and television. Produced editions 6 and 7 Reef Rescue Newsletters EOI's continue to come in so interest is still high across the region. A high number of EOIs are stage two showing that once people start with Reef Rescue they are keen to continue the work, however it is increasingly more difficult to target stage one growers (those who have never been involved). Supported grower forum in Townsville to encourage cane grower communication across three GBR regions on the trial and adoption of A class practices.	• What is working? (talk to other farmers about it) • Practice demonstration + discussion • Case studies are the best form of information (prefer over newsletter) • More details and access to information about individual projects – the good and bad Communicate our work and success to • Urban communities • Politicians • Green groups Would like to see investigation into new ideas/innovation
	Increased support and resources from Reef Rescue partners and	7 Precision Planning Consultants (Plane Creek Productivity Services, Agriserv, Canegrowers Proserpine, Reef Catchments, Growcom) – support for Stage 1 and 2 project	Many of the B class management activities now have industry wide support	Well-resourced and good support – "would not have got

MERI Framework	Reef Rescue Program Logic Components	Evidence Collected	Reef Catchments Taskforce Review Comments 2012	Performance Summit / Review Comments 2012
	industry for landholder uptake of A&B Class practice	development and milestone completion. 3 Key Contact Officers (Canegrowers, Reef Catchments, Growcom) – EOI coordination, phone calls and queries, support Stage 2 applicants 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 EM mapping of district with cane and rapid condition assessments of grazing land. In 2012 this included 3 Grazing Industry projects and 19 cane industry projects. Over the last 4 years there have been 64 Cane Industry, 16 Grazing Industry and 1 Horticulture Industry projects.	or resources available to make it easier or cheaper for growers to adopt. Reef Rescue supports the uptake of B class management practices through providing equipment for loan through industry partners. Reef Catchments now has three full time staff devoted to promoting Reef Rescue Grazing. Two in Mackay and one in Proserpine to service growers in the north of the region where uptake has been low. New ideas have been proposed to expand the Grazing working group, such as inviting major agricultural retailers in the region.	involved without the support." Maintain one on one contact for project development PPC <> farmer Can we fine tune between grazing > cane > horticulture Helps landholders achieve their plans Industry projects very useful – try before you buy!
	Increased support and resources from Reef Rescue partners and industry for planning and farm management	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. 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	Support from landholders to make Reef Catchments Grazing Forum an annual event. Growers have encountered difficulties with AgDat remote data recording systems not being robust enough for cane farm conditions – this is being addressed through new, stronger units being	More digital mapping information linked to GPS (not many hard copies) On target for property plans 70% of cane farms in the region have a property plan (cane) Expert advice prior to investment is a good thing

MERI Framework	Reef Rescue Program Logic Components	Evidence Collected	Reef Catchments Taskforce Review Comments 2012	Performance Summit / Review Comments 2012
		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. Development of Grazing Workshop delivered to local graziers and grazing extension staff. Included presentations on herd management, breeding, stocking rates, nutrient management, feral pig control, giant rats tail grass control etc.	ordered. TAGGLE (cattle tracking system) transmitting tags are not robust enough this issue has been reported to manufacturers to rectify.	Good holistic planning Experienced property planers understand grower needs
	Project proposal, assessment, prioritisation and approval process	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%. 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. 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. 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. Reef Catchments – participant interviews, case studies. Review of budget for grazing projects changed how fencing costs were determined and pasture/Stocktake monitoring was funded	Conversations with land holders and industry representatives have indicated that landholders would be much less likely to have adopted change or it would have occurred over a much longer time frame if Reef Rescue was not around or they were only funded at 20%. Grazing and cane expression of interest forms can now be filled out on line and can be accessed from the Reef Catchments website Continued development of eligible activities to support growers and graziers adopt A and B class management practices (2011/12 included mill mud pads, increased funding for low pressure overhead irrigation).	The method of prioritisation and/or ineligibility of some practices may disadvantage/discourage some moves: Some B>A changes Some C>B changes (farmers may identify what they perceive as an improvement but it is not under the RR prioritisation – therefore they will not do it and it could have a flow on effect, reducing chances of getting involved in future) More emphasis on revegetation Suggest Emergency improvement funding Incentives high enough to stimulate action Consider working with contractors especially 1.5>1.8m

MERI Framework	Reef Rescue Program Logic Components	Evidence Collected	Reef Catchments Taskforce Review Comments 2012	Performance Summit / Review Comments 2012
				Can some activities be separated 20% certainly less incentive than 50% - May be a problem for drawing new applications Should riparian at least stay at 50% Cane we support 2.3 courses with reef rescue grants? Grazing courses – Edge course, breeding, nutrition Cane courses chemical application – benefits Calibration Fertilisers Improve water/irrigation management + better timing (use tools)
Intermediate Outcomes	Property plans developed by every farmer and grazier involved in Reef Rescue	To be involved in Reef Rescue, every grower, grazier 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. All graziers now have access to maps and overlays highlighting land type and soil change across their property. Reef Catchments grazing staff develop these resources and assist landholders in understanding how to use them	Landholders use property plans to identify new areas for improvement on farm, informing water quality grant applications. We continue to promote AgDat for property planning and improved record keeping providing funding for training and infrastructure to enable the	Property plan helps to set targets/goals PPCs help to give different perspective PPCs bring knowledge about different methods and goals Farm planning is not as useful as it should be

MERI Framework	Reef Rescue Program Logic Components	Evidence Collected	Reef Catchments Taskforce Review Comments 2012	Performance Summit / Review Comments 2012
		for effectively planning for future management activities. Graziers all complete a current property and action plan booklet.	greater uptake of this technology. Increased emphasis in developing grazing property planning through increased grazing staff. Graziers have often indicated that the grazing maps are the first time they have seen their farm as a whole. Current property plan and action plan booklets have been merged into one document to simplify the grazing property planning process.	
	On ground implementation by farmers and graziers through Reef Rescue contributing towards 3 year target	Reef Rescue database is designed to track the number of projects/landholders/activities undertaken and demonstrate progress towards achieving the 3 year targets 08/09 • Sugar 119 Projects involving 170 growers • Grazing 50 Projects involving 50 graziers • Horticulture 7 Projects involving 7 producers 09/10 • Sugar 195 Projects involving 242 growers • Grazing 53 Projects involving 53 graziers • Horticulture 6 Projects involving 6 producers	Continued development of the database to include new and relevant data which can be compared between years. Management of the database is being future-proofed through sharing of skills and the continual updating of the manual. Three year targets identified in the MERI program logic have been met.	More support to promote or explain practices – not everyone uses the internet Reef Rescue promotes neighbour communication and sharing of costs – creates a critical mass change Increase promotion of the results and water quality improvements

MERI Framework	Reef Rescue Program Logic Components	Evidence Collected	Reef Catchments Taskforce Review Comments 2012	Performance Summit / Review Comments 2012
		10/11 • Sugar 203 projects involving 246 growers • Grazing 31 projects involving 31 graziers • Horticulture 6 projects involving 6 producers 11/12 • Sugar 218 projects involving 256 growers • Grazing 63 projects involving 63 graziers • Horticulture 8 projects involving 8 producers All of the projects for years 1 to 4 combined are impacting on around 164,000 ha = 18% of the Mackay Whitsunday Region	Yr 1 - 4 Outputs: Cane – 656 new growers and 264 repeat growers. Grazing – 151 new graziers and 41 repeat graziers Targets for Yr 1 – 4: Cane – 580 new growers and 185 repeat growers. Grazing – 190 new graziers and 32 repeat graziers	
	Improved Farm record keeping including development of regional support tools	Reef Regulations has now made growers and graziers keep and maintain records on nutrient and chemical applications. 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. Grazing and Cane current practice benchmark report/action plan identifies areas for improvement in record keeping	Funding has been provided for training and infrastructure to enable the greater uptake of AgDat technology. New farmers are being sought to trial AgDat Taggle (cattle management technology)	Prepares us for self-regulation – builds trust in the industry of good will and good management (AgDat) AgDat raises awareness of the need to keep records and the personal benefit of sound record keeping
	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.	Paddock to Reef surveying has been completed for cane and horticulture and continue for grazing to determine industry benchmarks for ABCD practices and land managers reason or process for A and B class	Need more focus placed on planning, goal setting, follow-up in property planning Record keeping is shared by the family, improved record keeping has improved overall family understanding of farm

<table>
<tr><th>MERI Framework</th><th>Reef Rescue Program Logic Components</th><th>Evidence Collected</th><th>Reef Catchments Taskforce Review Comments 2012</th><th>Performance Summit / Review Comments 2012</th></tr>
<tr><td></td><td></td><td></td><td>management adoption – that is Reef Rescue, Reef Regulations or voluntary. Reef Catchments Reef Rescue staff has supported this process.</td><td>management

Are retailers involved in best management practices?

Farm planning is not as useful as it should be</td></tr>
<tr><td></td><td>Improved profit by adopting A&B Class land management practices</td><td>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, Growcom, QFF, RGC) – case studies, state-wide newsletter articles

Reef Catchments – case studies, participant interviews

<table><tr><td></td><td>Case Studies</td><td>Participant Survey</td></tr><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><tr><td>2011/12</td><td>11**</td><td>70 (53 completed)</td></tr></table>
* 2010/11 + 6 additional Industry case studies done

** 2011/12 + 5 additional Industry case studies done</td><td>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 during the transition process that can be a barrier to land managers adopting them.

Project Catalyst Reef Rescue Innovative farmer case studies are being created with economic data on adopting specific A class management practices

Reef Catchments Reef Rescue staff are supporting work by Paddock to Reef to identify the total cost of adopting A and B class management practices

The Reef Catchments Reef Rescue newsletter will contain more information on the costs and benefits of practice change</td><td>Do some more local monitoring (farm/station level) to demonstrate the impact of activities (catchment case study)

P2R Water quality trials give us assurance of the benefit of the practice changes we are making

Economic analysis of farm costs helps with management

Land managers are keen to learn the pros and cons of different equipment required for practice change.</td></tr>
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MERI Framework	Reef Rescue Program Logic Components	Evidence Collected	Reef Catchments Taskforce Review Comments 2012	Performance Summit / Review Comments 2012
	Monitoring uptake of improved practice adoption through industry	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. 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. The development of AgDat for the grazing industry. Land condition assessment and Remote Sensing imagery. GBR wide industry projects (Canegrowers, AgForce, Growcom, QFF, RGC) – baseline projects Completion of Current Practice Benchmarking reports for Cane and Grazing. Industry service providers – such as Productivity and Extension Services in sugar P2R management practice info collected in 3 mill regions.	Investment continued in AgDat with development of AgDat remote and support role established providing assistance to growers in Mackay and Plane Creek. P2R management practice surveys have been conducted in all three mill areas and have been aggregated to show adoption of ABCD practices across sub-catchments. Regional Technical Working Group participated in the development of a list of key actions considered essential for best practice in cane farming in the region, through the Reef Protection Plan Science Unit. Supporting DAFF in undertaking a survey to develop a Coastal Grazing BMP	Reduce lag in publishing results Increase promotion of the results and water quality improvements We can tell our own story now, we have the data to respond to our critics
Longer term Outcomes	Broad scale adoption of A&B Class land management practices across the GBR – 1300 farmers and 650 graziers over the 5 years of Reef Rescue	From feedback through the RGC and QFF, across the regions for Year 1 to 3 there has been: • 1509 new farmers involved • 625 new graziers involved	High numbers of expressions of interest continue to be received. Communications plan has been developed to improve awareness of water quality grants for grazing.	Good work to date can be used to tell people (not just farmers) of the impacts More farmers adopting good practices More money to do more

MERI Framework	Reef Rescue Program Logic Components	Evidence Collected	Reef Catchments Taskforce Review Comments 2012	Performance Summit / Review Comments 2012
				improvements Promote the work to the non-agricultural community Focus more attention on those not involved – overcome resentment
	Culture within Agriculture of adoption of new improved land management practices	Still in the early stages to have collected any credible evidence to show we have achieved these Longer Term Outcomes through our Program Logic. 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. There are plenty of different funding support and programs available to promote innovation within the sugar industry: SRDC, GGIPs, Project Catalyst, Reef Rescue R & D projects, Reef Protection Plan R&D projects.	Continues to be high levels of adoption across industries. Strong relationships have been developed between Reef Rescue staff and local industry with industry support of B class practices growing. Reef Rescue staff supported a regional cane data synthesis run by the Paddock to Reef program, which documented industry leaders support for moving towards B and A class practices; acknowledging long term water quality and potential yield improvements.	Investment in local industry has improved Exposed to other activities (i.e. from the neighbours) Reef Rescue promotes neighbour communication and sharing of costs – creates a critical mass change Reef Guardian Farmers through GBRMPA – we need better incorporation – they should acknowledge Reef Rescue support Some people might just be looking at getting some funds rather than making a change. ??? do they do the work properly? Reduction in funding % could have a negative result
	Improved in-stream WQ Reduce the discharge of	Still in the early stages 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	Results from Paddock to Reef paddock monitoring due to be released late 2012	Increase promotion of the results and water quality improvements

MERI Framework	Reef Rescue Program Logic Components	Evidence Collected	Reef Catchments Taskforce Review Comments 2012	Performance Summit / Review Comments 2012
	dissolved nutrients and chemicals from agricultural lands to the GBR lagoon by 25 % in 5 years	catchment reductions. 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. Second report to be released July 2012 with the third report to follow soon after. Some early results from Mackay Whitsunday program shows 18% reduction in run off from controlled traffic system. 23% reduction in sediment from Controlled Traffic system.	Reef Rescue staff have provided data for Paddock to Reef second and third report cards on time Progressing towards load reduction targets identified in WQIP	
Aspirational Goals	Improved natural resource condition across the GBR catchments	Still in the early stages to have collected any credible evidence to show we have achieved our Aspirational Goals through our Program Logic. 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.	Improved linkages with paddock scale work and marine monitoring Continue to monitor and collect data at a local level to assess the improvement in Water Quality reaching the Great Barrier Reef Lagoon Reef Rescue funds are invested in local industry resulting in a boost to the local agricultural economy	P2R Water quality trials give us assurance of the benefit of the practice changes we are making
	Improved terrestrial and marine biodiversity			
	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 now with the delivery of Reef Rescue (2008-2012).

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.

Over the past year Reef Catchments continued to successfully encourage and engage land managers to adopt A and B class management practices. While adoption in the past year has been high there have still been a number of projects that have delayed due to the financial cost of the wet season experienced during year 3. It is expected that these projects should be developed during year 5.

In Year 4 of Reef Rescue, another 31,011 ha of new land came under improved management implementing A and B class management practices helping to improve the water quality entering the Great Barrier Reef Lagoon. This was made up of:

- 146 new sugar farmers
- 33 new graziers
- 4 horticultural producers

The hectares mentioned above may have had multiple sub projects undertaken on any one hectare. Therefore the total number of sub project hectares when added together will not total 31,011 but a much higher number.

All of the projects combined over the first 4 years of Reef Rescue are impacting on more than 159,000 ha of new land. On some of this land, there have been a range of activities implemented, which is helping to achieve sediment, chemical and nutrient load reductions reaching the Great Barrier Reef Lagoon.

3.1 Addressing the Evaluation Questions and Outcomes

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?	**770 Land holders adopting improved land management practices** **9 Extension/Planning service providers** **Improved record keeping systems**
	What, if any, unanticipated positive or negative changes have resulted from delivery of Reef Rescue in the Mackay Whitsunday region?	The ease of the process encourages further participation and improvement
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?	627 farmers undertaking RR projects (48% of CfoC land manager targets for GBR) 143 graziers undertaking RR projects (22% of CfoC land manager targets for GBR)
	What other activities/strategies might be more effective in the Mackay Whitsunday region for achieving the Caring for our Country "Protecting the Reef" targets?	Provide information to land managers of the science behind water quality improvements in plain English Fill the extension gap created by diminishing service providers with NRM staff
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?	Having trials on farms gets farmers involved and interested - Farmers teaching farmers. AgDat training has increased uptake and knowledge.
	Who adopted what, in what situations and why?	See final impact statement for each agricultural commodity (Section 5)
Efficiency	To what extent has the Mackay Whitsunday Reef Rescue delivery process and program attained the highest value out of available resources?	Reef Catchments prioritisation systems has resulted in a 2:1 investment ratio between managers : Aust Govt.
	What other ways could we invest or improve our Reef Rescue delivery process for greater return?	Increase knowledge of coastal grazing systems and the factors effecting WQ improvements. Greater communication of the positive results being achieved to the local community

Foundation Activities

Increased investment in incentives

The fourth year of Reef Rescue has continued to direct significant investment towards increased adoption of improved land management practices that is improving the water quality of the Great Barrier Reef lagoon. This investment from the Federal Government is the flagship initiative under the Caring for County program directing $200 Million in funding over five years to ensure the health of the Great Barrier Reef. This has been supported by funding from other sources for improved sustainable agriculture and land management along the coastal catchments.

In Year 4 of Reef Rescue, of the funding received by Reef Catchments from Caring for our country, $7,125,792 was specifically for water quality grants and partnership projects including industry projects. With a minimum of 50% of funding matched by land managers and industry, over $17.9 million has been invested by agriculture in the Reef Catchments region to adopt improved land management practices. This amount is set to increase in the fifth and final year of Reef Rescue.

The increases in funding directed to Reef Catchments to deliver Reef Rescue over the past 4 years has been essential in reaching the land holder targets. Equally, an increase in the funding of the final year will again result in more land managers adopting improved practices. While the early adopters led the way over the first three years, the task of the final two years is to engage the fence sitters or late adopters. During the fourth year an increased effort has been placed in communicating the program to the industries in an effort to encourage those late adopters to undertake a project. This increased communication effort will continue into year 5 together with a growing collection of economic data and the results from Paddock to Reef to show the benefits of Reef Rescue to the grower and to the reef.

Upscale of existing SLP program to deliver Reef Rescue

The previous sustainable agricultural program ‘Sustainable Landscapes’ was 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.

Immediate Outcomes

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

Throughout Year 4, Reef Rescue has funded 7 Precision Planning Consultants (PPC’s) to engage directly with the farmers and graziers involved in the program. Precision Planning Consultants from Plane Creek Productivity Services, Agriserv, Canegrowers Proserpine, Reef Catchments and Growcom support the property planning/farm risk assessment process. Providing the services of the PPC’s has been vital in building relationships between partners and also reducing any time wasting by quickly debunking any myths and ensuring projects are eligible before the project is developed up the proposal stage.

Through the Regional Working Groups for both the Cane and Grazing industries, Reef Rescue has continued to build and maintain strong relationships to promote the flow of information and ideas. State Government and the Mackay Regional Pest Management Group has provided valuable information such as new weed control and management strategies which have been made

available to land managers in the region. Reef Rescue will also feedback to the Mackay Regional Pest Management Group by providing summary aggregated data from the Current Practice review conducted by graziers

Reef Catchments has also continued to implement, “Project Catalyst” which looks at the planning support required for implementation of A class cane practices. Information gathered through this program is highlighted at the annual Project Catalyst forum and made available to the general public when possible.

In Year 5, Reef Catchments will try to build linkages with other grazing industry service providers. This engagement will include retailers in the region (more expressions of interest) and Central Queensland University (Giant Rats Tail grass research).

Promoting Reef Rescue at the Agriserve field day

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

Over the past four years, Reef Rescue has continued to fund the placement of 3 Key Contact Officers (KCO’s) within Canegrowers, Growcom and Reef Catchments. The KCO’s for each industry are the primary point of contact for their industries land managers ensuring correct information is passed on including information on eligible activities and A and B Class practices. The Key Contact Officers are responsible for providing regular updates on the progress of Reef Rescue for the current financial year back to their Working Groups and presenting Reef Rescue at local industry meetings and workshops.

The A and B class management practices funded through Reef Rescue have continued to be identified by the Management Frameworks produced in previous years.

While the focus has remained unchanged - the adoption of B Class Management Practices – there has been continued review of the eligible activities by the Cane and Grazing Regional Working Groups. Area’s where reviewing was needed had been highlighted by both industry and their

representing bodies showing a free flowing bidirectional information exchange and quick integration into the program.

In year 4 of Reef Rescue in the Mackay Whitsunday Region there was 310 Cane EOI's, 144 Grazing EOI's and 18 Horticulture EOI's. While not all of the Expressions of Interest were eligible for funding it shows that the communication effort over the past year is reaching the target numbers. Over the past four years, over 1800 EOI's have been received across the three relevant agricultural industries for the region.

Reef Catchments has continued to create high exposure for Reef Rescue and the adoption of A and B class management practices by producing a wide range of communication materials including newsletters, case studies, articles in newspapers and personalised letters to land holders. There were also a number of opportunities to attend field days to directly engage with land holders. During the past year Reef Catchments staff have taken the opportunity to present at forums or media events such as the Healthy Waterways Symposium, the Mackay Grazing Forum and to the delegates from UNESCO.

In May 2012 Reef Catchments held a grazing forum to support the adoption of A and B class practices in the region. Local and State Government, research and industry bodies together with farm service providers contributed to sharing knowledge on best management practices. The event was attended by over 120 local graziers.

In May 2012 Reef Catchments held the third MERI performance Summit to engage land holders and industry staff to assess the delivery of Reef Rescue in the region. This year, as in previous years, we invited land holders that have not attended a MERI Summit in the past with the aim to encourage fresh ideas. On the day 24 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. While this was the last of the scheduled MERI Performance Summits Reef Catchments believes the Performance Summits have provided great opportunities to evaluate the program. Therefore Reef Catchments will again organise a Summit at the conclusion of the program and encourage both people that have attended and people that haven't to participate. This way we can gather feedback from stakeholders on how they have seen the program adapted over the years and if these modifications have improved the delivery of the program.

Reef Rescue field day held at North Eton with farmers and industry to showcase Zonal Tillage equipment

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

The significant financial investment from the Federal Government into the Reef Rescue program has continued to drive practice change toward A and B Class management adoption. Together with industry partners Reef Catchments has continued to promote these practices which will improve the water quality leaving agricultural land and reaching the Great Barrier Reef Lagoon.

The 7 Precision Planning Consultants (PPC's) contracted during Year 4 have been essential in the rapid rollout of Reef Rescue in the region. PPC's provide support for Stage 1 and 2 project development and milestone completion including management planning. Equally essential for the successful delivery of Reef Rescue in the region are the Key Contact Officers (KCO's). Key Contact Officers are employed to provide support and communicate Reef Rescue to industry and the wider community and help in EOI coordination. The KCO also supports Stage 2 projects to develop their proposals.

To start to build better relationships with land managers in the Whitsundays the grazing KCO is now located in Proserpine. While this role is to act as the key contact for grazing it also provides increased support to any land holder in the north of the region seeking information on Reef Rescue.

These positions have proven themselves to be highly effective and efficient at supporting the adoption of A and B Class management practices in the region. These support positions have become even more essential for their industries as the available support from State Government agencies (Reef Protection Officers) and industry organisations (BSES) has actually diminished.

The support provided by the Grazing and Cane Regional Working Groups has over the past 4 years been immensely beneficial to support Reef Rescue in the promotion of A and B Class Management Practices. Regional Working Groups are made up of local industry experts, service providers and land managers to promote information exchange and support and validate decisions

such as the merits of industry wide project. In Year 4 there have been 19 industry wide projects in cane and 3 industry projects in grazing have been funded to continue to provide support and resources for the accelerated adoption of A & B class management practices.

To continually improve delivery and the flow of information both Regional Working Groups have asked for representation from the State Government to become a member to facilitate this information exchange.

Reef Rescue Grazing works directly with a range of partners including the State Department of Agriculture, Forestry and Fisheries (DAFF), who delivers the Pasture and Stocktake workshop as part of Stage 1 projects.

Cane Industry MOSES Project looking at the variability of soils within cane paddocks

Project proposal, assessment, prioritisation and approval process

Over the past 4 years, Reef Catchments has used the same project proposal, prioritisation and approval process in an effort to remain consistent in funding rounds. Maintaining consistency in funding over the years has eliminated any potential conflicts around increase/decrease in funding available for any certain project. There have been some increases in the maximum amount able to be funded for certain activities, but this has been in response to an increase in the total cost when compared to previous years.

Projects are funded according to their priority based on an analysis between a cost benefit ratio and a logical prioritisation process. The outcome from the prioritisation process suggests funding for a project between 20 – 50 per cent.

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

Maximum total funding continues to apply 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 verses 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 over the past 4 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. 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 on the use of these electronic forms was provided to all PPC's and KCO to ensure smooth delivery of the program. These forms and training has streamlined the planning process so to allow a greater number of projects to be processed.

For the past year Reef Catchments has been hosting both the Grazing Key Contact Officer and the Planning Precision Consultant roles. Hosting these roles within Reef Catchments has allowed a review process in the delivery of the Grazing component of Reef Rescue and to make some changes to help in delivery efficiency.

Reef Catchments has continued to conducted participant interviews and case studies in Year 4 which helps to get direct feedback from the participants on the delivery of 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 was again carried out to account for any increase in the cost of materials. The average cost of 1km of fencing was priced through each of the farm suppliers together with the cost of materials for watering points and resulted in the continuation of the current funding for how much incentive was provided.

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 a minimum standard of basic records of all nutrient and chemical inputs. While this has had an impact on the delivery of Reef Rescue, it has helped to achieve this outcome much quicker than would have been expected without them. Local industry service providers have developed up templates and booklets to help land managers with this record keeping.

Reef Catchments through the Reef Rescue program has continued to support the development of AgDat data recording systems for the cane and grazing industry. This includes industry wide projects to promote the use of the system and support land managers that have adopted the technology. Also there is a program to trial the use of the system in recording grazing land management and to link to Taggle technology to trial the potential use of radio transmitting tags to assist landholders as a farm management tool.

Back of truck Mill Mud spreader which applies mud directly onto the cane row

During the past year a review of the Grazing Current Practice Review and Action Plan was undertaken. These booklet provide the land managers with the framework needed to keep records and to identify key priority actions. However, it had been noted by the new grazing team that these two booklets could be combined without losing any information. This would reduce the time needed to fill it in and hopefully result in better record keeping after Reef Rescue had finished.

During year 4 of Reef Rescue there continues to be a range of industry wide projects funded to support the use of AgDat for data recording by the local industry. Projects include providing support people to help growers input data and providing web based training. Providing these industry projects supports the uptake of AgDat through the whole process from application to training to actually using AgDat on their property.

A grazing industry completed project during year 4 was the development of Pasture Photo Standards. These photos provide graziers with a tool to monitor and record their pasture yield providing a visual aid to compare their pastures against. Information recorded can then be used to adapt stocking rates to ensure that pasture cover is not deteriorating.

Project Catalyst Grower forum

Intermediate Outcomes

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%.

The uptake of A and B Class practices have contributed towards the three year targets outlined earlier. While the numbers of land managers that have not had a Reef Rescue project continues to decline, the uptake of available funding is still high which shows that the late adopters are becoming more familiar with the changes being promoted and are more willing to become involved.

*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

An essential component for landholders to access Reef Rescue funding is that property plans must be completed. The development of these plans is supported by the relevant industry based Precision Planning Consultants. This includes identifying current practice, a farm risk assessment and development of an action plan for adopting improved soil, nutrient, chemical, water (irrigation/stormwater), pasture and riparian management practices on farm.

A recurring comment made at the MERI Performance Summit is that without the help of the planning consultant in the development of the property plans many of the participants would not have been able to complete them. For some it is the first time they have seen an aerial photo of their property or found out what soil types they have.

For sugar cane farmers all nutrient, chemical and irrigation/stormwater projects must 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 blocks, product being used and rate, water rates, application method and timing.

While in grazing, a key part of the Precision Planning Consultant role includes supporting all graziers involved in property planning through farm risk assessment, action planning and information sharing. With Reef Catchments continuing to host the roles, there has been more emphasis placed on the planning process and the completion of the current practice booklet and map overlays. There will also be more regular follow up and monitoring to ensure improved alignment between project plans and the on ground works being funded through Reef Rescue.

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

Over the past year all land managers receiving Reef Rescue Grazing funding now have maps produced with overlays of soils and land types. These maps allow the graziers to mark out any problems such as the location of a weed outbreak or where any future infrastructure should go. The maps together with the action plan and current practice plan provide graziers with the resources to manage their properties into the future.

Throughout the Mackay Whitsunday region there are many farmers and graziers who have adopted A and B class management practices without receiving Reef Rescue funding. While these on-ground changes are happening, the level of property planning or future action planning involved with these landholders is very minimal or only being done to meet a set standard like the reef regulations or Reef Guardian Farmers. The increased adoption of using AgDat and other technology such as the new GPS systems by growers and industry service providers will allow for better property planning into the future as they will have data (spatially linked in many cases) to look at yields, costs , variability etc.

Monitoring uptake of improved practice adoption through industry

Through the Reef Rescue, Paddock to Reef and Reef Rescue Industry projects with Canegrowers, AgForce, DEEDI and Growcom, there continues to be current practice information collected on farmers and graziers. This current practice information is based on the ABCD management practice frameworks. For all Reef Rescue participants receiving funding, Reef Catchments is still providing what their current practice was and their proposed practice is for each year of delivery.

During the second reporting period in Year 4, growers from the 3 local sugar mill areas were engaged to answer 16 questions on what practices they were using in 10/11. The results of this survey have been aggregated up for the Mackay Whitsunday region.

Further analysis of the results was undertaken to assess where the individual was overall for each activity area: soil, chemical, nutrient and irrigation/stormwater. The information was used to give an overall picture of the breakup of ABCD farmers in each region and of the whole region.

The grazing industry has also been undertaking a survey to assess current practice with DAFF, surveying local graziers about their current practice. A second Rapid Condition Assessment has been completed which has provided information into the land condition of the region. This survey will be carried out at the end of the wet season annually and will be used as a way to monitor any change in land condition over time.

Improved profit by adopting A&B Class land management practices

There have been numerous reports (CSIRO, DEEDI, and Project Catalyst) over the first 4 years of Reef Rescue with regards to the adoption of A and B class management practices and the economic implications for the landholders. One common conclusion still is that once in the steady state, the improved practices will help improve profitability but the capital cost of change for some activities may be too expensive to get a return on the investment. This is particularly important if the farm size is too small. This shows the importance of the incentives in getting increased adoption in a short period of time, but also of getting small grower groups to make the change together to reduce the capital cost burden.

Some feedback from the partners involved in delivering Reef Rescue in the region is that the projects being funded through Reef Rescue will help to improve the efficiency and effectiveness of management practices on the farms and properties, but that true profitability is driven by a variety of other external factors and the promoted Reef Rescue activities may provide some resilience to their farm business.

Longer term Outcomes

Improved In-stream Water Quality

The Paddock to Reef monitoring and modelling project has been collecting water quality data over the years and will continue to inform us of the water quality improvements from the activities that are being supported through Reef Rescue. In the Mackay Whitsunday region, Paddock to Reef monitors cane practices with grazing and horticulture monitored in other GBR NRM regions. To date in the Mackay Whitsunday region, there have already been some results from the project at the Paddock, Multi-Block and Multi-Farm level for the 09/10 and 10/11 wet seasons and the 11/12 wet season is currently being analysed and interpreted. Some of the results released to date have shown A and B class practices do provide measureable water quality improvements over C and D class practices. More information will be provided through the Paddock to Reef project with an aim to be able to identify all regional water quality improvements at a later date and also through the report cards being developed.

The Paddock Monitoring Program will introduce two new trials for the 2012/13 wet season looking at specific Reef Rescue herbicide and nutrient activities including the banding of PSII herbicide and application of improved application of knock down herbicide. For grazing, riparian fencing and off stream watering points to manage stock around waterways is the preferred high priority project for many of the Reef Rescue projects being funded. For some graziers, this means reducing stock access to riparian zones with these sensitive areas used only for crash grazing to reduce fuel loads and control weeds. This direct removal of stock from waterways will support in-stream water quality improvements

Proserpine River

Andromache River

Devereaux Creek.

Pioneer River

Gillinbin Creek

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

The above 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 4, the numbers are:

- 127 new projects involving 150 new farmers
- 98 projects involving 117 repeat farmers
- 33 new projects involving 33 new graziers
- 28 projects involving 28 repeat graziers

Over the past 4 years in the Mackay Whitsunday Region, the numbers are:

- 502 new projects involving 627 new farmers
- 232 projects involving 283 repeat farmers
- 143 new projects involving 143 new graziers
- 41 projects involving 41 repeat graziers

From feedback through the Regional Groups Collective and Queensland Federated Farmers, across the regions to date for Years 1 to 3 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 third MERI Performance Summit has again been the major evaluation undertaken for Reef Rescue in our region during the 2011/2012 delivery period. Most of the comments and feedback from this workshop and lessons learned have helped to develop our Year 4 Reef Rescue MERI Performance Story. From the summit and other reviews conducted, some of the important and relevant lessons learned include:

1. Recently it has been noted that there are Reef Protection Plan R&D projects running concurrently with the Reef Rescue R&D program in the region. This has raised questions through the Regional Working Groups and other industry service providers as to whether there has been a doubling up of effort or how will this information get back to the industry.
2. Farmers and graziers are very interested in finding out the positive impacts their projects are having with regards to water quality so that they can promote the good work their industry is doing. There has been a delay in the release of this information and they consistently keep asking when it will be available.
3. The regions farmers and graziers are very aware of all the effort that has gone into improving the water quality leaving agricultural land over the past 4 years. However they would like to see more promotion to the general public to highlight all of this hard work and that they are very much part of the solution.
4. At Reef Catchments, all projects funded during 2011/12 must be completed by June 30th, 2012, regardless of when they received a contract. While most landholders have had enough time to complete their contracted activities, some have given feedback that they would have liked to have 12 months to complete their projects from the time they sign their contract. This in most cases is due to weather but also from delays with suppliers.
5. The feedback from the MERI Performance Summit has again been excellent to help improve our delivery of Reef Rescue. There were 24 people who attended and all highly recommended that there is a bigger one next year to look at the whole Reef Rescue 5 year program and invite a larger number of people to attend.
6. The majority of the landholders who became involved in Reef Rescue for the first time in Year 4 said they would not have been able to adopt the improved land management practices without the water quality grants that are available. They also indicated that the support provided by the Precision Planning Consultants are key to undertaking the project and have influence on the activities they undertake.
7. There are still many farmers and particularly graziers who have not become involved in Reef Rescue. The feedback continues to suggest that a big reason for this is that they haven’t heard about it or don’t quite understand that is it different to the reef regulations or other government programs. Reef Catchments has taken on the grazing roles but there wasn’t a complete team until January 2012 so this did impact on reaching graziers at the start of Year 4.
8. There continues to be an ever increasing expectation and some frustration by regional Industry, extension staff and land managers about the results and information being

developed through the Paddock to Reef program being communicated back to them. While the Report Card is one tool they would also like to see some regional presentation about it so that some discussion can be had.

9. It was identified that many of the land managers were giving incorrect information with regards to their ABN not matching their trading name and resulting in a delay of processing projects and payments. Steps were put in place to improve this but there have still been some come back incorrect.
10. There continues to be some confusion amongst cane growers about the need to go to a 1.8m system to be eligible for any Reef Rescue activities and this is a reason why they haven't participated. Others are confused why they can't get funding for improved soil management when they have moved out to a 1.65m system.
11. The cost when purchasing a new spray rig to reduce residual chemical use is high enough to discourage rapid industry adoption as what works for some may not work for other.
12. Feedback from industry and growers on our case studies has included a need to have a focus on equipment and the benefits of using it including pros and the cons.
13. The Reef Guardian farmer program is not well known or understood by the sugar industry and growers involved in Reef Rescue. More networking needs to be implemented to ensure that common goals are met without the duplication of work.
14. With inflation and the rising cost of machinery/equipment the maximum incentives for certain activities needs to be re-evaluated.
15. The number of repeat growers wanting to be involved is continuing to grow each year. The issue is that there is still less support and resources for them to be able to become involved again and adopt more improved land management practices on their farms.
16. In December 2011, the Proserpine Mill was bought out by Sucrogen and there has been a general increase in the interest by local growers in getting involved in Reef Rescue, but for many this will not be until Year 5. From the EOI's coming in, the PPC that works in that region will have an increased workload in Year 5 and less time to work in southern catchments.
17. There still appears to be a large number of graziers who exercise limited control over grazing pressure throughout the year (set stocking with multiple mobs of stock). Depending on the stocking rate, this practice is more likely to lead to increased weed pressure and declining pasture condition in the Mackay Whitsunday region.
18. There is still concern expressed by some graziers about the requirement for a wildlife friendly fence. Reef Rescue in the Mackay Whitsunday requires the top wire to be plain and not barbed.
19. Only a small number of Stage 2 graziers have continued observing and reporting on pasture monitoring sites established in Stage 1.
20. Sediment and nutrient loss from grazed pastures is likely to be higher on pastures heavily infested with weeds (like lantana, Giants Rats Tail grass, sickle pod), because these plants have an allopathic effect on plants below them, causing bare ground and likely surface erosion. Rehabilitation of these pastures will have a significant water quality benefit.
21. Given that ground cover is generally moderate to high in the Mackay Whitsunday region, it is likely that gully erosion on grazing properties combined with stream bank and bed erosion may contribute the highest % of sediment loss during high rainfall events.
22. The Reef Rescue Grazing working group would benefit from the addition of some commercial industry representatives, to provide advice and guidance on attracting new Expressions of Interest and assessing costing of projects.
23. There is limited information in the Mackay Whitsunday region on the impacts of different land management practices in grazing with regards to water quality benefits.
24. If there are any delays in reaching producers to develop up projects then the result for some is having to delay completing paperwork and projects until after the harvest (before the wet season) and there is a risk they may not have enough time available.

3.3 Improvement

Information about improvements or changes as a result of lessons 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 year 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. Both the Cane and the Grazing Regional Working Groups have requested a representative from State Government to fill the knowledge gaps of what other programs are running in the region. It is believed that with the added member in the RWGs there will be better communication between Reef Plan members and this will enable better synergies for future works.
2. More communication in Year 5 will promote what the impacts of certain activities are for water quality. Recently we have had the Paddock to Reef Regional Coordinator present at the MERI Performance Summit and with the Cane Regional Working Group about the upcoming release of Report Card 2 and the development of the Paddock to Reef 'look up' tables.
3. There will be a bigger effort in Year 5 of Reef Rescue to celebrate our regions achievements and to communicate and promote this to the non- farming community within our region and also throughout the state. This will include more information on our Social Network sites as well as regular communication to all of our members and partners through our newsletter "The Natural State".
4. Reef Catchments staff will process through contracts immediately as they come in rather than waiting for enough contracts to make up a founding round. This will give the greatest amount of time to land holders to complete their work. Also PPC's will be encouraged to only submit projects that can be accomplished in the remaining time frame and to communicate this to land holders that if the work cannot be completed they should not develop the project.
5. There are plans in place to hold a final MERI Performance Summit around May 2013 and to invite all partners, working group members and interviewees along to look at what has been achieved by Reef Rescue and some final feedback for improvements with regards to the delivery and eligible activities.
6. The last year of Reef Rescue is the biggest with regards to the funding allocation for the region. The majority of these funds have been allocated to new farmers and graziers to become involved and there is still good support available for repeat landholders and some industry wide projects. This includes continuing the extra Cane and Grazing Precision Planning Consultant roles to get more landholders able to participate.
7. With a complete Grazing Reef Rescue team on board, there has been a bigger effort in trying to communicate and promote Reef Rescue to more local graziers. Combined with the Precision Planning Consultants ability to market and promote it better there has been an increase in EOI's coming in and an expectation of increased participation in Year 5.
8. There will continue to be discussions with the Paddock to Reef team about communicating results back to industry and having some consistency by all of the partners involved in the message that is going out. Paddock to Reef Coordinator to present to both the regional working groups during 2012/13.
9. All PPC's have been contacted again to ensure that the correct information is supplied by filling out forms with the land managers and checking on the ATO website before submitting

grower project proposals. Contracts sent by Reef Catchments will continue to include more information on the cover letter that is attached to each contract to emphasise the importance of supplying the correct information and invoicing requirements.

10. The KCO and Reef Catchments will produce some more articles to just explain and reinforce that to do improved soil management you must be going to a Controlled Traffic system (row spacing = wheel spacing) and there is no set distance. The distance is based on your harvesting equipment. This is supported because of the water quality improvements over a non-Controlled Traffic system. At the same time we will also highlight that you don't need to be going to a Controlled Traffic system if you would like to get support for improved nutrient, chemical, irrigation or stormwater management practices.
11. Reef Rescue has funded the purchase of a new demonstration spray rig which has the ability to spray using four different methods. This will enable farmers to trial the rig and see what would work best on their property before having to outlay the money themselves.
12. Reef Catchments will produce some case studies in 12/13 with the focus on the equipment including how a number of growers have found the new equipment. This will include the pros and cons of the equipment.
13. Invite the Reef Guardian Coordinator to present at the Cane Regional Working Group. Also the coordinator should be included in communications for Reef Rescue.
14. The TWG will undertake a review to assess the current incentives offered and whether they should be increased or remain unchanged.
15. There will be continued support from the KCO, PPC's and Reef Catchments to help the growing number of Stage 2 growers. Year 5 will be the largest allocation available to Stage 2 growers to implement on-ground activities.
16. There will need to be some planning discussion between Reef Catchments, the KCO and the northern PPC to deal with the issues of increased interest from the Proserpine region and some changes in workload. This has been organised for 13th July, 2012.
17. In the next 12 months Reef Catchments will generate some media interest in controlled grazing and pasture spelling in the Mackay Whitsunday region. Pasture management still remains a core activity for graziers wanting to be involved in Reef Rescue, but some extra extension and communication is needed.
18. The brochure (being finalised) about wildlife friendly fences will be widely distributed and the logic for the Reef Catchments commitment to plain wire on top of fences, will be described.
19. Reef Rescue Grazing staff will emphasise the importance of ongoing monitoring as part of any Stage 2 projects and prepare a case study of at least one grazier who has been maintaining pasture monitoring sites.
20. Reef Rescue grazing staff will gather evidence and photos relating to soil loss from weed infested paddocks.
21. Reef Rescue grazing staff will gather evidence and photos relating to soil loss from gully erosion and stream bank erosion and may modify the eligible activities guidelines to reflect any changes in priority.
22. The Reef Rescue Grazing Working Group will talk with some of the regions commercial grazing industry representatives with an intention of inviting them to the next meeting if they are interested in participating.
23. To improve the understanding of different land management practices in grazing we have implemented some rainfall simulation trails. These are supported through the Paddock to Reef program and are located near Proserpine. Reef Rescue grazing staff have also been involved in the Paddock to Reef synthesis workshop.
24. A number of Expressions of Interest have been received towards the end of year 4. These EOI's will be chased up as early as possible in Year 5 to give producers the maximum amount of time before the harvest to complete their paperwork and implement their projects.

Section 4: Instances of Significant Change

The following 3 vignettes were chosen out of the 53 completed interviews conducted by the participants of the Reef Rescue MERI Performance Summit workshop being an accurate and true reflection of the program from those involved.

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 horticulture producer was introduced to the Reef Rescue program from Anna Geddes of Growcom. He was motivated to become involved with Reef Rescue, as he wanted to implement better farm management practices earlier than otherwise would have been achievable.

The farmer said that he was planning to do the activities before he became involved with Reef Rescue however new or secondhand equipment at a price that was affordable couldn't be found.

The benefits from the activities include less soil compaction, better condition of inter-row ground cover, less bogging, rutting and erosion, completing routine activities such as spraying, picking up fruit and nets while the paddocks are still water logged without causing damage and less herbicide usage because of better ability to spray at optimum times during the wet season.

The producer states that the unexpected outcomes include better safety having inexperienced farm hands using a slower, lower more stable vehicle. He also found the outside advice pointing out other areas of farm management practices that could be improved in a practical manner were of great use.

The producer believes that the Reef Rescue staff and the Growcom staff provided valuable assistance for his project.

The producer said that the changes would probably have still been adopted with only 20% funding, however the timing would have been deferred a number of years. In the future the horticulture producer hopes to install a fertigation system and improve soil nutrient monitoring.

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 growers are keen to adopt new practice management however are limited to the speed at which they can change by available funds.

Vignette #2 Reef Rescue creating networks for shared learning

This grower was introduced to the Reef Rescue program by the CANEGROWERS organisation. He said that the main incentive for becoming involved in the program was so he could upgrade his equipment to ensure it met the industry standards in relation to environmental concerns. Overall his main motivation was that with the support from Reef Rescue he could increase his farm's productivity, in a way that he would not have normally been able to do on his own.

The farmer said that he was planning to upgrade his equipment but at a much slower rate due to financial constraints. He estimates that without the support from reef rescue the changes he has made to his equipment would have taken him 10 years, however he has achieved this in three years.

The benefits that the farmer is hoping to achieve from the activities he is doing through Reef Rescue include being much more precise with his farming activities by reducing costs in land preparation and chemical application. An unexpected outcome through being involved was the networking he experienced with other innovative farmers who were looking at different projects.

The farmer believes that the Reef Rescue delivery team were very helpful. He thoroughly thought the home visits to discuss projects and how to apply for the funding kept him up to date with the process. He still believes that he would have become involved, however possibly not as easily without the help from the team.

With only 20% of funding the farmer ensures the he would have only achieved smaller, more limited projects.

In the future the farmer hopes to purchase more up to date equipment and research further into more projects that will increase productivity.

Overall the farmer believes that Reef Rescue has been very beneficial, positive and constructive. It has allowed him to implement changes on his farm that would have taken him at least 10-15 years to achieve. He feels that it has been extremely beneficial to the environmental and has made his farming practices more sustainable and profitable.

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.
- It highlights that if the incentive offered was smaller change would not occur.
- It shows that delivery support is essential for the project to be taken up by land managers.
- It highlights that networking opportunities can provided momentum for future practice change
- It highlights that without Reef Rescue change would not happen at the rate it is currently taking place.

Vignette #3 Reef Rescue fostering innovation to reduce inputs

This sugarcane grower was first introduced to the Reef Rescue program by Phil Trendell and Reef Catchments. His main motivation for getting involved was being the first grower in his area to trial a shielded sprayer in sugarcane using Roundup. He could see the environmental and financial advantages of the project. He says that Reef Rescue was able to help him trial and promote this sprayer, which has led to an ongoing association with Reef Rescue and further projects.

This farmer says that he was not likely to do the activities before Reef Rescue. Without the funding the projects would have been a big financial burden on his farming enterprise. Since then Reef Rescue has enabled him to modify his belt spreader to apply organic composted manure directly over the row and to catch a large amount of early rain fall by creating two tail water dams using his own equipment. He acknowledges that none of these improvements would have happened without Reef Rescue assistance.

The main achievements for this farmer are decreasing his chemical usage by two thirds, while increasing his productivity. He also has greater flexibility in applying chemicals and his composted manure has a high organic content which has shown to have a better uptake than his normal fertilizers while his tail water dams are holding a large amount of water which allows him to have sufficient supply on his property to warrant a closer look at a centre pivot irrigation system.

The farmer feels that he worked hand in hand with the Reef Rescue support team. He contacted Reef Catchments and he believes that together they worked through projects that have had environmental and economic outcomes. Overall he believes that without the staff at Reef Rescue achieving this on his own would have been very difficult.

With a maximum of 20% funding the farmer does not think he would have adopted these changes.

In future this grower hopes to start using a low pressure irrigation system. He says that with the rising costs of electricity and fuel required for his current irrigators a low pressure system would address this problem and create less pollution. He also thinks that with new minimum till equipment becoming available all of these new pieces should be evaluated for the best outcome.

Overall the farmer would like to see Reef Rescue funding continue in the future.

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

- It demonstrates that there is a willingness to change, however change is limited by cash flow.
- 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 cane industry is also being improved.
- It shows the importance of good support in delivering the project, without which the grower would not have been involved.
- It shows that activities supported through Reef Rescue maintain productivity while lowering input costs.

Section 5: Final Impact Statement

The delivery of the Reef Rescue program in the Mackay Whitsunday Region continues to be highly effective at driving practice change towards best management on agricultural land. Over the past year 160 new and 145 repeat land holders have been engaged to undertake works that will ultimately improve the water quality draining into the Great Barrier Reef Lagoon. During Year 4 new land holders involved in the program have improved management on 31,011 hectares of land. Over the past four years Reef Rescue has supported increased adoption of A and B class practices on 159,637 hectares of land working with 770 new and 324 repeat land managers.

***The hectares detailed in this report only include hectares of improved management from new projects. This differs from the Narrative Report which includes hectares under improved management for both new and repeat land holders. Please also note that a single hectare reported may have had multiple activities undertaken on it i.e. chemical, nutrient or soil improvements. ***

Reef Rescue Sugarcane 2011/12

Reef Rescue's Sugar water quality grants have been instrumental in supporting growers to adopt A and B class soil, nutrient, pesticide and irrigation management practices. Over the past year 310 Expressions of Interest were received to be involved which shows that there is still significant interest in the program. During year 4 Reef Rescue has worked with 146 new and 113 repeat sugar cane growers on 217 projects implementing 318 sub-projects. The 146 new growers involved, representing around 12% of the canegrowers in the region impacted on 24,444 hectares of land or around 19% of the agricultural land under cane production.

The 318 sub-projects developed during year 4 include:

- 87 soil sub-projects (machinery modifications for controlled traffic, zonal tillage units, GPS guidance, legume planters)
- 103 nutrient sub-projects (nutrient management plans, improved application such as sub-surface compost application, variable rate technology)
- 84 chemical sub-projects (shielded sprayer units for applying knockdowns, high clearance spray equipment)
- 44 irrigation/stormwater sub-projects (tail-water recycling, low pressure overhead irrigation equipment)

The total project costs for Year 4 was $10,961,473.93 with Reef Rescue contributing on average 32% ($3,585,809) to the total cost and farmers the other 68%. This means the average project costs was $50,513 and on average Reef Rescue provided $16,524.

Over the past 4 years of Reef Rescue in sugarcane, 1295 EOI's have been received resulting in 609 new cane land managers undertaking practice change to implement A and B class management on their properties. Of these 609 growers, 274 have now also been involved in repeat projects. The total cost of all these projects over the past 4 years is $39,669,763 of which Reef Rescue has contributed 33%. On average over the past 4 years, the total project cost was $44,926 with $14,825 provided by Reef Rescue.

Modern farming: GPS harvesting on controlled traffic

Over the past year, 19 Industry projects have been carried out at a total cost of $3,706,660 with Reef Rescue contributing $1,646,589 or around 44%. On average, the total project cost was $189,877 with $83,545 provided by Reef Rescue.

It is estimated that these 19 projects impact on the total available cane land of roughly 125,000 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 which has received funding over the past year is the development of Mill Mud Nutrient Guidelines. Mill Mud is a by-product of sugar production and the development of these guidelines was needed due to the limited information on the nutrient content of the mud and how much the mud varies between mills. The application of Mill Mud when applied below 70 tonnes per hectare is an A class practice. When applying mud at low rates it is essential for growers to know the nutrient components of the mud so as not to over apply when topping up with additional nutrients. Over application will have a negative result on water quality if excess nutrients are washed away after a flood event. Early results to date have shown that while there is variability in mud being produced from any single mill variation might not be as high as first thought, reportedly deviating by less than 10 per cent away from the mean. There was however variation between mills sampled but this was due to some mills producing mill mud only while another mill had a mill mud and boiler ash mix. This industry project will continue into year 5 with the establishment of new trial sites to validate these early results.

Another industry project funded called the MOSES Project looks for greater efficiencies minimising inputs while maintaining or improving yields. The use of variable rate fertiliser control allows fertiliser inputs to be modified across the paddock with rates determined by the yield potential of identified soil zones. Likewise, adjusting the rate of irrigation to take into consideration the slope of the land and the makeup of the soil within that paddock has the potential to reduce water use and limit runoff. The increased efficiency means that more of the inputs are used by the cane and less

prone to run off after flood events improving water quality. The MOSES project aims to generate Electrical Conductivity (EC) mapping and Real Time Kinematic (RTK) GPS data for variations in soil and elevations respectively for the central region. Once these two data sets are used together, with an in- paddock yield datasets derived over time using remote sensing technology, theses layers identify yield potential management zones. These zones can be managed to ensure high potential zones receive sufficient inputs to maximise potential while zones of low potential only receive what the cane can use.

Other industry projects include the implementation of an AgDat support role for the Plane Creek Region 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. Also funded was the continuation of the 'New Farming System' loan equipment which promotes A and B class soil management practices by providing growers with equipment to trial.

While 19 cane industry projects were funded over the past year, five additional support roles were also funded to help in the development of project proposals and to help growers develop up management plans. These planning positions were based with Mackay Area Productivity Services, Plane Creek Productivity Services and Canegrowers Proserpine. The Key Contact Officer position was based at Canegrowers Mackay.

3-row wavy disk cultivator funded through Reef Rescue confines compaction to the inter-row

Table 1: Reef Rescue Sugarcane Total Outputs

Sugar	Years 1-3	Year 4	Total Years 1 - 4
EOI	985	310	1295
Projects	361 new and 129 repeat	123 new and 94 repeat	484 new and 223 repeat
Landholders	463 new and 161 repeat	146 new and 113 repeat	609 new and 274 repeat
New Landholders % of industry	39%	12%	51%
New Impacted Area	97,613 Ha	24,444 Ha	122,057 Ha
New Impacted Area % of Industry Area	78%	19%	97%
Total Project Cost	$28,708,289	$10,961,474	$39,669,763
Total Reef Rescue Contribution	$9,549,492	$3,585,809	$13,135,301
Total Reef Rescue Contribution	33%	33%	33%
Soil - Numbers (New and Repeat)	323	87	410
Soil - Hectares (New Only)	76,596 Ha	15,671 Ha	92,627 Ha
Soil - % of Industry	61%	13%	74%
Total Soil Project Costs	$15,885,133	$3,912,092	$19,797,225
Total Reef Rescue Soil Contribution	$5,475,895	$1,406,420	$6,882,315
Total Reef Rescue Soil Contribution	34%	36%	35%
Nutrient - Number (New and Repeat)	195	103	298
Nutrient - Training	93	25	118
Nutrient - Hectares (New Only)	43,203 Ha	15,784 Ha	58,987 Ha
Nutrient - % of Industry Area	35%	13%	48%
Total Nutrient Project Cost	$3,188,564	$2,288,909	$5,477,473
Total Reef Rescue Nutrient Contribution	$1,237,899	$792,040	$2,029,939
Total Reef Rescue Nutrient Contribution	39%	35%	37%
Chemical - Number (New and Repeat)	217	84	301
Chemical - Training	65	13	78
Chemical- Hectares (New Only)	45,658 Ha	11,773 Ha	57,431 Ha
Chemical - % of Industry Area	37%	9%	46%
Total Chemical Project Cost	$4,922,270	$1,890,012	$6,812,282
Total Reef Rescue Chemical Contribution	$1,832,941	$642,867	$2,475,808
Total Reef Rescue Chemical Contribution	37%	34%	36%
Irrigation/Stormwater - Number	79	44	123
Irrigation/Stormwater- Hectares	8,010 Ha	4,881 Ha	12,891 Ha
Irrigation/Stormwater- % of Industry Area	6%	4%	10%
Total Irrigation/Stormwater Project Cost	$4,712,324	$2,870,461	$7,582,785
Total Reef Rescue Irrigation/Stormwater Contribution	$992,757	$744,482	$1,737,239
Total Reef Rescue Irrigation/Stormwater Contribution	21%	26%	23%
Industry Projects	47	24	71
Impacted Areas Ha	125,000 Ha	125,000 Ha	125,000 Ha
Impacted Areas % of Industry Area	100%	100%	100%
Total Industry Project Costs	$12,162,399	$4,846,660	$17,009,059
Total Reef Rescue Industry Contribution	$4,972,787	$2,216,589	$7,189,376
Total Reef Rescue Industry Contribution	41%	46%	42%

Reef Rescue Grazing 2011/12

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 4 of Reef Rescue 144 Expressions of Interest were received to be involved in grazing projects. Of these 144 EOI's, 33 new land holders and 28 repeat land holders were funded to undertake 102 sub-projects.

The 33 new projects impacted on a total of 6,376 hectares or 9% of the available intensive pastoral land which is now under improved land management practices. The 102 sub-projects include:

- 55 pasture/ground cover sub-projects impacting on 5927 hectares. This involves pasture and stock monitoring training, 73 pasture monitoring sites, 26.1 km of land type fencing, 19 land type watering points, 2 gully management and 4 grazing land improvement projects.
- 24 riparian sub-projects impacting on 106 hectares. This involves 41.7 km of stock fencing and 26 watering points helping to manage stock around waterways.
- 23 nutrient sub-projects involving 66 nutrient soil tests and analysis for nutrient management planning impacting on 3334 hectares.

A total cost of $1,157,932 was spent to improve grazing and riparian land management with Reef Rescue contributing $454,391 or 39%. On average, the total project cost was $18,982 with $7,449 provided by Reef Rescue.

Riparian fencing funded by Reef Rescue with wildlife friendly plane wire on top

These sub-projects have impacted on 36,610 hectares of land which are now under improved land management. In total these 382 sub-projects include:

- Improved Pasture Management through 240 pasture monitoring sites, 230 nutrient monitoring sites and 130.7 of land type fencing
- Improved Riparian Management through 184 km's of riparian fencing, 154 off-stream watering points and improved management on 789 ha.

Over the past 4 years of Reef Rescue in grazing, 468 EOI's have been received to be involved resulting in 143 new land holders and 41 repeat land holders undertaking a total of 382 sub-projects. Total project costs over the past four years are $4,387,962 with Reef Rescue contributing 41%. On average over the past four year the total project cost was $23,847 with Reef Rescue providing $9,889

Off stream watering point funded by Reef Rescue to prevent cattle entering waterways

In year 4 of Reef Rescue Grazing in the Mackay Whitsunday region, 3 industry projects were also carried out. One industry project was the continuation of the use of a new cattle tag to spatially locate animals within a property for use within the AgDat data framework. During the trial, grazing pressure information on each paddock on a large property was collected, to form the basis of improved nutrient, pasture and herd management on the property. The Taggle tags proved to be too fragile for commercial use and a new design is being produced for further trialling. The potential of the tags to alert the grazier if cattle are in "no go" zones on the farm (such as fenced off riparian zones) or to provide information about mating behaviour of cattle.

The two other industry projects that was undertaken was to again carry out a Rapid Condition Assessment (RCA) and complete the Pasture Photo Standards:
The Rapid Condition Assessment is undertaken to assess the overall condition of grazing land and to act as a benchmark for future condition assessments. As land condition decreases productivity decreases and the land becomes less resilient to pressure. Monitoring this change over time allows any changes to be identified and management to be adapted. Four main grazing land types in the Mackay Whitsunday Region were identified and rated according to ground cover, weed pressure, tree cover, erosion and fire history and rated using an ABCD scale.
The Pasture Photo Standards is a series of pasture yield photos for the main improved pasture types within the region. These standard photos will be used as part of future Pasture Stocktake workshops and they will allow graziers to compare their current pasture against a photo standard. The total cost of the three grazing industry activities in Year 4 Reef Rescue is $137,944 of which Reef Rescue has contributed $62,944 or 46%.

Support roles were also funded for the grazing industry. The Key Contact Officer and the Planning Consultant provided support to the grazing industry to help in the development of projects and to help graziers complete their current property plan and the action booklets.

Reef Rescue grazier Joe Borg implemented riparian and land type fencing to control stock

Table 2: Reef Rescue Grazing Total Outputs

Grazing	Years 1-3	Year 4	Total Years 1 - 4
EOI	324	144	468
Projects	123	61	184
Landholders	110 new and 13 repeat	33 new and 28 repeat	143 new and 41 repeat
New Landholders % of industry	6%	2%	8%
New Impacted Area Ha	30,234 Ha	6,376 Ha	36,610 Ha
New Impacted Area % of Industry Area	40%	9%	49%
Total Project Cost	$3,230,030	$1,157,932	$4,387,962
Total Reef Rescue Contribution $	$1,365,198	$454,391	$1,819,589
Total Reef Rescue Contribution %	42%	39%	41%
Groundcover - Training	69	31	100
Gorundcover - Hectares	29,644 Ha	5,927 Ha	35,571 Ha
Landtype Fencing kms	104.6 kms	26.1 kms	130.7 kms
Pasture and Stock Monitoring Sites	167	73	240
Nutrient Monitoring Sites	164	66	230
Riparian Hectares	683 Ha	106 Ha	789 Ha
Riparian Fencing Kms	142 kms	42 kms	184 kms
Off-stream Watering points	128	26	154
Industry / Partnership Projects	15	5	20
Total Industry / Partnership Project Costs	$2,684,748	$637,944	$3,322,692
Total Reef Rescue Industry Contribution $	$1,028,332	$312,944	$1,341,276
Total Reef Rescue Industry Contribution %	38%	49%	40%

Reef Rescue Horticulture 2011/12

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 4 of Reef Rescue 18 Expressions of Interest were received of which 4 new and 4 repeat farmers were funded. The 4 new producers impacted on 191 hectares of land which is roughly 14% of the horticultural production land in the Region. The eight projects of year four include:

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

The total cost of projects undertaken in year 4 of Reef Rescue in the horticulture industry was $248,693 with Reef Rescue contributing $105,521or 42%. On average, the total project cost was $31,086 with $13,190 provided by Reef Rescue.

Reef Rescue funded a side throw mulch mower for maintaining good inter-row ground cover and mulching for weed control.

Over the past 4 years of Reef Rescue for Horticulture, 54 EOI's have been received resulting in 18 producers undertaking projects impacting on a total of 970 hectares of land. The projects funded include 12 soil, 5 nutrient, 7 chemical and 11 irrigation/stormwater sub-projects. In the region over 4 years under Reef Rescue $770,261 of work has been undertaken with Reef Rescue contributing 321,168 or 42%. On average, the total project cost was $28,528 with $11,895 provided by Reef Rescue.

Table 3: Reef Rescue Horticulture Total Outputs

Horticulture	Years 1-3	Year 4	Total Years 1 - 4
EOI	36	18	54
Projects	19	8	27
Landholders	14 new and 5 repeat	4 new and 4 repeat	18 new and 9 repeat
New Landholders % of industry (45)	31%	9%	40%
New Impacted Area	779 Ha	191 Ha	970 Ha
New Impacted Area % of Industry Area	58%	14%	72%
Total Project Cost	$521,568	$248,693	$770,261
Total Reef Rescue Contribution	$215,647	$105,521	$321,168
Total Reef Rescue Contribution	41%	42%	42%
Soil - Numbers	9	3	12
Soil - Hectares	353 Ha	120 Ha	473 Ha
Soil - % of Industry	26%	9%	35%
Total Soil Project Costs	$160,923	$97,276	$258,199
Total Reef Rescue Soil Contribution	$76,760	$42,947	$119,707
Total Reef Rescue Soil Contribution	48%	44%	46%
Nutrient - Number	4	1	5
Nutrient - Hectares	52 Ha	100 Ha	152 ha
Nutrient - % of Industry Area	4%	7%	11%
Total Nutrient Project Cost	$47,422	$55,000	$102,422
Total Reef Rescue Nutrient Contribution	$19,681	$27,500	$47,181
Total Reef Rescue Nutrient Contribution	41%	50%	46%
Chemical - Number	4	3	7
Chemical- Hectares	315 Ha	28 Ha	343 Ha
Chemical - % of Industry Area	23%	2%	25%
Total Chemical Project Cost	$49,503	$56,417	$105,920
Total Reef Rescue Chemical Contribution	$13,753	$25,074	$38,827
Total Reef Rescue Chemical Contribution	28%	44%	37%
Irrigation/Stormwater - Number	10	1	11
Irrigation/Stormwater- Hectares	503 Ha	8 Ha	511 Ha
Irrigation/Stormwater- % of Industry Area	37%	>1%	38%
Total Irrigation/Stormwater Project Cost	$260,522	$40,000	$300,522
Total Reef Rescue Irrigation/Stormwater Contribution	$105,452	$10,000	$115,452
Total Reef Rescue Irrigation/Stormwater Contribution	40%	25%	38%
Industry / Partnership Projects	4	1	5
Total Industry / Partnership Project Costs	$250,000	$50,000	$300,000
Total Reef Rescue Industry Contribution	$125,000	$25,000	$150,000
Total Reef Rescue Industry Contribution	50%	50%	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 by Reef Rescue over the past year the estimated load reductions are presented in Table 4. Total load reductions from the past four years are detailed below in Table 5. It must be noted that the load reductions presented in Tables 4 and 5 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 validated by the Paddock to Reef Monitoring and Modelling Program and may be subjected to change at a later date.

Bonsucro Field day at the Paddock to Reef Monitoring site at Marian

Table 4: Estimated Load Reductions from year 4 of Reef Rescue in the Mackay Whitsunday

2011 - 2012 Reef Rescue total Estimated Load Reductions from Current Water Quality
Suspended sediment load reduced by approximately 28,328 t/yr
Particulate Nitrogen load reduced by approximately 98 t/yr
Particulate Phosphorus load reduced by approximately 91 t/yr
DIN(Dissolved Inorganic Nitrogen) load reduced by approximately 86 t/yr
FRP (Filterable Reactive Phosphorus)load reduced by approximately 28 t/yr
Total Pesticides load reduced by approximately 331 kg/yr

Table 5: Estimated Load Reductions from the first 4 Years of Reef Rescue in the Mackay Whitsunday

2008 - 2012 Reef Rescue total Estimated Load Reductions from Current Water Quality
Suspended sediment load reduced by approximately 189,380 t/yr
Particulate Nitrogen load reduced by approximately 399 t/yr
Particulate Phosphorus load reduced by approximately 222 t/yr
DIN(Dissolved Inorganic Nitrogen) load reduced by approximately 240 t/yr
FPR (Filterable Reactive Phosphorus)load reduced by approximately 50 t/yr
Total Pesticides load reduced by approximately 1618 kg/yr

Multi block sampling at the North Eton site

Section 6: Appendix

Appendix 1: Grazing Case Studies

- Joseph Borg
- Ken Muller
- Don and Annette Boettcher
- The Burns Family

Appendix 2: Cane Case Studies

- Annette, Dennis and John Werner
- Ian Passfield
- Les and Paul Durnsford
- Mal Burston
- Michael Deguara

Appendix 3: Horticulture Case Studies

- Anthony Bernard
- Don and Pauline Brown

Appendix 4: Industry Case Studies

- Laser Levels
- MOSES Project
- Mill Mud Nutrient Trials
- Plane Creek Productivity Services (PCPSL)
- WeedSeeker

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Joseph Borg

Land Type and Riparian Fencing

Reef Rescue helped Joseph Borg to maintain a healthy riparian zone which protects the banks and encourages regeneration of native trees and shrubs. Land class fencing has made it possible to graze pastures more efficiently and enable spelling when required.

Joseph Borg's farm is skirted by Boundary and Prospect Creeks and Division Creek runs through property. These streams are at the very top of the Fitzroy catchment, which emerges near Rockhampton. Joseph plans to have all streams on the property fenced so that he can control grazing in the riparian zone to avoid erosion of the banks. He will use off stream watering points to make management and movement of stock easier.

The property has five land types – 1000 hectares of alluvial flats and plains, 700 hectares of spotted gum ridges, 150 hectares of narrow leaved ironbark woodland at the front of the property, 150 hectares of bulloak country on the high ground and about 40 hectares of coastal rain forests.

"The stocking rate on the flats is about 1 adult equivalent /hectare and on the hills it is about one adult equivalent /4 hectares," explained Joseph.

The property runs about 700 Brahman breeders, 80 steers, 80 replacement heifers, 40 bulls as well as the calves and weaners. The cattle are managed in 12 herds – 3 stud herds kept near the front of the property and the rest graze the paddocks throughout the year. Joseph manages the property himself with one workman who lives on a nearby property.

Much of the work on the property is done by contractors, however fencing, cane harvesting, dozing, applying fertiliser and mustering is done with the help of family and friends. In return for this assistance Joseph helps out on other properties in times of peak labour demand.

About the farm...

Joseph and Amanda Borg manage Barnganel, a 2040 hectare grazing property, near Blue Mountain, which has been in the family since 1971. The late Joe Borg snr operated the farm with his brothers until 1987 when the partnership was formally split, however family and friends still assist when needed.
Joe Borg snr continued to work hard on the farm until he passed away in 2010, but he passed on a lot of his
knowledge and skill to young Joseph.
Cane was first grown on the property in 1991 with 152 ha now planted.For some time grazing was a lower priority than cane; however now with the help of Reef Rescue, Joseph is improving grazing land management on the property.

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Joseph found out about the Reef Rescue program through friends who have been involved in water quality grants along with a visit from Jim Fletcher (DEEDI) back in 2009. In 2009, Joseph attended the Stocktake workshop, established three pasture monitoring points, had three soil samples analysed and constructed 2.7 kms of land class fencing.

"The Reef Rescue project has enabled me to better manage my herds, and control where they graze," said Joseph.

"I would have only done a smaller amount of work, if the level of support from the Reef Rescue program had been lower. I have modified my plans and done more work because of the stimulus provided by the Reef Rescue Water Quality Grants," he said.

"I would have only done a smaller amount of work, if the level of support from Reef Rescue program had been lower"

Joseph uses a contractor to build the new fences, but he prepares the wooden posts from timber on the property and drives the dozer to clear the fence himself. The top wire is plain to satisfy the Reef Rescue requirement for protection of wildlife; with three barbs below.

Next year, Joseph hopes to complete the riparian fencing program, establish off stream watering points, construct a small land class fence and review the grazing rotations on the property to continue the renovation of the grazing lands on the property.

OUTCOMES

Fencing either side of Division creek which runs through the property (9.2 km)

Fencing off a small section of Boundary creek which is in an inaccessible corner of the property (0.5km)

A land class fence to separate the alluvial flats and plains from the spotted gum ridges

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 the Reef Rescue Team at Reef Catchments on (07) 4968 4200 or email: reception@reefcatchments.com.au

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Land Type Management

Reef Rescue has helped Ken, Larry, and Snow Muller construct roughly 6.5 km of land type fencing and off-stream watering points on their property to improve management of their cattle over the varying land types and better handle wet conditions and disease outbreaks.

The Muller's found out about the Reef Rescue funding through a member of Agforce where they were informed that the funding would allow them to start and complete the projects they have wanted to do around the farm for some time, making it far easier than trying to go it alone.

"Without the Reef Rescue funding to help us along, the completed works would only be a dream that would be put off for another 10 years," Ken explained.

The fencing work enabled the Muller's to split up what was two quite a large blocks within their farm into 4 more manageable blocks along different land conditions. This allowed the Muller's to move their cattle around to blocks that best suited the environmental conditions at any particular time meaning their blocks were better prepared to respond to the summer rains when they arrive. Off-stream and land type watering points were also funded to help provide the Muller's cattle with clean water and keep them from disturbing the creek banks, which can lead to erosion.

To Ken the benefits of the land type fencing program go further than just being able to properly spell blocks, improve pasture condition and reduce sediment loss. The fencing also makes it much easier to control tick outbreaks and intestinal worms in his cattle which leads to reduced chemical requirements, improved cattle management and a higher return on investment.

About the farm...

Ken, Larry and Snow Muller own and manage the 5250 ha property, Mt Pluto Station in the Proserpine foothills below the Proserpine Dam.
The property contains many tributary streams that run into the Gregory River as well as bordering the Proserpine River as it exits the dam wall.
The property is used predominantly as a breeding ground with a selection of the cattle being sent to their Richmond property.

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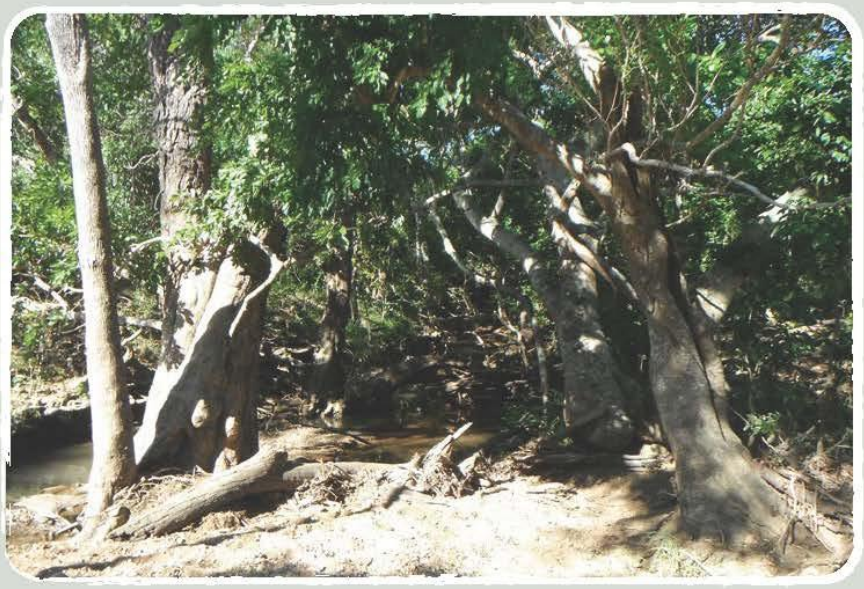

"The Reef Rescue Grazing team, provided by Reef Catchments, has made the whole funding process simple and straight forward and without them this project would have been virtually impossible," said Ken.

"They are a professional team that don't seem out of place in our agricultural environment and know their way around a farm, which gives me the confidence to work closely with them," he added.

"Without the Reef Rescue funding the help us along,the completed works would only be a dream that would be put off for another 10 years."

The projects that Reef Rescue helped the Muller's complete on their farm were all projects that they have been wanting to do on their farm for quite some time, however the assistance they received allowed these works to be realised much sooner.

OUTCOMES

Off-stream watering points provide clean fresh water to the cattle while protecting the bank

Improved cattle rotation has increased ground cover

Reduction of sediment loss reaching waterways

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 the Reef Rescue team at Reef Catchments on (07) 4968 4216 or email: reception@reefcatchments.com.au

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Don and Annette Boettcher

Riparian Fencing

Reef Rescue helped Don and Annette Boettcher to develop their grazing management knowledge and construct riparian fences on their property to protect the waterway and low lying areas from the impact of regular grazing by stock.

Don has spent many days every year reducing a heavy infestation of lantana on the property and now feels that he needs to be vigilant and get on top of weeds when they appear. A relatively low stocking rate has enabled a dense pasture cover to develop on the property and has helped to reduce the weed content of the pastures.

The property runs 30 breeding cows and they generally buy in heifers to maintain a grey Brahman cross herd. The size of the herd enables Don and Annette to closely monitor their condition. The Reef Rescue Stocktake course provided some new insights into reading the pasture condition as well as stock condition. Don has noticed that the pasture and stock condition has improved since he has been able to more effectively control where the stock are grazing.

Don and Annette found out about the Reef Rescue program through a letter sent to them and also know some other graziers who have been involved in the past.

The 2011/12 Reef Rescue Grazing project developed with Michael Boyd from Reef Catchments on their property included:

- Reviewing the current practices and developing a plan for the future, using the A3 maps produced by Reef Catchments
- Attending the Stocktake workshop which Don said was very informative and well presented by Jim Fletcher from DAFF

About the farm...

Don and Annette brought their 120 hectare property at Sunnyside in 1977 while Don was still teaching at Sarina High School. Since then the property and herd have been a great source of enjoyment and satisfaction. They have developed the property and made many improvements, as time and finances permitted, over the last 35 years. "I am happy to do my bit to improve the quality of water going towards the coast," said Don.

Spring Creek runs through Don and Annette's property and is a good example of a small stream, with a protected, intact riparian zone. The property has three land types - 30 hectares of coastal rainforest that isn't grazed, 70 hectares of eucalypt hills and ranges and 20 hectares of alluvial flats and plains.

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Don is a hands on stock manager.

- Establishing two pasture monitoring sites to enable them to track changes in the pastures over time
- Fencing off a low lying area (soaks) on the property and constructing riparian fences (1.4kms), along both sides of Spring Creek to maintain high water quality

"I am happy to do my bit to improve the quality of water going towards the coast."

Don and Annette found that the Reef Rescue program motivated them to undertake the works on their property earlier than they would have.

Don said the Reef Rescue project, "Pushed us along and gave us a deadline. We redirected effort into the riparian fencing project."

Reef Rescue funding has given Don a chance to further develop a fence design that enabled him to fabricate in the workshop during wet weather and assemble quickly in the field when the conditions are right. The stays and anchor points are concreted in and Don welds on the attachments to the posts, with simple, detachable connections to the wire. The top wire is plain to satisfy the Reef Rescue requirement.

Next year, Don hopes to complete some land class fencing to enable him to graze the hills and flats separately to better utilise fresh grass at different times of the year; this project may include the construction of one or two additional watering points.

OUTCOMES

Reduced sediment loss by excluding stock from swampy areas during the wet season

Reduced risk of stream bank erosion by limiting stock access to the creek

Reduced chance of soil or nutrient movement by spelling pastures

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 the Reef Rescue Team at Reef Catchments on (07) 4968 4200 or email: reception@reefcatchments.com.au

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The Burns Family

Gully Management

Reef Rescue is assisting Rob and Robyn Burns to stabilise a major gully slip through revegetation and riparian fencing.

Rob Burns is a firm believer in learning from his neighbours to improve his land management. "We watch what our neighbours do," said Rob who manages farm operations at Orr Farm. Rob and his family act as stewards of the land. "We bought the land to control what happens to our environment. We've always had a passion for sustainability."

A major landslip occurred in 2010 on Rob's property after heavy, prolonged rainfall on a south west facing slope above Sawpit Creek. There had been one major and several minor landslips on similar steep slopes on the property over the years. A number of factors contributed to Rob's most recent landslip, including:

- The steep slope (approx. 20^0-30^0)
- Saturation of shallow soils from prolonged rainfall and seepage
- The lack of deep rooted vegetation above the slip area to take up moisture and stabilise soils

After consulting with Landcare and the Department of Primary Industries, Rob knew something had to be done. The area surrounding the slip was immediately fenced to reduce danger to stock as well as promote ground cover for stabilisation.

Land slips can lead to the loss of productive land and result in stock injuries. There are limited solutions to a slip of this magnitude that would not require large machinery and great expense.

About the farm...

Eungella graziers the Burns family bought their Eungella property in 2007 and developed what Rob Burns calls a lifestyle cattle farm. The farm is run by Rob along with his wife and son. They named the property Orr Farm, recognising Owen, his son, Robyn, and Rob himself.

The family originally purchased the Eungella property in the 1970's as a dairy. It was sold in the 1990's as they followed other business avenues in the region. In 2007 they bought back the 102ha Eungella property, as a grazing property. They currently run 110 breeders, steers and bullocks. The property is divided into a number of paddocks, with off stream water and fenced riparian areas help manage the stock and land.

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Amanda Bland from Reef Catchments talked to a number of colleagues with experience in soil conservation who all recommended the most cost effective way of stabilising Rob's landslip would be revegetation with a mix of deep rooted trees, shrubs and small, clumping plants with fibrous roots above and around the site.

In 2012 with help from Reef Rescue funding, Rob is going to permanently fence the landslip area and the adjoining creek to control stock access. In addition, Rob intends to plant out the landslip area with local native plants to stabilise the soil and reduce any further slips.

Revegetation will be done in two phases. The first phase will be planting fast growing local pioneer species and small, clumping plants. The second phase is revegetation with slower growing native plants with deep roots.

Rob plans to revegetate with native species including brown kurrajong, lilly pilly and Lomandra sp. "Not only do we need trees to stabilise the slip, but also ground cover and shrubs," he said. The positive effects of revegetation extend beyond stabilising land. Native species provide a wind break and shelter for stock and help ensure wild life habitat connectivity through developing connected corridors.

This is Rob's second time working with Reef Catchments. Two years ago, he received Reef Rescue funding to complete the stocktake workshop, undertake soil testing and property planning. He also received assistance to construct riparian fences to control stock access to creeks. Riparian fences also help to create wildlife corridors and improve water quality. According to Rob, riparian fences help to avoid future problems and "keeps cattle out of calamities."

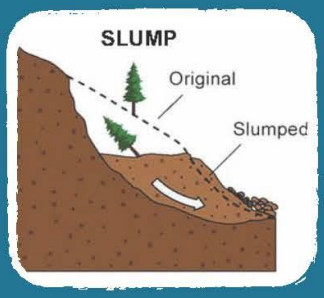
"We bought the land to control what happens to our environment. We've always had a passion for sustainability."

Activities on this property will improve Water quality by reducing sediment runoff from gully erosion and stream bed and bank erosion through:

- Improved soil stability by controlling stock access to eroding gully and creek
- Improved soil stability on hillsides by revegetation with deep rooted plants
- Increased water absorption into the soil reducing saturation

Revegetation work on Orr Farm. *Photo by Saskia Von Fahland*

OUTCOMES



Improved soil stability by controlling stock access to eroding gully and creek *(ref. www.ga.gov.au/hazardlandslide.html)*

Improved soil stability on hillsides by revegetation with deep rooted plants

Increased water absorption into the soil reducing saturation

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 Amanda Bland at Reef Catchments on (07) 4968 4216 or email: amandabland@reefcatchments.com.au

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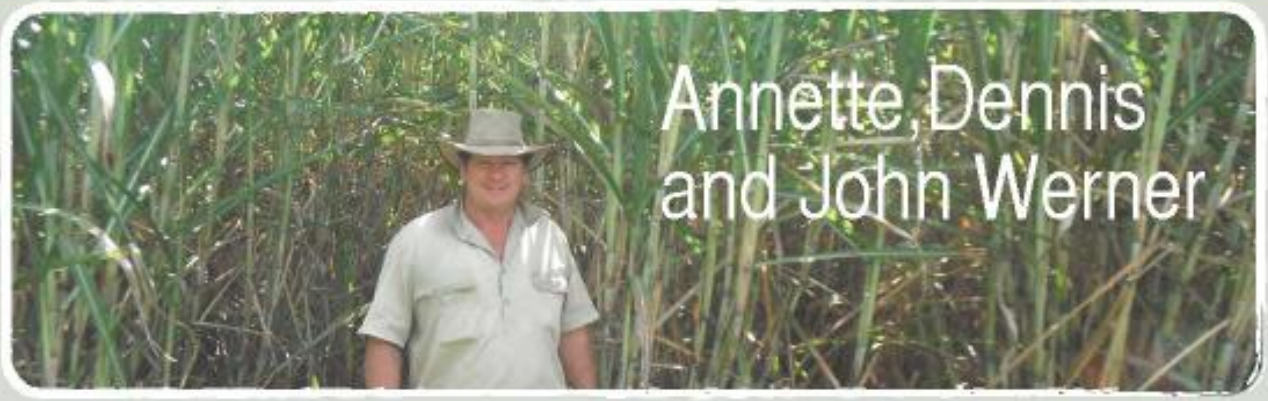

Improved Farming System Using Controlled Traffic and Sub-Surface Nutrient Applications

Reef Rescue has helped the Werner's to make many changes on their farm including adopting a controlled traffic system with improved nutrient management. With the funding, the Werner's were able to modify their existing equipment and purchase some new equipment to make adopting their ideal system possible in a short time frame.

In 2006, the Werner's started to convert their farm and equipment to a 1.83 m controlled traffic system and have only around 5% left to plant at the new row spacing.

With the help of Reef Rescue in 2009 they finished the modifications to their harvester including widening the fronts and putting on an elevator extension and purchased a rotary hoe to do zonal tillage operations.

The Werner's like to utilise rotational fallow crops as part of their new system and this includes planting legumes or forage crops so that they can provide a feed source for their cattle and maintain excellent ground cover during the wet season to reduce the risk of any sediment loss.

As well as improving their soil management, the Werner's have made other changes to their nutrient, chemical and irrigation management across the farm. This includes the purchase of a 4-row shielded sprayer unit in 2009 so that they could use knockdown chemicals to control weeds in their inter-rows and for vine control before out of hand stage.

John also controls weeds in their grazing land with the introduction of camels to get on top of lantana but explained that "they do prefer the tougher spikier weeds."

In 2011 they purchased a new hard hose irrigator with automated computer controls to improve the efficiency and accuracy of their irrigation applications.

Annette and Dennis are 3rd generation farmers and their son John, 4th Generation. Their family first farmed near Rosella in 1894 before moving up to Septimus in 1936, which is around 45 km West of Mackay. Their 330 ha property includes 112 ha of cane, an area leased from them for a council quarry and the rest is grazing. In 1989 they were one of the first farms to be 100% green cane harvested. The property sits in the Cattle Creek Sub-catchment with Seven Mile Creek flowing through the farm before joining Cattle Creek and the Pioneer River.

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"We can control the speed of the irrigator so that it speeds up over our hillier country or in our clay soils to prevent over watering," John explained. This helps to complete their ideal system of irrigate, spray, fertilise/grub control and a final irrigation to incorporate.

The Werner's are also committed to applying all of their nutrients sub-surface so that it is directly in the root zone. In 2011 with the help of Reef Rescue they purchased a 2-row sub-surface granular side dresser.

They have constructed a mill mud pad and in 2012 through Reef Rescue are building a sub-surface mill mud applicator and are aiming to apply rates at 20 tonnes/ha which will cover 2 years of phosphorous requirements. "Without Reef Rescue we would have still been keen to do all of this work but it would have taken a much longer time," said John.

"Without Reef Rescue we would have still been keen to do all of this work but it would have taken a much longer time"

"It has helped being able to check out other Reef Rescue projects that have been going on and down the track we may look at getting a GPS," he added.

OUTCOMES

Reduced risk of nutrient losses with accurate sub-surface applications

Reduced risk of losses with automated high pressure overhead irrigation

Reduced risk of residual chemical losses by utilising knockdown chemicals where practical

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 The Reef Rescue Team at Reef Catchments on (07) 4968 4216 or email: reception@reefcatchments.com.au

This project is supported by Reef Catchments through funding from the Australian Government's 'Caring for our Country' program.

CARING FOR OUR COUNTRY

REEF RESCUE

2012

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

Improved Farming System using Controlled Traffic and Efficient Irrigation

Reef Rescue helped Ian Passfield to make a range of changes on his farm including adopting a controlled traffic system with improved nutrient management and efficient low pressure over head irrigation. With the funding, Ian was able to modify some of his existing equipment and purchase new equipment to make implementing the changes possible.

In 2009, Ian made the big decision to go to a controlled traffic system and increase his row spacings to 1.83 m with the help of Reef Rescue. He started by modifying his equipment including his spray rigs and fertiliser box to match his new system and in 2010 planted his first lot of cane on the wider rows.

To further improve the system, he used Reef Rescue funding to purchase a GPS and in 2012 will have converted his whole farm. The benefits of controlled traffic include reducing soil compaction and trials have shown that it improves water infiltration leading to less run-off and sediment losses from within the paddock.

As well as improving his soil management, Ian has made other changes to his nutrient and irrigation management across the farm. In 2010 he modified his 3-row granular stool splitter fertiliser box with new double disc openers for accurate and effective sub-surface placement.

Ian said that "after using the double disc openers I would never go back to the legs as they do a much better job in a range of conditions, such as wet trash, with very accurate placement." This means he can be confident it is putting out exactly the rates he planned using his EM mapping, soil testing and 6 Easy Steps recommendations.

In 2012 he also modified his planter to use liquid fertiliser which has allowed him to reduce his fertiliser rates due to it being more efficient and effective.

About the farm...

Ian is a 2nd generation cane farmer with his parents originally farming in the Victoria Plains area, just west of Mackay. Ian moved to his current 250 ha farm north of Bloomsbury in 1989 and now has 130 ha under cane production. The farm is located at the junction of the Andromache and O'Connell Rivers, which is around 75km North West of Mackay. Ian says the rivers have constantly changed since he moved there and are really silting and filling up. He was told that in the past people could ride a horse under the Caping Road Bridge leading to his farm and has noticed that floods now seem to do more damage to the banks.

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Andromache River

"You get away from needing to have a bag lifter which is just another job," he explained.

Ian also improved his irrigation management through using controls on his pumps to regulate the amount of pressure going to equipment in his paddocks.

"After using the double disc openers I would never go back to the legs as they do a much better job in a range of conditions, such as wet trash, with very accurate placement"

He already had a traveling boom and soft hose winches for application but has been able to increase their efficiency, incorporate all inputs and reduce the risk of any run-off from over irrigation.

"Without Reef Rescue I would not have made all the changes I have done. It has been a real help during some tough times of drought, floods and stand over cane," Ian said. "The paperwork was not demanding, there was support along the way and if it continues who knows what we might do with new technology and products coming along," he added.

OUTCOMES

Reduced risk of nutrient losses with accurate sub-surface applications

Reduced risk of chemical losses with accurate and effective applications

Reduced risk of losses from low pressure overhead irrigation

Reef Catchments

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CARING FOR OUR COUNTRY

REEF RESCUE

2012

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

Improved Farming System using Controlled Traffic and Zonal Tillage Operations

Reef Rescue helped Les and Paul Durnsford to adopt new management practices on their farm including a controlled traffic system with zonal tillage operations. With the funding, Les and Paul were able to modify their existing equipment and purchase some new equipment to match their new system they are implementing.

In 2006, Les and Paul made the decision to convert their farm into a controlled traffic system with 1.83 m rows. Now, in 2012, 95% of the farm has been converted to the new system. With the support of Reef Rescue they have modified all of their equipment to match the 1.83 m row spacing, including their planter and spray rigs.

"In 2009 we needed to put in a harvester elevator extension and purchased a GPS which we would not have been able to do without Reef Rescue support," Paul explained. Now, in 2012, with some of their original wide row plantings going into fallow, they have purchased a 3-row zonal rotary hoe so that they can reduce the area needing to be cultivated and hopefully the number of times they need to drive up and down the paddocks. Not only does this save dollars but can improve soil structure and reduce the risk of soil being exposed during rainfall events. Down the track Paul said he would like to be able to put a GPS in the harvester as well to finish off the system. "So hopefully Reef Rescue continues," he added.

Les and Paul have implemented other activities to improve management practices across the farm. They have modified their spray rig to include Irvin Legs so that they can do a directed spray of residual chemicals in under the canopy and reduce the total amount applied while still providing good control. "With any inputs on the farm such as chemical or fertiliser applications, either

About the farm...

Les and Paul are 2nd and 3rd generation cane farmers who own a farm near Yalbaroo, around 60 km North West of Mackay. The 400 ha farm was bought in 1928 and originally was all cattle. They currently have 300 ha under cane with a few cows left on the areas not able to be cultivated. The farm is cut in half by the Bruce Highway with Mt Catherine one of the stand out features in the landscape. The farm is part of the Blackrock Creek sub-catchment, but has Catherine, Beatrice, Nota Bean and Alligator Creeks flowing through it before they all come together as Black Rock Creek below their property.

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Alligator Creek

granular or liquid, we like to incorporate them with irrigation as soon as possible as we see this makes a real difference," Paul said. "This also reduces the risk of losses in run-off as it can be incorporated into the soil and we make sure our soil stays in the paddock," he added.

Les and Paul used Reef Rescue to purchase a new hard hose irrigator with an automated computer control system to help with the incorporation process. "The computer controls mean that we can program in the amount of time and water that is put out and so can match soil type to irrigation amount very accurately," Paul said.

"In 2009 we needed to put in a harvester elevator extension and purchased a GPS which we would not have been able to do without Reef Rescue support"

This can help them save water and reduce the chance of any run-off from over irrigation. "We also like to harvest with moisture so that we don't need to irrigate straight away and can wait till we need to incorporate inputs," Paul added.

OUTCOMES

Reduced risk of chemical losses with accurate and effective applications

Reduced risk of sediment losses with minimum tillage system

Reduced risk of losses from improving irrigation efficiency and incorporating inputs

Reef Catchments

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CARING FOR OUR COUNTRY

REEF RESCUE

2012

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

Improved Farming System Using Controlled Traffic and Zonal Tillage Operations

Reef Rescue helped Mal Burston to make big improvements on his farm including adopting a controlled traffic system with zonal tillage operations. With the funding, Mal was able to modify some of his existing equipment to match his new row spacings and purchase new equipment to make the changes possible.

In 2009, Mal made the big decision to go to a controlled traffic system and increase his row spacings to 1.83 m with the help of Reef Rescue.

"The funding motivated us to do it and without it we would probably still be thinking about it," Mal said. During 2009 and 2010 Mal has modified most of his equipment to suit his new row spacings including setting up his ripper and rotary hoe to be able to do zonal workings and more importantly coming into his second crop cycle.

"We have converted most of the farm and I am really seeing the benefits of it and will be happy when we are all done by 2013" Mal added. Mal also has wider headlands and drains to stop compaction around the farm that can cause erosion problems down the track.

As well as improving his soil management, Mal has taken advantage of Reef Rescue to make changes to his nutrient and chemical management practices. This includes in 2010 modifying a 2-row sub-surface side dresser to match his new row spacings which will be combined with a new liquid applicator to band apply other products like molasses as a nutrient source and annual application of lime to rectify any calcium deficiencies.

"We like to use irrigation to incorporate our fertiliser and will construct some more stormwater structures into the future on our dry land section to be able to do this over the whole farm," Mal added. To improve his chemical management, Mal purchased a 4-row shielded spray unit in 2012.

About the farm...

Mal is a 3rd generation farmer and his family first moved to the 350 ha farm near Kuttabul in 1947. Back then it was a dairy and the conversion to cane started in the 1950's. It now has 280 ha under cane production with some grazing and is located around 30km North West of Mackay.

The farm is bordered by Palm Tree Creek which flows into Jolimont Creek and is part of the Murray Creek sub-catchment. Mal says that the creek has a major flood in it at least every 3 years which does come very close to the house.

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"We used to use lots of residual chemicals across the farm but thought it was impacting on our cane. We now want to use more of a knock down strategy to reduce the impact on the crop," explained Mal.

"The funding motivated us to do it and without it we would probably still be thinking about it."

To do this Mal times some of his cultivation in plant cane for weed control and then in ratoons uses the shielded sprayer to apply knockdowns in the inter-row and into the stool. He is also going to add a 3rd tank and a boom to the front of his spray tractor for vine control where required.

Mal was very supportive of Reef Rescue and said that "without the funding we may have done some things but certainly would not be as far down the track. We have changed our whole farming system in 4 years instead of 10 or more." He does have some more projects he would like to do and added that "it would be great if Reef Rescue could continue so that we can finish the job we have started."

Palm Tree Creek

OUTCOMES

Reduced risk of sediment losses with zonal tillage operation

Reduced risk of losses with well grassed drains and stormwater structures

Reduced risk of sediment losses from reduced cultivation

Reef Catchments

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REEF RESCUE

2012

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

Improved Farming System using Controlled Traffic and Rotational Legume Fallows

Reef Rescue has helped Michael Deguara make big changes on his farm including using rotational legume fallow crops as part of a controlled traffic system with GPS. With the funding, Michael was able to modify existing equipment and purchase some new equipment to make implementing his

Michael has a history of trialling new management practices on his farm. In 2000 he trialled legume fallows and then in 2005 started to implement some wider row spacings to look at the benefits of controlled traffic.

After a few years Michael could see the benefits of combining these practices on his farm and in 2009 used Reef Rescue to help purchase a legume planter and to modify his equipment such as his spray rigs and grubber to match his 1.83m row spacings.

Michael explained that "legume fallows have made a huge impact on soil health on my farm and I have seen the subsequent productivity benefits.

"It also provides good ground cover during the wet season and provides the majority of nitrogen to the following plant cane crop. Last year was the first time since 2000 that Michael was unable to establish legumes due to the extreme rainfall in late 2010 and early 2011.

Michael has now converted his whole farm to the new system and in 2012 received Reef Rescue funding to get GPS on two tractors, a zonal rotary hoe and modify his planter to match the row spacing he has selected.

Michael said "I wanted to establish wide rows on the farm to test how it works and now want to use GPS to maintain permanent traffic zones and adopt zonal tillage operations."

About the farm...

Michael is a 4th generation farmer and the 3rd generation to farm his current 150 ha farm located at Farleigh, around 10 km North West of Mackay. His family moved to the farm in the 1950's and Michael has grown sugarcane there since 1990.

The farm is close to the Farleigh Mill and is bordered by the Bruce Highway as you drive north. While the property does not incorporate or border a waterway, runoff drains into Amhurst Creek which is part of the Reliance Creek sub-catchment.

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He is currently testing to find the most suitable cultivation operations or methods to go from last ratoon into a legume fallow and then back into plant cane for the soil types on his farm. Michael said, "I was always keen to move to my new system but without Reef Rescue this would have taken much longer than it has."

"I was always keen to move to my new system but without Reef Rescue this would have taken much longer than it has"

As well as improving his soil management, Michael has been changing some of his other management practices on farm. He has attended many training programs including FEAT, 6 Easy Steps and Weed Management courses and is incorporating what he has learned back on the farm.

In 2011 he received Reef Rescue support for the purchase of a 3-row sub-surface granular stool splitter fertiliser box to be able to apply his determined nutrient rates accurately with placement under the ground.

Michael explained "I also modified my spray equipment to improve my application effectiveness and timing because you do need better weed management in the wider rows and I don't want to have to keep coming back to control vines."

Three row sub-surface fertiliser applicator

OUTCOMES

Reduced risk of chemical losses with accurate and effective applications

Improvements in soil heath from rotational legume fallows helping crop productivity

Reduced risk of sediment losses from increased ground cover during wet season

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REEF RESCUE

2012

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

Improved Stormwater Management

With the help of Reef Rescue, Anthony Bernard has improved his stormwater management across his cane and lychee farm. The funding allowed Anthony to improve the effectiveness of his dams and sediment/ detention basins to collect the majority of run-off from his farm.

Over the last 3 years, Anthony has applied for Reef Rescue funding to complete work on existing stormwater structures to improve their effectiveness to trap run-off from his farm. "I heard about the Reef Rescue program through Anna Geddes at Growcom and was keen to see how I could be supported to do some work on my farm," Anthony said.

With Anna's support he identified that improving the efficiency and effectiveness of his stormwater structures would not only have an environmental benefit for habitat and water quality but would also provide an irrigation source to improve his production.

Anthony said that some of the structures were built around 45 years ago, adding, "I remember it costing around 800 pound to build one back then and it would most likely be too expensive to do it today." Over the years plenty of sediment has been trapped and there have been changes made to drainage across the farm which meant that the structures were not functioning at full capacity.

"It was work that I always wanted to do, but with Reef Rescue it made it a possibility to do it now rather than later," explained Anthony.

Since cleaning out the stormwater structures and improving the drainage into them he has also been able to do better weed control along the edges, controlling hymenachne and paragrass. This can prevent weeds spreading into his lychees, cane and the surrounding environment including the wetlands.

About the farm...

Anthony Bernard has a 74 ha property that borders Sandy Creek, around 16km south of Mackay. He has lived there for the entire 71 years of his life. The property was originally a dairy farm when his parents purchased it. In 1952 the first cane was planted and the whole farm was soon converted. In 2006 a decision was made to put in lychee trees to help diversify. The majority of the farm is still cane but there are now 10 ha of lychees with around 3000 trees planted on 8 meter row spacings with 4 meters between each tree.

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The structures are also showing signs off having more wildlife use them with barramundi, turtles and plenty of water birds now regularly seen.

Anthony has adopted some other management practices that reduce the risk of losses including under canopy micro-sprinklers for irrigation linked to a fertigation system to apply nutrients to the crop at the right time. He also maintains excellent ground cover on his inter-rows during the wet season to reduce the risk of any erosion within the crop.

"It was work that I always wanted to do, but with Reef Rescue it made it a possibility to do it now rather than later"

With regards to the Reef Rescue program, Anthony said, "the help I have received from Anna and also Chris Dench from Reef Catchments has been great and helped make the whole process much easier for me." He also added that if there was more funding available in the future he would be keen to look at some more projects that he has identified with Anna through the Growcom FMS modules.

OUTCOMES

Reduced risk of losses from efficient irrigation methods

Reduced risk of sediment losses from good inter-row ground cover

Reduced risk of losses by capturing stormwater run-off

Reef Catchments

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REEF RESCUE

2012

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Improved In-Crop Management

Reef Rescue helped Don and Pauline Brown implement a range of improved in-crop management practices on their lychee farm. With the funding, they were able to improve the accuracy and efficiency of their nutrient and chemical applications and maintain excellent ground cover between their rows.

In 2010, Don and Pauline applied for Reef Rescue funding to help purchase a side throwing slasher and fertiliser spreader for use within their lychee orchard. Don said "with the slasher, we are able to take one of the sides off and then when mowing the inter-row throw the residue in under the trees to act as a mulch."

The Brown's also allow all of their pruning's to stay under the trees for even more mulch cover and this helps increase organic matter, retain moisture and suppress weed growth amongst the trees so they don't need to spray underneath them. Don added, "All we need is maybe to spray some knockdown along the rows to control any weeds heading into the trees."

With the new fertiliser spreader the Browns have changed from using chemical based fertiliser to applying organic products. Don explained that, "the spreader is able to be changed to accurately apply a range of products but we now prefer to use things like chicken pellets."

The organic fertiliser is thrown in evenly under the trees and as Don points out; combined with the increased mulch cover, when it rains it doesn't go anywhere. To help provide the trace elements that lychees need, they also use a foliar application to get in under the leaves where it can be absorbed.

In 2012, Don and Pauline where keen to improve their application of chemicals within the trees for control of pests that impact on their crop.

About the farm...

Don and Pauline Brown own a 22 ha farm along the banks of Gillinbin Creek, around 70 km south of Mackay. They first moved there in 1977 and in 1998 planted their first 200 lychee trees. Over the years the area under lychee production has grown with 2000 trees now planted over 8 ha. The trees are set up on 8 meter rows with 5 to 2.5 meters between them depending on the variety. The Brown's also grow strawberries to supply local stores and have developed up some pangola pasture to run a few head of cattle.

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This project is supported by Reef Catchments through funding from the Australian Government's 'Caring for our Country' program.

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Gillinbin Creek

To do this they successfully applied for a 500 litre Mister and are very keen to start to use it.

Don said that "controlling pests is a key part of managing a lychee crop and our old application method was inefficient. With this new applicator we will be able to use a reduced amount of product and have better crop cover which will help reduce losses in any run-off."

"With the slasher,we are able to take one of the sides off and then when mowing the inter-row throw the residue in under the trees to act as a mulch"

The Browns also use trickle tape and sprayers for under canopy irrigation and some of this is linked to a fertigation system and storm water structures to capture any run-off. One important thing they pointed out was the establishment of wind breaks around the property and the real benefit this has had for their crop.

With regards to the Reef Rescue program, Don and Pauline both said that "without the help of Anna Geddes from Growcom they would not have got involved in the program."

They explained that if there was no funding available, or they could only get 20% funding, they would have maybe only completed one of these great projects.

OUTCOMES

Reduced risk of chemical losses from efficient,accurate application

Reduced risk of losses by capturing stormwater run-off

Reduced risk of nutrient losses from accurate under canopy application

Reef Catchments

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Laser Levels

2012

Reef Rescue Case Study: Laser Levels

Due to the long and intense wet season of 2010/11 it became evident that many cane properties in the region had issues with water logging.

This problem had gone unnoticed for years as irrigation was used in the previous dryer years. In 2010/11 the seasonal rain was more than enough and the many downpours of the season highlighted drainage issues on properties across the region.

Water logging occurs when water is unable to drain effectively from a property and can lead to reduced yields. Poor drainage can also cost growers through the loss of sediments, and applied nutrients and chemicals in runoff, resulting in poor water quality leaving the property.

BSES sought to remedy the problem by supplying land managers with laser level survey equipment to assess their properties for any drainage issues. BSES obtained funding to purchase three laser levels through the Reef Rescue Industry Grants. The laser levels are now loaned to growers at no cost. If drainage issues are identified the growers can undertake earthworks needed to improve water flow.

This project is similar to another BSES project which loans Zonal Tillage equipment for growers to trial. The zonal tillage project also gained substantial funding through Reef Rescue's Industry Projects Fund.

"These projects allow growers to trial or use equipment at no cost. Growers are then in a position to make more informed decisions if they wish to purchase the equipment themselves," said Chris Dench, Reef Rescue Officer. As with Zonal Tillage equipment project, BSES provides technical assistance to the growers' trialling the laser levels to ensure the optimum outcome is reached.

Reef Rescue is funded through the federal government's Caring for our Country program.

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Example of flooding due to poor drainage

Poor drainage after 2011 wet season

Brad Hussey with a BSES laser level

Reef Catchments

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Brad Hussey from BSES Limited said that the levels selected for the project are Trimble LL400 Lasers Levels which have an operating range of 400m and are capable of grade matching. Grade matching means that the level can be setup at the top of the ridge and then the beam of the laser can be manually focused to a point down the slope to enable a drain of constant slope to be constructed with no additional calculations.

The lasers are equipped with a tripod, staff and a CR600 detector which can be used either on the staff or magnetically mounted on the earth moving equipment. With the detector mounted on the earth moving equipment the operator can maintain accurate drain depth with laser assistance. The laser beacon turns the process into a one man operation and solves the issue of having to find someone to hold the staff, or to get in and out of the machine to check levels.

Mackay cane grower Vince Germanotta recently borrowed the laser levels from BSES to put in a 400m drain on his property. "Our land is pretty flat." said Vince, "We needed the laser levels to put in the drain so that we didn't end up with a hollow in the middle which would have been likely without using equipment. Using the BSES Laser Levels also meant that I could do the job on my own and get it done pretty quickly. I didn't need a hand which I would have if I was using Dumpy Levels". Vince is now looking to buy his own laser levels to use in the future to keep the water flowing off his land.

Loan Equipment Available from BSES

- Laser levels
- 3 Row wavy disk cultivator with crumble roller
- Single row wavy disk cultivator with crumble roller
- Bed renovator
- Zonal ripper
- Multi-purpose demo spray rig
- Zonal Rotary Hoe

If you are interested in finding out more about Laser Levels contact Brad Hussey at BSES
ph (07) 4963 6803 email: BHussey@bses.com.au

MOSES Project

2012

The VERIS machine mapping soil electrical conductivity

MOSES Project - a free service provided through Reef Rescue

Precision agriculture in cane farming seeks to look for greater efficiencies by taking into account variability, not only across farms and paddocks but within the paddocks. Increasingly producers are looking to improve efficiency i.e. to minimise inputs while maintaining or increasing yield as a way to increase profit margin.

Soil and soil properties vary across paddocks so the application of large amounts of fertilisers applied evenly will not necessarily produce a higher yield. The use of variable rate fertiliser control allows fertiliser inputs to be modified across the paddock with rates determined by the yield potential of identified soil zones. Likewise, adjusting the rate of irrigation to take into consideration the slope of the land and the makeup of the soil within that paddock has the potential to reduce water use.

The increased efficiency means that more of the inputs are used by the cane and less prone to run off after flood events improving water quality. The MOSES Project is being run by Farmacist and supported with funding from Reef Rescue. It studies the variation across paddocks and how using variable rate application can ultimately improve efficiency. The MOSES project is expanding on and adding to information from the findings of a previous SRDC funded project. The SRDC project BSP001 identified a number of variables that are influential in crop growth including soil and chemical properties, drainage, seasonal conditions, disease and plant varieties.

While all of these factors can affect yield the project identified three key spatial datasets which have significant influence in maximising yield potential.

Reef Rescue is funded through the federal government's Caring for our Country program.

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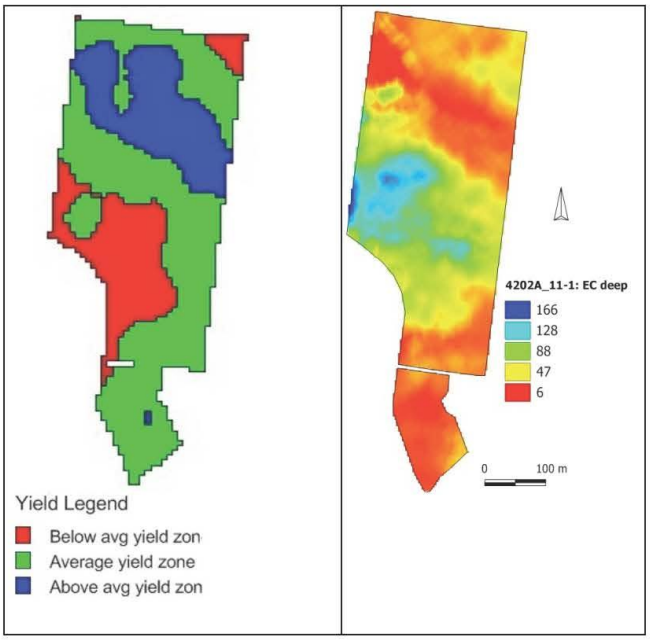

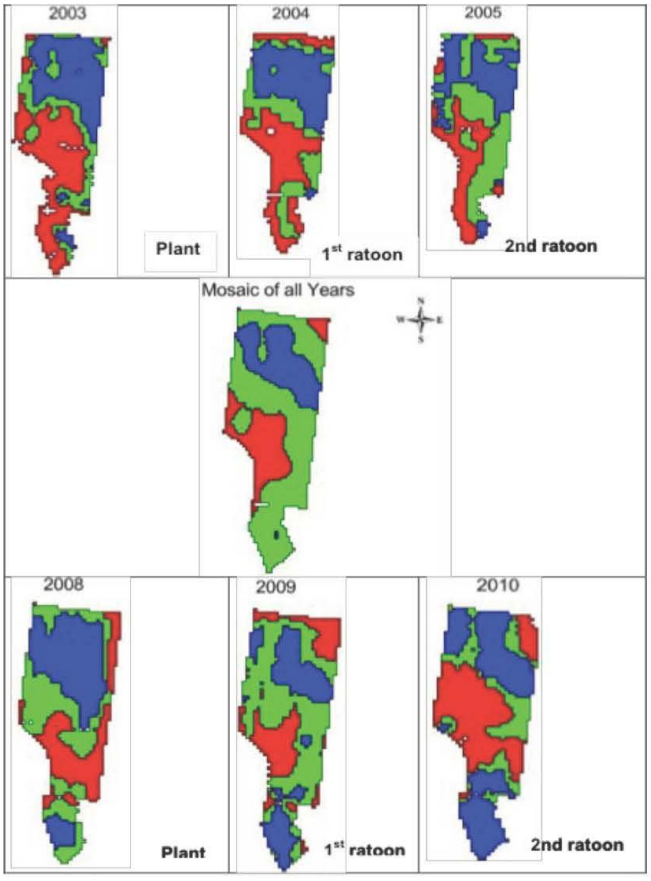

They are: soil layers, topographical or elevation layers, identifiable and stable in-paddock yield patterns.

The MOSES project aims to generate Electrical Conductivity (EC) mapping and Real Time Kinematic (RTK) GPS data for variations in soil and elevations respectively for the central region. Until now much of this information has not been available with the detail needed to effectively make decisions using precision agriculture. Previous soil layers have been at the coarse scale of 20 hectares, while topographical maps have had elevation accuracies of one metre. Now using EC mapping, soil patterns are able to be mapped at a scale needed to identify changes in soil properties within paddocks suitable for precision ag purposes. Similarly, advances in technology using RTK GPS can achieve topographical maps displaying elevation accuracies of less than 2cm.

Once these two data sets are used together, with an in-paddock yield datasets derived over time using remote sensing technology, theses layers identify yield potential management zones. These zones can be managed to ensure high potential zones receive sufficient inputs to maximise potential while zones of low potential only receive what the cane can use.

So what does all this mean?

Land managers are able to manage their paddocks according to the maximum yield potential of the identified zones therefore maximising input efficiency. This improved efficiency together with less chance of any inputs leaving the property is improving the economic and environmental sustainability of sugarcane production in the central region.

Top figure - relationship between yield and EC mapping
Bottom figure 2 - stability of yield over time

Reef Catchments

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www.reefcatchments.com.au

EC mapping of your soils is a free services offered by Farmacist and funded by Reef Rescue.
If you are interested in finding out more about the MOSES Project contact Farmacist on 0408 849 902.

2012

Mud Mill Nutrient Trials

Reef Rescue Case Study: Mud Mill Nutrient Trials

Reef Rescue industry funding in the Mackay Whitsunday region has progressed the development of nutrient management guidelines incorporating the use of mill mud. This new knowledge can be directly applied to A class practices, i.e. banded application using less than 70 tonnes per hectare.

This research was needed to to fill gaps in information on mill mud, including how much variation there is in mud nutrient levels coming from a mill and also the variation in mud between mills. Farmacist Pty Ltd were engaged to undertake the necessary field studies and to develop user guidelines for the use of mill mud.

It is important to establish guidelines for the application of mill mud so that growers can apply at measured rates that offer maximum benefit. With the development of banded applicators mud can be applied directly onto the row rather than spread over the whole paddock. This has reduced application rates by as much as 100 tonnes per hectare. With growers required to report applications of mill mud over 100 tonnes per hectare it is essential for to have confidence in the amount of nutrient being applied when applied at lower rates.

Having confidence in the rate of nutrients coming from the mud means growers can top up with conventional fertilisers ensuring the cane has adequate nutrients to grow while still complying to '6 Easy Steps' methodology.

This has benefits for both water quality and the grower with only the required amount of nutrient going onto the paddock, meaning that excess is not lost to runoff or deep drainage and the grower won't pay for additional fertiliser that is not used by the plant.

Reef Rescue is funded through the federal government's Caring for our Country program.

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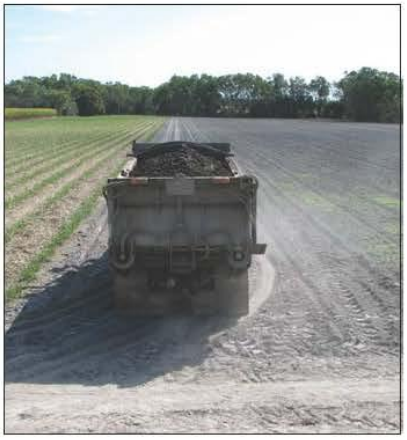
A mill mud truck fitted with side applicators fitted to enable banded application



A mill mud truck at work (above and below)

Banded mill mud sits above the water running off this cane paddock during rain.

Trial Results

There has been much conjecture as to the variability in relation to the nutrient content of mill mud. Analysis of mud from 2010 and 2011 has shown that while there is variability in mud being produced from any single mill variation might not be as high as first thought, reportedly deviating by less than 10 per cent away from the mean. There was however variation between mills sampled but this was due to some mills producing mill mud only while another mill had a mill mud and boiler ash mix. This variation would need to be taken into consideration when nutrient content calculations are performed. Results from the trials established during 2010 on five properties have shown that lower rates of mud using banded application have no measurable difference on cane quality parameters such as yield, sugar content and dirt levels.

After the collection and analysis of data from the first years trial further knowledge gaps were identified. These included what level of nutrients remain within the mud after a crop cycle and if the mud remaining in the paddock increases dirt levels collected during harvest. Results from the 2011 harvest season have indicated that minimal mill mud remains on the surface prior to the harvest in the year following application. Of the mud collected and analysed, less than 10% of the original content remained on the surface. There have also been some concerns that dirt levels in the cane supply from areas that had mud banded onto the surface may be higher than other areas. Daily dirt levels have been compared between areas with banded mud applied and areas of no mud with results showing that there is no measurable difference in dirt levels from each area.

New Trial Sites

During 2011/12 Farmacist has established five new trial sites with the aim of further validation of these early results. Results will be available after samples collected from the 2012 harvest have been analysed.

If you are interested in finding out more about the Reef Rescue funded Mud Mill Trials contact Rob Sluggett from Farmacist.
Ph: 0459 688 844 Email: robertS@farmacist.com.au

Reef Catchments

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

Contact the Reef Rescue team at Reef Catchments on (07) 4968 4200 or email: reception@reefcatchments.com.au

Plane Creek Productivity Services Ltd 2012

Plane Creek Productivity Services Supports Local Growers Through Reef Rescue

Reef Rescue Industry Incentives allow organisations to provide increased extension and services to all growers in their region.

This ensures all growers are able to benefit from Reef Rescue funding regardless of whether or not they have accessed funding themselves. Plane Creek Productivity Services Limited (PCPSL) has three Reef Rescue funded industry projects currently underway which look to provide improved services to growers.

The projects currently underway are:

The delivery of an AgDat support/ extension role for the Plane Creek Milling Region

Extension to the Plane Creek GPS Base Station Network to enable more growers to adopt precision agriculture methods

Mill Mud distribution, monitoring and recording system for the Plane Creek area.

AgDat Support:

This project aims to provide an on ground support role and contact for growers that want to utilise the AgDat and/or AgDat remote recording system. AgDat is a farm recording system that allows growers to enter in a range of input data such as chemical or nutrient applied, rate, date etc. AgDat outputs can then be used to compare data between years and to also show compliance with Reef Regulations.

This extension service provides growers with one on one support and information to allow growers to easily take up this new technology.

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Extension to Plane Creek GPS Base Station

Plane Creek currently has Dual Frequency RTK base stations throughout the Plane Creek region to enable growers to benefit from GPS technology in their farming operations.

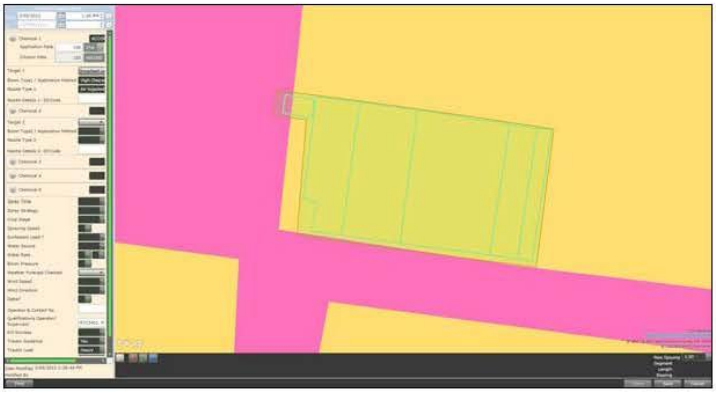
Providing a community base station network allows growers to adopt GPS technology at a reduced cost. Using GPS in a farming system opens up a range of identified improved practices including controlled traffic and variable rate technology improving nutrient and chemical application.

With increased uptake in GPS technology gaps in current coverage area have been identified. Plane Creek applied for Reef Rescue industry funding to erect a new base station increasing their current service by 15% or 2850 hectares in the west Plane Creek area. This project will be finished by June 30 2012 providing growers in the west Plane Creek area coverage to undertake GPS technology.

Mill Mud Distribution

The application of Mill Mud is used by growers as a way to get nutrients back onto the paddock cheaply by using an industry bi-product. With industry funding, PCPSL will be incorporating new technology, fitting data loggers and sensors to spatially map the distribution of mud. Data can then be added to AgDat for growers to use to calculate their nutrient loads and be used to show compliance for reef regulations.

Images from top: *Plane Creek Mill, Community Base Station, Repeaters for a Community Base Stations, Ag Dat display*



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If you are interested in finding out more about AgDat in the Plane Creek area contact Kathy Langdon on ph 0438 024 057
email: k.langdon@pcpsl.com.au

For more information about the Base Station extension project contact Sue Rowlinson on ph 0438 787 295 email: srowlinson@qld.chariot.net.au

For more information about the Mill Mud extension project contact Jim Kirchner on ph 0419 477 446

WeedSeeker®

2012

The Weedseeker® Selective Spray Unit

Reef Rescue Case Study: WeedSeeker®

For the past two years Mackay Canegrower Rod Lamb has been working with BSES Limited to adapt the WeedSeeker® Selective Spraying technology for use in the cane industry.

Commonly used in broad acre crops, WeedSeeker® uses infra-red light emitting diodes to emit light downwards to detect weeds. Light reflected back is captured by sensors and analysed for the light spectrum of green plants.

When detected spray nozzles fire a small amount of herbicide on top of the plant.

The use of this technology in broad acre crops has resulted in the reduction of herbicide by up to 80 per cent. Traditionally, in broadacre this technology has been used on boom sprays and only recently has been fitted to inter-spray hoods for use in-crop.

For use in the cane industry, Rod has fitted the diodes and sensors to inter-row spray shields for use in plant and ratoon crops. The benefit of using this technology is that when there is no weed under the sensor the nozzle will not spray; compared to conventional spraying in which a continuous stream of herbicide is applied regardless of whether or not a weed is present.

Trials:

During the last spray season Mr Lamb has been trialling the innovative technology to see whether the conversion is worthwhile in the cane industry.

Mr Lamb sprayed two paddocks using the WeedSeeker®, one paddock was 6.5 hectares and the other 20 hectares. The weed pressure varied between the two paddocks with the larger paddock having slightly higher weed pressure.

Reef Rescue is funded through the federal government's Caring for our Country program.

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Results:

The result of using the WeedSeeker® highlighted the potential savings from the reduction in the use of herbicide. The WeedSeeker® sprayed 13 per cent of the inter-row in the smaller paddock and 27 per cent of the inter-row in the larger paddock which is what was expected due to the higher weed pressure. Using the conventional shielded spray method 100 per cent of the inter-row would be sprayed. The reduction in the use of herbicide resulted in a saving of $11.72 per hectare for the smaller paddock and $9.82 for the larger paddock. This is a great saving both economically and for the environment.

Conclusions:

Using the above results, if a cane grower had 400 hectares which was sprayed twice a year it would take roughly five years to pay for the equipment. "We are planning to undertake more field trials this year in different blocks to see how the numbers add up. Last year's field trials have also raised a number of unforeseen issues such as the weight of the shields used. The current shields have been found to be too heavy for our five row high-rise and when driving at speed create too much movement along the length of the boom. We are currently looking at remanufacturing a new hood to reduce the weight. We have also found that we need to calibrate the sensors more often than initially thought. This year's trials will also assess the optimum position and number of nozzles on the spray unit to gain maximum benefit from the equipment," Mr Lamb said.

Images: *(from top left) spray coverage using spray shields, Weedseeker® in the field, weed pressure in the inter-row following spraying using a conventional conventional irvin legs sprayer, conventional spraying using the irvin legs.*

If you are interested in finding out more about WeedSeeker® contact Phil Ross from BSES on
ph: 07 4963 6823
email: emailpross@bses.com.au

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