

*You make a difference*



*econcern*



# Final Report

## GBR COASTAL WETLANDS PROTECTION PROGRAMME

2005 - 2007 Pilot Programme



Australian Government



Queensland  
Wetlands Programme

## > Contents

> Introduction .....	4
> Description of achievements against objective / deliverables .....	6
> Effectiveness of the cooperative programme arrangements .....	11
> Appropriateness and success of the Pilot Programme..... <i>what worked and what didn't?</i> .....	16
Riparian Weeds .....	16
Aquatic Weeds .....	18
Grazing and Fire .....	19
Revegetation .....	21
Hydrology / Drainage .....	22
Barriers to Fish .....	24
Feral Pigs .....	26
Constructed Wetlands .....	27
Scientific Monitoring .....	28
Planning Toolkit .....	29
Decision Support System Trial .....	31
BMP: Riparian and Wetlands on Cane Farms .....	32
> Project Partners Seminar .....	33
Figure 1 Map showing location of the 21 Pilot Programme project sites .....	7
Table 1 Pilot Programme project sites and integrated management strategies applied at each .....	6
Table 2 Summary of MER outputs for all projects within the Pilot Programme .....	9
Table 3 Summary of Coastal Wetlands Protection Programme – Pilot Programme publications .....	10
Table 4 Contact details for CWPP-PP key project partners .....	13
Appendix 1 Independent Reference Group .....	35
Appendix 2 GBR CWPP Project Sites Co-ordinates .....	39
Appendix 3 Sample Final Project Report .....	40

**Acknowledgements:** The GBR Coastal Wetlands Protection Programme – Pilot Programme was funded by the Australian Government through the Department of Environment and Water Resources. The Pilot Programme was implemented by a consortium comprising Conservation Volunteers Australia (CVA), WetlandCare Australia (WCA), the Australian Centre for Tropical Freshwater Research at James Cook University (ACTFR) and EConcern. This report has been compiled by the consortium's Project Team – Bob Smith (WCA), Damien Burrows and Vern Veitch (ACTFR), Jim Tait (EConcern and WCA) and David Hudson (CVA). The Project Team wishes to acknowledge the efforts and dedication of dozens of other programme participants from State and Local Government, Landcare and Catchment groups and regional NRM bodies, Indigenous organisations and landholders. Without them the great wetland outcomes of the Pilot Programme could not have been achieved.

## > Introduction

The Great Barrier Reef Coastal Wetlands Protection Programme (GBRCWPP) was announced by the Australian Government in 2003 with the aim to develop and implement measures for the long term conservation and management of priority wetlands in the Great Barrier Reef Catchment. The \$8 million programme, to be managed by the Department of Environment and Heritage (now the Department of Environment and Water Resources DEW), would assist in achieving the goal of the Reef Water Quality Protection Plan over 5 years.

The GBRCWPP is part of the Queensland Wetlands Programme<sup>2</sup>, which is jointly funded by both Australian and Queensland Governments.

In July 2004 a \$2 million Pilot Programme was announced to fast track the delivery of tangible outcomes that protect priority wetlands in the Reef catchment area. Tenders were called for a consultant to deliver the programme and in early 2005 a contract was awarded to a consortium comprising Conservation Volunteers Australia, WetlandCare Australia, Australian Centre for Tropical Freshwater Research at James Cook University, Econcert, and CSIRO. The consortium's task was to develop and implement projects by direct negotiation with stakeholders. There was no public call for applications and projects were assessed by an Independent Reference Group (IRG) appointed by the Minister. The IRG comprised agency, community and industry representatives (Appendix 1). The 2-year programme was due for completion in February 07 but an extension was granted until 30 June 07, mainly due to delays in the assessment and approval of proposals.



### Pilot Programme description

The tasks identified in the Pilot Programme contract included:

- Developing, implementing and managing an on-ground programme to conserve and manage priority wetlands. An Independent Reference Group was appointed to identify priority wetland areas.
- Negotiating with landholders, regional bodies, local government and industry and developing proposals to undertake activities in identified priority wetland areas. Including for example, voluntary conservation agreements, incentive packages, fencing, vegetation buffer restoration and weed control.
- Ensuring, where possible, that these proposals also further actions under the Reef Water Quality Protection Plan and complement the regional plans developed under the Natural Resource Management Programmes, the Natural Heritage Trust (NHT) and the National Action Plan for Salinity and Water Quality (NAP).
- Preparing proposals for consideration by an Independent Reference Group and approval by the Minister for the Environment and Heritage.
- Monitoring project progress toward completion of approved activities, making payments and reporting on the progress of the approved proposals. Approved proposals must be substantially complete within the two-year timeframe.
- Maintaining an effective project management system with adequately trained staff, including a process for managing project delays and non-performing projects.
- Trialling the Decision Support System (under development) to assist with the prioritisation of wetlands in the Great Barrier Reef catchment for investment.
- Providing a final report that will evaluate the success of the pilot programme in its administration and its on-ground outcomes for the purpose of informing future delivery of the Great Barrier Reef Coastal Wetlands Protection Programme.

The consultant was required to undertake the following identified activities:

- Attend project meetings with relevant officers of the Department of the Environment and Heritage as required;
- Act on advice from the Independent Reference Group on priority areas/types to guide project development;

<sup>1</sup> <http://www.reefplan.qld.gov.au/library/pdf/reefplan.pdf>

<sup>2</sup> <http://www.environment.gov.au/coasts/pollution/qldwetlands/nhtwetlands.html>

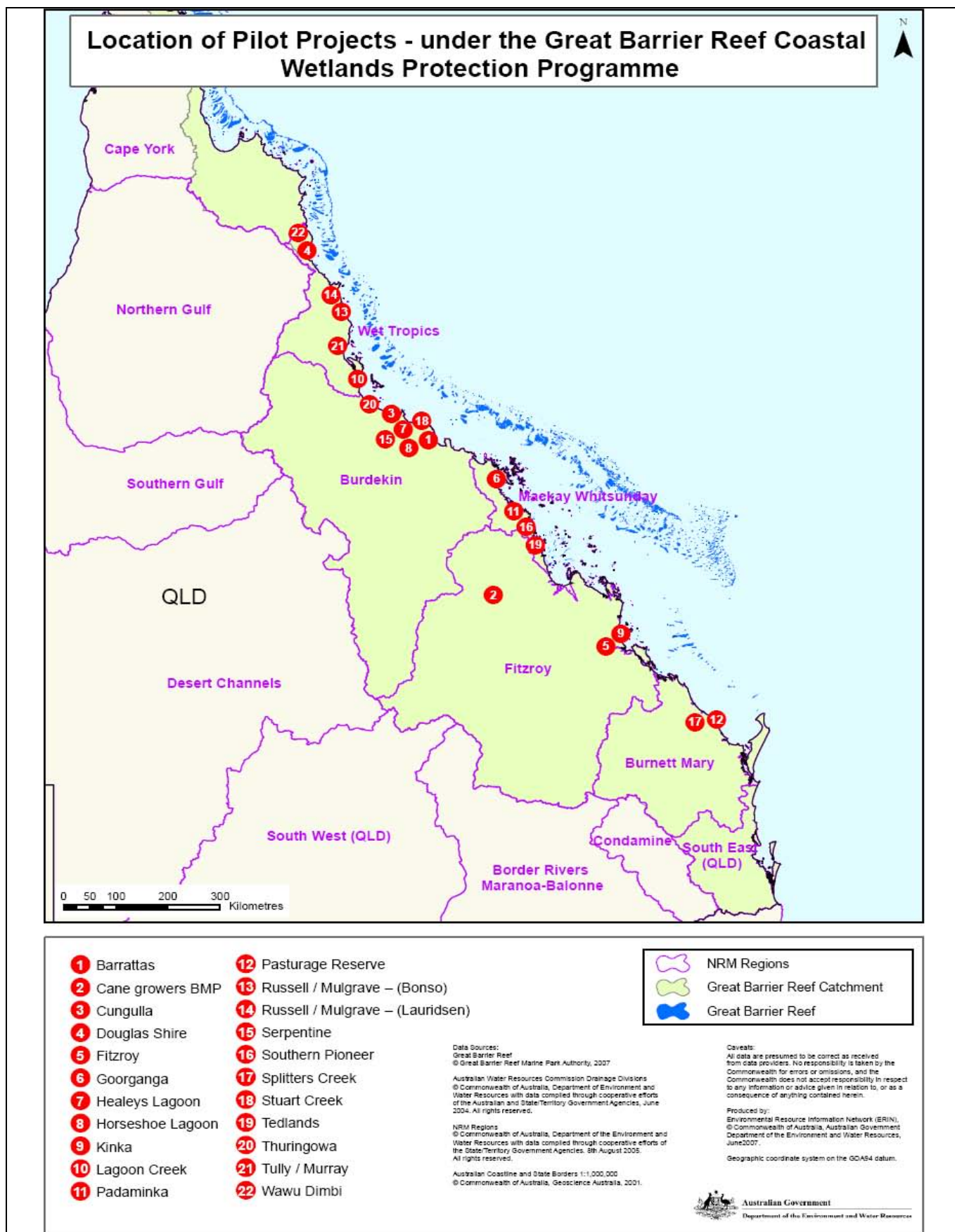
- Negotiate with landholders, regional bodies, local government and industry and develop proposals to undertake activities in identified priority wetland areas;
- Provide proposals to the independent reference group for consideration;
- Write contracts in a form approved by the Department of the Environment and Heritage to deliver the funding to approved proposals;
- Manage the approved proposals to their completion; and
- Provide reports and financial acquittals as required

### **Final Report format**

The contract requires that the Final report will include:

- Description of achievements against the objective and deliverables;
- An evaluation of the success of the pilot programme in its administration and its on-ground outcomes;
- Appropriateness of approaches used;
- Effectiveness of the cooperative programme arrangements; and
- An appropriately audited financial statement of receipt and expenditure.

[illegible]

Figure 1 Map showing location of the 21 Pilot Programme project sites<sup>3</sup>

<sup>3</sup> Map co-ordinates for all projects are provided in [Appendix 2](#)



## **‘Monitoring, Evaluation and Reporting’ of individual project outputs**

A Monitoring Evaluation and Reporting (MER) Strategy developed for the Queensland Wetland Programme (QWP)<sup>4</sup> provided the basis for the Pilot Programme to report on outputs against targets set in each individual project work plans. This enabled a consistent and transparent approach to reporting the progress and effectiveness in delivering individual project and overall Pilot Programme goals and objectives consistent with other projects within the QWP. It provided a means of building on the knowledge gained from the projects and for accommodating new and emerging issues. This required the development of a monitoring and evaluation strategy for each individual project within the overall Pilot Programme objective. An underlying consideration was to demonstrate the appropriate use of funding to implement the desired actions goals and objectives.



Monitoring, evaluation and reporting was a welcome addition to the project as it provided a template containing output categories and 'output units of measure' combined with the opportunity to provide a plain English 'description' of the activity. Output categories of particular reference to the Pilot Programme included technical assessments, DSS, R&D, BMP, resource management plans, awareness raising, skills and training, institutional arrangements, community support, agreements, fencing, rehabilitation, revegetation, wetland health, pests, erosion, and conservation works. A summary of the overall project outputs is provided in [Table 2](#).

## **Progress reporting – individual projects**

MER was integrated into project planning so that each project had a single document that contained the initial project proposal, work plan and budget to which was added columns containing output codes, description of measures and provision to describe the activity as per the MER reporting proforma. This proved to be an acceptable format for project partners preparing updated progress reports (linked to progress payments) culminating in a final report for each project. A sample of a final report containing the MER section is provided in [Appendix 3](#). The complete set of 21 individual MER reports together with the respective project proposals are reproduced in Volume 2 of this report. Note that the reporting formats for 2 projects (Douglas and Mulgrave Russell) are in a slightly different format to facilitate cross reporting with Terrain NRM. Note also that progress reports for Mulgrave Russell have been included. They provide an excellent insight into the trials and tribulations of being a catchment co-ordinator in the wake of Cyclone Larry.

<sup>4</sup> Conrick, D (2005) Development of a Monitoring, Evaluation and Reporting Strategy for the Queensland Wetland programme, prepared by Queensland Department of Natural Resources and Mines draft report WL NRM 02. December 2005.



**Table 2 Summary of MER outputs for all projects within the Pilot Programme**

Output Category	Code	Total Output	Description of Output
<b>Resource assessment (RA)</b>			
RA1 Setting or monitoring resource condition targets	RA1.2	6	New monitoring programs established
RA2 Investigations (survey, inventory and mapping, and data analysis)	RA2.1	42	Biophysical studies completed <b>and</b>
		214,487	Hectares surveyed
	RA2.2	1	Social /economic studies completed <b>and</b>
		20	Population covered by the survey sample
	RA2.3	11	Reports completed
RA3 Decision support tools	RA3.2	8	Information management systems developed
	RA3.3	1	Other decision support tools developed
RA4 Research and development studies	RA4.1	16	Research and development studies completed
<b>Planning (P)</b>			
P3 Sub-regional plans	P3.1	3	Catchment or sub-catchment plans or strategies completed
	P3.2	4	Property or reserve management plans completed
P4 Resource management plans	P4.2	10	Other resource management plans completed
P5 Other plans	P5.1	2	Other biophysical, economic or socially related plans plans completed
<b>Capacity building (CB)</b>			
CB1 Awareness raising	CB1.1	33	Awareness raising events such as demonstrations, field days or study tours conducted <b>and</b>
		291	Participants in person-days
	CB1.2	31	Written products such as brochures, newsletters, posters or fact sheets developed <b>and</b>
		2,754	Estimated number of recipients
	CB1.3	7	Displays for use at events such as regional meetings developed
	CB1.4	16	Media opportunities resulting in articles in newspapers or on radio or television created
CB2 Skills and training	CB2.1	5	Training sessions, workshops, seminars or other skills and training events conducted <b>and</b>
		20	Participants in person-days
CB3 Establishing new institutional arrangements	CB3.1	1	Key organisational documents produced
	CB3.2	21	Formally documented collaborative arrangements developed
	CB3.3	14	Arrangements for effective collaboration negotiated where a formal agreement does not exist
CB4 Organisational learning	CB4.2	6	Significant knowledge evaluation events held
CB5 Community Support	CB5.1	12	Community groups OR projects assisted
<b>On-ground works (OG)</b>			
OG1 Conservation by agreements	OG1.2	4	Voluntary conservation agreements negotiated <b>and</b>
		3.5	Hectares protected
OG2 Native vegetation protected by fencing	OG2.2	365	Hectares of wetland native vegetation protected by fencing
	OG2.3	6.0	Hectares of riparian native vegetation protected by fencing <b>and</b>
		1.2	Kilometres of riparian vegetation protected
OG3 Native vegetation enhanced/rehabilitated includes improved fire management practice	OG3.2	98.3	Hectares of wetland native vegetation enhanced/rehabilitated
	OG3.3	57.5	Hectares of riparian native vegetation enhanced/rehabilitated <b>and</b>
		31.3	Kilometres of riparian vegetation enhanced/rehabilitated
OG4 Revegetation with native vegetation	OG4.3	3.3	Hectares planted to wetland native species <b>and</b>
		3.3	Hectares of this vegetation that are locally occurring natives
	OG4.4	5.6	Hectares planted to riparian native species <b>and</b>
		5.6	Hectares of this vegetation that are locally occurring natives
OG6 Wetlands health protected or enhanced	OG6.1	124	Hectares of wetlands with connectivity reinstated
OG8 Significant pest plant, animal and disease control	OG8.1	540	Hectares of pest plant control measures implemented
	OG8.3	47,400	Hectares of pest animal control (vertebrates) measures implemented
OG9 Works related to soil management and other soil treatments	OG9.1	2.0	Hectares of land treated and/ or protected from soil erosion by engineering works
OG11 Works for improving waterway health	OG11.4	0.25	Kilometres of in-stream habitat established
OG12 Works for improving water quality	OG12.7	2	Wetlands constructed <b>and</b>
		0.07	Hectares of constructed wetlands

### Information bulletins, technical reports, scientific monitoring

The Pilot Programme provided an opportunity to prepare a broad range of publications that underpin many of the wetland management work plans, management decisions and observations contained in this final report. A summary of these printed publications is provided in [Table 3](#) (following page).

**Table 3 Summary of Coastal Wetlands Protection Programme – Pilot Programme publications**

Project	Publication Title
CWPP-PP general	Great Barrier Reef Coastal Wetland Protection Programme – Pilot Programme. Information Bulletin series: #1: 17 July 2006, #2: 17 July 2006, #3: IPA Wetland Planning Toolkit Pilot Project May 2007, #4: Wetland Management and Protection Needs Case Study: Thuringowa City Council
Douglas Shire	Tait, J (2006) Daintree Oxbow - McDowell Swamp. Identified Management Issues and Options. Report prepared by WetlandCare Australia. Bradley, P (2007) Great Barrier Reef Coastal Wetland Protection Program. Douglas Shire Incentives Project. Bradley, P (2006) Incentives Project. Terrain NRM (formerly FNQNRM) & Douglas Shire Council.
Russell Mulgrave	Smith, R (2006) Bonso constructed wetland design. WetlandCare Australia.
Tully Floodplain	Smith, R (2006) DSS Rapid Assessment Field Trial. Cardwell Shire Council, Tully, 12-13 October 2006. Report prepared by WetlandCare Australia Sydes, D (2007) DSS assessment trial results, April 2007.
Lagoon Creek	Veitch et al (2007 a) Trialing different low cost methods of water hyacinth removal in tropical coastal Wetlands Proceedings of the 5th Australian Stream Management Conference. Australian rivers: making a difference. Charles Sturt University, Thurgoona, New South Wales. Veitch et al (2007b) Removal of Aquatic Weeds From Lagoon Creek, Herbert Catchment North Queensland: Trialling Novel Removal Methods and Demonstration of Environmental Benefits ACTFR Report No. 07/15 Barnett, B. and Veitch, V., 2007. New Life in Lagoon Creek, <i>Wetlands Australia (National Wetlands Update 2007)</i> , 15
Thuringowa	Tait, J (2006) Thuringowa's Wetlands: Review of Status, Protection and Management Needs. Report by Econcern.
Stuart Creek	Tait, J (2006) Assessment of Values, Condition and Strategic Management. Options for Lower Stuart Creek Reaches (Stuart Prison – Bruce Highway). Report by Econcern. Veitch, V (2006) Aquatic Habitat and Fish Community Structure in Stuart Creek. ACTFR Interim Report, 19 October 2006
Cungulla	Lokkers, C and Perry, T (2006) Ecological review of inter-dunal wetlands in the Cungulla area, north-east Queensland. Report to Townsville City Council, June 2006. Report by Earthworks Environmental Services. City of Townsville (2007) <i>Cungulla Inter-Dunal Wetlands Management Guidelines</i>
Serpentine	Dowe, J (2007) Ecological Assessment and Clearing Guidelines for the Serpentine Lagoon Project. ACTFR Report No. 07/07, April 2007
Healeys Lagoon	Burrows, D (2006) Monitoring of the Health and Fish Passage Issues of Healey's Lagoon Following Removal of an Extensive Mat of Floating Aquatic Weeds. Australian Centre for Tropical Freshwater Research Report No. 06/11, June 2006 Loong, D et al (2006) Appendix to Water Quality And Aquatic Health Assessment Of Healey's Lagoon, Haughton River Catchment, North Queensland – Decr 2005 to June 2006. Australian Centre for Tropical Freshwater Research Report No. 06/11
Horseshoe Lagoon	WetlandCare Australia (2007) Memorandum of Understanding between Partners involved in Establishment of Outlet Erosion Control Works and associated Plan of Management at Horseshoe Lagoon in the Burdekin Shire. WetlandCare Australia (2006) Horseshoe Lagoon Plan of Management. Prepared by WetlandCare Australia for the Horseshoe Lagoon Management Committee. December 2006. Sunwater Engineering Services (2006) Horseshoe Lagoon Overflow Works – Interim Investigation report Sunwater Engineering Services (2006) Horseshoe Lagoon Drainage Works Design Report. Veitch, V and Burrows, D (2007) Investigation of Potential Barriers Restricting Fish Passage Into Horseshoe Lagoon, Burdekin-Haughton Floodplain, North Queensland Australian Centre for Tropical Freshwater Research Report No. 07/16
Barrattas	Veitch, V. et al (2007c) Aquatic Ecosystems of Barratta Creek - Review of Existing Knowledge. Australian Centre for Tropical Freshwater Research Report No. 07/17, June 2007 ACTFR (2007) Information Bulletin: Development of a Barratta Creek Catchment. Wetland and Waterway Management and Investment Strategy. Information and Discussion Session for Catchment landholders and other stakeholders.
Goorganga	WetlandCare Australia (2005) Integrated Planning Act Schemes: Wetland Protection Mechanisms – draft portfolio July 2006. Goorganga Plains Integrated Weed Control Trials. Whitsunday Catchment Landcare Information Bulletins No. 1 / Aug 2006, No. 2 / June 2007, No. 3 / June 2007 and No. 4 / June 2007 Whitsunday Landcare (2006) Landholder Survey Proforma: Feral Pig Control Program – Proserpine Area
Fitzroy	Fitzroy River and Coastal Catchments (2006) Helping Wetlands in the Southern Fitzroy Floodplain. Information Bulletin No. 1 Fitzroy River and Coastal Catchments (2006) Springers Lagoon Interpretive signs #1 and #2; Toonda Lagoon Interpretive sign. Tait, J (2006) Fitzroy Basin Association Wetland Grazing Strategy – Dry Tropics
Kinka	DPIF (2006) Kinka Swamp Bund Wall Fishway Design Drawing. DPIF (2006) Kinka Swamp Access Road Fishway Design Drawing.
Splitters Creek	Tait, J (2006) Identification of Reach Values and Management Issues –Splitters Creek. Report by WetlandCare Australia BMRG (2006a) Landowner Weed Survey Proforma. Friends of Splitter's Creek Project. BMRG NRM Plan Quarterly Report BMRG (2006b) Priority Management Actions and Issues in Splitters Creek BMRG NRM Plan Activity Quarterly Report BMRG (2006c) Investment Recommendations. Friends of Splitter's Creek Project. BMRG NRM Plan Activity Quarterly Report BMRG (2006d) Monitoring and Evaluation Plan for works completed to June 2007. Friends of Splitter's Creek Project. BMRG NRM Plan Activity Quarterly Report BMRG (2006e) Friends of Splitter's Creek Bulletin No 1 (November 06) and No 2. (February 2007) Berghuis, A (2006) Fish Migration Barriers of Splitter's Creek - Summary and Recommendations by DPI&F, Bundaberg
Pasturage Reserve	Tait, J (2006) Pasturage Reserve Grazing and Burning Regime Management Trials. Report by WetlandCare Australia. Queensland University of Technology (2007) Access and Interpretive Plans. Prepared by QUT Post Graduate Students for Burnett Shire Council. Burnett Shire Council (2006) Summary of Pasturage Reserve Lease for or Steering Committee and Management Planning Smith, R (2006) Review of Pasturage Reserve Hydrology. Report from meeting held Wednesday October 18, 2006. Report prepared by WetlandCare Australia for Burnett Shire Council. Priority Works Plan and Cost Estimate as basis for Funding Application.
BMP Cane	Smith R (in press) Best-Practice: Riparian and Wetland Areas on Sugarcane Farms Volume #6 Canegrowers 'Best Management Practice' Series

A full set of the project publications is contained in Volume 2 (DVD) of this report.

## > Effectiveness of the cooperative programme arrangements

This section of the final report addresses the overall co-operative arrangements involved in delivering the Pilot Programme, especially the effectiveness of the 'consortium' approach, the 'start-up' phase, the role of the Independent Reference Group (IRG), outcomes from the project scoping 'roadshow' in regard to identifying priority projects, working with the Department of Environment and Water Resources (DEW), co-investment and ongoing funding.

### 'Consortium' project team

The concept of a 'consortium' approach to delivering the Pilot Programme grew out of necessity, given the diversity of tasks and associated skills required i.e. project administration, wetland ecology, wetland management, on-ground delivery of works and scientific monitoring. The extensive geographic coverage of the Pilot Programme ideally required the Project Team to have had experience in most of the bioregions within the GBR catchment. Finally there was the need to tap into existing networks built up by consortium members. The consortium comprising Conservation Volunteers Australia (CVA), WetlandCare Australia (WCA), Econcert, Australian Centre for Tropical Freshwater Research (ACTFR) and CSIRO brought these skills together.

Although all consortium members operated across most programme responsibility areas, lead roles undertaken by programme partners included project administration by CVA, wetland ecology and evaluation Econcert, wetland management technical and on-ground support WCA and scientific monitoring ACTFR. (Note: Whilst CSIRO was initially part of the consortium, their role was primarily as providers of data and EBI modelling. As the Pilot Programme unfolded these resources were not required and CSIRO played no direct part in the the programme's implementation.)

The Project Team comprised Bob Smith (WCA), Jim Tait (Econcert and WCA), Damien Burrows and Vern Veitch (ACTFR), and David Hudson (CVA), with other valuable support provided at various times by George Lukacs (ACTFR) and Richard Pepper (CVA). The dispersed location of team members (Cairns, Townsville, Northern NSW) worked surprisingly well, especially as the easiest way for the WCA technical team to service the 21 projects was via Brisbane airport, with direct flights to Bundaberg, Rockhampton, Mackay, Proserpine, Townsville and Cairns. CVA provided overarching project supervision of contractual and administrative matters as well as a considerable level of technical skills and an extensive NRM community network in coastal Queensland. ACTFR confined its involvement to its principal area of operation (Mackay Whitsunday to Wet Tropics).

The original concept was for WCA to locate a project officer in Townsville to service all projects with specialist input from senior WCA staff on technical matters. As the Pilot Programme evolved, it became evident that there were benefits in WCA specialists working directly with local project 'drivers' rather than through a WCA project officer. This was achieved by splitting the project sites between WCA's Jim Tait and Bob Smith, with CVA's David Hudson also taking a project co-ordination role for several sites.

### Start-up phase

The consortium was advised in December 2004 that its tender had been accepted. A project inception meeting (CVA / DEW) was held on 20 December. The contract to deliver the Pilot Programme was finalised on 21 February 2005. Both the Project Team and DEW were keen to commence implementation, but the Independent Reference Group had not been formed (*see next section*). One of the key roles of the IRG was to "identify priority wetlands by region or wetland type". In the absence of this guidance DEW requested that the consortium use its knowledge and experience to develop a 'start-up' project.

The project team set to work and developed 3 projects in the Burdekin Dry Tropics Region (Healeys Lagoon, Horseshoe Lagoon and Cungulla) with proposed activities totalling \$177,435 (GST exclusive). These proposals were submitted on 10 May 2005 and approved directly by the Minister in early June 2005. Pending approval of the start-up projects and in the absence of direction from the IRG, DEW requested that the consortium identify and develop further 'start-up' proposals.

The project team undertook a rapid scoping exercise in the Mackay Whitsunday and Wet Tropics Regions and identified Goorganga floodplain (M/W) and Lagoon Ck (W/T) as suitable priority sites. Draft proposals were on this occasion submitted to the IRG (meeting of 12 July 2005). The IRG recommended that the proposals be developed further. The proposals were subsequently re-submitted to the IRG meeting of 22 August. The Goorganga project (\$157,762 GST excl) was recommended to the Minister for approval. The consortium was asked to rework the Lagoon Ck proposal against a reduced budget. The Lagoon Ck project was ultimately recommended to the Minister for approval at the 28 November IRG meeting, with a budget of \$255,496 (GST excl). The Minister approved both proposals in early December 2005.

### Independent Reference Group

The Independent Reference Group (IRG) was appointed by the then Minister for Environment and Heritage and met for the first time on 27 May 2005. At this meeting the IRG agreed on the desired outcomes of the Pilot Programme, suggested tools that could be applied, and developed a set of selection criteria for assessing proposals (*see Appendix 1*).

The IRG met again on 8 July 2005 and on this occasion were joined by representatives of the consortium. The key outcome of this meeting (from the consortium's perspective) was that the IRG would not be identifying priority wetlands, but would provide a set of guidelines for the consortium to use itself in developing proposals (*see Appendix 1*). The consortium sought and was granted permission to undertake a 'Roadshow' to enable project team members to visit and consult local stakeholders in all regions along the GBR coast with a view to developing a list of potential project sites complete with a 'one-pager' proposal for each one (*see next section*).

The IRG met again on 22 August and 28 November 2005, and 6 March 2006. At the March meeting DEW advised that an additional \$250,000 (excl GST) had been identified to expand the Pilot Programme. Four proposals were rapidly developed, and these were assessed out-of session by the IRG members.

Throughout their involvement in the programme the IRG members demonstrated a high level of awareness of the time constraints on the project and the associated risks in being able to complete projects on-time and within budget. Consortium members were appreciative of the valuable agency and stakeholder advice and direction provided by the IRG. The process provided an opportunity to test project proposals in their formative stages, before fine-tuning and submission for final sign-off.

The one issue that the consortium did have with a number of proposals was the IRG's stipulation that co-investment be achieved as a pre-requisite for securing their recommendation for ministerial approval. This was not a requirement under the consortium's contract, and did create substantial delays in the approval process and administrative complications in implementation. However, the pursuit of co-investment did serve a number of purposes including achieving greater local ownership of developed projects, better integration with regionally based project delivery models and in several instances, substantially greater project resources and scope.

### **Project scoping 'Roadshow' to identify priority proposals**

The IRG and DEW sought assistance from the Consortium to identify and prioritise potential wetland protection and rehabilitation sites within the GBR catchment. The output was to be a list of potential projects plus a one page proposal outline.

The Project Team undertook a 'Roadshow' and visited 5 of the 6 Natural Resource Management regions within the GBR catchment (Burnett Mary, Fitzroy Basin; Mackay Whitsunday, Burdekin Dry Tropics and the Wet Tropics). Cape York was not included due to its low priority under the Reef Plan.

Fifty (50) prospective project sites were screened in conjunction with local wetland management stakeholders. 21 one-page proposals were prepared by the Project Team and submitted to the August meeting of the IRG for review. The IRG selected 17 of these to be developed into full proposals, although it was noted that the total of the indicative budgets exceeded the available Pilot Programme funds. The IRG ultimately recommended 12 of these to the Minister for approval. Several of these were recommended with reduced budgets and / or with stipulations for achieving co-investment.

The 'roadshow' was a very effective way of promoting the Pilot Programme and proved to be an excellent means of engagement with local wetland management stakeholders. It also engendered ownership and therefore the viability of proposals ultimately dependent upon local support and project drivers. Technical support provided to local groups by the Project Team during the development of project proposals, was well received.

Feedback from project partners indicated that the achievements of the Pilot Programme were in part due to the setting of realistic targets at the outset. Where possible, the Project Team recommended projects that already had local drivers who demonstrated some established capacity for undertaking on-ground works within time-frame constraints.

Project partners also indicated a desire and need for larger and longer term projects particularly citing the long lead time often required to court and engage landholders at some of the more extensive, valuable and economically more productive wetlands sites. Such projects require an ongoing commitment in terms of both project management and a flexible approach to funding. The Project Team found it necessary to bypass larger and more time-consuming / expensive potential projects due to both time and budgetary constraints of the Pilot Programme.



### **Local capacity**

Across and within the NRM regions, there was a significant variation in local capacity to deliver on-ground wetland management works, both in terms of expertise and level of staffing. This meant that the Project Team was in high demand to provide assistance with on-ground delivery of some projects, while others required only

technical support to capitalise on existing capacity that 'hit the ground running' once funding was made available.

The ultimate success of projects hinged on the availability and strong commitment of the local 'driver' to deliver project outcomes. Where this commitment was lacking, or the key driver moved on and was not replaced, it was necessary to make other arrangements. The Project Team members were on occasions required to take on the 'driver' role to keep projects viable. In other instances, the capacity of local teams exceeded expectations and the Project Team were able to reduce their inputs and re-allocate their time to other projects.

A key component of the Pilot Programme was the ability to fund local project officer time at 12 of the sites and provide the technical support to facilitate the development of local expertise in 21 locations. The Project Team made every opportunity to increase local capacity by involving local stakeholders in detailed project planning discussions and field investigations and preparation of documentation such as the reach-based wetland assessments carried out during many projects and documented (*see Table 3, Summary of CWPP-PP publications*).

The overall degree of success in building local teams and the development of wetland management skills, as well as on-ground outcomes, has to some extent been limited by the tight time frame of the Pilot Programme. The most successful projects have however been those with a high level of local commitment and on-ground capacity. Local partners in many cases have taken on Pilot Programme work over and above their existing obligations and priorities. However, in the main, they have demonstrated a high level of commitment in achieving scheduled outcomes.

### Key project partners

One of the most rewarding outcomes from the Pilot Programme was the formation of a strong network of key project partners and their on-ground teams, initially during the proposal development phase and subsequently consolidated throughout the implementation of the 21 Pilot Programme projects. The well-attended Pilot Programme seminar held in Townsville on 11 May 2007 demonstrated the coverage of this network and further reinforced it. The rollout of the remaining GBR CWPP funds and other wetland programmes should benefit from the wetland management network established during the Pilot Programme, if it is sustained.

The key project partners at each site and contact details are listed below. However, these are contact people only, and in most cases, there are local teams delivering wetland outcomes.

**Table 4 Contact details for CWPP-PP key project partners**

Project	Contact	Organisation	phone	email
Wawu Dimbi	Damian Britnell	Bamanga Bubun Ngadimunku	4098 1305	<a href="mailto:damian@yalanji.com.au">damian@yalanji.com.au</a>
Douglas Shire	Peter Bradley	Terrain Natural Resource Management	4098 3156, 0419 646 079,	<a href="mailto:wqip@terrain.org.au">wqip@terrain.org.au</a>
Russell / Mulgrave	Bruce Corcoran	Terrain Natural Resource Management	4056 1205, 0438 720 179	<a href="mailto:brucec@terrain.org.au">brucec@terrain.org.au</a>
Tully / Murray	Damon Sydes	Cardwell Shire	4068 0055	<a href="mailto:rupo@csc.qld.gov.au">rupo@csc.qld.gov.au</a>
Lagoon Creek	Naomi Phillips	Terrain Natural Resource Management	4777 2822, 0419 771 629	<a href="mailto:naomip@terrain.org.au">naomip@terrain.org.au</a>
Thuringowa	Sean Warner Mathew Baldock	City of Thuringowa	4773 8723	<a href="mailto:SHAUNW@thuringowa.qld.gov.au">SHAUNW@thuringowa.qld.gov.au</a> <a href="mailto:matthewb@thuringowa.qld.gov.au">matthewb@thuringowa.qld.gov.au</a>
Stuart Creek	Richard Pepper	CVA	4721 4077, 0419 584 439	<a href="mailto:rpepper@cva.org.au">rpepper@cva.org.au</a>
Serpentine	Phil Bourke	QPWS	4796-7793, 0422 005 286	<a href="mailto:phil.bourke@epa.qld.gov.au">phil.bourke@epa.qld.gov.au</a>
Cungulla	Adrian Turnbull	Townsville CC	4727 9520	<a href="mailto:Adrian.Turnbull@townsville.qld.gov.au">Adrian.Turnbull@townsville.qld.gov.au</a>
Healeys Lagoon	Merv Pyott	Burdekin Shire	4783 9875, 0407960897	<a href="mailto:Merv.Pyott@Burdekin.qld.gov.au">Merv.Pyott@Burdekin.qld.gov.au</a>
Horseshoe Lagoon	Tracy Jensen	Burdekin Shire	4783 9872	<a href="mailto:tracy.jensen@burdekin.qld.gov.au">tracy.jensen@burdekin.qld.gov.au</a>
Barrattas	Vern Veitch	ACTFR	4781 6741	<a href="mailto:vern.veitch@jcu.edu.au">vern.veitch@jcu.edu.au</a>
Goorganga	David Pepplinkhouse Christine Peterson	Whitsunday Catchment Landcare	4945 0267	<a href="mailto:David.Pepplinkhouse@whitsunday.qld.gov.au">David.Pepplinkhouse@whitsunday.qld.gov.au</a> <a href="mailto:Christine.peterson@whitsunday.qld.gov.au">Christine.peterson@whitsunday.qld.gov.au</a>
Padaminka	Maureen Cooper	Landholder	4959 3770	<a href="mailto:padaminka@bigpond.com">padaminka@bigpond.com</a>
Southern Pioneer	Darren Jennings	Dept of Primary Industries and Fisheries	4967 0859	<a href="mailto:darren.jennings@dpi.qld.gov.au">darren.jennings@dpi.qld.gov.au</a>
Tedlands	Matt Bloor	Mackay Whitsunday NRM	4957 7158	<a href="mailto:matt@mwnrm.org.au">matt@mwnrm.org.au</a>
	Saskia von Fahland	Sarina Landcare and Catchment Management	4956 1388	<a href="mailto:slcmasaskia@mcs.net.au">slcmasaskia@mcs.net.au</a>
Fitzroy	Darcy Murray	Fitzroy River & Coastal	4921 0524	<a href="mailto:dmurray@frcc.org.au">dmurray@frcc.org.au</a>



	Moira Close	Catchments		<a href="mailto:mclose@frcc.org.au">mclose@frcc.org.au</a>
Kinka	Ian Dare	Livingstone Shire	4939 9877, 0407 119 034	<a href="mailto:I.Dare@livingstone.qld.gov.au">I.Dare@livingstone.qld.gov.au</a>
Splitters Creek	Deb Scott	Bundaberg Landcare Inc	41559328, 0431472046	<a href="mailto:deboscott@optusnet.com.au">deboscott@optusnet.com.au</a>
	Sue Sargent	Burnett Mary NRM	41328311, 0429462041193	<a href="mailto:sue.sargent@burnettmarynrm.org.au">sue.sargent@burnettmarynrm.org.au</a>
Pasturage Reserve	Geordie Lascelles	Burnett Shire	41505466, 0741599286,	<a href="mailto:bsc@burnett.qld.gov.au">bsc@burnett.qld.gov.au</a>
	Maureen Schmitt	Bundaberg Landcare Inc	0427 517 759	<a href="mailto:schmittm@bigpond.net.au">schmittm@bigpond.net.au</a>
Canegrowers BMP	Bernard Schroeder	BSES	4132 5200	<a href="mailto:bschroeder@bses.org.au">bschroeder@bses.org.au</a>
	Tim Wrigley	CANEGROWERS	3864 6444	<a href="mailto:tim_wrigley@canegrowers.com.au">tim_wrigley@canegrowers.com.au</a>

## Co-investment

Securing co-investment was not included in the Pilot Programme Terms of Reference, nor as a condition in the consortium's contract with DEH. Nevertheless the IRG included co-investment (encouraged but not mandatory) in the assessment criteria for proposals developed at their initial meeting. However, the IRG later placed conditions on their recommendations for funding that co-investment be obtained. The Consortium was required to secure co-investment funds for the Pasturage Reserve (\$3,400 from local sources) Splitters Creek (\$20,000 from local sources) and Serpentine Lagoon (\$47,500 from Burdekin Dry Tropics NRM).

Securing this co-investment funding (particularly Splitters and Serpentine) significantly complicated the delivery of the Pilot Programme through the preparation of funding applications, development of expanded work plans (which resulted in unsynchronised project timelines), overlapping contracts and reporting duplication / complications with associated accountability issues. The process added considerable delays to the roll out of these projects and resulted in the loss of valuable momentum.

Some level of co-investment was ultimately achieved in all projects. However, categorising and quantifying the co-investment is not straightforward. For example, the woody weed component of the Serpentine Lagoon project was funded by Burdekin Dry Tropics NRM with a matching in-kind contribution from the landholder. The BDTNRM contribution came from their Regional Investment Strategy, which is funded by the Australian Government's Natural Heritage Trust. So this could be viewed as 2 Australian Government programmes co-investing with each other. Another factor to consider is whether the 'local' investment would have occurred on the wetland sites anyway, irrespective of whether the Pilot Programme funds were available. This was certainly true in some cases.

Nevertheless, the total value of work undertaken during Pilot Programme would far exceed its \$2.25 million budget. Noteworthy examples include

- Splitters Creek - \$75,000 (Burnett Plan of Action, Qld Dept of State Development, via Burnett Mary Regional Group) PLUS \$5,500 (BMRG RIS);
- Serpentine Lagoon - \$47,500 (Burdekin Dry Tropics NRM) PLUS \$40,000 (approx in-kind from Landholder)
- Barrattas - \$30,000 (Burdekin Dry Tropics NRM)
- Wawu Dimbi - \$25,000 (approx in-kind from Defeating the Weed Menace via Douglas Shire Council) PLUS \$5,000 (approx in-kind from Douglas Shire Council for revegetation)
- Tully Murray –total approx \$150,000 (CCI via Cardwell Shire Floodplain Program, Defeating the Weed Menace, Envirofund, Gumbudda CDEP, Cardwell Shire Council)
- Southern Fitzroy Floodplain – total approx \$100,000 (Fitzroy Basin Assn, Fitzroy River Coastal Catchments, Department of Natural Resources & Water, Fitzroy Shire Council, Wildlife Preservation Society (WPSQ), Capricorn Conservation Council (CCC).

## Spoiled for choice – too many funding programmes?

Frustration and concern was expressed by many Pilot Programme partners over the difficulty that they faced in coming to grips with the plethora of wetland and other related NRM funding programs, their differing approaches and criteria, their relationship to each other, and how the Pilot Programme fitted into the mix.

The reality seems to be that most of funding accessible to the community comes via Australian Government programmes and that multiple branding and 'siloing' of funds can lead to confusion, inefficiencies and possibly duplication of effort at the local level.

While the project team was in regular communication with key people in the Queensland Wetland Programme, there was only limited contact at the project officer level between Pilot Programme and other Queensland Wetland Programme projects. This was in-part the result of the large number of QWP and GBR CWPP projects underway during the conduct of Pilot Programme. However, an annual seminar to update progress in all concurrent wetland projects could have significantly improved communication between project teams, identified areas of overlap and provided the opportunity for more collaborative effort in sharing resources and information.

## Landholder caution

Some private landholders were suspicious and/or resentful of the Pilot Programme, viewing it as yet another 'government program' being used to undermine their 'property rights' and as possibly providing the basis for increased legislative controls on their activities. This was especially so where field trials and monitoring were proposed and data recorded and/or there had been a history of interaction with Qld Government agencies concerning native vegetation under the *Qld Vegetation Management Act 1999*.

Very few private landholders embraced the Pilot Programme's initiatives with sufficient enthusiasm and trust to provide the opportunity for the Project Team to broach the subject of voluntary conservation agreements or other long-term commitment to the works.

There were several notable exceptions including the success achieved by Burdekin Shire Council in securing 3-year aquatic weed management agreements with landholders at the Healeys Lagoon and Horseshoe Lagoon sites. The Pilot Programme provided a small contribution to extend the duration of these agreements. A similar commitment was achieved with in-kind support for 3-years for the Proserpine feral pig control group.

## Project delays, lead-times and windows of opportunity.

The Pilot Programme initially faced potential delays in obtaining a list of priority wetland sites from the IRG. This was addressed by DEW and the consortium through the development of 'start-up' projects. Critical delays were subsequently experienced in gaining Ministerial approval for about half of the projects following their recommendation by the IRG. Other delays were experienced with obtaining co-investment from project partners (identified above), securing landholder approval (eg Tedlands project took > 6 months) and delays caused by cyclone Larry and extended wet seasons in both 2006 and 2007. The latter was particularly problematic for works that could only be conducted during dry season conditions e.g. fencing and controlled burning and resulted in delayed project start-ups and incomplete project outputs within the original time frame of the Pilot Programme.

A contract extension of 4 months (to 30 June 2007) was granted by DEW in recognition of these factors. This has allowed most Pilot Programme projects to be delivered with the majority of scheduled activities completed within time and budget.

## DEW and project team flexibility

From the Consortium's point of view, DEW staff demonstrated a flexible and accommodating approach to the vagaries inherent in the Pilot Programme and responded positively to consortium requests for variations to individual projects. For example, after the IRG had passed the responsibility for identifying priority wetlands to the consortium, it was agreed that the project scoping 'roadshow' would be an effective way of identifying potential projects. An added benefit of the roadshow was that the projects had a high level of local ownership because they had been selected and designed at the local level, facilitated by members of the project team.

The consortium also adopted a flexible approach throughout and attempted wherever possible to actively promote the innovations adopted by DEW in the Pilot Programme. The consortium accepted some additional responsibilities such as embracing the QWP Monitoring, Evaluation and Reporting framework, which was incorporated into a user-friendly progress reporting process for individual projects – with favourable responses from project partners.

The consortium was appreciative of the concise contractual reporting requirements. In contrast, the amount of usable information generated by the project was extensive (*see Table 3*). These outputs, combined with the 21 project proposals and accompanying progress reports and attachments (*Volume 2*), provide easily accessible in-depth technical and administrative background to the operations of the Pilot Programme.

## Ongoing funding

There is widespread enthusiasm for managing wetlands throughout the NRM community. The local capacity to deliver wetland projects has been significantly enhanced through the Pilot Programme. However, maintaining enthusiasm and growing this capacity is highly dependant on the availability of ongoing funding from the Australian and Queensland Governments.

The Pilot Programme has clearly demonstrated that wetland projects are generally unsuited to short lead-times, given seasonal factors limiting site access / activities as well as the long lead-times often required to gain landholder support and / or agency approvals for regulated works. Grazing and fire demonstration projects in particular require at least 3 years to show results, but a more realistic time-scale is 10 years.

The Pilot Programme has created a considerable momentum among NRM stakeholders, which seems likely to be maintained for at least the next 12 months via the distribution of the remaining GBRCWPP funding to the three (3) nominated NRM Regional Bodies (FBA, MWNRM, and Terrain NRM). It appears that wetland managers in the other 3 regions (Burnett Mary, Burdekin Dry Tropics and Cape York) will need to fund future wetland protection and rehabilitation from NHT, NAP and other sources.

**To achieve the best outcomes possible for our wetlands the consortium strongly recommends that DEW direct its investment into fewer projects that are larger scale and with longer timeframes.**

## > Appropriateness and success of the Pilot Programme.....*what worked and what didn't?*

The following section of the final report is an evaluation of the success of the pilot programme in its on-ground outcomes. It is based on a 1-day Wetlands Seminar held in Townsville on Friday 11<sup>th</sup> May 2007. The seminar provided the opportunity to share with project partners, the lessons learnt during the Pilot Programme and to seek feedback prior to compilation of the final report. It also provided an opportunity to acknowledge the excellent work of project partners and an opportunity to further strengthen the wetland network in Qld.

The underlying theme of the Seminar was to deliver on-ground wetland management projects with the aim of improving water quality entering the GBR lagoon as well as enhancing local biodiversity. Topics discussed during the day included aquatic and riparian weeds, grazing and fire, revegetation, hydrology / drainage, barriers to fish, feral pigs, constructed wetlands, best management practice, monitoring weeds / birds / fish and water, integrated planning and other local initiatives, and the DSS trial.

### Riparian Weeds

#### Issues

Wetland weeds are comprised of three main non-exclusive categories that occupy habitats that range from:

1. *Terrestrial / riparian weeds* - above inundation zone
2. *Floating / submerged aquatic weeds* - those that occur predominantly within the aquatic environment; and
3. *Emergent / fringing weeds* - those that occupy the bank margin / water interface.

Terrestrial / riparian and floating / submerged aquatic weeds are discussed below. Emergent / fringing weeds are discussed in following section under 'Grazing and Fire).

Weeds competitively exclude native vegetation resulting in a reduction of habitat resources for both terrestrial and aquatic biota and associated reduction in biodiversity. More significantly, weeds can generate changes in ecological functions (light regime, fire regime, water quality) that totally modify the ecosystem and generate impacts that extend beyond the site of infestation.

Wetlands are part of the landscape, not isolated from it. Many 'wetland' species require a habitat mosaic that includes riparian and terrestrial habitats, not just the wet areas. The biodiversity values of a wetland may be impacted by the condition of the surrounding vegetation, especially if impacted by weeds, hence the importance of terrestrial / riparian weeds.

There is a major issue of public good vs private benefit aspects of funding weed management in wetlands and riparian areas e.g. Pond apple. Landholders often do not perceive much private benefit especially in riparian and aquatic weed control. However there are major public benefits in terms of water quality and aquatic habitat in managing these weeds. The opportunity to undertake revegetation as a long-term management strategy is often governed by landholder attitudes, compounded by long term funding required but rarely available to achieve success. Related to this is the need for "ownership" of the weed problem and commitment to long-term maintenance.



#### Success on-ground

The Pilot Programme enabled significant areas of terrestrial and riparian pond apple control at Wawu Dimbi, Russell River and Tully Murray; and chinee apple control at Serpentine Lagoon (jointly funded by BDTNRM and Landholder). A high profile site was cleared of guinea grass and chinee apple at Stuart Ck, leading to increased community interest in this otherwise high ecological value creek. Kilometres of stream reach have been cleared of riparian weeds including 'garden escapee' varieties at Splitters Ck (Burnett Basin).

Successful demonstration control trials using fire and a range of chemical approaches for Devils Fig and Sickle Pod were carried out at Goorganga Plain (Mackay Whitsunday).

As terrestrial and riparian weed management was not a high priority activity for the Pilot Programme, the outcomes achieved in many cases were a bonus.

**Appropriateness of approaches used**

Activities were generally delivered using recognised best practice and skilled local labour. At Splitters Ck a catchment-wide postal questionnaire survey was successful in defining weed distribution and to engage producers / riparian landholders in defining and having ownership of their weed management priorities.

**Co-operative arrangements**

Working with the local pest managers who know their turf was instrumental in success.

**Feedback from project partners**

- Guinea Grass impacts on fire regime which impacts adversely on native riparian vegetation but can be a tool in managing terrestrial weed species;
- The dilemma is where landholders are legislatively required to controlled certain weeds, but are reluctant to do so in a 'low-enforcement' climate in Qld;
- Sickle Pod is a major production-cost weed and its control during the Pilot Programme was a valuable leg-in to undertake other wetland management activities with landholders. It was important to define key weed species from landholder perspective, to gain support for the Pilot Programme investment.

## Aquatic Weeds

### Issues

The Pilot Programme provided the opportunity for innovative and efficient removal, management and maintenance of aquatic weeds in Lagoon Creek.<sup>5</sup> Introduced aquatic weeds are having significant adverse environmental impacts compounded by adjacent land management practices. Spraying and sinking weed rafts produces additional environmental risk e.g. exacerbates deoxygenation and increases nutrient export.

Underlying causes are often not reversible in human time frames – e.g. soil and ground water nutrients have decadal response times. Most biological controls have proved unsuccessful in NQ.

Contemporary practices such as irrigation and fertiliser application can also cause native aquatic plants to become weeds (i.e. plants that grow in the wrong place) e.g. Cumbungi growing behind tidal bunds.

Natural flood events can assist in reducing intervention costs by scouring out aquatic weeds but may not be frequent enough or intense enough to be effective.

There are community concerns over some proposed management options e.g. re-opening tidal bunds, salt spraying, and chemical use. Cheaper options i.e. chemicals, used on large infestations can have adverse long-term impacts.

Once off aquatic weed control will fail without intervention spraying of re-infestations at least 4-times per year,



### Success on-ground

Methods employed on Lagoon Creek demonstrated a range of tools available to local communities. These included:

- Herbicide along edge – to break raft binding to banks;
- Brine spraying - to weaken weed raft
- Flood removal - limited success but very low cost;
- Mechanical break-up of rafts - using weed harvester;
- Wind harvesting – using the prevailing winds to help push the weed mat towards the excavator;
- Mechanical removal – using 'dozer' boats and excavators; and
- Follow-up boat and bank chemical spraying (4 treatments per year).

### Appropriateness of approaches used

The Lagoon Creek multi-faceted approach has the lagoon substantially free from aquatic weeds, has achieved a dramatic improvement in water quality, and with sufficient funds in-hand to carry out follow-up chemical control in the short-term. Site access was difficult and compounded by the very successful community riparian revegetation work in past years.

### Effectiveness of co-operative arrangements

There was only limited success at Lagoon Creek (Herbert Catchment) in engaging neighbouring landholders in the day-to-day activities and in obtaining a commitment to long-term maintenance. By comparison, landholders at Healeys Lagoon and Horseshoe Lagoon (Haughton Catchment) project sites signed management agreements (brokered by Burdekin Shire) and pledged to contribute to a pool of funds to employ a contractor to control weeds on a needs basis.

There is also further work required at Lagoon Creek to change attitudes to the harvested material being recognised as a valuable resource with significant value as an on-farm soil ameliorant or export to higher value uses. The regular harvesting of water hyacinth is a means of removing nutrients and silt is deserving of further analysis.

<sup>5</sup> Veitch V et al (2007b) Removal of Aquatic Weeds From Lagoon Creek, Herbert Catchment North Queensland: Trialling Novel Removal Methods and Demonstration of Environmental Benefits ACTFR Report No. 07/15



## Grazing and Fire

### Introduction

Invasive exotic pasture grasses constitute one of the most significant threats to the ecological values and functions of coastal GBR catchment wetlands. In many coastal agricultural landscapes, grazing land use has been alienated from wetland and riparian areas as cropping has become more intensive. Emergent / fringing weeds that typically occupy the bank margin / water interface in the main are comprised invasive pasture species that have dominated remnant riparian and wetland habitats on properties. The impacts of removal of grazing from these areas are realised in both instream aquatic and terrestrial riparian habitats and include:

- competitive exclusion of native wetland plants;
- organic loading impacts on water quality;
- associated fish habitat loss;
- fish passage barrier creation;
- loss of waterfowl feeding and nesting resources;
- large fire fuel load generation;
- blockages of flood flow paths; and
- increased sedimentation.



While some invasive species are declared pests (i.e. hyemachne), many are not. Most invasive pasture species are valued by pastoralists for their grazing productivity. Therefore eradication of extensive infestations of exotic grasses impacting on wetland and riparian areas is not feasible and not politically enforceable given that government has been responsible for introducing many of the invasive species and has promoted their utilisation in ponded pasture areas over many decades.

### Issues

Since eradication of exotic pasture species that have invaded wetlands is not an option, efforts need to be directed toward management approaches that minimise the worst of their ecological impacts. Broadacre management tools are required to be cost-effective and deliver ongoing landscape scale management. Grazing and burning (of fire sensitive pasture species) provides the best management tools for delivering broadacre management of exotic pasture impacts in wetlands.

Fire and grazing regimes exert a strong influence on the ecological character and condition of wetlands. Local management trials are sometimes required to identify the most appropriate grazing and burning regimes to deliver optimal wetland biodiversity and water quality outcomes. Controlled burning also offers a means of managing a host of other weeds including woody species that impact wetland and riparian areas.

Since the majority of larger coastal wetlands lie outside of protected areas, and are used for grazing, there is also a need to better understand the impacts of long-term grazing and associated lack of fire regimes on the ecological character of wetlands.

### Success on-ground

Controlled grazing / fire based wetland management trials and associated monitoring are underway in all regions:

Wet Tropics	McDowell Swamp <sup>6</sup>
Burdekin Dry Tropics	Horseshoe Lagoon <sup>7</sup>
Mackay Whitsunday	Goorganga, Tedlands
Fitzroy Basin	12 Mile, Gracemere
Burnett Mary	Pasturage Reserve <sup>8</sup>

Another site planned for Serpentine Lagoon (BDT) was delayed by landholder uncertainty about the implications of generating data that may impact on the Nature Refuge status of the land.

Controlled burns conducted at two sites (Goorganga, Gracemere) and post-fire vegetation responses have been monitored at three sites (+12 Mile Lagoon). Fire was successfully demonstrated to provide broad acre

<sup>6</sup> Tait, J (2006) Daintree Oxbow - McDowell Swamp. Identified Management Issues and Options. Report prepared by WetlandCare Australia.

<sup>7</sup> WetlandCare Australia (2006) Horseshoe Lagoon Plan of Management. Prepared by WetlandCare Australia for the Horseshoe Lagoon Management Committee. December 2006.

<sup>8</sup> Tait, J (2006) Pasturage Reserve Grazing and Burning Regime Management Trials. Report by WetlandCare Australia.

weed management benefits (woody weeds e.g. Devils Fig, pasture grass e.g. Para). Fire and grazing has also successfully been demonstrated to help maintain or promote native macrophyte diversity / recovery. Results achieved include weeds controlled, native macrophytes promoted and practical methods demonstrated. A major communication and promotion campaign is required to increase adoption of these practices. Trials need to be continued over many years to gain maximum returns from the established plots, refine techniques and to maintain landholder engagement.

Numerous planned trial opportunities (particularly burning) during the Pilot Programme were missed due to seasonal constraints (too wet, too late) underpinned by landholder and logistical constraints associated with fencing (i.e. receiving permission, availability of fencing contractors). The scope of the projects and the selection of trial sites was impacted somewhat by landholder reluctance to become involved due to fears of being forced to adopt management outcomes.

### **Appropriateness of approaches used**

Local Project Officer capacity was essential for establishing grazing and burning trial fencing and a regular monitoring program. Purpose flown oblique aerial photography linked to GPS, combined with and trial plot photo monitoring points proved to be powerful tools for grazing and fire regime trials. Involvement of respected 'peer' landholders was valuable in achieving communication and adoption of outcomes. Engagement of landholders in development stages of the proposed trials and in defining site layouts engendered ownership of project. There was also value in assessing and monitoring existing sites (e.g. fence line comparisons, wildfires) as a quick way to demonstrate some of the principles of grazing and fire management.

The short time frame of the Pilot Programme was unrealistic to document significant results, but provided a valuable opportunity to establish a local skills base and well designed sites for data collection and further engagement of landholders to refine management techniques in the future. Ongoing funding under CWPP (TerrainNRM, MWNRM, FBA) and/or NHT/NAP (BDTNRM and BMRG) is essential to capitalise on the groundwork in place.

### **Co-operative arrangements**

Where public land was made available for projects, trials could more readily be pursued without 'fear or favour' to landholders. Conducting trials on operational pastoral properties constrained some trial options. Use of landholder infrastructure and machinery provided project cost-benefits. The Rural Fire Services were willing participants in controlled burns and potential target audience for future extension campaigns to curb their enthusiasm for too much fire.

There is still significant resistance amongst some conservation groups and individuals to the concept of the use of fire and/or grazing as environmental management tools. State Govt Agency support and use of statutory 'encouragement' by reference to *Land Protection Act* and Leasehold Land Management Guidelines could provide impetus for higher levels of landholder interest and adoption in undertaking broadscale burning /grazing regimes trials for wetland weed control and ecological condition improvement.

### **Feedback from project partners**

- How can we fire and graze exotic pastures for ecological management;
- Some grazing regimes are contrary to agency recommended grazing BMP (BMP grazing vs BMP wetlands);
- Goorganga Plains wetlands are a good example of different management practices across fence lines in the same wetland environment as graphically illustrated in aerial photos where property access is not possible; provides reliable data rather than hearsay.
- Need communication with conservation groups about benefits of burning / grazing;
- Where are cattle good to use as a weed management tool? Varies with region e.g. in wet tropics spray weeds rather than graze as trees grow well and soon shade weeds. In the dry tropics canopy cover may be more open, providing less shading of weeds, so grazing may be good option. In some situations it may be better to spray weeds and encourage natural regeneration of trees;
- QEPA working on best policy mix of legislation on wetlands - do not want to bring in harsh legislation; Planning law only triggered when there is a change of use (in Qld);
- Lease renewals will require longer-term management planning and should include fire / grazing in wetland and riparian areas.

## Revegetation

### Issues

Revegetation of riparian areas is important for bank stabilisation, nutrient filtering, shading out of weeds and fish passage. It also improves terrestrial and instream habitat. The technique used for revegetation was determined by site needs as well as by landholder attitudes, which were found to span a broad spectrum ranging from opposition, tolerance, and acceptance to successful engagement. However even 'engaged' landholders may lack capacity to deliver on-ground works. This is especially so when it comes to responsibility/commitment for ongoing maintenance where long term funding is required but rarely available.

### Success on-ground

The Pilot Programme has provided an opportunity to undertake revegetation at 15 sites across the GBR catchment. In addition, natural regeneration has also been facilitated at many sites using a combination of weed, grazing or fire management. Project Sites located at:

Wet Tropics.....Wawu Dimbi (Daintree); Russell River; Tully/Murray;  
 Burdekin Dry Tropics.....Stuart Ck; Healeys Lagoon;  
 Mackay Whitsunday.....Padaminka; Sandringham Lagoon;  
 Fitzroy Basin.....Southern Fitzroy Floodplain;  
 Burnett Mary.....Splitters Creek.

Approx. 15 hectares native riparian vegetation has been established, 25,000 stems planted and 5 monitoring programs established

Overall results were very positive, especially when working in partnership with experienced local revegetation practitioners. Less successful outcomes occurred where landholders were only tolerant.....*"you can plant some trees there if you'd like, but leave my Guinea Grass alone!!"* Some perverse scenarios were also identified for example at Lagoon Creek where earlier revegetation efforts were so successful and extensive that they actually hampered aquatic weed control undertaken as part of the Pilot Programme.

### Appropriateness of approaches used

A one-shoe-fits-all approach does not work with revegetation. It was important to recognise the differences in local human capacity, growing conditions and to adopt techniques developed by local practitioners. There were however some common themes for example, using local provenance seed wherever possible.

### Co-operative arrangements

In most cases, the Pilot Program acted in a facilitative role, providing funding to local revegetation practitioners. These local experts used their knowledge and experience to deliver the outcomes.



### Feedback from project partners

- 'Vegetation Assist' and 'Nature Assist' from the Qld State government have been helpful but only applies to very small % of landholders;
- Wawu Dimbi example of 25-30 year project, the Pilot Programme is only a start;
- Must look at natural regeneration strategies in dry areas as revegetation often does not work;
- Labour component of the Pilot Programme was very important for revegetation projects as without this, projects would fail, especially if volunteers were not available;
- Revisits the concept of bureaucracy / lack of funding \$\$ for personnel for revegetation / volunteer burnout, therefore need to pay people;
- Tully Murray has one of the strongest Council revegetation crews and lots of water to grow trees (often too much).

## Hydrology / Drainage

### Issues

Four main hydrological / drainage issues were found to be impacting on wetlands in the GBR Wetlands during the 'Roadshow'. These included:

- Drowning of wetlands when they are used to carry / store irrigation water, leading to a loss of riparian vegetation, invasion by aquatic weeds as well as water quality problems;
- Drains through wetlands deprive them on regular inundation and can draw down groundwater leading to a decline in wetland vegetation, increased fire risk / damage and increased grazing pressure;
- Floodgates deprive wetlands of tidal inundation and can export acid (when constructed in Acid Sulfate Soil landscapes) leading to a decline in water quality, fish habitat / passage and increase aquatic weeds; and
- Coastal levees deprive wetlands of tidal exchange replacing estuarine wetlands with freshwater wetlands, but these are often characterised by poor water quality, impeded fish passage and invasion by aquatic weeds.

The Pilot Programme provided the opportunity to attempt to redress all the above forms of alteration to hydrology / drainage, except the latter (coastal bunds), which were found to require more time and funding than was available. Management actions to redress hydrology and drainage issues focused on reinstating natural inflows to and outflows from wetlands and reinstating regulated tidal flows.



### Success on-ground

A proposed Daintree floodgate redesign was initially considered by the senior property owner but then strongly rejected at a second meeting with his son.

The Horseshoe Lagoon concept for a water level control structure achieved landholder consensus, SUNWATER was engaged to undertake the engineering design, but the moratorium on water licences stalled the construction. In the interim, the previous consensus was vetoed by the landholder who initiated the idea in the first place. A fallback position was negotiated to install two erosion control structures in the outlet channel, achieving very limited hydrological control. Landholders undertook some minor hydrological works without

requiring approval.

Partial reinstatement of Pasturage Reserve hydrology progressed through stakeholder consultation stages to drainage redesign concept, driven by need for Council to improved treated WWTP effluent management. The concept was picked up and further developed by Environmental Engineers engaged on the Pasturage Reserve 'Access and Interpretive Plan' prepared by QUT Post Graduate students. Burnett Shire Council has secured funding to further progress the initial concept in consultation with local stakeholders.

Design studies and associated approvals for fish passage works in Stuart Creek and Kinka wetland added significant time delays to implementation of on-ground works.

The Pilot Programme demonstrated that reinstatement of hydrology is extremely difficult, requiring multiple landholder endorsements, satisfying multiple management objectives (therefore political), design and works are expensive and multiple approvals can add significant delays.

### Appropriateness of approaches used

Despite the Pilot Programme highlighting that hydrology / drainage were key issues to be addressed in any integrated approach to wetland management (Table 1), the results on-ground were poor. Planning focus meetings were found to be an efficient way to scope wetland / hydrological issues and to seek consensus on action. However, most sites required detailed site investigation, consultation and design. Compromise was often necessary to balance competing needs (e.g. fish passage vs manipulating water levels).

A single water / local authority would be in a much better position to redesign hydrology / alter drainage as part of ongoing maintenance or upgrade of local infrastructure. This might be driven by the need for water efficiency, adoption of best management practice and new funding opportunities.

In non-irrigation areas, it was found necessary to propose temporary water control structures and to evaluate these in order to build stakeholder confidence prior to committing funding on engineered designs and concrete structures. In many instances, the time required to gain approval to permanent solutions to hydrology / drainage issues was well in excess of the 2-year Pilot Programme timeframe.

Consequently, establishing binding voluntary agreements to modify hydrology and drainage was unsuccessful. However, in the example of the Horseshoe Lagoon Plan of Management (PoM), four out of seven key stakeholders signed a Memorandum of Understanding pledging support for the PoM. This only occurred after reference to 'modification of hydrology' was removed.

### **Co-operative arrangements**

Difficulties experienced in obtaining approvals for 'environmental repair' highlighted the need for involvement of consent agencies in initial scoping discussions – but this was no guarantee of a timely approval process. Delays in implementing hydrology works combined with turnover of agency staff undermined initial consensus even where it was obtained.

Even where co-operative arrangements were working well, engineering works scheduled for wetlands were often thwarted by the prolonged wet season in combination with very difficult working conditions. This only emphasises the need for thorough preplanning, obtaining approvals but most important in having a pool of funds to undertake works as seasonal opportunities present.

### **Feedback from project partners**

- A novel way to achieve community support was to pursue an educational approach to altering hydrology e.g. using post graduate students from QUT to prepare an 'Access and Interpretive' plan for Pasturage Reserve wetland;
- DPIF are considering reinstating hydraulic connectivity in the lower Splitters as initiated by the Pilot Programme;
- Need to work directly with water authorities in the future as they have the capacity for quick delivery, at a cost, but are still required to obtain the same approvals;
- Need reduction in red tape.....letting in the 'midnight brigade' is tempting;
- NWR – would be better if they were involved in the process from the start, but sometimes difficult to get them along;
- Bigger projects need the NRMs to bring approval agencies together in one room and agree at the start; perhaps use water boards to look at catchment scale projects.



## Barriers to Fish

Approximately 30% of the freshwater fish community in tropical coastal catchments have some estuarine life history dependency and therefore require uninterrupted or seasonal passage to and from estuaries. Both physical and chemical barriers can prevent or restrict fish passage.

### 1) Physical Barriers

#### Issues

Physical barriers include large structures (dams / weirs) and more innocuous small structures (culverts / causeways etc). Invasive weed species such as *Hymenachne* and *Typha spp* may also seasonally impede fish passage. Structures that are impassable to all or some fish lead to the loss of upstream fish populations and associated fishery values. Fish surveys are often necessary to identify the impact of individual fish passage barriers.

Many fish passage barriers occur on private land, are privately owned and some are unlicensed. Landholders / producers are often reluctant to consider removal of structures associated with productive land uses (i.e. ponded pasture bunds). Gains achieved by addressing multiple small fish passage barriers may be more cost-effective than redesigning single large structures.

#### Success on-ground

Fish surveys were used to confirm that fish passage barriers existed at number of sites (Stuart and Lagoon Ck, Sandringham, Horseshoe & Springers Lagoon). Two additional investigations confirmed that fish passage was occurring at other sites (Tedlands, Goorganga), despite concerns that barriers existed.

Rectification options were identified and designs completed for three sites (Springers, Sandringham, Kinka) with construction to be undertaken by end of the Pilot Programme. Generally there was a high capacity (agency, private and NRM) to address fish passage barrier issues, because of the high level of involvement of DPIF. There is also a high level of community support for fish passage barrier works.

#### Appropriateness of approaches used

Where possible, the Pilot Programme used locally available capacity such as private consultants (Infotish) and State agency (DPIF) to survey sites to confirm a problem and to design on-ground works. Fish survey was necessary to quantify and identify fish passage barrier issues including the merits of providing access to upstream habitat areas before progressing to consideration of works. Preference was given to targeting small 'doable' / affordable structures, rather than large expensive structures.

An attempt was made to provide an incentive (win / win) to engage landholder support i.e. to armour eroding coastal levee in such a way as to incorporate fish passage, but on closer examination, the upstream habitat values were not sufficient to warrant public investment.

#### Co-operative arrangements

Co-operative arrangements in delivering fish-passage outcomes were effective due to established fish passage works capacity and support of State agencies (DPIF) and NRM bodies. Key agency (DPIF) capacity was stretched in some instances and therefore some project timelines challenged.



## 2) Chemical Barriers

### Issues

Low dissolved oxygen (DO) is the most important water quality parameter affecting fish life in GBR coastal floodplain wetlands. DO levels in freshwater wetlands acts as a chemical barrier to fish or in other instances a death trap. In many instances it is a question of..... *'How long can you swim while holding your breath?'* Humans need ~ 20% oxygen in air to survive while fish make do with <2 PPT or 0.02% in water, with considerable tolerance varies between species. Low DO also affects invertebrates.

The often-poor ecological condition of coastal freshwater wetlands is caused predominantly by high nutrient levels (nitrogen and phosphorus) and associated floating and emergent aquatic weeds.

Fish are highly sensitive to low DO and respond by increasing breathing rate or panic response. Wetlands with high organic loads suffer low DO even during flood events.

Where possible fish generally avoid low DO water and therefore, any stream reach with poor water quality acts as a partial or complete barrier, impacting on migration to important habitat both upstream and downstream. Problems can also occur in shallow ephemeral wetlands invaded by emergent aquatic weeds (ponded pastures) that impact adversely on water quality

### Success on-ground

The Pilot Programme identified new causes of DO depletion not previously known. Chemical fish passage barriers were confirmed at three locations on separate floodplain distributaries and there has been an increased community and scientific awareness of scope of problem. Rectification of chemical passage barrier was demonstrated in Lagoon Creek during post weed-harvest monitoring. Data was collected and analysed for inclusion in the Pilot Programme final report providing the scientific basis for the identification of potential sites for reducing chemical barriers across many GBR catchments.



**Figure 3a:** Site LC004 (upper lagoon) in February 2006



**Figure 3b:** Site LC004 in January 2007

### Appropriateness of approaches used

Fish survey data and wetland condition assessment was successfully used to identify critical problem areas. DO was confirmed as the key cause of fish absence. However local stakeholder support for ongoing aquatic weed annual maintenance (4 treatments each year) was not fully secured and therefore long-term maintenance of management gains has not yet been guaranteed.

### Effectiveness of cooperative arrangements

Weed removal and ongoing control in the easily fixed coastal wetlands is the critical issue to removing chemical barriers to fish passage and the discharge of poor water quality to the GBR Lagoon. A much more focused effort is required to identify priority wetlands and to provide long-term weed control programs to achieve enduring benefits to meet Reef Plan objectives.

Indicators of the success of efforts to restore such wetland systems in delivering improved water quality could be measured by improvement in DO and the fish habitat value as measured by fish population surveys.

## Feral Pigs

### Issues

Feral pigs are listed as 'declared pests' responsible for disturbing soil, damaging vegetation, predating on fauna and damaging crops. They are intelligent, migratory, concealed, fecund and very selective feeders. They readily move 'next door' when disturbed, can outrun, outsmart, outbreed, and outlive ad hoc control measures.

Eradication is not practical, baiting with 1080 is controversial and trapping is hard work. There is seldom perennial co-operation amongst stakeholders to keep the pressure on feral pigs and funding support for enthusiastic groups is rare.

The Pilot Programme provided the opportunity to establish two 'Co-ordinated Pig Control Groups' located at 1) Proserpine (Goorganga Plain) and 2)



Sarina (Rocky Dam) and to see if improvements could be made on previous attempts at control feral pigs.

Co-ordinated control involves defining the pig control area, engaging stakeholders and developing with them a strategy based on seasonal sitings as preferred feeding patterns, labour availability, monitoring and strategy review. Stakeholders then needed to agree on techniques to be used and allocation of tasks (e.g. trapping, shooting, baiting). Progress with the co-ordinated strategy needs to be progressively updated preferably using air photo or satellite imagery as a planning base.

### Success on-ground

The Pilot Programme initiative evoked a strong commitment and acceptance of need for strategic co-ordinated approach. Landholders' preference was to do the job themselves (baiting and trapping), with technical and material assistance with 1080 baits, traps, feed. Both 1080 baiting and trapping are highly seasonal and require a high level of local community engagement to be effective.

Both co-ordinated control groups established under the Pilot Programme underestimated time required get to 'on-ground' work underway and consequently were successful in achieving only a 'low' number of pigs destroyed. Results included:

- 2 co-ordinated control groups established;
- 1 survey of landholder observations / attitudes;
- 1 strategic integrated plan developed;
- 1 on-ground control program initiated;
- 1 pooling of funding / resources (3 years);

### Appropriateness of approaches used

It was essential that the co-ordinated pig control group had a local Landcare / Council 'driver'. There was some sensitivity amongst landholders that outside funding for feral pig control might be linked to other wetland management objectives. However, the concept of the need for a co-ordinated and strategic approach to pig control was readily accepted and understood by most of the key stakeholders, but the smaller landholders were generally less motivated.

### Feedback from project partners

- Pigs need to be controlled on a large (sub-catchment scale);
- Need a co-ordinated approach to the problem due to large areas involved;
- Significant lead-time in the process of setting up a group and getting operational;
- Good synergy between landholder / technical needs;
- Tools and ideas from this project are good for producing a model for future users;
- Project important for biodiversity outcomes.



## Constructed Wetlands

### Issues

Constructed wetlands are gaining popularity on cane farms, but their effectiveness in improving water quality is limited by available unused land on cane farms. Despite the absence of detailed scientific results to quantify the effectiveness of constructed wetlands, they are popular amongst innovative cane farmers for their biodiversity values (fish, birds, reptiles and riparian vegetation) as well as their aesthetic values. Their educational value has also yet to be evaluated.

### Success on-ground

The Pilot Programme provided an opportunity to promote the concept of a 1.4 Ha constructed wetland on a 300 Ha cane farm in the Wet Tropics. A site was identified by the local Landcare co-ordinator and a concept design compiled from the limited guidelines available. ASS testing was undertaken and the site was found not to have any significant problems. The landholder advised early in the project that the subsoil clay material unsuitable for paddock levelling. Further investigation established that there would be a high cost in trucking the clay to other potential reuse sites (flood mounds) and that there was no immediate need for the material. A staged-approach was thus proposed to allow clay material to be stockpiled until a cost-effective use could be found, given the limited resources available through the Pilot Programme.

### Co-operative arrangements

The constructed wetland component of a comprehensive revegetation and hydrological management project received excellent support from the Landcare representative and the landowner. The available design guidelines were readily applied to site and the site limitations identified and quantified. The high cost of finding a use for the excavated subsoil was the key to the viability of the proposal. Despite the limitations identified during the project, there are good prospects for construction of the wetland in the future for demonstration and potentially research purposes. Implementation is contingent on the landholder finding a local use for the spoil.

### Feedback from project partners

- The 11 May Seminar in Townsville provided an opportunity for the 50 participants to suggest improvements to the design. One suggestion was to install the silt trap in the existing drain (widen) rather than relying on the inlet sump in the wetland;
- Justification for the constructed wetland was more to do with reinforcing the landholder's attitude to biodiversity on farm, especially birds and fish, rather than water quality – although anecdotal evidence suggests there are benefits – needs research;

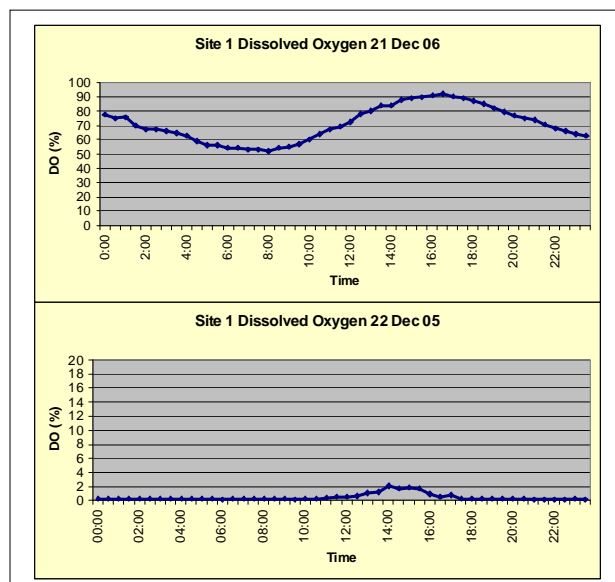


## Scientific Monitoring

### Issues

Scientific monitoring was undertaken at a limited number of project sites and analysis undertaken to assist in future decision making in key management areas (aquatic weed control, water quality recovery and reinstatement of fish habitat values) in rehabilitated wetland areas. Background data was also needed to redress a lack of benchmarks for target setting in the future.

Biological responses to wetland management actions are not always predictable or well documented. Limited resources restrict monitoring effort during the Pilot Programme and there were limitations imposed on scientific rigor by the absence / intervention of natural events (e.g. floods) necessary for responses to be monitored. In addition, there was no guarantee that environmental benefits would become apparent (flora and fauna responses, water quality, fish recruitment, ongoing community commitment) in the timeframe of the funding.



### Success on-ground

A range of monitoring techniques was employed to provide a snapshot of the status of wetlands in critical locations. These included:

*Fish barriers and habit values* using electrofishing with boat-mounted equipment;

*Water quality* using field meters, submersible data loggers, Secchi disk and other equipment combined with 24 hour stratified sampling and week long data logging in each seasonal weather pattern.

*Vegetation* using transect photo monitoring, dominance / density species composition; use of in-situ trials to overcome programme time constraints; repeat low altitude aerial surveys with GPS marked photos;

*Birds* – visual observation in repeated surveys (ground and aerial);

Examples of monitoring outcomes include:

- Fish and water quality responses to management demonstration (Lagoon Ck);
- Biodiversity risks of fire and grazing exclusion (Pasturage Reserve);
- Native macrophyte-waterfowl relationships and exotic pasture impacts demonstration (Goorganga Plain);
- Fishery habitat values quantified (Stuart Creek, Tedlands, Goorganga Plain, Fitzroy, Horseshoe and Healy's Lagoons);
- New fish passage barrier issues quantified (Fitzroy, Sandringham, Horseshoe & Healy's Lagoons); and
- Effective weed control quantified using fire (Fitzroy, Goorganga Plain)

### Appropriateness of approaches used

Water quality varied markedly both spatially and temporally, necessitating that the monitoring design to be both flexible and intensive enough to account for this. Birds were highly visible and monitored with minimal equipment. Peak events such as floods precluded monitoring due to safety and access issues.

The following Monitoring Reports are available from the ACTFR web site (<http://www.actfr.jcu.edu.au/>):

Healy's Lagoon  
Horseshoe Lagoon  
Stuart Creek  
Serpentine Lagoon  
Lagoon Creek



## Planning Toolkit

### Issues

During the conduct of the Pilot Programme, team members were frequently asked for guidance in assessing the condition of wetlands as well as the best means for protecting and managing wetlands locally. When the team looked at what was available to assist local government, it was fairly clear that there were adequate resources to incorporate wetland protection into planning schemes, as well as undertake on-ground works.

### Success on the ground

In order to promote local government to protect and manage wetlands, the concept of a 'Planning Toolkit' was developed. This was based on a review of selected planning schemes along the Queensland coast and other tools that would assist. It was found that very few local governments had planning provisions to protect wetlands from inappropriate use. However, there were exceptions including the Gold Coast City Council planning scheme that contains model provisions such as:

- Natural Wetland Areas and Natural Waterways Constraint Code;
- Overlay Map of Wetlands; and
- Policy 8: Guidelines for Ecological Assessments;

A comprehensive list of other tools is also available to assist local government in actively managing wetlands through their planning schemes including:

- EPA Wetland Mapping and Classification;
- EPA Wetland Management Profiles;
- CWPP Wetland Prioritisation Decision Support System; and
- EPA AquaBAMM - assessing riverine wetland conservation values.

WetlandCare Australia is also currently working in a new set of Wetland Rehabilitation Guidelines (WCA, 2008).

The Project Team has concluded that there are sufficient planning 'tools' now available from the Queensland Wetland Programme and the Great Barrier Reef Coastal Wetlands Protection Programme to comprise an 'IPA Wetland Planning Toolkit' for freshwater wetland protection and management. Further details are contained in Pilot Programme Information Bulletin #3

### Pilot Programme Case Study: Thuringowa City Council

A more in depth look at what local government might do in protecting and managing wetlands and riparian was carried out in Thuringowa City Council as part of a comprehensive review of the status of wetlands in the shire.

### Threats

The main threats to wetlands identified in the shire included:

- Land development
- Vegetation clearing
- Hydrological change sediment / nutrient loads
- Weeds
- Fire

### Needs

An analysis of how these threats might be addressed was undertaken. It was found that there are a comprehensive range of actions possible including:

- Planning scheme wetland provisions;
- Performance criteria for development near wetlands;
- Wetland management plans; and
- Increasing the protection area status of high value wetlands.

A range of other non-planning scheme initiatives were also identified including:


- Promotion of improved fire and grazing techniques;
- Riparian revegetation;
- Terrestrial and aquatic weed control;

- Development of BMP for residents living in proximity;
- Provision of incentives for on-ground works; and
- Voluntary conservation agreements.

## Feedback from project partners

- Planning scheme provisions only trigger an action if someone proposes development;
- BMP refers to urban / rural residential land uses;
- Many councils not able to see past short-term gains;
- Need to raise the bar on legislation to protect wetlands in Qld;
- Need to send Information Bulletins #3 and #4 to planners / parks and reserves, engineers, strategic planners;
- Councils need to be made aware of where wetlands are and their importance;
- Use EPA wetlands mapping – followed up with technical explanation at a local scale, especially subtle systems such as ephemeral wetlands;
- Need performance criteria to achieve acceptable outcomes for developments in / adjacent to wetland areas; and
- Do we need more enforcement of existing legislation necessary to begin with.

Further details are contained in CWPP-PP Information Bulletin #4.



**Great Barrier Reef  
Coastal Wetland Protection Programme**

**Information Bulletin #3: IPA Wetland Planning Toolkit** Pilot Project May 2007

**Update**  
Information Bulletin #3 in the CWPP series introduces a new range of planning 'tools' currently available to local government planners throughout the GBR Lagoon Catchment. These tools provide the essentials to allow the inclusion of comprehensive freshwater wetland protection and management measures in local planning schemes. This can be done either at the initial preparation stage of a planning scheme or at any time in the future as part of an amendment under the Integrated Planning Act (IPA).

The tools introduced here are but part of a comprehensive range of initiatives being undertaken by the Queensland and Australian Governments as part of the Queensland Wetlands Programme. This programme is funded through the Great Barrier Reef Coastal Wetlands Protection Programme and the Queensland Natural Heritage Trust (Wetlands) Programme. Both programmes are designed to protect wetlands in Queensland. Central to all these initiatives is a commitment by both the Queensland and Australian Governments to see the Reef Water Quality Protection Plan implemented.

**Planning Scheme (GPS) has used various codes, including the Natural Wetland Area and Natural Waterways Constraint Code and associated Overlay Map. This is backed up by Policy 8: Guidelines for Ecological Assessments.**

Other information and assessment tools are also now available to assist local governments in protecting and managing wetlands. These include the recently released EPA Wetland Mapping and Classification in the GBR Catchment, and the associated Wetland Management Profiles. There is also a rapid system for protecting wetlands for management investment based on the Wetland Prioritisation Decision Support System. A complementary means of assessing marine wetland conservation values is provided by AquaticLife. Each of these tools is briefly reviewed below and web links are provided to obtain more detailed information.

**1. Natural Wetland Area and Natural Waterways Constraint Codes:** Produced by the Gold Coast City Council, this 5-page document comprehensively spells out development requirements within or adjacent to wetlands and waterways and includes:

- general ecological assessment procedures;
- retention of ecologically significant areas;
- rehabilitation;
- water management;
- on-site effluent management;
- buffers and setbacks; ecological corridors;
- management arrangements; and
- vehicular and pedestrian crossing.


**2. Wetland Mapping and Classification**  
A comprehensive wetland mapping and classification project has recently been completed by the IPA as part of a funding partnership between the Australian and Queensland Governments, under the Queensland Wetlands Programme. Wetland maps are now available as GIS data layers, suitable for inclusion in coastal planning schemes, mostly at a scale of 1:50,000.

**EPA Wetland Mapping Methodology**

1. Data gathering and processing.
2. Water body map development and classification by:
  - a) Combining water body data (satellite imagery, Decade and the Riverine Pigeon Ecosystems (RPE) water features) and applying the water regime model and preliminary water classification;
  - b) Addition of activity and soil hydrological data to develop and naturalised water bodies;
  - c) Allocating RPE to water bodies;
  - d) Reclassifying and updating existing products (RPE pre-clearing, RPE removal and water body maps) and generation of final natural regional ecosystems wetland coverage;
  - e) Generating final wetland map - combining RPE, discharge R, water bodies (R), naturalised RPEs and RPE springs data layers;
  - f) Refining wetland map through internal quality control and expert panel. (Source: EPA 2006)

**Why a 'Planning Toolkit'?**  
WetlandCare Australia has frequently asked during the rollout of the bioregional (BIO) program Pilot Projects along the Queensland coast (see Information Bulletins #1 and #2) for guidance in assessing the condition of wetlands. There were also regular enquiries regarding the best means for protecting and managing local wetlands from inappropriate use as part of the planning process.

A review of selected Planning Schemes prepared under IPA has highlighted some examples of comprehensive provisions to protect and improve wetlands. In particular, the Gold Coast



**Great Barrier Reef  
Coastal Wetland Protection Programme**

**Information Bulletin #4: Wetland Management and Protection Needs**  
Pilot Project Case Study: Thuringowa City Council May 2007

**Introduction**  
Land use change is inevitable and is normally a response to demographic pressures and lifestyle demands, improved farming techniques and a greater appreciation of the need for sustainable practices.

While wetland values are often acknowledged as an issue to be considered during land use change, in many areas only minimal wetland protection measures are in place, including Integrated Planning Act (IPA) schemes. Without appropriate 'Desired Environmental Outcomes' and supporting 'Design Guidelines', land use intensification within or upstream of wetlands may pose a significant threat.

**Pastoral Leases under new leasehold land arrangements:**

- Hyacinthine declared a Class 2 pest (mandatory eradication) under Qld pest management legislation; and
- Nature Refuge designation desirable and negotiable as part of leasehold land 5 yearly NRM audits.

**Land Use Change Within Wetlands and Contributing Catchments**  
GPS within federal, state and local government wetland protection and planning policies make wetlands and their upper catchments vulnerable to inappropriate land use impacts.

The opportunity exists to review wetland protection and management provisions during reviews of IPA schemes and to draw on approaches from elsewhere within Queensland to develop exemplary planning schemes and Council-initiated management responses to redress identified gaps.

**Coastal development poses a long-term threat to the integrity of many coastal wetlands and tributary streams entering the GBR Lagoon. Future design and location of coastal development and associated infrastructure is the key to minimising impacts on adjacent waterways.**

**Case Study: Thuringowa City Council**  
The Information Bulletin #4 in the CWPP Pilot Project series summarises the findings of Tait, J. (2006) 'Thuringowa Wetlands: Review of Status, Protection and Management Needs'. The report analyses and discusses the key threatening processes to coastal wetlands, and effective management strategies to redress these threats. These strategies are aimed at achieving biodiversity conservation and water quality protection objectives of the GBRWPP and the Burdekin Dry Tropics NRM Plan.

**The main threats identified include:**

- land development
- vegetation clearing
- hydrological change (sediment / nutrient loads)
- weeds
- fire

The GBRWPP Pilot Project has provided the opportunity to actively promote wetlands as warranting a high level of recognition, resourcing and protection, within the context of the numerous statutory instruments and voluntary programs currently or potentially applying to wetlands including:

- the Integrated Planning Act (compliant planning schemes being developed and released);
- Old State Coastal Management Plan;
- Land and Water Management Plans (including declared pests of wetlands) to be required of

The Tully trial had good landholder involvement and this assisted in gaining local approval of the DSS. The Tully group used the DSS for water quality funding prioritisation purposes. A similar exercise in the Herbert however found the criteria too technical / complex / difficult to understand. There is a need to simplify the DSS language and

## BMP: Riparian and Wetlands on Cane Farms

### Project outline

A funding initiative by CANEGROWERS during the Pilot Programme resulted in WCA partnering the Bureau of Sugar Experimental Stations (BSES) to produce a 'Best Management Practice (BMP) Guideline - Riparian and Wetlands on Cane Farms'. This is one volume in a 6-part BMP for the 'Cane Production' BMP series.

The project has allowed WCA to deliver a relatively low-cost educational component to the Pilot Programme that will reach most canegrowers within the GBR catchment. It provides an opportunity for the experience gained during the conduct of the Pilot Programme in developing integrated wetland management plans to be communicated on an industry-wide scale.

### Objectives

The 'Canegrowers Best Management Practice (BMP) - Riparian and Wetlands on Cane Farms' project seeks to:

- provide the sugar growing industry with standards for sustainable management of riparian lands and wetlands associated with sugarcane production;
- promote to landholders the benefits of adoption of the BMP in protecting and enhancing wetland biodiversity, fishery production and water quality functional values;
- document examples of where the implementation of BMP has achieved improvements in environmental performance without impacting adversely on farm productivity;
- ensure that the BMP is acceptable to and endorsed by the sugar industry; and
- identify the necessary incentives for canegrowers to adopt BMP to protect and enhance the ecological values of wetlands on cane farms.

### BMP guidelines

The BMP focuses on water quality outcomes and what can be achieved by active management of the riparian and wetland areas on cane farms. It provides guidance in a broad range of management issues including: riparian and aquatic weeds, streambank erosion and sedimentation, revegetation, restoring former wetlands, constructing new wetlands, irrigation and drainage management, fish habitat and migration, use of fire / grazing and herbicides in wetlands and feral animal control.

### 'Model' cane farm

The guidelines bring each of the above management issues into focus with the concept of a 'model cane farm - riparian and wetland management.

Version 2: 12 April 2007

#### Best-practice: Riparian and Wetland Areas on Sugarcane Farms

Volume #6 Canegrowers 'Best Management Practice' Series

Robert J Smith<sup>1</sup>



Australian Gov and other logos

<sup>1</sup> Wetland Management Consultant, WetlandCare Australia, 1 Brown Ave, Albionville NSW 2477. Tel: 02 8625 3472, Mob: 0407 496 367 [rob@wetcare.com.au](mailto:rob@wetcare.com.au)

#### Table of Contents

INTRODUCTION .....	5
BMP Riparian and Wetlands project outline .....	5
Status of riparian and wetland areas on cane farms .....	7
Progress by canegrowers to date .....	9
How wetlands and riparian areas work .....	10
Benefits of riparian and wetland areas .....	12
'Important Wetlands' in Queensland .....	14
Wetlands and Integrated Planning Schemes .....	14
Wetland mapping and classification .....	14
Wetland management profiles .....	15
WATER QUALITY AND CANE FARMING .....	16
Summary of current situation .....	16
Best farming practice for water quality .....	17
Possible Nutrient Management Zones – role for wetlands .....	19
RIPARIAN & WETLAND MANAGEMENT ISSUES ON CANE FARMS .....	21
BEST MANAGEMENT PRACTICE – RIPARIAN AND WETLANDS .....	25
RIPARIAN AND AQUATIC WEEDS .....	25
STREAMBANK EROSION AND SEDIMENTATION .....	26
REVEGETATION .....	30
RESTORING FORMER WETLANDS .....	31
CONSTRUCTING NEW WETLANDS .....	32
IRRIGATION AND DRAINAGE MANAGEMENT .....	33
FISH HABITAT AND MIGRATION .....	38
FIRE, GRAZING AND HERBICIDES IN WETLANDS .....	42
FERAL ANIMAL CONTROL .....	43
'MODEL FARM' - RIPARIAN AND WETLAND MANAGEMENT .....	46
LEGAL REQUIREMENTS .....	47
TECHNICAL SUPPORT .....	48
REFERENCES AND FURTHER READING .....	49

## > Project Partners Seminar

WetlandCare Australia hosted a 1-day seminar in Townsville on Friday 11<sup>th</sup> May 2007 with the theme....."sharing with project partners the lessons learnt during the Great Barrier Reef Coastal Wetlands Protection Programme - Pilot Programme 2005-2007 conducted at 21 wetland sites between Bundaberg and Port Douglas"

Presenters included Jim Tait and Bob Smith (WetlandCare Australia), David Hudson (Conservation Volunteers Australia), Vern Veitch (Australian Centre for Tropical Freshwater Research). This 'Consortium' has worked with local project partners for the past 2 years in delivering on-ground wetland management projects with the aim of improving water quality entering the GBR lagoon as well as enhancing local biodiversity.

The day was attended by 50 invited 'project partners' from NRM, state and local government and community groups. Cassie Burns and Nicola Sheard from WCA ran the day and took the opportunity to promote their new project 'Rehabilitation Guidelines for GBR Catchment Wetlands'.

Topics discussed during the day included:

Aquatic and riparian weeds	Feral pigs
Grazing and fire	Constructed wetlands
Revegetation	Best Management Practice Cane Farms
Hydrology / drainage	Monitoring weeds, birds, fish and water
Barriers to fish	Integrated planning and other local initiatives

The presentations made at the seminar on the above topics and the feedback received from project partners on the day, provided the basis for the earlier sections of this report. The following section is a summary of discussion held during the 'open forum' at end of the seminar. The four topics discussed were nominated earlier during the Seminar. Notes from the discussion are presented below:

### Cost benefit analysis

- Key to next step forward - needs to include aquatic weeds, grazing fire / lost productivity to fishery;
- We can cost on-ground works constructed and provide (qualitative) anticipated environmental benefits (contained in project proposals);
- Need to ask for full costs of projects, not \$2000 for 20 Ha, look at whole system – good job for DPI;
- CSIRO role in the tender was to provide EBI to projects – understand that there is a metric matrix for tender assessment – with the constraints on this project it was not possible;
- Need to compare cost of constructed wetlands in wet tropics vs dry tropics;
- Farmers who reduce grazing on marginal land can benefit financially but if they reduce grazing pressure by a large amount of land it can cause big economic losses;
- Suggested that funding should go to mid-range farmers (in terms of BMP) rather than to top farmers;
- Suggested that there might be 2 different designs for constructed wetlands – one for biodiversity, one for water quality (some disagreed); i.e. some designed for habitat values and some water quality values;
- Water quality monitor at edge near sediment traps – difficult to put a value on it;
- New project just approved to assess socio-economic value of improving the water quality in the GBR – for future funding assessment;
- CSIRO has 4-year project monitoring water quality in constructed wetland in the Tully;

### Stewardship payments

- Cost benefit analysis – what is the value of short-term stewardship payments vs buying the land?
- Ag stewardship project in budget aimed at Box Gum association in Qld, NSW and Victoria. DEW may jump to another stream e.g. JAMBA, CAMBA in 5 year agreements;
- Community needs to lobby government to re where and how to target funding;
- Stewardship payments very important – maybe a few errors but do it generously as it is very valuable – make sure it does not cost landholders \$\$ - but where should it be targeted?;
- Environmental weeds impacting on wetlands are not declared;
- Need to convene network to decide items 2-5 on whiteboard list;

### Capital equipment

- Capital equipment funding must be returned to regional bodies;
- Hard to find substantial \$\$ base to fund maintenance of equipment;



- Political will to fund ongoing operation of for example \$0.25m aquatic weed harvester;
- Agencies need to accept that scale of works that need to be done requires specialised equipment;
- Trials undertaken in CWPP-PP are an example of what \$\$ can achieve and the type of equipment needed;
- Need a dedicated response fund to be used post-flood event to cost effectively control aquatic weeds as proposed in the Lagoon Creek project;
- One piece of equipment could be in use all the time on aquatic weeds;
- Need ongoing funding for equipment maintenance;
- Change the setup of Regional Organisations to make it easier to introduce such ideas.

### **Volunteer capacity / funding for labour**

- Where do we go for manpower for assistance with controlled burning – suggest specialist weed control contractors;
- Availability of funds to pay labour in this project has been fundamental to success – thanks;
- Liked being involved in project planning and the speed of fruition;
- Need centralised \$\$ source for volunteer labour / funded labour to do work;
- Revegetation better to do on your own as less time required that organising other (volunteer) people to do it.
- Volunteers need ongoing support to retain momentum;
- Project \$\$ for labour means the community (volunteers) have back-up to make sure the job gets done;
- But make sure the community groups kept as vital part of these projects where possible;
- Need paid professionals to be capacity builders and to support / organise community group e.g. Tully SC has planted 10,800 trees as they have very good capacity plus excellent volunteer community;
- Volunteers want to have a good experience and are important as they are voters;
- Nurseries got going in NQ as Councils joined forces;
- Round 10 Envirofund coastal and Marine only – BDTNRM successful in getting funding for building capacity in regional groups / community groups;
- Policy makers need to keep funding rolling and use the same programme name to maintain volunteer capacity;
- Funding was not to support for community nurseries in their region as this would have meant competition for commercial nurseries;
- Need reduction in red tape / approvals to do environmental work;
- Agroforestry and its effects on wetlands needs examination.





## Appendix 1 Independent Reference Group

### A. Membership

Mr Noel Dawson (Chair):	currently Chair of Great Barrier Reef Marine Park Authority's Water Quality and Coastal Development Reef Advisory Committee.
Dr Tim Wrigley:	Canegrowers, Senior Manager Environment and Natural Resources and represents Canegrowers on the Great Barrier Reef Marine Park Authority's Water Quality and Coastal Development Reef Advisory Committee.
Mr Tony Allingham:	member of AgForce State Council and AgForce Cattle Board, manager of the AgForce Environment Policy Reference Group and represents AgForce on the Great Barrier Reef Marine Park Authority's Water Quality and Coastal Development Reef Advisory Committee.
Mr Peter Macdonald:	Project Manager Wetlands, Queensland Environmental Protection Agency.
Mr Peter Stanton:	Director of Conservation on the Wet Tropics NRM Board (FNQNR Pty Ltd). Previously the principle scientist for the Environment Protection Agency Queensland.
Mr Roger Jaensch:	Senior Program Officer, Wetland Inventory & Waterbird Surveys, Wetlands International – Oceania.
Mr Richard Leck:	WWF Australia - Observer

### B. Terms of Reference– Great Barrier Reef Coastal Wetlands Protection Programme (GBRCWPP) – Pilot Programme

The Great Barrier Reef Coastal Wetlands Protection Programme – Pilot Programme Independent Reference Group is a non-statutory body which provides technical and policy advice to inform implementation of the Programme.

Advice includes:

- Prioritising wetland areas for investment.
- Assessing project proposals.

Committee membership represents non government organizations, industry, science and government stakeholders.

In particular, the Independent Reference Group will:

- (1) Identify priority wetlands by region or wetland type in the Great Barrier Reef coastal wetlands catchments for intervention based on, for example:
  - Reef Water Quality Protection Plan actions, and priority catchments
  - Queensland Environment Protection Agency wetland priorities
  - National Action Plan for Salinity and Water Quality and Natural Heritage Trust priorities
  - Biodiversity hotspots
  - Natural Resource Management Catchment Plans
- (2) Provide advice to GBRCWPP Pilot Programme project managers Conservation Volunteers Australia on priority wetlands to guide development of project proposals.
- (3) Assess project proposals and recommend proposals for funding.
- (4) Provide advice to the Minister/Department of the Environment and Heritage for proposals recommended for funding.

### C. Outcomes of the Pilot Program:

The desired outcomes of the pilot program are to:

- Contribute to the improvement of water quality within wetland systems
- Create awareness within and engage the community

- Contribute to the protection of wetlands and their values
- Contribute to the prevention of further wetland degradation

The pilot program will contribute to a number of actions under key Reef Plan strategies. For example:

- Develop and implement education and extension programs (Action B1).
- Develop and implement 'community awareness raising' including the need to protect and rehabilitate wetlands (Action B4).
- Promote the benefits of management plans, conservation agreements and covenants (Action B5)
- Establish conservation agreements and covenants to protect and manage wetlands (Action C6)
- Implement a pilot auction program that targets the conservation of wetlands that have a direct relationship with water quality improvements (Action C8)
- Identify potential areas within high-risk areas of the Reef catchment as a measure against land degradation (Action E2)
- Provide technical resource information (Action F2)
- Develop water quality targets for Reef Catchment waterways with a focus on investing in remedial action to protect and rehabilitate wetlands (Action H1).
- Identify wetlands that should be preserved to protect water quality (Action H3)
- Develop partnerships with NRM Regional bodies to make wetland rehabilitation a high priority in high-risk Reef catchment areas (Action H5)

#### **D. Development of Proposals:**

In developing proposals the consortium will engage with Regional NRM bodies, local government, industry (e.g. through peak bodies), community groups (such as Landcare) and individual landowners. A number of mechanisms, such as voluntary conservation agreements, auctions, incentive packages and farm management system/business management planning, will be employed to achieve the desired outcomes. Preference will be given to those proposals that trial a diversity of mechanisms i.e. proposals that include more than one mechanism or a number of proposals which collectively embrace several mechanisms.

The consortium will liaise with the QLD EPA on the assessment of approved NRM Regional Investment Strategies to identify priority areas and issues within each region.

No public call will be made for proposals – given the short time frame, the focus will be on building on existing initiatives. Proposals will need to demonstrate that public benefit outweighs any private benefit.

Tools to be employed to achieve the outcomes of the pilot program include:

- Management (e.g. weeds, riparian vegetation, grazing management, drainage etc) actions
- Education/training and support of private landholders and/or NRM boards/staff
- Conservation Agreements, possibly in perpetuity, with farmers and local government, either voluntary or under government legislation
- Incentives - public good aspect to payments, bidding system or conservation agreement, short term rather than long term payment, possible auction approach
- Rehabilitation of wetlands

In developing proposals the consortium will have regard to:

- Publicity opportunities to raise community interest, creating awareness of the objectives of the pilot program, develop outline of a communication plan – develop measures for 'awareness changes'
- Surrounding land use and other potential threats
- Integrate with existing communication initiatives – Regional Plans, GBRMPA, Reef Plan, Industry bodies, and local authorities for example
- Features of the proposal that may affect natural water flows or conditions
- Condition of riparian vegetation
- Aquatic plants (including presence of weeds)
- Fish habitat and connectivity
- Enhance biodiversity values, especially listed species, communities and sites
- Improvement of 'aggregations/complexes' and not just the individual wetlands within them

- Recognise different approaches will be required for the broad range of catchments, tenures and land systems, i.e. cover a variety of land systems not just floodplains; trial different methods on leasehold and freehold land managed by landholders; lease conditions could be an incentive
- Ensure communication activities link with existing communication programs (GBRMPA, Industry, Regional etc) and the communication plan for this program

Proposals should address any on-ground activities and/or programs already in place within the region. These activities/programs should be evaluated relative to the proposal to ensure there is no duplication of activities.

#### References:

Barbier, E.B, 1994. *Valuing Environmental Functions: Tropical Wetlands*. Land Economics 70(2): 155-173.

Mackenzie, R., Robinson, J., Lockie, S., Dent, J., Rockloff, S. and Scheltinga, D.M., June 2004. *Sustainable Land Management and Wetlands Conservation on Freehold and Leasehold Land in the Great Barrier Reef Catchment*, CRC for Coastal Zone, Estuary and Waterway Management.

### E. Identification of Priority Wetlands

To identify priority wetlands in the Great Barrier Reef coastal catchments, the IRG agreed that selection criteria would be developed to:

- Meet the identified outcomes
- Limit adverse consequences outside the wetlands (e.g. water supply)

The focus will be on priority catchments as identified in the Reef Plan at Appendix 3, Catchment Risk Assessment, and take into consideration wetland priorities identified by the Queensland Environment Protection Agency (EPA), priorities under the National Action Plan for Salinity and Water Quality and Natural Heritage Trust, Biodiversity hotspots and Natural Resource Management Regional Plans.

In identifying priority wetlands, consideration will be given to whether or not wetlands have already been identified as a priority or as an area of local, State, national or international significance, e.g.

- Sites in the *Directory of Important Wetlands in Australia*
- Regional Coastal Management Plans
- Regional NRM Plans and Regional Investment Strategies
- Local government planning schemes
- Wetlands within priority catchments as identified in the Reef Water Quality Plan and/or National Action Plan for Salinity and Water Quality
- Reports or studies in relation to wetlands and conservation activities (e.g. Sunfish report)
- Ramsar sites and Wetland Regional Ecosystems
- Wetland Regional Ecosystems that are listed as Endangered or Of Concern

To ensure that the pilot program leads to widespread community involvement and awareness of its objectives, proposals will ideally be distributed across a number of regions within the greater Reef catchment, subject to optimal delivery of project outcomes.

#### References:

- *Queensland Government – Strategy for the Conservation and Management of Queensland Wetlands*, Environmental Protection Agency, January 1999.  
[http://www.nrm.qld.gov.au/planning/plans/wetlands\\_strategy\\_qld.html](http://www.nrm.qld.gov.au/planning/plans/wetlands_strategy_qld.html)
- *Directory of Important Wetlands in Australia*, Department of the Environment and Heritage, 2001  
<http://www.deh.gov.au/water/wetlands/database/directory/index.html>
- *Freshwater Wetlands and Fish, Importance of Freshwater Wetlands to Marine Fisheries Resources in the Great Barrier Reef*, V Veitch, B Sawynok, GBRMPA, Sunfish Queensland, May 2005
- *EPA map of Queensland wetlands showing potential priority areas*
- *Status of Wetlands in Northern Australia. - Protecting the Values of Rivers, Wetlands and the Reef - Finlayson, Max; Lukacs, George (2003). Extract from report into wetlands loss along the Queensland coast. Recently compiled estimates of wetland loss from a variety of studies:*
  - 50% of large ephemeral wetlands on the Burdekin River floodplain
  - 80% of melaleuca systems on the Herbert River floodplain
  - 65% of all freshwater wetlands on the Johnstone River floodplain
  - 54% of all freshwater wetlands on the Russell-Mulgrave River floodplain
  - 65% of all freshwater wetlands on the Moresby River floodplain

- 71% of melaleuca and palm swamps on the Tully-Murray Rivers floodplain

#### **F. Selection Criteria for Assessment of Proposals:**

The 'Investment Strategy for the Queensland Wetlands Program' provides general principles to guide investment decisions under the Queensland Wetlands Program and is consistent with the intent of the Bilateral Agreement and the objectives of the Reef Plan. These principles are listed below and will be used for assessment of pilot program proposals:

- Scientific analysis of natural resource conditions, trends, problems and priorities
- Addressing the causes rather than symptoms of problems
- Consistency with other planning processes and legislative requirements
- Setting targets consistent with the National Framework for NRM Standards and Targets and the goal of the Reef Plan
- Strategic, prioritised and achievable actions necessary to address the objectives of the program and achieve the targets
- Continuous development, monitoring, review and improvement of the proposal
- Progressing the implementation of strategies within the Reef Plan
- The program will be supportive of projects that are able to deliver permanent protective measures such as conservation agreements

At the inaugural meeting of the IRG, the following additional criteria were developed for assessment purposes. No weighting has been applied at this stage. If the IRG is presented with more proposals than needed, then a weighting system may be applied, i.e. members will be asked to make individual assessments and to rank proposals.

The proposal addresses or includes:

- Demonstrates self sustaining management – i.e. how the long term benefits of the program will continue and be managed
- Creates awareness of wetland values and actions to protect and manage wetlands
- Improvement of water quality and/or protection of biodiversity
- Priorities in Regional Investment Strategies and/or catchment plans
- Demonstrated community involvement from a range of stakeholders
- No adverse consequences on other wetlands downstream, surrounding areas and in the catchment
- Public benefit outweighs the private benefit
- Co-investment (encouraged but is not mandatory)
- Demonstration that the proposal provides value for money, a return on investment and is a strategic targeted investment (identify any on-going maintenance requirements)
- Delivers on priorities of other NRM programs e.g. Reef Plan, NRM planning processes
- Delivers permanency of conservation agreements
- Innovation, or incorporation of innovative technologies and/or processes
- Assessment of whether/not it would trigger the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- A monitoring and reporting framework to ensure the effectiveness of the proposal is maintained and end products are achieved

## Appendix 2    GBR CWPP Project Sites Co-ordinates

Site	East	South
Wawu Dimbi	145°20'46.40"E	16°14'24.78"S
Douglas Shire	145°22'47.81"E	16°16'44.34"S
Russell / Mulgrave (Lauridsen)	145°56'56.81"E	17°18'56.53"S
(Bonso)	145°58'7.84"E	17°23'48.27"S
Tully / Murray	145°54'27.36"E	18° 1'1.27"S
Lagoon Creek	146°15'7.54"E	18°37'11.74"S
Thuringowa	146°27'21.63"E	19° 5'0.02"S
Stuart Creek	146°50'19.04"E	19°19'38.11"S
Cungulla	147° 2'23.27"E	19°21'1.06"S
Healeys Lagoon	147° 3'3.70"E	19°32'20.88"S
Horseshoe Lagoon	147° 7'35.64"E	19°32'49.79"S
Serpentine	146°53'28.85"E	19°34'27.18"S
Barrattas	147°13'17.00"E	19°34'52.28"S
Goorganga	148°38'57.38"E	20°25'50.54"S
Padaminka	149° 3'23.30"E	21°10'39.07"S
Southern Pioneer	149° 7'29.83"E	21°17'43.43"S
Tedlands	149°17'37.63"E	21°33'41.65"S
Kinka	150°47'51.02"E	23°14'12.24"S
Fitzroy	150°32'55.04"E	23°26'23.07"S
Splitters Creek	152°16'45.34"E	24°50'8.98"S
Pasturage Reserve	152°26'33.82"E	24°48'34.61"S
Canegrowers BMP	All GBR catchment	

### Appendix 3 Sample Final Project Report

#### *Splitters Creek Project:*

*Final Report - 6 July 2007*

**PROJECT ASSESSMENT:** Spliters Creek is an iconic remnant of freshwater biodiversity within the highly modified lower Burnett River Basin. In contrast to adjoining catchment wetland systems the Spliters Creek catchment lacks significant structural barriers for fish passage, retains a relatively contiguous riparian vegetation corridor and contains a diverse array of representative wetland types ranging from channel hosted lagoons to Melaleuca swamp forests to brackish sedgeland communities. It also hosts rare and threatened species including the EPBC listed Lungfish. Prior to the project scoping undertaken in the early stages of the Pilot Programme it would be fair to claim that the system did not have a high profile within the regional NRM community. Since then the Spliters Creek project has proven to be one of several examples within the Pilot Programme where limited funding (57 K) and strategic technical support made available through the Pilot Programme provided the nucleus for a more substantive project predominantly funded by co-investment (94.25K) obtained by local project partners (facilitated by the Program consortium) in this case Bundaberg and District Urban Landcare Association and Burnett Mary Regional Group (BMRG). While BMRG provided a modest 5.5 K they were instrumental in the project obtaining major funding from the Qld Government's Coordinator General Department's Burnett Program of Actions (BPOA) funding initiative. Given the more substantive funding obtained from co-investment one of the challenges for the project was aligning milestone outputs of the original CWPP proposal within the longer term work plan of the ultimate project which also had a belated start up due to the IRG stipulating that secured co-investment was a prerequisite for Pilot Programme funding. By and large this has been achieved with minor exceptions noted in comments sections below. The project has also been successful in attracting support from a State Government Agency (DPIF) fish passage barrier 'Bio-Pass Program' which is now funding electro fisher surveys of the creek system and looking to fund the rectification of several low flow fish passage barriers within it. Local project drivers Bundaberg and District Urban Landcare, particularly the funded project officers have successfully capitalised on the Pilot Programme investment and displayed a high level of capacity and enthusiasm in delivering the project which has been a star on more than one occasion on local TV and radio news bulletins. Overall the Spliters Creek project has proven to be successful beyond original aspirations in terms of outcomes delivered on-ground but still requires the sustained funded of local project drivers to deliver some of the more challenging desired outcomes in terms of tenure based protective management and Shire Planning initiatives.

Task	Proposed Outputs	Output Code	Output Unit of Measure #1	No	Output Unit of Measure #2	No. <sup>9</sup>	Date/s undertaken	Comments (Concise but descriptive statement of activity/ milestone achievement.)
<b>Rapid Assessment of Reach Values / Threats / Needs</b>	<ul style="list-style-type: none"> <li>Assemble available data</li> <li>Compile reach based assessment to define values, threats and management / protection needs</li> </ul>	RA2.1	Number of biophysical studies completed	3+*	Area (ha) surveyed	16550 ha	Nov 2005 & May 2006  Feb 2007  April 2007	(1) The identification of reach based values and management issues was undertaken by WetlandCare Australia Specialist Wetland Consultant Jim Tait and Bundaberg Landcare Project Officer Maureen Schmitt ( <b>Attachment 1</b> ). Site inspections of wetland and riparian values, habitat condition and management issues were conducted at creek reaches throughout the catchment (c/f the more limited number of reaches included in the original proposal) and subcatchment tributaries with the support of current aerial photo coverage. An aerial fly over of the catchment using a light aircraft was also conducted to identify values and issues in areas not readily accessible on ground and to obtain a broader catchment perspective. A canoe was also utilised to access some of the larger waterholes and reaches with difficult land based access. Additional information was obtained from regional ecosystem and riparian vegetation mapping undertaken by the Queensland Herbarium and direct communication with state agencies that have some history of involvement or interest in the catchment. The opportunity was also taken to interview riparian landholders encountered during the course of field investigations (2) An assessment of fish passage barriers within the system was undertaken in February 2007 by TAG members lead by Andrew Berghuis DPIF ( <b>Attachment 2</b> ). (3) An assessment of aquatic weed distribution within the catchment was also undertaken used field verified spot imagery in April 2007 ( <b>Attachment 3</b> ) *Additional biophysical studies funded through co-investment have also been undertaken or are in progress including a Spot Imagery assessment of the entire catchment area 16, 550 ha. These are documented in BMRG NRM Activity Plan Quarterly Milestone Reports. ( <b>Attachments 4-8</b> )

<sup>9</sup> No. refers to the number of ha, km, events, participants, publications, distribution etc as measures of outputs



Task	Proposed Outputs	Output Code	Output Unit of Measure #1	No	Output Unit of Measure #2	No. <sup>10</sup>	Date/s undertaken	Comments (Concise but descriptive statement of activity/ milestone achievement.)
<b>Rapid Assessment of Reach Values / Threats / Needs (cont)</b>	<ul style="list-style-type: none"> <li>Assemble expert panel to review assessment and validate priorities for action*</li> </ul>	CB4.2	Number of significant knowledge evaluation events held	1			Dec 2006 - ongoing	A Technical Advisory Group (TAG) comprised of representatives from State Government Agencies (DPIF, NRW, EPA), community NRM groups (BDUL, BMRG), Conservation NGOs (WWF, Wetlandcare Australia), Local Government and Environmental Consultants was formed in December 2006. In February 2007 the TAG met to review the reach-based assessment produced by Wetlandcare Australia and to provide feedback on management investment priorities and approaches.
<b>Plan of Management and Community Awareness</b>	<ul style="list-style-type: none"> <li>Develop map based Plan of Management based on above, as basis for a sub-catchment based community awareness program*</li> </ul>	P3.1	Number of catchment or sub-catchment plans or strategies completed	2			Draft April 2007 ongoing – August 2007	<b>This activity is incomplete primarily due to the extended project time frame and more extensive consultative processes engendered by the locally derived and substantive co-investment.</b> The reach based assessment prepared by Wetlandcare in mid 2006 presented an initial range of management recommendations tied to sub catchment areas. In early 2007 (April) an A0 spot image map of the catchment was prepared (currently being printed) with icons identifying values and management issues within the basin. A series of reach based fact sheets are also being produced in conjunction with the pictorial based management plan to provide more detailed supplementary information. The overall catchment management plan and reach fact sheets are being released for community review in August 2007.
	<ul style="list-style-type: none"> <li>Develop supporting Information Bulletins on management of riparian frontages, aquatic weeds, terrestrial weeds, grazing / fire<sup>11</sup></li> </ul>	CB1.2	Number of written products developed	3	Estimated number of recipients	650	Nov 2006 Feb 2007 July 2007	Two information Bulletins have been released and a third is currently being finalised for release in mid July 2007 ( <b>Attachments 6 &amp; 7</b> ). Mail outs of information bulletins have also been used as the opportunity to engage landholders within the catchment including through questionnaire surveys that have obtained information on weed distribution, landholder willingness to participate in management activities and landholder nominated investment priorities ( <i>Attachment 4</i> ).
	<ul style="list-style-type: none"> <li>Engage all stakeholders in awareness campaign, including all landholders fronting Splitters Creek</li> </ul>	CB1.1	Number of awareness raising events such as demonstrations, field days or study tours conducted	3	Number of participants in person-days	80 20 100s+	Dec 2006  Mar 2007 April 07	To date three key awareness raising events have been held including an initial on-site project launch information day involving approximately 80 people, a plant and weed and plant identification 'Catchment Crawl' bus trip conducted in March 2007 involving approximately 20 people and a major project display at the AgroTrend Field Day in Bundaberg which drew a large level of interest over its duration. <b>Additional awareness raising events including public release and review of draft management plans are scheduled for August 2007.</b>

<sup>10</sup> No. refers to the number of ha, km, events, participants, publications, distribution etc as measures of outputs

<sup>11</sup> Funding split for on-ground activities under CWPP nominally allocated to Co-ordination 25%, Catchment Plan 5%, Riparian Weeds 10%, Aquatic Weeds 10 %, Fire Regime / Grazing 10%, Protection of high value areas 15%, Education 10%, Incentives 15%.

Task	Proposed Outputs	Output Code	Output Unit of Measure #1	No	Output Unit of Measure #2	No. <sup>12</sup>	Date/s undertaken	Comments (Concise but descriptive statement of activity/ milestone achievement.)
<b>Plan of Management and Community Awareness (cont)</b>	<ul style="list-style-type: none"> <li>Engage all stakeholders in awareness campaign, including all landholders fronting Splitters Creek (estimated 100)</li> </ul>	CB1.3	Number of displays for use at events such as regional meetings developed	4				A number of displays used in events such as regional meeting have been developed through the project including (1) invasive weeds of the catchment (2) Information on the Southern Snapping Turtle <i>Elseya albagula</i> (3) the draft pictorial based catchment management plan and the project display used at the AgroTrend Field Day.
		CB1.2	Number of written products developed	1	Estimated number of recipients	650	Feb 2007	A questionnaire survey sent out with information Bulletin 2 (see in attachment 4) has helped engage 60 landholders across the catchment (see map in attachment 4) and provided weed distribution and management investment prioritisation guidance.
		CB1.4	Number of media opportunities resulting in articles in newspapers or on radio or television created	6			Aug 06, Nov 06, Feb 07, Mar 07, April 07, Jun 07	Six media releases have all been reported by local media outlets including coverage on ABC Rural Radio and Channel 7 Local News.
<b>On-ground Works - Reach #1: Tidal (high quality)</b>	Minor weed invasion (Groundsel and rubber vine) – deferred pending additional funding on 1:1 basis							To date no on-ground works have been delivered in this reach in which proposed works were nominated during project proposal development due to more considered stakeholder and TAG defined works priorities being identified elsewhere and a lack of participating landholders in this reach. A committed landholder has recently been engaged in the estuarine section of this reach and works opportunities now being progressed.
<b>On-ground Works - Reach #2: Bluegum (highly degraded Swamp Forest) - 2 owners</b>	Engage with 2 key landholders to enlist support for management intervention in the most highly degraded reach* Control exotic grass invasion and impacts by combination of strategic fencing and grazing to close riparian / swamp forest canopy Strategic use of herbicide in difficult to manage areas to control grass and floating weeds	OG8.1	Area (ha) of pest plant control measures implemented	1.5				Works within this reach have included: <ul style="list-style-type: none"> <li>Chemical spraying of Para Grass blocked stream channel (see photo below)</li> <li>Electro fisher survey of fish fauna</li> </ul>
		RA2.1	Number of biophysical studies completed	1				An off-site grazier has been engaged to provide strategic controlled grazing of exotic pasture infestation within this reach but to date the adjoining riparian landholders have not agreed to riparian fencing works despite initial indications of support.  A working group of TAG members primarily Government Agency representatives (considering the riverine works permits requirements) has also been formed to further examine options for rectification and longer term maintenance of the fish passage barrier created by the aquatic weed infestation within this reach.

<sup>12</sup> No. refers to the number of ha, km, events, participants, publications, distribution etc as measures of outputs

Task	Proposed Outputs	Output Code	Output Unit of Measure #1	No	Output Unit of Measure #2	No. <sup>13</sup>	Date/s undertaken	Comments (Concise but descriptive statement of activity/ milestone achievement.)
<b>On-ground Works - Reach # 3: Nut Farm</b> (aquatic weed infested deepwater lagoon)	Engage with key landholders to enlist support for grazing management intervention to facilitate reduction in fuel loads and encouragement of natural recruitment to widen and thicken riparian vegetation. Contribute to Burnett Shire Council's annual aquatic weed control program for deepwater lagoons of lower Splitters Creek. Seek to establish a high priority for aquatic weed control in Splitters Creek to reflect the system's high conservation values.	OG3.3	Area (ha) of riparian native vegetation enhanced / rehabilitated	5	Streambank length (km) of riparian vegetation enhanced / rehabilitated	5		<p>Works within this reach have included:</p> <ul style="list-style-type: none"> <li>Physical removal of approximately 6.6 ha of aquatic weeds (Hyacinth and Salvinia)</li> <li>Flow channel re-instatement to off river water body resulting in flushing clearing of 1 ha aquatic weeds</li> <li>Chemical spot spraying of residual aquatic weed infestations</li> <li>Cut and dab plus physical pulling of riparian weeds along 5 km of stream frontage</li> <li>Revegetation along approximately 1 km of narrow riparian vegetation buffer</li> <li>Electro fisher survey of fish fauna</li> <li>Owl boxes installed in partnership with GROWCOM farmer as trial for bio-control of rats in Macadamia plantation</li> </ul> <p>All riparian landholders within this reach (3 on eastern side and 2 on western side) have been engaged by the project in delivering on-ground works.</p> <p>Burnett Shire Council has not been responsible for annual aquatic weed control activities as originally indicated. These operations have in fact been conducted by the Burnett Catchment Care Association (BCCA) who recently received substantial funding from the Burnett Mary Regional Group (750K). An agreement has now been established between the Bundaberg Landcare Association and the BCCA with the former responsible for monthly monitoring of the system with BCCA responding with spray based aquatic weed control when required.</p>
		OG8.1	Area (ha) of pest plant control measures implemented	6.6				
		OG4.4	Area (ha) planted to riparian native species	1				
		RA2.1	Number of biophysical studies completed	1				
<b>On-ground Works - Reach # 4: Fig Tree Terrace</b> (high quality deepwater lagoon) – 10 owners	Education based improvement in management of riparian vegetation by rural residents. Seek to identify, support and promote a 'model manager' in this community	OG3.3	Area (ha) of riparian native vegetation enhanced / rehabilitated	2	Streambank length (km) of riparian vegetation enhanced / rehabilitated	2		<p>Works within this reach have included:</p> <ul style="list-style-type: none"> <li>Physical removal of approximately 5.7 ha of aquatic weeds (Hyacinth and Salvinia)</li> <li>Chemical spot spraying of residual aquatic weed infestations</li> <li>Cut and dab plus physical pulling of riparian weeds along 2 km of stream frontage</li> <li>Electro fisher survey of fish fauna</li> </ul> <p>50% of the landholders within the rural residential developed eastern bank of this reach have been engaged by the project in delivering on-ground works on their property's riparian frontages.</p>
		OG8.1	Area (ha) of pest plant control measures implemented	5.7				
		RA2.1	Number of biophysical studies completed	1				
		CB1.2	Number of written products produced such as brochures, newsletters, posters or fact sheets	1	Estimated number of recipients	49		<p>Bundaberg Landcare developed and distributed a 'Land managers Toolkit' containing information on weeds and riparian management practices to 49 landholders. NB these kits were distributed to landholders throughout all catchment reaches.</p>

<sup>13</sup> No. refers to the number of ha, km, events, participants, publications, distribution etc as measures of outputs

Task	Proposed Outputs	Output Code	Output Unit of Measure #1	No	Output Unit of Measure #2	No. <sup>14</sup>	Date/s undertaken	Comments (Concise but descriptive statement of activity/ milestone achievement.)
<b>On-ground Works - Reach #5: Meadowvale</b> (high quality deepwater lagoon) - 6 owners	Promote elevation of Meadowvale to a higher conservation status via planning and other non-statutory means Highlight the strategic importance of this extensive natural area in maintaining the health of Splitters Creek	OG3.3	Area (ha) of riparian native vegetation enhanced / rehabilitated	4	Streambank length (km) of riparian vegetation enhanced / rehabilitated	4.2		Works within this reach have included: <ul style="list-style-type: none"><li>Chemical spot spraying of residual aquatic weed infestations</li><li>Cut and dab plus physical pulling of riparian weeds along 4.2 km of stream frontage</li><li>Electro fisher survey of fish fauna</li></ul> Delegations and submissions have also been made to local government seeking to get the tenure of the Meadowvale Council Reserve converted to a Reserve for Environmental Purposes. Council have agreed to the development of a management plan for the reserve and Bundaberg Landcare is now represented on the steering committee which met for the first time in June.
		OG8.1	Area (ha) of pest plant control measures implemented	0.5				
		RA2.1	Number of biophysical studies completed	1				
<b>On-ground Works – Reach** #5: 10- Mile (closed canopy at high risk from rural subdivision)</b>	Education based improvement in management of riparian vegetation by rural residents Seek to identify, support and promote a 'model manager' this community	OG3.3	Area (ha) of riparian native vegetation enhanced / rehabilitated	7	Streambank length (km) of riparian vegetation enhanced / rehabilitated	7.2		Works within this reach have included: <ul style="list-style-type: none"><li>Revegetation and rehabilitation of bank erosion adjoining a artificial storage backing the riparian zone</li><li>Cut and dab plus physical pulling of riparian weeds along 7.2 km of stream frontage</li><li>Revegetation of approximately 1 km of stream bank adjacent an existing narrow vegetated riparian buffer</li><li>Fencing 850 metres</li><li>Electro fisher survey of fish fauna</li></ul> A large landholder from the Macadamia Industry (MacaLand Pty Ltd) has committed to supporting the project within this reach and is providing a model role.  ** NB these works were delivered within areas of stream confluences and therefore also included the Farm and Swenson's Creek Reaches (see Attachmet1).
		RA2.1	Number of biophysical studies completed	1				

#### Attachments:

1. Tait (2006) *Identification of Reach values and Management issues – Splitters Creek. A Great Barrier Reef Coastal wetland Protection Program Project with Burnett Mary Regional Group and Bundaberg Landcare*. Report Prepared for WetlandCare Australia.
2. Berghuis (2007). *Fish migration barriers of Splitter's Creek*. Report Prepared by Andrew Berghuis Qld Department of Primary Industries and Fisheries, Bundaberg
3. Weed survey proforma.pdf
4. Water weeds survey map\_4.pdf
5. Monitoring and Evaluation Plan.pdf
6. Examples of on-ground works.pdf

<sup>14</sup> No. refers to the number of ha, km, events, participants, publications, distribution etc as measures of outputs