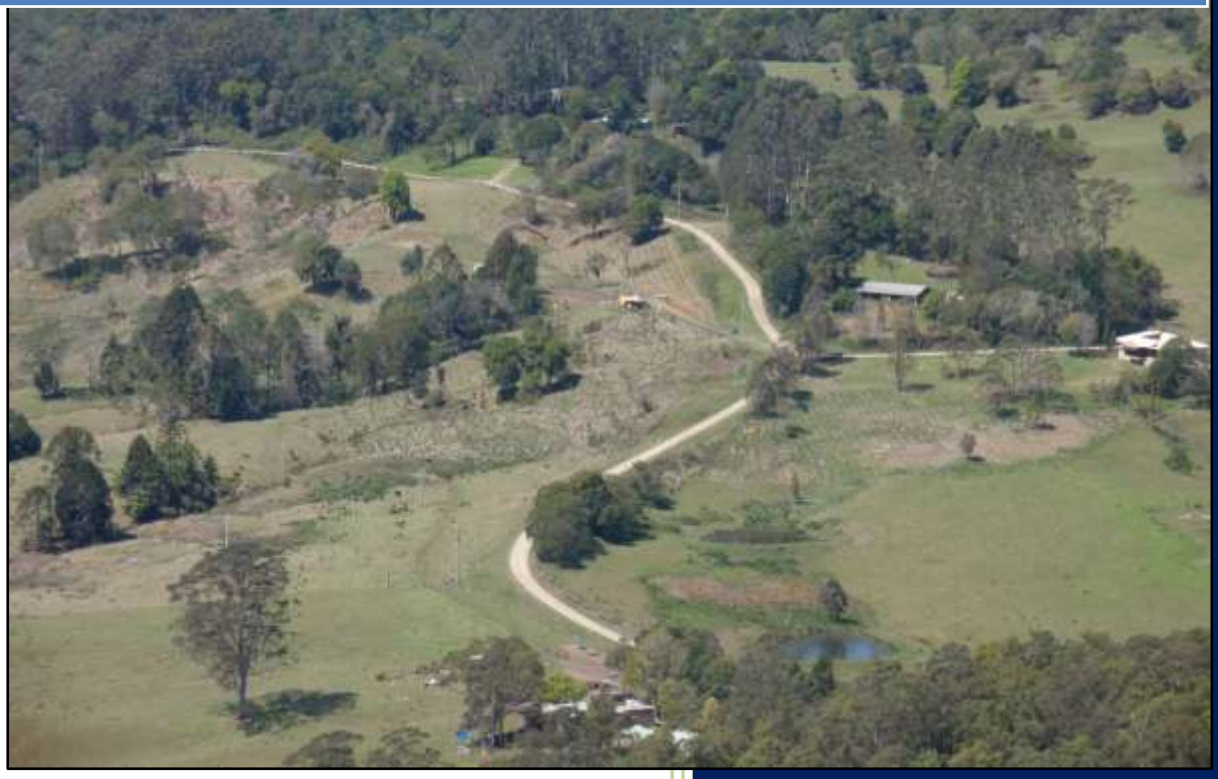
LAKE BAROON CATCHMENT CARE GROUP

seqwater WATER FOR LIFE

Projects 2011-12

Bridge Creek Rehabilitation (McLauchlan) Year 3



PROJECT PLAN

Project No. 1112-004

This Project proposal has been prepared by:

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This 3rd Year Project Proposal must be read in conjunction with *Bridge Creek Rehabilitation (McLauchlan)* [LBCCG Project no. 0910-004] and *Bridge Creek Rehabilitation (McLauchlan) Year 2* [LBCCG Project no. 1011-004] (see Appendices).

PROJECT VERSIONS & APPROVALS

Version	*Date*	*Version/Description*	*Result*
1.0	10/4/2012	Draft Project Proposal	n/a
1.0	12/4/2012	Project presented to LBCCG Committee	Approved (Minutes 53.6.10)
1.0	17/4/12	Project Proposal forwarded to Seqwater for approval (email)	Approved 30/4/12

Cover photo: *Revegetation on the McLauchlan property from Tesch Road, Witta.*

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Appendices

i. EXECUTIVE SUMMARY

PROJECT TITLE: **Bridge Creek Rehabilitation Project (McLauchlan) Year 3**

PROJECT NUMBER: **1112-004** **DATE:** **March 2012**

PROJECT SUMMARY:

The project will reduce sediment and nutrient run-off from eroding hill-slopes, rehabilitate areas of erosion and revegetate significant waterways in the Bridge Creek catchment. Farm productivity will be enhanced by reducing nutrient, sediment and chemical export through a range of activities implemented on the property bordering Lake Baroon.

APPLICANT/LANDHOLDER DETAILS

Names	Rob & Janice McLauchlan
Postal Address	[redacted]
Phone Numbers	[redacted]
E-mail	[redacted]

PROJECT / SITE LOCATION

Property Address	Wells Road, Maleny		
RP Number (Lot)	RP208215 (3)	SP118115 (5 & 6)	
Property Size (ha)	40 hectares		
Existing Land-use	Beef cattle		
Stock Carried	70		
Sub-Catchment	Bridge Creek		
Management Unit	BR3		
M.U. Priority *(LBCCG IP)*	**Low**	**M.U. Priority** (Pollution)	**High**

PROJECT PARTNERS/STAKEHOLDERS & ROLES

Lake Baroon Catchment Care Group	Project coordination, administration & reporting, monitoring & evaluation
Seqwater	Project funding – 2011/12 ($7,891)
Commonwealth Government (Community Action Grants)	Project funding – 2009/10/11 only ($20,000)
Rob & Janice McLauchlan	Landowners ,in kind contribution, cash contribution – total project ($21,440)

PROJECT DETAILS

Project Start Date	June 2012	**Project Completion Date**	June 2013
Maintenance	4,500 plants		

1.0 INTRODUCTION

Lake Baroon Catchment Care Group is an on-ground implementation, not for profit community group focussed on improving water quality in the Lake Baroon catchment. The activities of LBCCG are supported by Seqwater as they align with Seqwater's commitment to the NHMRC Framework and to environmental stewardship by supporting catchment planning and targeted remediation for reduction of catchment based risks to water quality.[1]

Bridge Creek Rehabilitation (McLauchlan) is a multi-year project commenced in 2009 (*see Project 0910-004 Bridge Creek Rehabilitation [McLauchlan]*). The project focusses on the revegetation of first order watercourses and eroding hill-slopes in the lower Bridge Creek catchment – watercourses immediately upstream of Baroon Pocket Dam.

The project attracted funding from the Commonwealth Government's Caring for Our Country Community Action Grants program ($20,000) and spawned a side project dealing with a small (expensive) land slip that was funded by Sunshine Coast Council and Conservation Volunteers Australia National Green Jobs Corps program. This highlights the importance of Seqwater funding in leveraging supporting funding and the level of value adding to the Seqwater funding.

With the recent consecutive wet summers access to the property has been difficult and in some areas impossible for heavy equipment (trucks). A proposed riparian fencing and revegetation site was abandoned in 2010/11 due to compromised access (this site was moved to an area that could be accessed – see *Appendix 2: Bridge Creek Rehabilitation (McLauchlan) Year 2*).

Despite these weather related issues, the project is performing well with all revegetation establishing, maintenance reducing and the outcomes of reducing livestock access to waterways and reducing erosion, sediment, nutrient and pathogen inputs to the catchment continuing.

With the success of the first two years of the project, the third year of the project should proceed as planned.

Above: Lower Bridge Creek from Tesch Road, Witta.

[1] Smolders, A 2011 Project Briefing Note: Water Quality Project – Cork's Dairy Restoration, Seqwater

2.0 RATIONALE[2]

An estimated 80% of sediment and 35% of nitrogen in the waterways in South East Queensland come from non-urban diffuse loads. Reduction of these loads clearly represents a major target for action if significant improvements in water quality are to continue to be achieved in South East Queensland.

Modern agricultural activities have been identified as a major source of diffuse pollutants into waterways. Land management practices, such as stocking rates, grazing pressures, land clearing and the application of fertilisers have significant impacts on pasture and land condition. These practices can result in erosion processes, decreased infiltration of soils, and excess nutrient and sediment run-off, all of which impact on local water quality.

Unlike point source pollution where there are generally a number of relatively easily identifiable sources, diffuse source pollution is much more difficult to deal with. The nature of diffuse pollutant discharge makes it difficult for authorities to restrict and monitor the level of diffuse pollutants entering SEQ waterways.

Diffuse pollutants are:

- aggregated within a catchment; but delivered from sources dispersed throughout the catchment
- random in nature with weather playing a critical role in the process of pollutant delivery
- difficult to monitor on a continuous basis for a reasonable cost

Despite these barriers, evidence suggests there is an opportunity to reduce the contribution of non-urban diffuse source pollutants to prevent further water quality degradation throughout South East Queensland.

Buffer strips provide a strip of vegetation that acts as a filter for sediment. They are designed to remove sediment, organic material, nutrients and chemicals carried in run-off. Buffer strips include both vegetative filters adjacent to agricultural land and riparian zones that maintain bank and channel stability. Sediment is removed from the overland flow as velocity is decreased, filtering sediment and allowing particles to settle. A sufficiently dense buffer can also significantly reduce chemical drift from agricultural activities from contaminating water bodies. Buffer strips provide a filtration barrier between a land-disturbing activity and an adjacent waterway.

Particulate or sediment associated nutrients can be removed from surface run-off, although nutrient trapping is generally lower than for sediment. Phosphorus from fertilisers and manure is commonly absorbed by soil particles and organic matter. Soluble phosphorus is likely to be infiltrated and subsequently consumed by plants, diluted and/or transformed. Soluble phosphorus movement through the buffer depends largely on plant-uptake potential, soil properties and subsurface flow paths.

Buffer and riparian zones are considered to be effective in removing nitrates from shallow, subsurface water; however nitrogen retention relies on three major mechanisms – plant uptake, microbial immobilisation and bacterial dentrification.

[2] Department of Environment and Resource Management, *Development of a water quality metric for south east Queensland*, 2010)

3.0 LOCATION

3.1 THE BRIDGE CREEK CATCHMENT

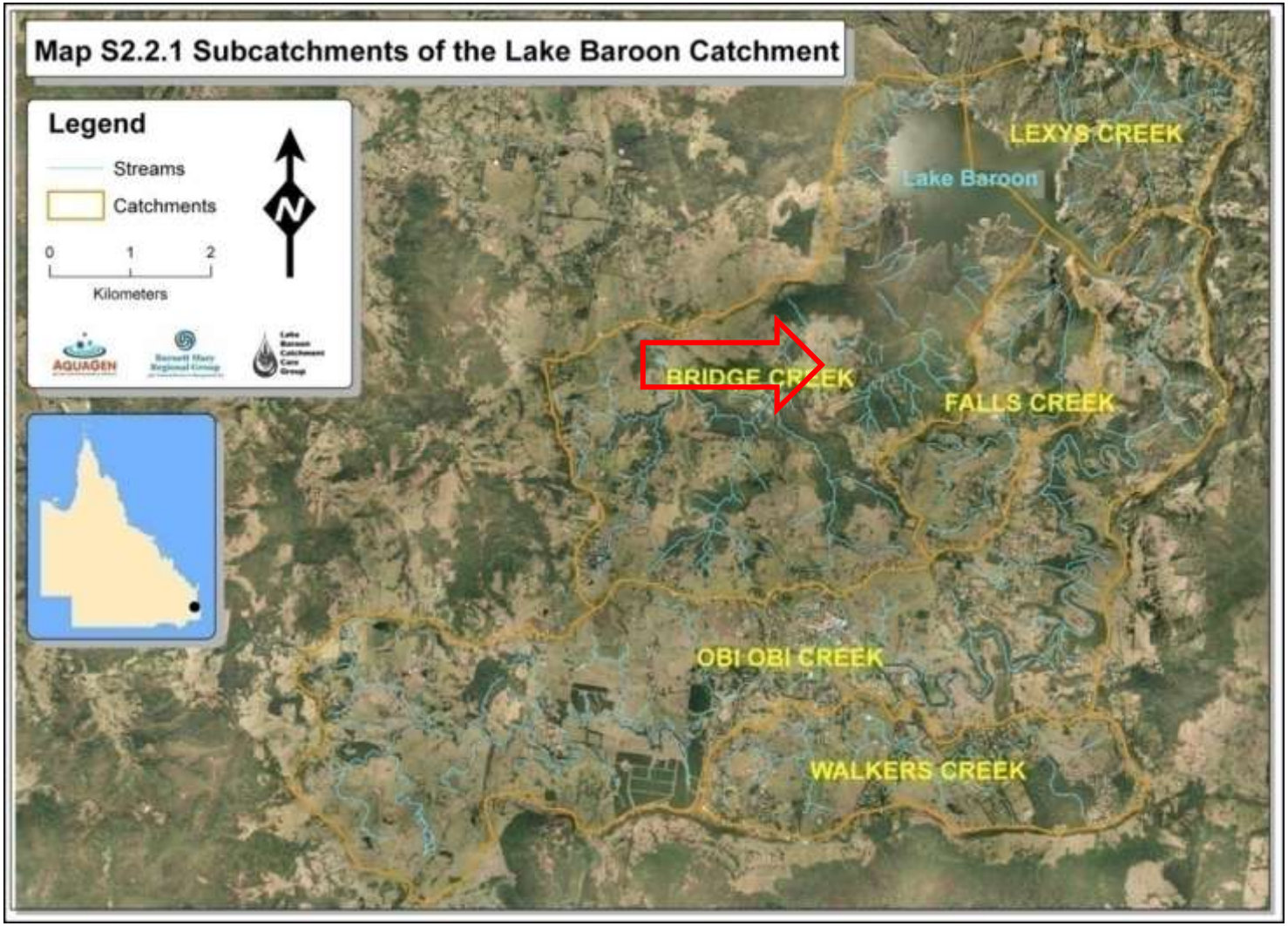
The Lake Baroon Catchment Implementation Plan (2007) describes the Bridge Creek sub-catchment as dominated by natural vegetation, though dairying (rapidly declining) and cattle grazing are significant land uses in several Management Units. The sub-catchment covers an area of 2,134 hectares and has a total significant stream length of 52 km. Approximately 43% of the sub-catchment has vegetation cover although much of this is significantly disturbed and degraded by environmental weeds.[3]

Left: Bridge Creek has good riparian vegetation and displays excellent bed diversity and bank stability. The creek however is threatened by sediment loads entering the waterway through excessive erosion in the catchment – particularly in the headwaters and first and second order streams.

Bridge Creek has been divided into six management units that reflect property boundaries, physiography, vegetation, land use, point and diffuse source impacts, and administrative convenience. The project site is in Management Unit BR3.

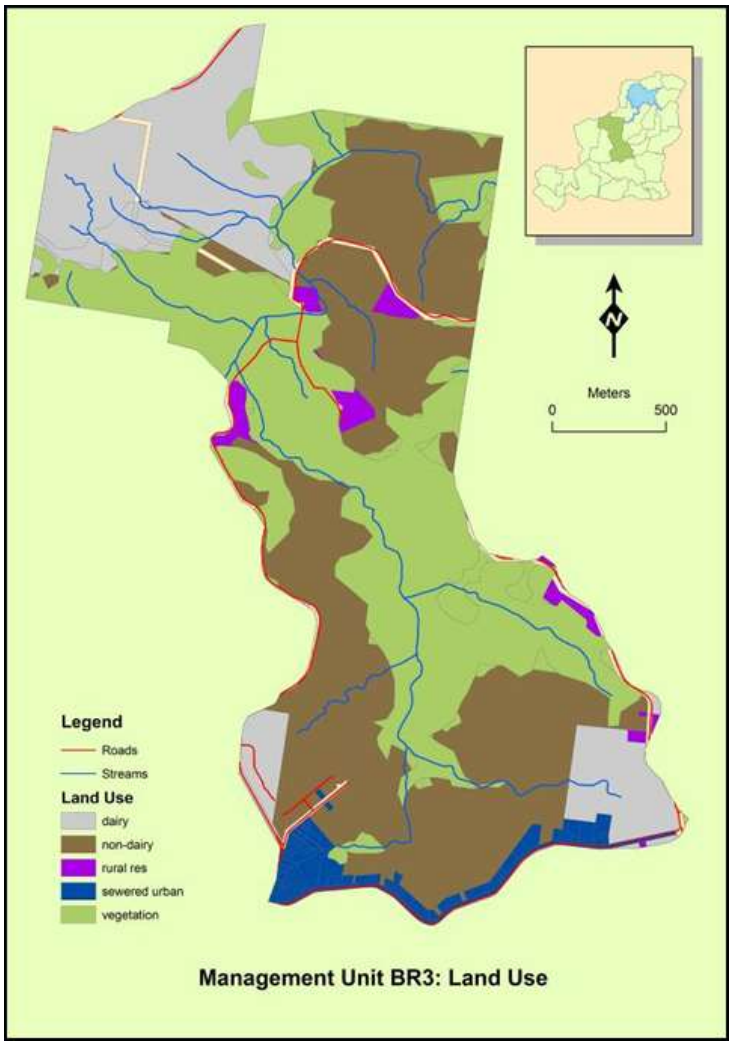
Left: The McLauchlan property is immediately upstream of Seqwater land surrounding Baroon Pocket Dam.

[3] Dunstan, M. 2007, Lake Baroon Catchment Implementation Plan, Aquagen Water & Renewable Energy, Palmwoods.



Above: Bridge Creek forms the western sub-catchment of Lake Baroon.
The McLauchlan property is situated on Bridge Creek immediately before it enters Lake Baroon.

3.2 LAND USE



Above: The Bridge Creek catchment is experiencing a rapid shift from livestock grazing (dairy and beef) to rural residential land use (no dairies remain in the catchment), and several urban developments in the headwaters.

The proposed project is located within Management Unit BR3. This MU is 518 ha in size and has 14 km of significant waterways. Riparian vegetation is present alongside 40% of the waterway length, although much of this is in a degraded condition from environmental weeds.

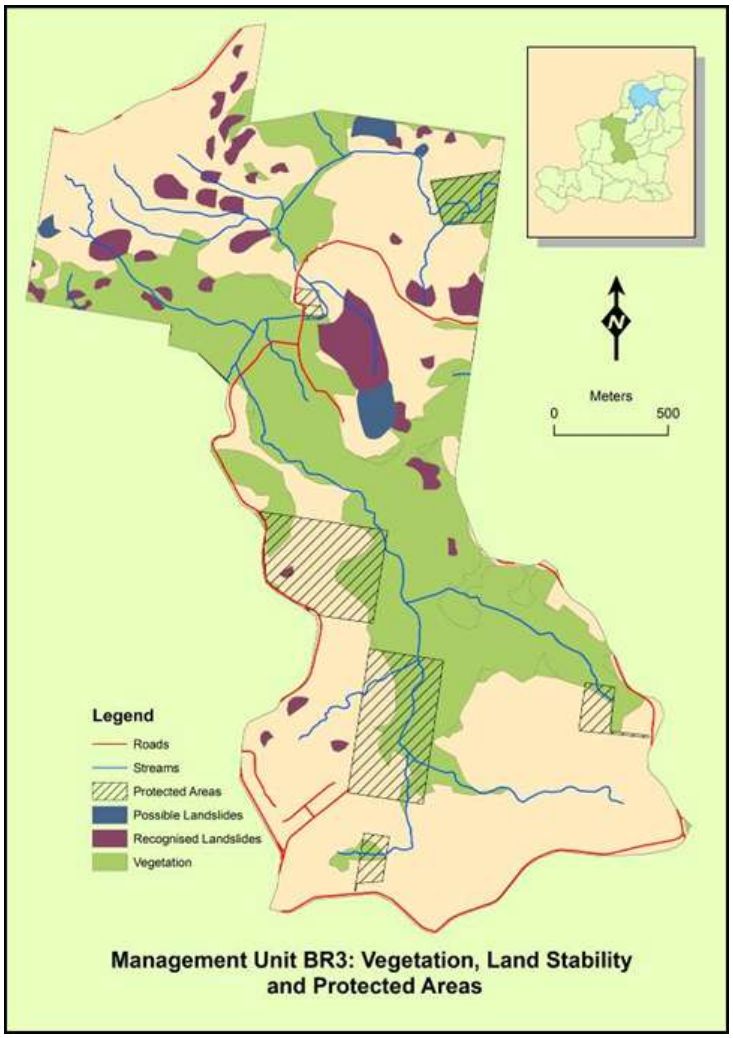
The Bridge Creek catchment is experiencing a rapid shift from livestock grazing (dairy and beef) to rural residential land use (no dairies remain in the catchment – although there is dairy grazing in the catchment – the actual milking sheds are in the neighbouring catchment). The upper part of the MU takes in part of urban Maleny.

Once dominated by dairy grazing, the Management Unit is now predominantly used for non-dairy grazing with a large area covered with vegetation, some areas of rural residential, and a small area of sewered urban.

There has been a considerable effort in the Management Unit to fence and revegetate waterways and riparian zones.

Left: Like much of the Bridge Creek catchment, large agricultural properties are gradually making way for smaller 'lifestyle' or 'bush' blocks.

3.3 GEOLOGY, SOILS & STABILITY



Above: The lower part of the MU is particularly unstable (upper part of figure).

The catchment is characterised by its steep slopes, lack of vegetation in the headwaters, and the inability of the soil to absorb nutrients and moisture.

The relatively steep nature of the land, moderate instability (63% of land unstable) and lack of natural cover in some areas of the catchment means that there is high erosion potential, and minimal filtering of run-off, therefore inputs of nutrients are significant (70% of samples exceeding guideline levels).

Despite this the upper reaches are relatively stable with nutrient inputs relatively moderate.

The lower reaches of the Management Unit however, are very prone to slips and mass movement.

Left: Mass movement in the middle reaches of Bridge Creek

4.0 WATER QUALITY

The relatively steep nature of the land, moderate instability (50% of land unstable) and lack of natural cover in some areas of the catchment means that there is high erosion potential, and minimal filtering of run-off, therefore inputs of nutrients are significant (40% of samples exceeding guideline levels).[4] Combined with the close proximity to Baroon Pocket Dam, the McLauchlan property is a high priority for erosion mitigation and waterway protection activities.

4.1 STATISICAL ANALYSIS OF WQ DATA – WELLS ROAD (BRIDGE CREEK)

Water quality monitoring and analysis taken at the Bridge Creek crossing (Wells Road) shows, despite much of the catchment being vegetated, the catchment contributes significant nitrates, ammonia, phosphates, phosphorus and faecal coliforms.

Parameter	***pH***	***Turbidity***	***NOx (N)***	***NH3 (N)***	***PO4 (P)***	***Total P***	***Faecal Coliforms***
(units)	***(pH units)***	***(NTU)***	***(mg/L)***	***(mg/L)***	***(mg/L)***	***(mg/L)***	***(number/ 100 mL)***
Guideline Value	***6.5-8.2***	***<25.0***	***<0.040***	***<0.010***	***<0.030***	***<0.030***	***<100***
Max	8.2	85.6	0.316	0.166	0.068	0.335	1480
Min	6.7	0.6	0.000	0.000	0.001	0.005	0
Mean	6.9	3.6	0.059	0.026	0.023	0.043	233
Median	6.9	1.4	0.036	0.010	0.013	0.027	60
Std Dev	0.3	16.0	0.214	0.183	0.047	0.068	4627
20th Percentile	6.8	1.0	0.003	0.006	0.008	0.020	20
80th Percentile	7.0	2.3	0.118	0.040	0.041	0.050	390
Count above GV	0	1	23	24	17	22	20
Count	51	51	50	50	51	50	51
% above GV	0.00	1.96	**46.00**	**48.00**	**33.33**	**44.00**	**39.22**

[4] Dunstan, M. 2007, Lake Baroon Catchment Implementation Plan, Aquagen Water & Renewable Energy, Palmwoods.

5.0 PURPOSE & OBJECTIVES

In 2008-09 Rob McLauchlan completed a Property Management Planning program with Lake Baroon Catchment Care Group. The main outcome of the PMP program was the potential to improve water quality in Bridge Creek and its tributaries (and ultimately Lake Baroon) by identifying and completing on-ground works that would also improve the productivity and sustainability of the farm business.

The main issue identified by the McLauchlan's were the management difficulties associated with the numerous springs and associated water-logging. Erosion from the steeper areas of the property deposits sediment onto less steep areas and with groundwater springs contributing moisture, results in the formation of water-logged zones. Furthermore during heavy rainfall events loosened sediment, caused by livestock overgrazing, runs off and enters Bridge Creek and ultimately Lake Baroon.

The project has been minimising sediment and nutrient run-off from the property by fencing and revegetating springs, rehabilitating high livestock traffic areas (dam over-flows and a laneway) and enhancing the filtering and buffering ability of the properties' waterways. Furthermore farm productivity has been improved by reducing nutrient, sediment and chemical export.

A healthy aquatic ecosystem is one that is stable and sustainable; maintaining its physical complexity, biodiversity and resilience. It has the ability to provide ecosystem services that provide good water quality, wildlife habitat and recreation.

The Lake Baroon Catchment Implementation Plan (2007) rates BR3 a LOW priority for rehabilitation works. However, when assessing the Management Unit using a modified version of the Prioritisation Process, which prioritises MU's on pollution input levels and land instability parameters, BR3 rates as a HIGH priority.[5]

The project will continue to enhance the filtering and buffering capacity of the previously degraded waterways on the property.

Priority actions (in priority order) for Bridge Creek:[6]

1. Revegetate first order streams throughout the sub-catchment to maximise buffer capacity and reduce erosion potential.
2. Provision of advice, encouragement and incentives to landholders to maintain adequate riparian buffers and erect riparian fencing and manage stock access to waterways. This includes the provision for off stream watering, shade and hardened waterway access points and livestock laneways.
3. Encourage good farming practices, particularly on floodplains and steep slopes which reduces the rate of soil loss to below that of natural soil forming processes.
4. Actively support SCC Land for Wildlife, NRM Small Grants Scheme and legal covenant agreement initiatives that protect and rehabilitate remnant vegetation and enhancement projects.

[5] Dunstan, M. 2007, Lake Baroon Catchment Implementation Plan, Aquagen Water & Renewable Energy, Palmwoods.

[6] Traill, C.B. 2007, *State of the Lake Baroon Catchment, Volume 2: Appendices*, AquaGen Water and Renewable Energy, Palmwoods.

5.1 TARGETS

Project Objectives:

* community benefit
* protection of remnant vegetation
* water quality benefits
* demonstration of best practice

Specific Objectives:

* restore riparian tree canopy with moderate diversity through revegetation
* restore 75% canopy within 3 years
* retain grasses between rows and in waterway channel until revegetation establishes
* after 2 years encourage natural regeneration to enhance diversity
* establish a vegetative buffer between agricultural activities and Bridge Creek and its tributaries

Target Condition:

* stable waterways with erosion reduced to natural levels
* 75% canopy closure (revegetation) in 3 years (90% in 5 years)
* extend vegetation corridors by 600 metres
* reduce targeted weed infestation by 90% with ongoing maintenance program
* provide 2 hectares of new habitat

Left: Barung Landcare performing maintenance.

5.2 OUTCOMES

Healthy catchments lead to healthy waterways. Through the prioritisation and implementation of riparian protection and rehabilitation throughout rural catchments – particularly headwaters, we can provide multiple beneficial outcomes.

The primary aim of the project is to improve the water quality of Bridge Creek and the waterways that flow directly into Lake Baroon. By reducing erosion and the associated sediment and nutrient inputs into the properties waterways, the quality of water in the Bridge Creek catchment will be significantly improved. Ultimately this improves the quality of water entering Lake Baroon which leads to a lowering in drinking water production costs, as well as improving the recreational and amenity value of Bridge Creek and the storage.

Specific Outcomes

1. Reduce nutrient delivery to waterways.

Nutrient delivery to waterways is continuous and increases during episodic rain events.

Vegetative buffers intercept run-off contaminated with excessive nutrients from diffuse rural and urban sources (stormwater).

2. Reduce sediment delivery to waterways.

Soil from erosion leads to high turbidity and is transported to Baroon Pocket Dam and beyond.

Vegetative buffers stabilise eroding riparian zones and intercept run-off contaminated by sediments. We will address land slips on the property and thereby reduce the delivery of significant volumes of sediment inputs to Bridge Creek.

3. Improve aquatic habitat.

Riparian vegetation plays a critical role in the creation and maintenance of aquatic habitats in freshwater ecosystems.

Riparian vegetation provides shade, limits nuisance aquatic plant growth, provides vegetative inputs that serve as habitat and food, and provides bank and bed stability.

4. Raise community awareness.

The majority of land in the Lake Baroon catchment is privately owned and without landholder and community support, activities improving catchment health and water quality are impossible.

The project will demonstrate the importance of excluding livestock from riparian zones and the reestablishment of vegetation to improve water quality – both throughout the catchment and Lake Baroon. On-ground works provide the opportunity for land managers to apply their knowledge and experience at the local level whilst contributing to landscape scale outcomes increasing the skills in the community.

5. Improve farm productivity.

Watercourses and riparian zones are difficult to manage in the farm management context.

Excluding livestock from riparian zones and watercourses can improve the health of livestock (providing off stream watering that provides cleaner water and less disease), facilitates easier mustering and reduces the risk of injury through misadventure.

6. Whole farm approach to property management.

Clear property management objectives that take into account environmental considerations lead to efficient and effective projects.

The landholder has a clear Property Management Plan and property objectives to ensure all activities will be implemented in a permanent and cost effective manner.

7. Reduce impacts of weeds.

Weed sources in the upper catchment contribute to the proliferation of weeds through seed and vegetative material.

The project sits immediately upstream of Baroon Pocket Dam and through staged and comprehensive weed management will remove weed sources – particularly WONS lantana, and to a lesser extent local priority Camphor laurel, Privet and Chinese elm.

8. Restore links between vegetation and create corridors.

Riparian zones provide wildlife corridors so that fauna can safely move from one area to another.

The project will reinstate a link between the remnant vegetation on the Manduka Nature Refuge and vegetation throughout the lower Bridge Creek catchment.

9. Provide terrestrial habitat including 'Essential Habitat'.

Riparian vegetation provides important habitat for the adult stages of aquatic insects and amphibious organisms such as frogs and turtles.

The project will reinstate riparian and associated vegetation providing, in time, valuable habitat for a variety of native fauna.

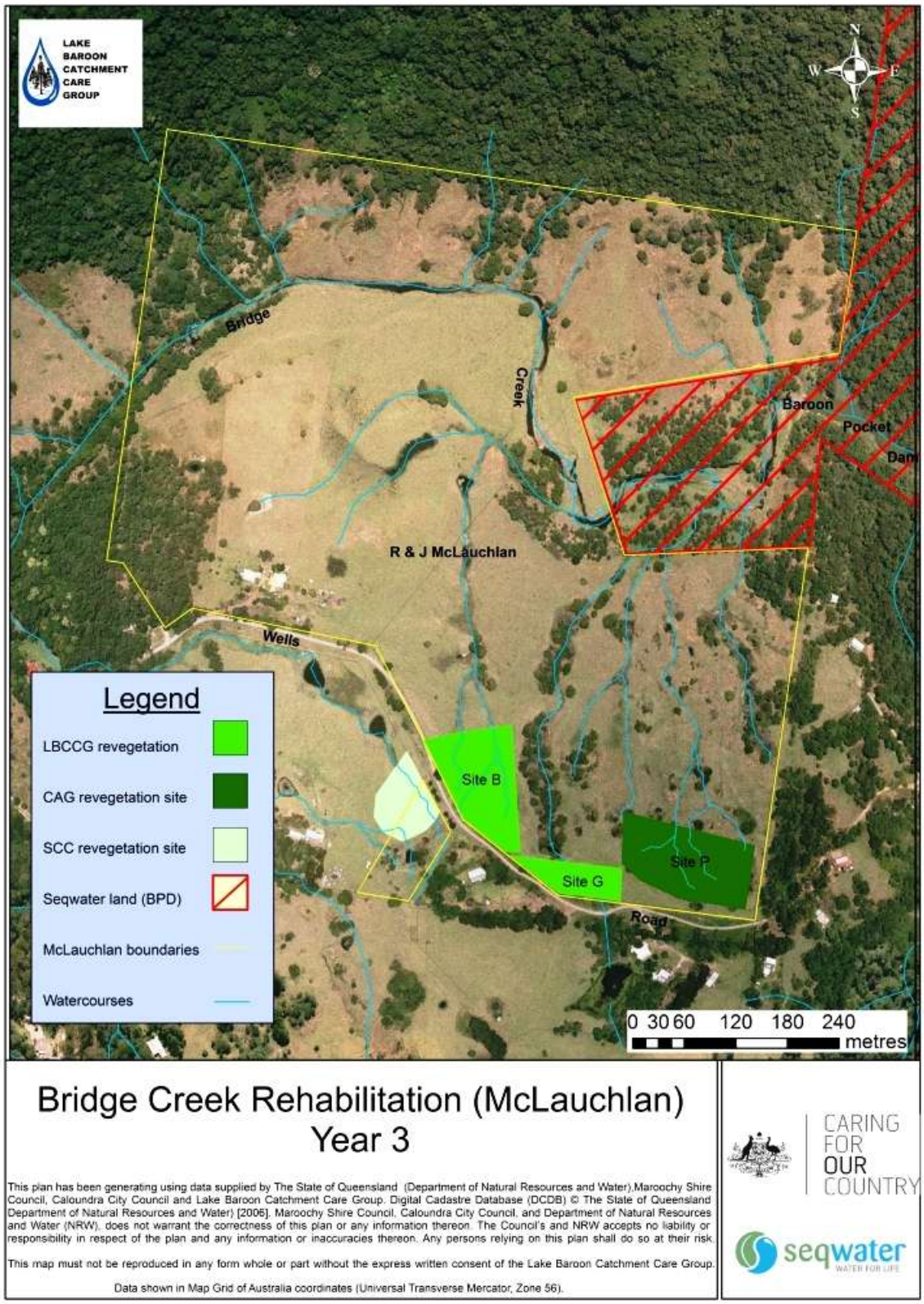
10. Reduce chemical delivery to waterways.

Improved water quality monitoring and analysis by Seqwater has identified pesticide and herbicide contamination in Baroon Pocket Dam.

The project will reinstate riparian vegetation on 1st and 2nd Order streams adjacent to agricultural land providing a buffer to pesticides and herbicides.

6.0 IMPLEMENTATION

6.1 PROJECT OVERVIEW



Above: Project Overview – revegetation sites requiring maintenance.

6.2 ACTIVITIES

6.2.1 MAINTENANCE & CURRENT STATUS

Good maintenance is an extremely important component of re-establishing vegetation particularly in the first 3 years of planting. Weed growth is very rapid on the Maleny plateau – particularly over the summer months where maintenance must be performed every six weeks. Failure to do so can result in plant mortality, weed infestation and frustrating labour – all of which results in excessive spending to re-capture the site.

The project (and revegetation sites) is now entering its third (one revegetation site second year) and maintenance is gradually reducing as establishing trees throw a shade canopy, reducing light penetration and discouraging weed growth. Also as trees gain height their ability to be overgrown by weeds is significantly reduced. A general rule of thumb is weeds should never exceed the height of the revegetation. This is now unlikely on the majority of sites therefore maintenance visits are reduced. The greatest threat to the revegetation is now perennial woody weeds such as lantana and privet, and vine weeds which can still establish and smother even established revegetation.

Above: The Community Action Grant site was covered in WONS weeds lantana and blackberry.

It is desirable, if not essential, to employ specialists who have the equipment, skills and knowledge to successfully manage revegetation sites and establish functioning waterway buffers. Barung Landcare is usually the preferred contractor for LBCCG projects and has been responsible for the majority of maintenance performed on the site (excluding landholder maintenance). Landholders are rarely capable of managing all the maintenance required on large revegetation sites (more than 500 plants) and therefore in an effort to ensure success, LBCCG provides the bulk of support for maintenance.

Grass is maintained between the rows of revegetation to reduce erosion and to act as a filter and trap sediments and nutrients during high rainfall events.

A combination of guarding methods has been used on the various revegetation sites. The largest site (2,500 tube-stock) was initially unguarded, however predation by wallabies prompted retro fitting of plastic sleeve guards on susceptible species.

The Community Action Grant site utilised the large (680mm high) 'Think-Pink' corflute guards. The land-slip site (a project funded by Sunshine Coast Council and technically not a part of this project) used two litre milk cartons to provide short term protection (from wallabies and herbicide overspray). The final revegetation site utilised the smaller (350mm high) 'Think-Pink' guards as the majority of this site was assessed as being drier and weed growth was not expected to be excessive.

Above: 'Think-Pink' tree guards reduce maintenance costs off setting their initial high purchase and installation cost.

Above: Site B (2,500 plants).

All revegetation sites, bar the first 2,500 stem planting used jute weed mats (necessary under guards of any kind). The 2,500 site used cane-mulch.

The grass between the rows is occasionally brush-cut so that access is maintained and the site does not become over-grown.

It is clear, despite the initial greater expense to purchase and install the 'Think-Pink' guards, that the use of these types of guards is greatly beneficial to the success of the revegetation project. The pink guards increase the visibility of plants – particularly if a maintenance visit is delayed (or missed), allow faster herbicide application around the plant by shielding the stem from overspray and protect the plant from predation. This reduces the overall maintenance cost.

At this stage it is unclear how many times a 'Think-Pink' guard can be used but is expected at least three – which will spread the purchase cost over the multiple uses.

Funding is required to continue maintenance on the site for three years. This is to ensure the revegetation successfully establishes.

Above: Site P - CAG (1,300 plants).

Above: Site P (700 plants).

7.0 ALIGNMENT WITH LAKE BAROON CATCHMENT IMPLEMENTATION PLAN

The project's outcomes are consistent with the Lake Baroon Catchment Implementation Plan (2007) which takes into account the Burnett Mary Regional Group Country to Coast: A Healthy Sustainable Future management actions.

LBCIP Activity Theme		***Implementation Activity***	***BMRG Program***
On ground	OG1	Develop on ground works for water quality improvement and aquatic biodiversity maintenance & improvement	Water Quality & Equitable Use Biodiversity Conservation
Catchment management	CM1	Develop a program where by all landholders involved in on ground activities initiate PMP's as part of application process	Biodiversity Conservation
Catchment management	CM2	Property Management Planning Toolkit	Sustainable Use
Catchment management	CM4	Adoption of BMP for point and concentrated diffuse pollution	Community Capacity and Partnerships
Catchment management	CM6	Community involvement	Community Capacity and Partnerships
Catchment management	CM7	Stakeholder Survey	Community Capacity and Partnerships
Catchment management	CM8	Transition in NRM practice	Community Capacity and Partnerships
Catchment management	CM11	Industry involvement in NRM	Community Capacity and Partnerships
Catchment management	CM12	Training and skilling stakeholders in NRM	Community Capacity and Partnerships

8.0 PROCUREMENT

8.1 COST ESTIMATION METHODOLOGY

Maintenance costs have been estimated from rates provided by Barung and confirmed by comparison with recent similar activities on LBCCG projects.

8.2 BUDGETS

8.2.1 FINANCIAL YEAR LBCCG FUNDING BUDGET

LBCCG has a policy of keeping Project Budgets confidential as individual project costings vary and can give misleading information.

Detailed Budgets can be supplied on request. Please contact the LBCCG Project Manager on (07) 5494 3775 for further information

9.0 ACTION PLAN

Action		Responsibility	Start Date	Completion Date	Measurable Output
Project Proposal (3nd Year)		LBCCG Coordinator	Jan 12	Mar 12	Project Plan
Project presented to LBCCG Committee for approval (includes Seqwater rep).		LBCCG Coordinator & Committee	Apr 12	Apr 12	-
Mid project monitoring		LBCCG Coordinator	Jul 11	Jun 12	Photo & data set
IMPLEMENTATION	Revegetation maintenance (including replanting & weed management)	Landholder	Jul 11	Jun 12	>90% survival
Media release		LBCCG Coordinator	May 11	May 12	1 media release
Quarterly progress reports.		LBCCG Coordinator	Jun 11	Sept 14	12 Progress Reports
Post-works monitoring		LBCCG Coordinator	Nov 09	Sept 14	-
Project evaluation & progress report prepared and presented for approval of 3rd year funding.		LBCCG Coordinator	June 11	Apr 12	Second Year Progress Report
Project evaluation & progress report prepared and presented for approval of 4th year funding.		LBCCG Coordinator	June 12	Jul 12	Third Year Progress Report
On maintenance (on-ground works completed & inspected for compliance with Project Plan – Report.		LBCCG Coordinator & Committee	Jun 13	Jul 13	On Maintenance Report
Project completed/signed off.		LBCCG Committee	Sept 14	Sept 14	Final report

10 COMMUNICATION

10.1 INTRODUCTION

Monitoring and evaluation strategies are essential components of any environmental rehabilitation project. Evaluation is the best way to improve our knowledge about what works, what doesn't and how we can best direct our rehabilitation efforts. Monitoring strategies are key components of the overall evaluation process that allows you and others to learn from the project and assess whether rehabilitation aims have been met.

Photo point monitoring will provide valuable evidence of works completion, a record of changes over time, and provide an important assessment tool to evaluate the project.

Furthermore, monitoring results and information will be used to:

1. Raise awareness and encourage further remediation works with priority landholders (primary producers and large landholders in the Lake Baroon catchment).
2. Promote cooperative projects between Lake Baroon Catchment Care Group, Seqwater, and other Natural Resource Management organisations.
3. Critically examine techniques and methods used throughout the project to continually improve the service to landholders conducting on-ground works in the catchment and improve best practice management.
4. Develop cost-effective strategies and techniques to perform on-ground activities.
5. Continue to develop monitoring and evaluation program that meets the requirements of funding bodies, but also provides the relevant information and feedback to the LBCCG and Seqwater to improve project delivery.

Monitoring of rehabilitation activities, particularly the laneway rehabilitation component will be split into periodic and episodic monitoring.

Periodic monitoring is important to measure the effectiveness of the activities over time and will occur on a quarterly basis by LBCCG with assistance from the landholder.

Episodic monitoring will occur following significant storm/rainfall events and will check all project activities - particularly the crossing integrity.

10.2 REPORTING

Reporting on the progress of the project is an essential component of delivering successful on-ground outcomes. Therefore the following reporting schedule will be implemented to ensure all stakeholders are informed in a comprehensive and timely way.

Report	*Recipients of Report*	*When*
Progress Reports (presentation & brief summary).	LBCCG	Monthly
Progress Reports (written report). Based on Project Action Plan (see above)	LBCCG Seqwater Stakeholders	Quarterly
On Maintenance Report	LBCCG Seqwater Stakeholders	On-ground activities completed (excluding maintenance).
Final Report (includes evaluation & further recommendations for project)	LBCCG Seqwater Stakeholders	Completion of project

11.0 AUTHORISATIONS

Role	*Individual*	*Organisation*
Project Sponsor	Tim Odgers	Seqwater
Project Approval	Brad Heck	Seqwater
Project Owner	Peter Stevens	LBCCG
Project Committee	Steve Skull	LBCCG
	Gillian Pechey	LBCCG
	Keith Schelberg	LBCCG
	Marek Malter	LBCCG
Project Manager	Mark Amos	LBCCG

12.0 REFERENCES

Abal, E.G., Bunn, S.E & Denison, W.C. (Eds.) 2005. Healthy Waterways Healthy Catchments: Making the connection in South-east Queensland, Australia. Moreton Bay Waterways and Catchments Partnership, Brisbane.

Alt, S., Jenkins, A. & Lines-Kelly, R 2009, *Saving Soil – A landholder's guide to preventing and repairing soil erosion*, Northern Rivers Catchment Management Authority, NSW.

Department of Environment and Resource Management, *Development of a water quality metric for south east Queensland*, 2010

Dunstan, M 2007, *Lake Baroon Catchment Implementation Plan*, Aquagen Water & Renewable Energy, Palmwoods.

Olley, J, Wilkinson, S, Caitcheon, G & Read, A 2006, *Protecting Moreton Bay: How can we reduce sediment and nutrient loads by 50%?*, 9th International River Symposium, Brisbane.

Polyakov, V, Fares, A & Ryder, MH 2005, *'Precision riparian buffers for the control of nonpoint source pollutant loading into surface water: a review'*, Environmental Reviews, Vol. 13, pp. 129-44.

Qureshi, ME & Harrison, S 2002, *'Economic instruments and regulatory approaches in implementing riparian revegetation options: observations of the Queensland system'*, Australian Journal of Environmental Management, Vol. 9, pp. 89-98.

Slack-Smith, E 2005, Diffuse Source Best Management practices: Review of Efficacy and Costs, report for Moreton Bay Waterways and Catchment Partnerships, WBM Oceanics, Brisbane.

Smolders, A 2011 Project Briefing Note: Water Quality Project – Cork's Dairy Restoration, Seqwater

South East Queensland Healthy Waterways Partnership 2007, *South East Queensland Healthy Waterways Strategy 2007-2012*, South East Queensland Healthy Waterways, Brisbane.

South-east Queensland Regional Water Quality Management Strategy Team, 2001. *Discover the waterways of South-east Queensland: Waterways health and catchment management in South-east Queensland, Australia*, South East Queensland Healthy Waterways, Brisbane.

Traill, C.B. 2007, *State of the Lake Baroon Catchment, Volume 2: Appendices*, AquaGen Water and Renewable Energy, Palmwoods.

Ziebell, D & Richards, PL 199, *Gully Erosion in South Gippsland*, Landcare Note SC0039, State of Victoria, Department of Natural Resources and Environment.