

Falls Creek *(Riparian revegetation)*



PROJECT PLAN

Riparian Condition Improvement
& Agricultural Practice
Improvement Program

CBP2324-002

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How to read this Plan

This Plan has been developed to provide a brief description of the project and includes summarised details of the stakeholders, budgets, outputs and outcomes. The attached appendices provide further useful information relating to Project Plan Budget, Lake Baroon and its catchment, and outlines various implementation activities of the project.

Confidentiality

Much of the information contained herein is confidential and must not be reproduced or passed on to any person outside Seqwater without prior written permission from Lake Baroon Catchment Care Group.

DOCUMENT VERSIONS & APPROVALS

Version	Date	Version/Description	Result
1.0	August 2023	Draft LBCCG Project Proposal completed. Project emailed to LBCCG Committee for comments.	Approved, August 2023
1.0	August 2023	Project Proposal forwarded to Seqwater for approval (email)	
1.0			

AUTHORISATIONS

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Prepared by: Luke Ferguson - Project Manager, LBCCG		
Approved by: LBCCG Management Committee (signed by Peter Stevens – President)		
Approved by (Seqwater):		

Cover: Falls Creek running through the property, some remnant riparian vegetation in the background.

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Introduction

Falls Creek (Riparian Revegetation) will be implemented in a high priority management area, located along Falls Creek. The property is a highly productive macadamia farm, with over 1,500 macadamia trees, set out on 12 Ha, with Falls Creek running directly through the centre of the plantation.

Macadamia orchard properties are characterised by intensive horticultural practices and land management. Considered to be potentially high risk to water quality, their impacts on the environment and watercourses are complex and proportional to their location in the catchment.

The Landholder approached LBCCG for assistance to expand the areas of native vegetation, to enhance the riparian buffer and provide habitat and food sources for native pollinator insects, which will assist his macadamia orchard. Additionally native vegetation, rather than weeds, provides less pest harbour (rats) and encourages a heavier density of predators. The project aims to support the farm to establish and improve pollinator and predator habitat while reducing risk to water quality by improving the riparian buffer, through establishing riparian vegetation and protecting and enhancing remnant vegetation.

The property was identified as a high priority property in the 2021-26 Implementation Plan for the Lake Baroon catchment¹, based on its distance to Baroon Pocket Dam off take tower, land use, riparian health, readiness to implement projects and the likelihood of gaining additional funding. The Falls Creek catchment is characterised by relatively un-intensive beef grazing, considerable areas of rural residential and minimal vegetation, particularly along the watercourses. Historically the upper Falls Creek catchment supported dairy grazing which, along with the rural residential areas, likely yielded poor water quality results - high levels of nutrients (and likely pathogens).

Maintaining water quality is critical to providing safe bulk drinking water for the population of South east Queensland. All of the raw water storages managed by Seqwater are located in catchments which are developed to varying extents and support active and growing communities, including important industrial and rural economic activity. To provide a multi-barrier approach to the supply of drinking water, Seqwater must influence the management of land not owned by, but which exert an influence on Seqwater's core business.

Background

The Landholder purchased his property over twenty years ago and has developed his property into a small intensive macadamia orchard. Last year the farm was the top macadamia nut producer per Ha in the country. With this intensive agriculture there is a need to have substantial buffers to help filter the runoff water of nutrients and chemicals used during production. The current buffer is an extensive well maintained grass area. It is hoped that the revegetation will increase the riparian buffers ability to filter and remove nutrients and chemical washed from the orchard, with the added benefit of decreasing pest numbers (rats), increasing native predators and also increase pollen sources for native bees.

The revegetation of Falls Creek on the property will create a vegetative buffer and wildlife corridor of over 350 m. The plantings will connect existing remnant and regrowth vegetation along the creek. The revegetation will use a diverse variety of local rainforest species, with an emphasis on planting species that will result in flowering throughout the year. 1640 trees will be planted in 2 x 2m spacings, and will be planted to give, roughly a 10 m buffer along the creek.

¹ Lake Baroon Catchment Care Group, (2020), 2021-26 Implementation Plan for the Lake Baroon catchment, Maleny, Queensland



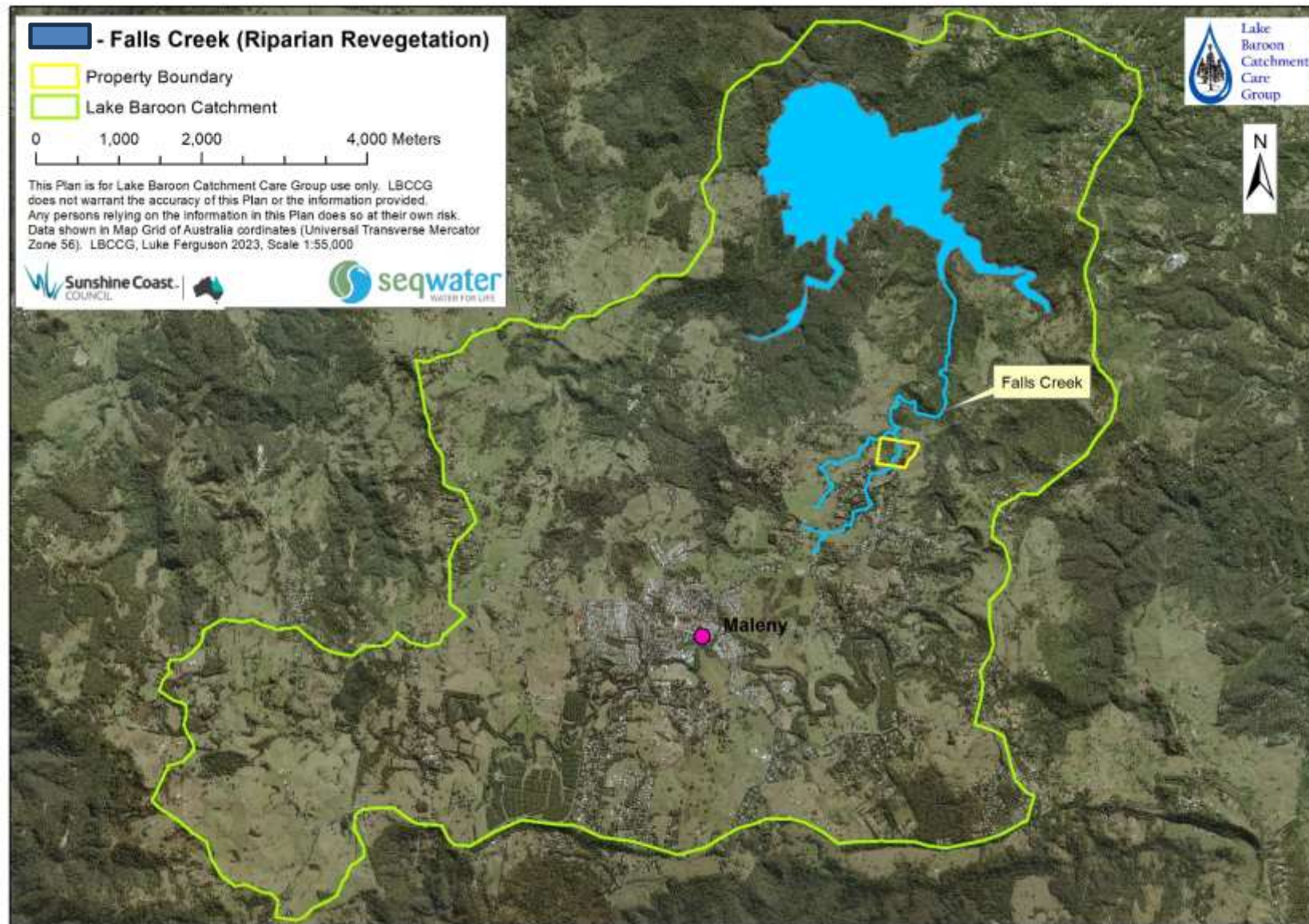
Left: A sample of the native bee hives at the macadamia farm.



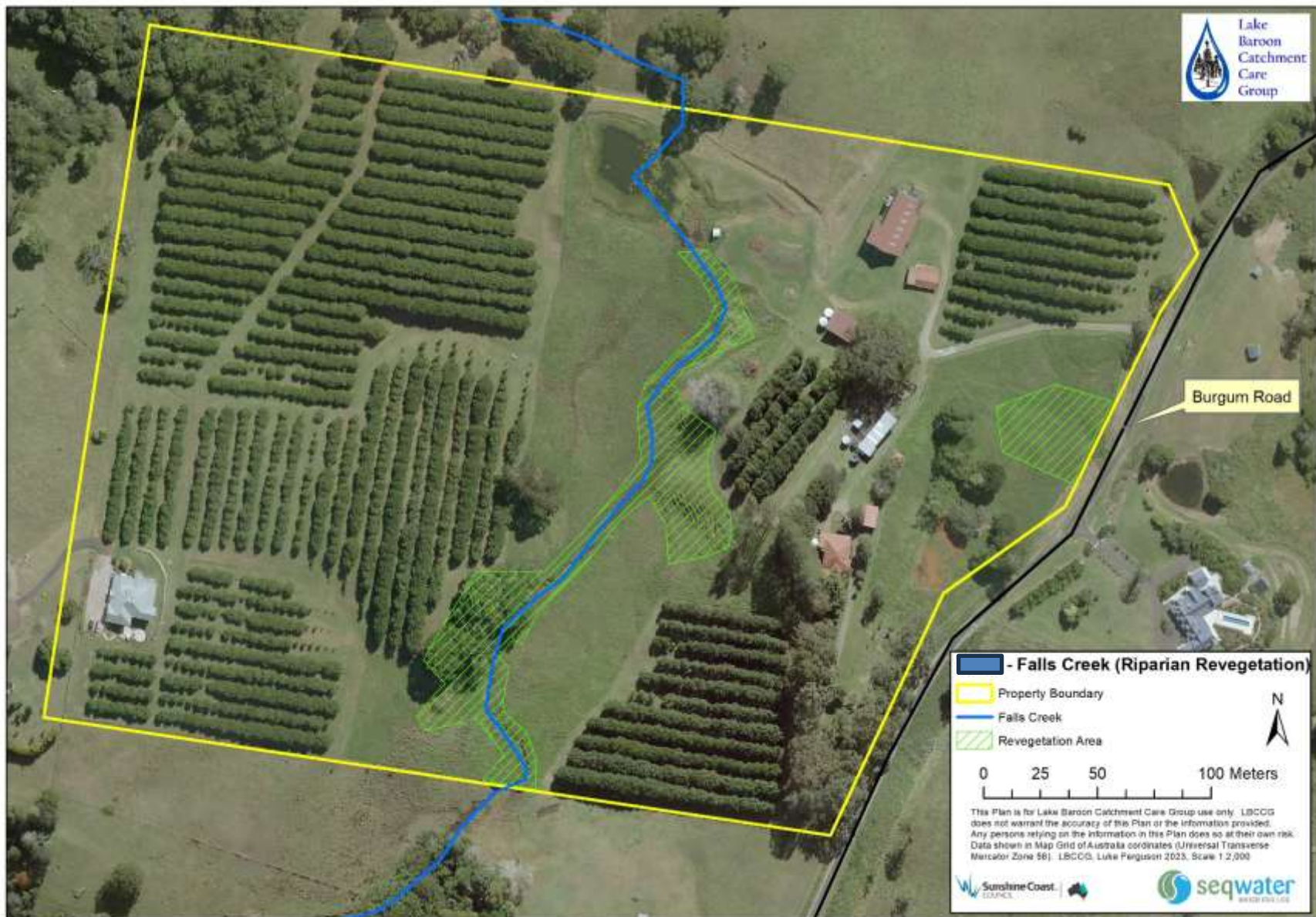
Left: Falls Creek running through the Macadamia orchid. A patch of native vegetation will be linked to the revegetation, once complete.

Also in the background, is the site of a revegetation planting from 2022/3

Project Location



Project Map



Project Plan

Project Plan Name	Falls Creek (Riparian Revegetation)	
Site	209 Burgum Road, North Maleny, QLD, 4552	
Project Start Date	August 2023	
Project End Date	June 2024	
Landholder details	Property owner / Manager	
	Contact Details	
	Real Property description	Lot 2 RP819421
	Property Size	12.5 hectares
	Land use	Macadamia Orchid
	Tree Number	1500
	Latitude/longitude	-26.740 152.876
	Water quality hazards present	1) Significant agricultural runoff 2) Poor riparian vegetation 3) Moderate stream bank instability 4) Moderate weed coverage 5) Poor stream drainage
Water Quality Risk (assessed according to 2021-26 Implementation Plan for the Lake Baroon catchment)		
Distance from Baroon Dam off take	High Priority	Property is 2.9 km from off take.
Prioritisation of land use	Medium to High	Intensive horticulture.
Riparian condition	High Priority	Poor riparian health – Absence of strong riparian buffer.
Landholder readiness & willingness	High Confidence	High confidence – Landholder sought out engagement with LBCCG.
Complimentary funding availability	Low Priority	Landholder unlikely to apply for funding for Landholder Environment Grants (SCC).
Land management weightings	Moderate Priority	Intensive horticulture, with inadequate riparian buffers.
OVERALL PROJECT PRIORITY	HIGH PRIORITY	

Cash & in-kind contributions			
Project Funding	Seqwater 2023-24 Riparian Condition Improvement (Water Quality)	\$ 17,900	
Project Management	Seqwater 2023-24 Project Management Funding (Water Quality)	\$ 8,258	
Landholder contribution	Cash & In-kind	\$ 23,625	
Other Contributions	LBCCG Management Committee In-Kind	\$1,516	
TOTAL		\$ 51,299	
Project Plan & Scope of Works			
Description of hazards on site and how they are to be addressed	Very limited vegetative buffer between Falls Creek and macadamia orchard	Revegetation with a diverse range of species along Falls Creek, linking existing regrowth and remnant vegetation.	
	Lack of vegetation diversity in riparian zone – dominated by annual, perennial weeds and grasses		
	Minimal stream shading contributing to deoxygenation and other impacts		
	Lack of diverse native vegetation to provide complex root systems and mechanical bank stability benefits		
	Lack of wildlife habitat / corridor		
Activities to be delivered as part of project & Schedule of works	1. Revegetation	1,640 stems	September 2023
	2. Weed management	.65 hectare	June 2024
Future maintenance requirements	Maintenance of revegetation will be required between 3 – 5 years. Likely \$3.00 per stem in first year and reducing to \$0 by year 5. Other on-going costs will be borne by the landholder.		
Project Outcomes			
Improve water quality <i>Improve water quality of:</i> <i>a. source water in Falls Creek; and</i> <i>b. raw water intake at Lake Baroon</i>	Improved riparian buffer in the Falls Creek Catchment	Revegetation of riparian zone improves ability of buffer to trap and/or process sediment, nutrients and chemicals.	
	Reduced erosion of the bed and banks of Falls Creek reducing turbidity and sedimentation		
	Reduce pathogen delivery to waterways		

Increase catchment biodiversity	Improved aquatic habitats	A reduction in turbidity, sediments, nutrients and pathogens will improve water quality and contribute to maintaining in-stream biodiversity.
	Improved land management	Support the Grice Farm to actively reduce reliance on the use of insecticides by providing habitat for native pollinators and predators
	Increased awareness of water quality issues and causes	Utilise the Grice property as a demonstration site that displays the practical tools that landholders can incorporate on their land to help improve water quality.
	Development of wildlife habitat corridors and sanctuary areas	Use revegetation plantings to provide wildlife corridors and habitat for native animals along Falls Creek. Plantings to link remnant and growth areas.

Monitoring

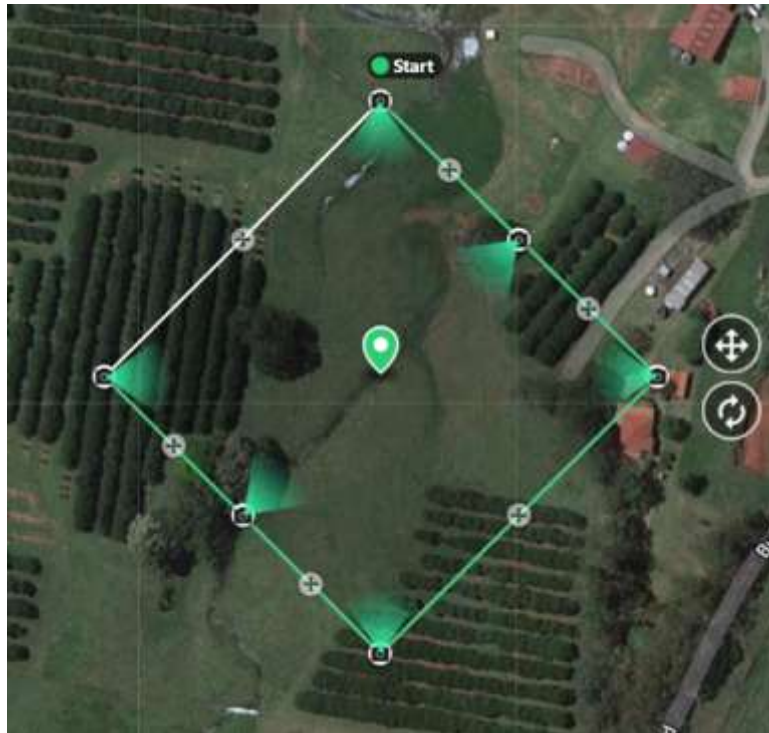
Seqwater's new Monitoring, Evaluation and Reporting (MER) program will be used to monitor this project. Under this new, standardized program, a project asset register will be developed for each project using Field Maps. A Condition Assessment Survey will be developed using Survey 123 and a Performance Assessment Survey will be completed for each site. All projects will be reviewed using the MER program

Drone footage will be captured for the project site. A detailed map and photo monitoring points will be created for the site. The maps and photo monitoring points will be produced annually and will provide valuable evidence of works completion, a record of changes over time, and provide an important assessment tool to evaluate the project.

Whilst undertaking annual inspections after project completion, outputs such as riparian fencing, stream crossings, off-stream watering will be monitored and evaluated for structural integrity. Project updates will be provided at monthly LBCCG meetings. The Project will also be reported on in the LBCCG Annual Work Plan (to Seqwater and Sunshine Coast Council) and Annual Reports (LBCCG members and placed on LBCCG website).



Left: An example of the mapping of Falls Creek using the drone which will be used for monitoring the project



Above: Photo monitoring points established for the project on the Grices' property.

Future Investment Options

There are no further projects to be undertaken at this point in time.

References

Seqwater (2020), *Scope of Works: Development of an implementation plan for the Baroon Pocket Catchment Water Quality Improvement Program*, Seqwater, Ipswich.

Lake Baroon Catchment Care Group (2020), *2020-21 Annual Work Plan*, Lake Baroon Catchment Care Group, Maleny.

Lake Baroon Catchment Care Group (2020), *1920-001 Upper Falls Creek Riparian Fencing and Revegetation (Warner)*, Lake Baroon Catchment Care Group, Maleny.

Appendices

Appendix 1: 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 info@lbccg.org.au for further information.

Appendix 2: Background Information

Lake Baroon Catchment Care Group

Lake Baroon Catchment Care Group (LBCCG) is a not for profit community group focussed on reducing the risks to water quality in the Lake Baroon catchment - primarily through the implementation of on-ground remediation projects. This aim is consistent with Seqwater's objectives of producing high quality, competitively priced potable water for the Sunshine Coast (and greater South east Queensland) region.

LBCCG reduces risk to water quality by working with private landholders in the catchment. Supporting landholders to improve land management provides multiple beneficial outcomes; water quality improvements and broader environmental benefits while enhancing property management and productivity. Catchment activities not only benefit the raw water flowing into one of south east Queensland's most important water storages (hence Seqwater's significant support) but by providing a range of other environmental outcomes generates support from other funding providers.

Reducing risk to water quality is critical to providing safe bulk drinking water for the population of south east Queensland. All of the storages managed by Seqwater involve catchments that are developed to varying extents and support active and growing communities, along with important industrial and rural economic activity. (Murton 2012²).

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 (Smolders 2011³).

As this project is consistent with the shared aim of reducing risks to water quality from erosion, nutrients and pathogens, and impacts on native vegetation from livestock and invasive species, the activities to fence and revegetate riparian zones, enhancing the ability of watercourses to trap and process water contaminants, are considered beneficial to support.

Catchment Land Use and Associated Impacts

An estimated 80% of sediment and 35% of nitrogen in the waterways in south east Queensland comes from non-urban diffuse loads; sources such as unmanaged livestock grazing. Reduction of these loads clearly represents a major target for action if significant improvements in water quality are to be achieved in South East Queensland (DERM 2010⁴).

Despite the extensive clearing, 17% of the Lake Baroon catchment is still moderately forested; a significant proportion in the immediate area around the dam, although much of this is degraded by environmental weeds. Today, the catchment is susceptible to impacts associated with an increasing diversity of land use (Keys 2009⁵).

² Murton, S. & Keys, S. 2012, Seqwater Natural Asset Management Plan – Lake Baroon, Sinclair Knight Merz, Brisbane

³ Smolders, A. 2011, Project Briefing Note: Water Quality Project – Cork's Dairy Restoration, Seqwater

⁴ Department of Environment and Resource Management, Development of a water quality metric for south east Queensland, 2010

⁵ Keys, S., Murton, S., Costanzo, S. & Thompson, A. 2009, Catchment and In-Storage Risk Assessment for Water Quality – Baroon Pocket Dam, Sinclair Knight Merz, South Brisbane.

The area closest to the dam is popular with “tree changers” and has seen land use change from intensive grazing to smaller rural residential properties. This has resulted in the fragmentation of larger tracts of agricultural land into smaller parcels with a large increase in the number of on-site wastewater treatment systems in the catchment (Keys 2009).

Presently the catchment is susceptible to a number of land use impacts (Traill, 2007⁶; Dunstan, 2007⁷) including:

- poorly managed dairying and cattle grazing;
- new developments and increased stormwater runoff;
- runoff from impervious surfaces of existing developed areas;
- irrigation of treated effluent associated with the Maleny Sewage Treatment plant;
- uncontrolled stock access to the lake and its tributaries;
- lack of riparian vegetation and integrity – a result of extensive vegetation clearing;
- abundance of weeds – shift in land ownership from land managers (e.g. farmers) to inexperienced residents has potentially led to the spread and proliferation of weeds (including emerging weeds); *and*
- varying pollution sources related to increased population.

Maintaining a healthy riparian system is essential for a productive landscape. When a riparian area is healthy it contains lush, thick vegetation, providing habitat for wildlife and aquatic species, maintains stream bank stability, influences morphology and provides shade which in turn lowers water temperatures and increases the oxygen carrying capacity of the stream. Additionally, riparian vegetation filters, utilizes and stores nutrients, thus preventing them from entering major watercourses. Weed invasion is an indicator that the riparian system is in decline and has the potential to alter the vegetation structure to such an extent that habitat and water quality outcomes are threatened.

Falls Creek Sub-Catchment

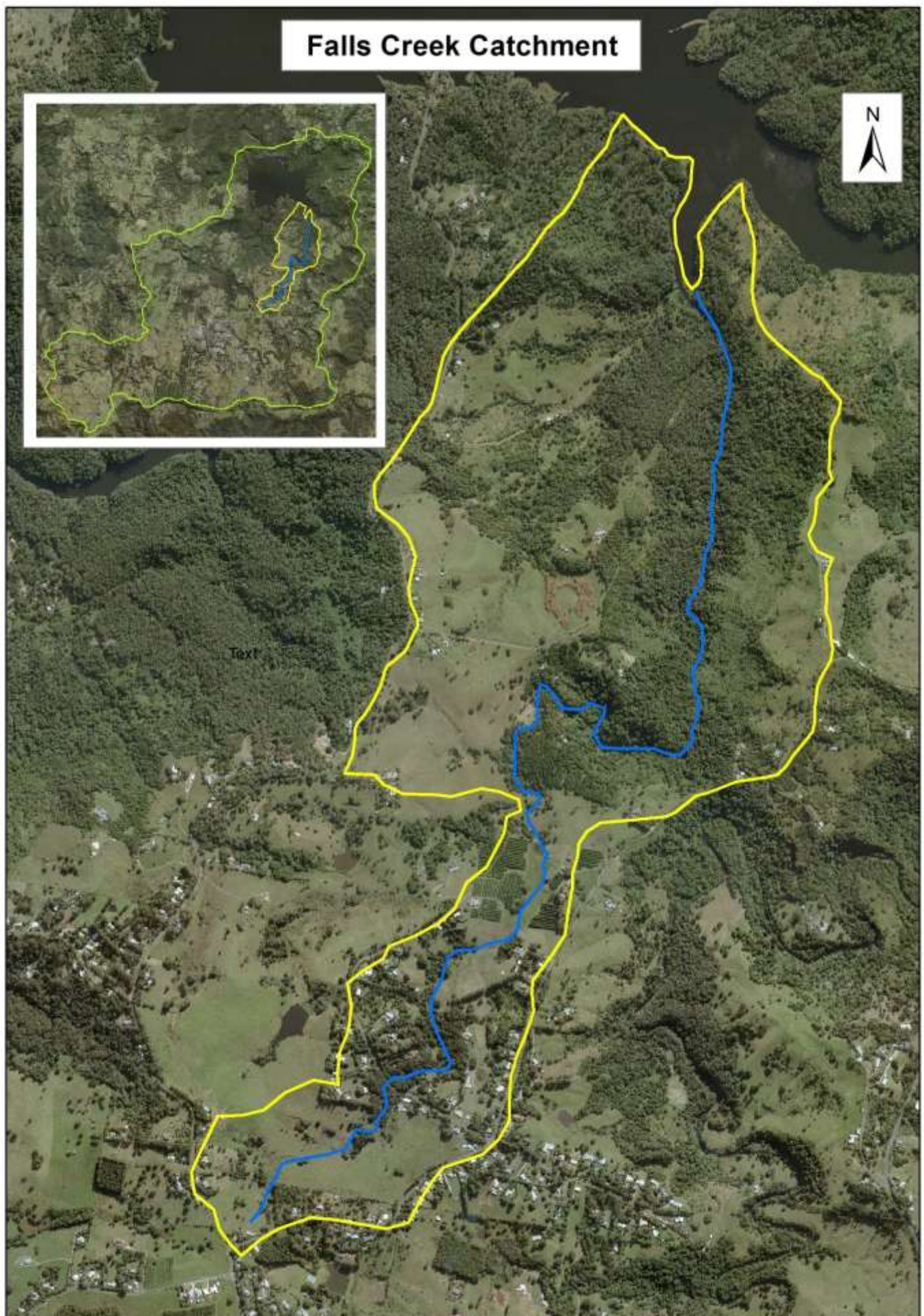
Falls Creek is a relatively small sub catchment covering 391 Ha, representing approximately 5.5% of the Baroon Pocket Dam Catchment area. The Falls Creek catchment is characterised by relatively un-intensive beef grazing (39%), considerable areas of rural residential (32%) and minimal vegetation, particularly along the watercourses.

Beef grazing has replaced dairying as the dominant land use (the Warner property was previously owned by the Newsham family who ceased dairying around 2013). The gentle slopes are stable despite having little vegetation cover. The lower reaches however are steep with large areas uncleared or permitted to return to regrowth vegetation. The slopes closest to the Dam are generally very unstable with many large landslips which impact the water storage.

The Lake Baroon Implementation Plan (2020/21) considers this part of the catchment as a high priority property based on its distance to Baroon Pocket Dam off take tower, land use, riparian health, readiness to implement projects and the likelihood of gaining additional funding. Historically the upper Falls Creek catchment supported dairy grazing which, along with the rural residential, likely yielded poor water quality results - high levels of nutrients (and likely pathogens).

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

⁷ Dunstan, M 2007, Lake Baroon Catchment Implementation Plan, AquaGen Water & Renewable Energy, Palmwoods



Appendix 3: Project Activities

Riparian revegetation

Riparian vegetation provides a buffer between water and agricultural activities. Buffers trap sediment, nutrients and faecal material before it reaches a flowing watercourse. Additionally, any contaminants that do reach the flowing water are more likely to be processed by in-stream vegetation if present. A combination of both native woody vegetation (trees) and grasses are ideal for buffers to utilise a wider range of nutrients so 'messy' riparian zones are likely more efficient despite possibly being viewed as 'ugly'.

Riparian zones due to their nature of being the most productive with good soils and moisture tend to grow thick stands of weeds (along with grass) and require either heavy management or require revegetation with native vegetation to out compete and shade most weed species. Revegetation therefore is a long-term management solution for fenced riparian zones.

Riparian buffers comprising grassed buffer strips are effective at trapping sediments and nutrients adsorbed to sediments (such as phosphorus), but tend to be relatively poor at trapping dissolved nutrients, or for the provision of shade, food sources, in-stream structure or corridors for many species. Riparian buffers comprising taller, woody vegetation are typically good at providing shade, as a source of food and woody habitats, as a screen for light and noise, as corridors for terrestrial fauna (to a varying extent depending on species composition), and as a means for reducing soluble nutrient inputs.

Designed riparian buffers usually incorporate multi-tiered systems of both native woody vegetation to enhance ecological function, and vegetated filter strips for the management of water quality. In essence, this approach seeks to mimic the complexity and effectiveness of a natural riparian buffer system, and often the best approach is to provide the required buffer width to enable a self-sustaining buffer of native vegetation (Barwick et al, 2009⁸).

Revegetation will occur along Falls Creek on Bob Grices' property, resulting in the revegetation of approximately 350 m of the creek. This planting will be a diverse selection of rainforest species found in the area. The trees will provide a buffer between the macadamia orchard and Falls Creek. 1640 trees will be planted along the riparian edge, giving a buffer of 10 m on either side of the creek, this will not only have a positive impact by improving water quality, provide a significant wildlife habitat corridor, but will also provide a food source for native bees all year round.



Left: A section of the proposed planting site along Falls Creek. The tree planting will strengthen the health of the riparian buffer and will link in with existing remnant and regrowth vegetation present along the creek.

⁸ Barwick, M, Wassman, D & Pitman, K. 2009, *Maleny Community Precinct Environmental Management Scoping Document*, Australian Wetlands Pty Ltd, Caloundra, Qld

Weed management

Normally LBCCG does not actively manage woody weeds in riparian zones as any vegetation in riparian zones is better than none (except for a few key species that have a detrimental impact on water quality). Weed management is only completed where:

- Priority weeds are present (Chinese elm, Madeira vine, Cats claw creeper);
- There is a long-term plan to ensure the weeds do not return (revegetation);
- Weedy vegetation is affecting water quality (blocking flows, causing erosion, diverting flows etc).

Several methods of weed control are utilised:

- Initial knock down with excavator or tractor mounted mulcher;
- Follow up spot spraying of re-shooting weeds;
- Cut and paste of larger weeds that cannot be mulched or sprayed (particularly important within and adjacent to remnant or good quality regrowth vegetation);
- Regular follow up over several years (as part of revegetation maintenance).



Sections of lantana, devils fig and wild tobacco need to be brushcut and mulched, then the regrowth treated with herbicide. This is the most cost-effective way to control the weeds on the site.