



Lake
Baroon
Catchment
Care
Group

Working with our community...for our waterways

Projects 2023/24

Obi Obi Creek *(Riparian fencing, revegetation & off stream water)*



PROJECT PLAN

Riparian Condition Improvement &
Agricultural Practice Improvement
Programs

CBP2324-024



This Project Plan has been prepared by, and all enquiries to be directed to:

Lake Baroon Catchment Care Group
PO Box 567 (455 North Maleny Rd)
Maleny, 4552
Email - info@lbccg.org Ph - (07) 5494 3775

Disclaimer

While every effort has been made to ensure the accuracy of this Project Plan, Lake Baroon Catchment Care Group makes no representations about the accuracy, reliability, completeness or suitability for any particular purpose and disclaims all liability for all expenses, losses, damages and costs which may be incurred as a result of the Plan being inaccurate or incomplete.

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. Appendices provide further useful information relating to budget, the Lake Baroon catchment and land use, 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	17 th April 2024	Draft LBCCG Project proposal completed. Project emailed to LBCCG Committee for comments.	Approved
1.0	16 th May 2024	Project proposal presented at LBCCG Management Committee meeting for approval.	Approved
1.0	8 th May 2024	Project Proposal forwarded to Seqwater for approval (email)	Approved

AUTHORISATIONS

Name	Signature	Date
Prepared by: Luke Ferguson (Project Planner) & Claire Wynn (Office Manager)		21-3-2024
Approved by: LBCCG Management Committee (signed by Peter Stevens – President)		16-05-2024 (Minutes 0161.8.4)
Approved by (Seqwater): Julian O'Mara (Senior Planner – Source Protection)		

Cover: Property

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Introduction

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.

The Landholder owns a 13ha property at the head of the Obi Obi Creek catchment. The property is currently and running between 10 to 15 head of cattle. The property has 300 m of frontage to Obi Obi Creek, and currently the livestock have unrestricted access to the riparian zone. Historically, the Obi Obi 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).

Riparian fencing will be installed in the first stage of this multistage project. Stage 2, 2024/25, will incorporate an off-stream watering , and the revegetation of the fenced riparian zone. These measures are best practice management for improving water quality. The project was identified as a Preferred Project in the LBCCG 2023/24 Annual Work Plan¹.

The property is a moderate to low priority property based on its distance to Baroon Pocket Dam off take tower. However, the significance of this project is increased by the land use, riparian health, and the landholder's readiness to implement projects. Furthermore, the significance of the project is increased due to the importance of the Obi Obi Creek in the Lake Baroon catchment, and the volume of previous, planned and current projects undertaken in the surrounding area by Lake Baroon Catchment Care Group (as shown in Map 1).

Background

The property has always been used for livestock grazing and stocking rates have been adjusted seasonally. Livestock have always relied on access to Obi Obi Creek for their water supply, resulting in bank erosion, damage to the riparian vegetation, weed proliferation, poor riparian buffers and the direct delivery of faecal material (E.coli and pathogens) into Obi Obi Creek.

The landholder has a long association with Lake Baroon Catchment Care Group as a contractor and understands the importance of protecting and enhancing riparian buffers. The property's significance is increased by its location at the head of the Obi Obi Creek catchment and the linkage with the neighbouring project.

The upper Obi Obi Creek catchment has been targeted for major on ground activities (projects) since 2009 as this sub-catchment is recognised as delivering very high volumes of nutrients and other contaminants (the sub-catchment is largely agricultural).

Map 1

Previous, proposed & planned LBCCG riparian projects in Upper Obi Obi Creek sub-catchment including Daley Creek

- Riparian fencing & revegetation
- Riparian revegetation only
- Riparian fencing only
- Proposed project
- Planned projects (2023/24, 2024/25, 2025/26)

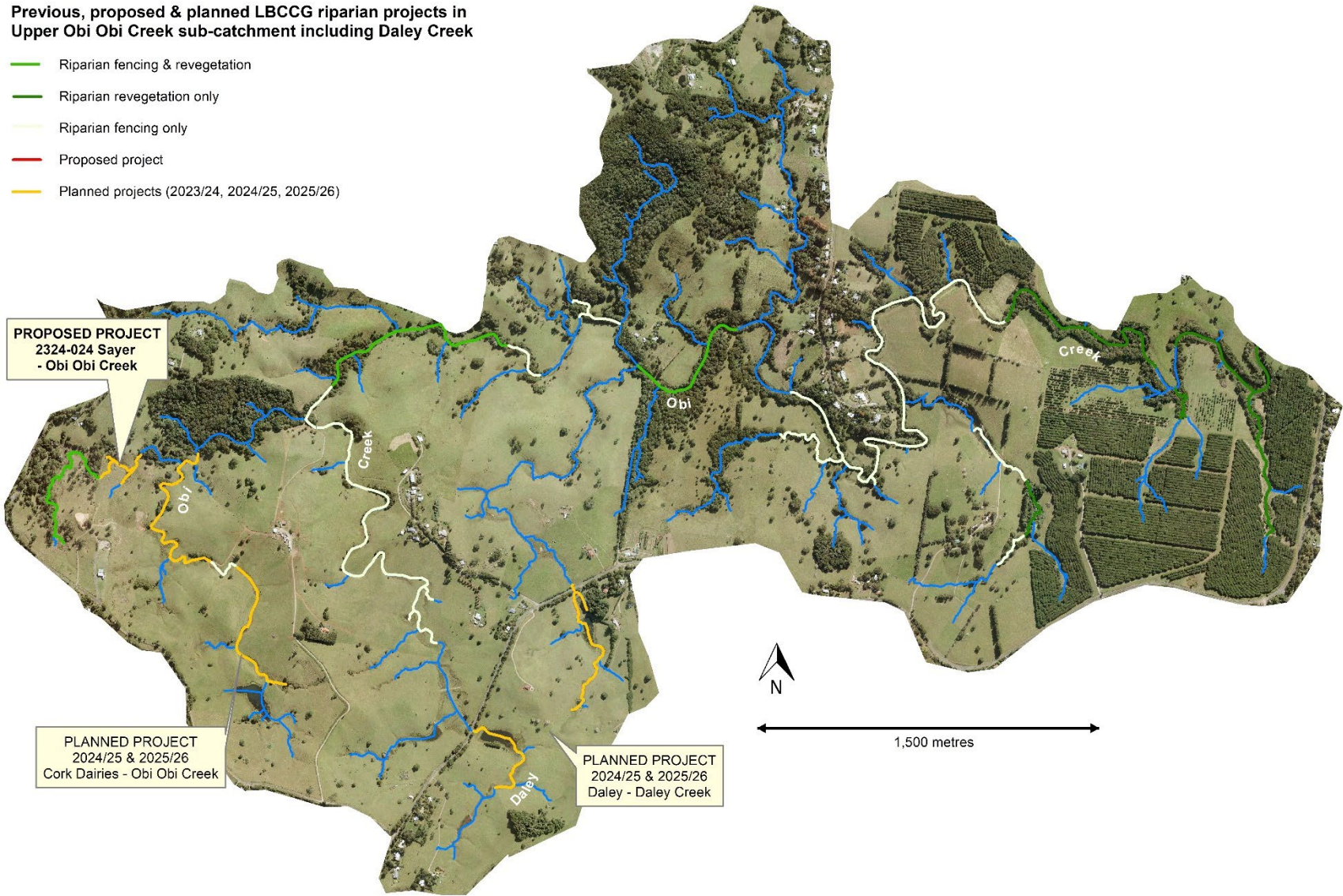


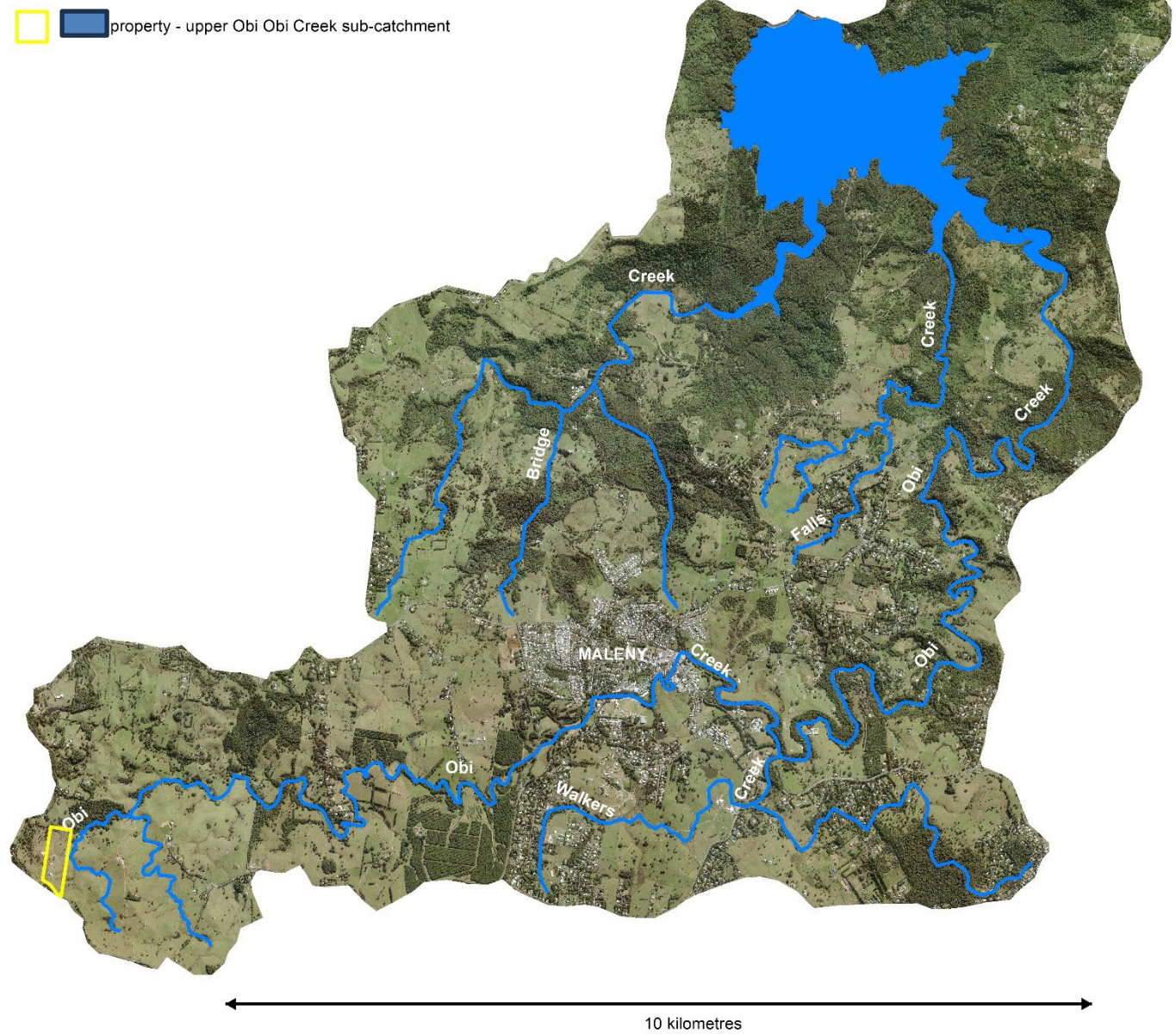


Figure 1: The property is at the head waters of Obi Obi Creek. Riparian fencing will help strengthen the riparian buffer along the waterway. The exclusion of cattle from the riparian zone through fencing, will decrease the chance of pathogens entering the waterway.

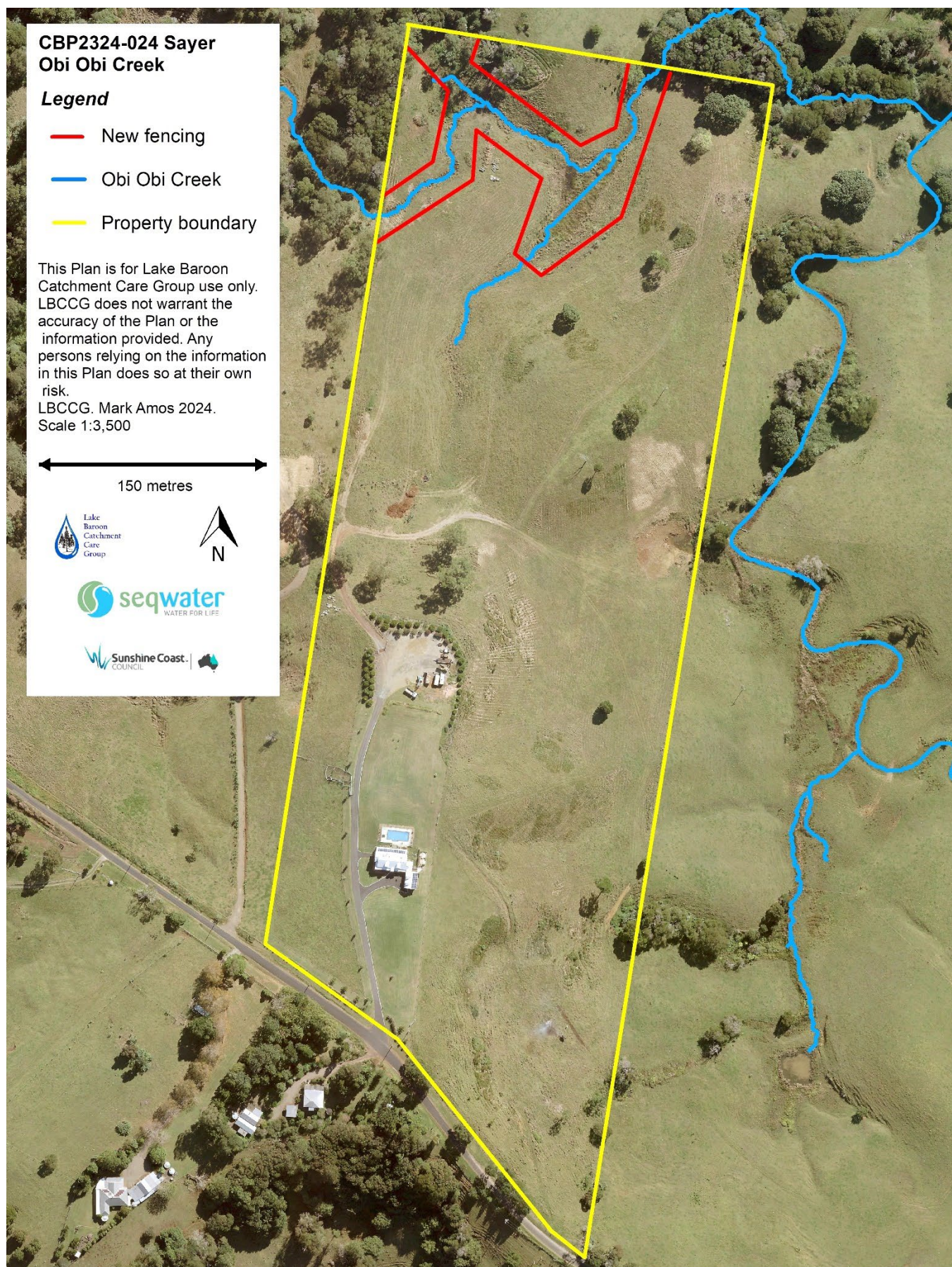


Figure 2: Riparian fencing and future planned revegetation will link with other projects in the area and will help strengthen the riparian buffer along the waterway.

Project location



Project Map



Project plan

Project title	Falls Creek (Riparian fencing, revegetation, stream crossing & off stream water)	
Location		
Project Start Date	May 2024	
Project End Date	June 2024	
Landholder details	Property owner / Manager	
	Contact details	
	Real Property description	
	Property size	
	Land use	
	Livestock numbers	
	Latitude/longitude	152.789, -26.776
	Water quality hazards present	1) Stock access to riparian zones 2) Poor riparian vegetation 3) Moderate stream bank instability 4) Moderate weed coverage
Water Quality Risk (re-assessed according to 2021-26 Implementation Plan for the Lake Baroon catchment criteria)		
Distance from Baroon Dam off take	Low priority	Property is 10 km from off take
Prioritisation of land use	Medium to High	Grazing (moderate intensity)
Riparian condition	High priority	No riparian fencing, poor riparian buffer with little vegetation, moderate weeds, minor erosion
Landholder readiness & willingness	High Confidence	High confidence – landholder sought out engagement with LBCCG, significant in-kind contribution to project
Complimentary funding availability	Low Priority	Less likely to receive additional funding
Land management weightings	Moderate Priority	Priority land use, inadequate riparian buffers, low risk project
OVERALL PROJECT PRIORITY	MODERATE PRIORITY	

Cash & in-kind contributions		
Project funding	Seqwater 2023-24 Agricultural Practice Improvement	\$ 23,004
Project management	Seqwater 2023-24 Project management	\$ 10,000
Landholder contribution	Cash & in-kind	\$ 23,960
Other contributors	LBCCG Management Committee in-kind	\$ 1,516
TOTAL		\$ 58,480
Project Plan & Scope of Works		
Description of environmental hazards on site and how they are to be addressed	Livestock have unmanaged access to Obi Obi Creek	Fence waterway to exclude livestock. Future installation (2024/25) of off stream watering system removing reliance of livestock watering in Obi Obi Creek
	Fragmented vegetative buffer between Obi Obi Creek and grazing	Future revegetation (2024/25) with a diverse range of species along Obi Obi Creek, linking existing regrowth and remnant vegetation. Link with neighbouring projects.
	Minimal vegetation diversity in riparian zone – moderate coverage of annual, perennial weeds, grasses and woody weeds	
	Minimal stream shading contributing to deoxygenation and other impacts	
	Lack of diverse native vegetation to provide complex root systems and mechanical bank stability benefits	
Activities to be delivered as part of project & Schedule of works	1. Fencing	750 metres
Future maintenance requirements	No foreseen maintenance requirements, any 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 Obi Obi Creek; and</i> <i>b. raw water intake at Lake Baroon</i>	Improved riparian buffers in the Obi Obi Creek Catchment	Riparian fencing, removing livestock from the riparian zone improves ability of buffer to trap and/or process sediment, nutrients chemicals and pathogens.
	Reduced erosion of the bed and banks in the catchment of Obi Obi Creek	
	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	Protection of riparian zones, improved livestock management, improve livestock health.
	Increased awareness of water quality issues and causes	Utilise the property as a demonstration site that displays the practical tools that landholders can incorporate on their land to help improve water quality.

Monitoring

Seqwater's new Monitoring, Evaluation and Reporting (MER) program will be used to monitor this project. Under this new, standardised 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.

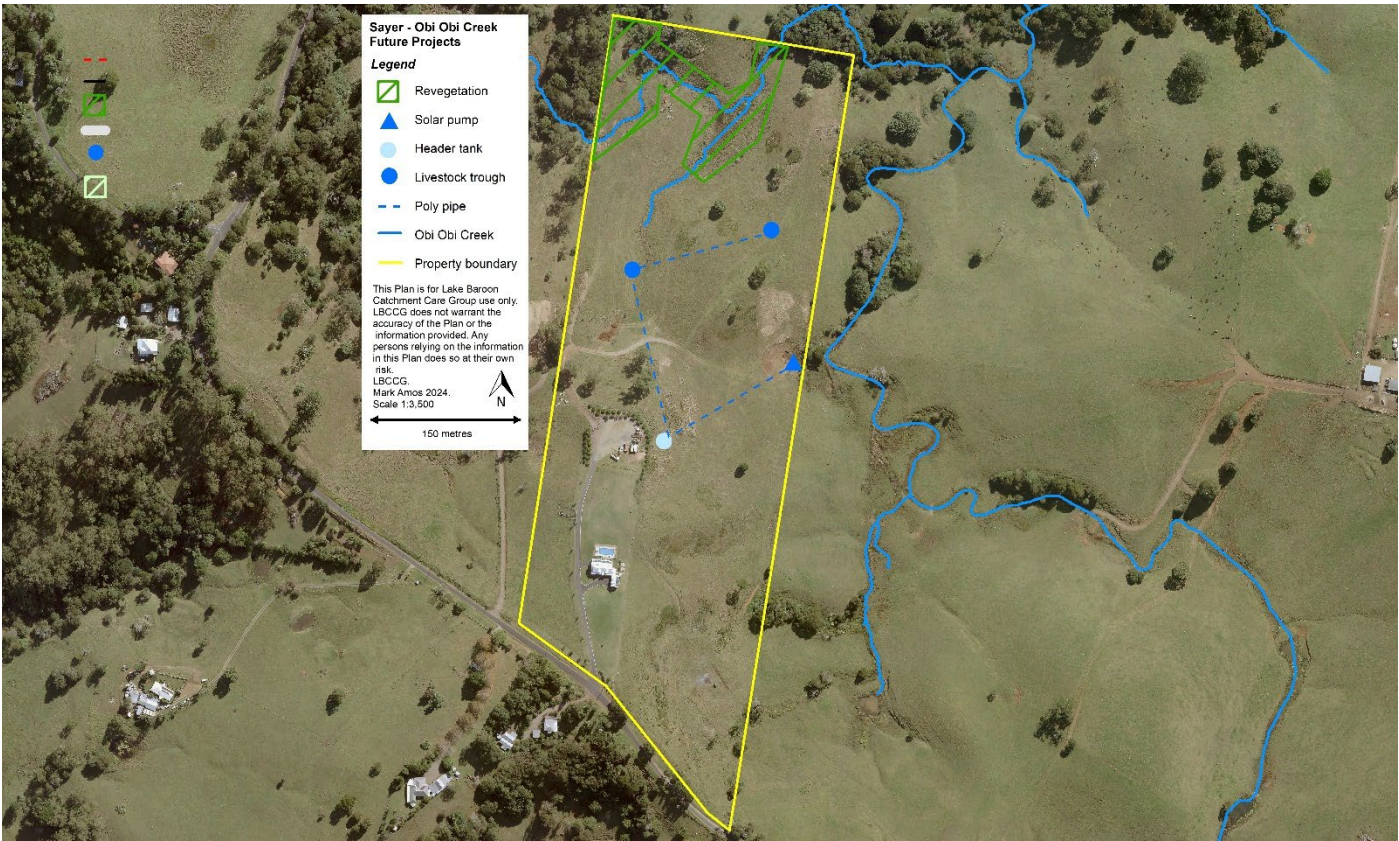
Whilst undertaking annual inspections after project completion, outputs such as riparian fencing, revegetation, stream crossings and off-stream watering will be monitored and assessed for condition and fit for purpose. Project updates will be provided at monthly LBCCG meetings. The Project will also be reported on in the LBCCG Annual Reports (LBCCG members and placed on LBCCG website).



Figures 3 & 4: Drone deploy software is utilised to monitor the project site providing repeatable imagery over time and establishing photo monitoring points

Future investment options

Location	Future Work Options	Priority	Indicative Cost
Obi Obi Creek –property	Off Stream Watering System	Very high	\$20,000
	.5 Hectare revegetation	Moderate	\$ 15,000



References

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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.¹

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.²

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.³

Despite the extensive clearing, 22% 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.⁴

The area closest to the dam is popular with "tree changers" and has seen land use change from intensive grazing to increasingly 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.⁵

¹ Murton, S. & Keys, S. 2012, Seqwater Natural Asset Management Plan – Lake Baroon, Sinclair Knight Merz, Brisbane

² Smolders, A. 2011, Project Briefing Note: Water Quality Project – Cork's Dairy Restoration, Seqwater

³ Department of Environment and Resource Management, Development of a water quality metric for south east Queensland, 2010

⁴ 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.

⁵ ibid

Presently the catchment is susceptible to a number of land use impacts; ⁶ 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.

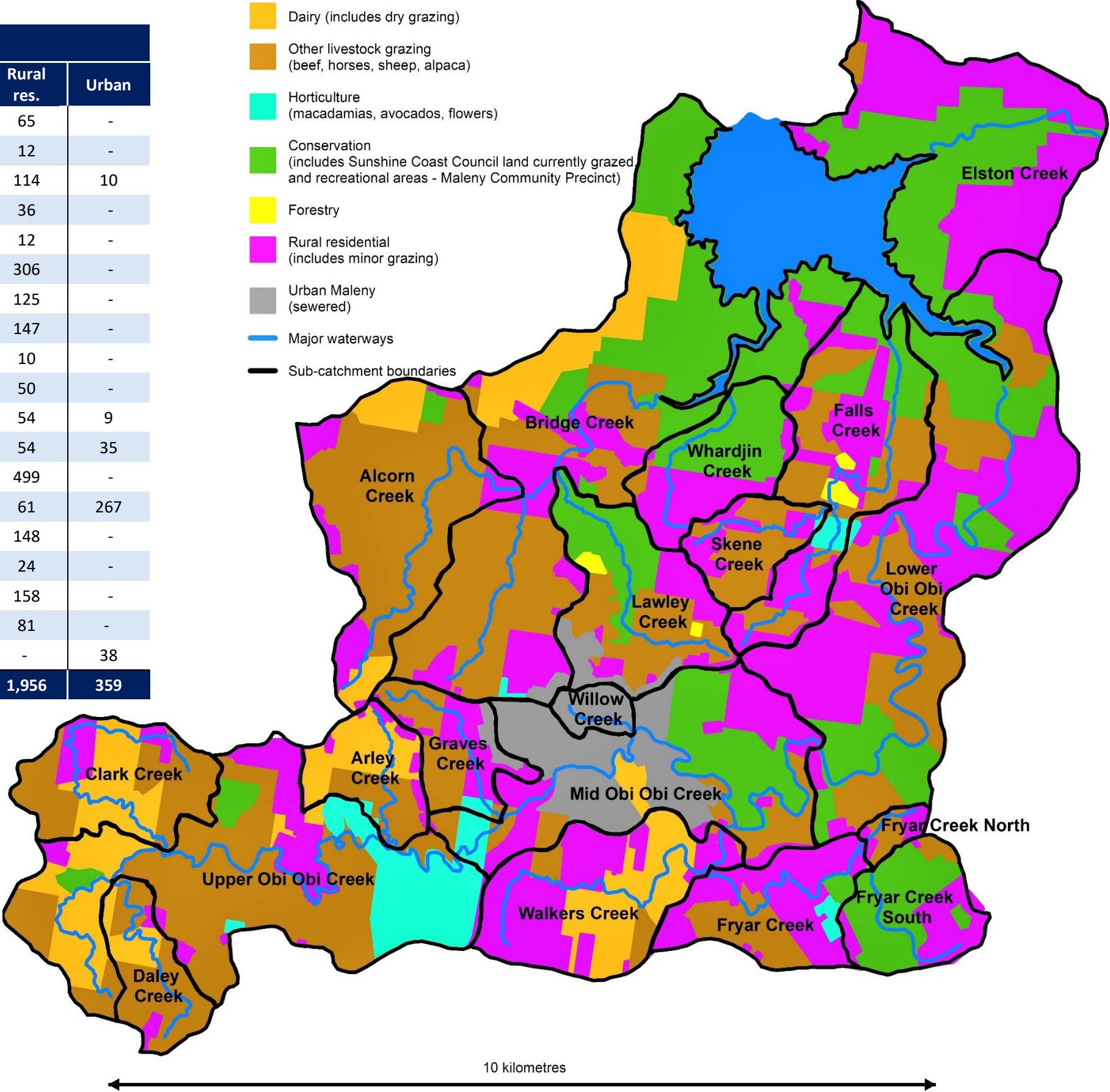
Maintaining a healthy riparian system is essential for a productive landscape. When a riparian area is healthy it contains lush, thick vegetation, providing habitat for wildlife and aquatic species, maintains stream bank stability, influences morphology and provides shade which in turn lowers water temperatures 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.

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

Table 1 - Lake Baroon sub-catchments and land use

Sub-catchment	Total hectares	Land use (hectares)						
		Dairy	Grazing	Horti-culture	Conser-vation	Forestry	Rural res.	Urban
Alcorn Creek	539	44	416	-	14	-	65	-
Arley Creek	135	72	49	2	-	-	12	-
Bridge Creek	1,250	166	476	-	484	-	114	10
Clark Creek	227	83	108	-	-	-	36	-
Daley Creek	127	28	87	-	-	-	12	-
Elston Creek	673	-	12	-	355	-	306	-
Falls Creek	391	-	154	12	89	11	125	-
Fryars Creek	200	-	47	6	-	-	147	-
Fryars Creek North	27	-	13	-	4	-	10	-
Fryars Creek South	164	-	8	2	104	-	50	-
Graves Creek	132	-	64	5	-	-	54	9
Lawley Creek	345	-	119	-	130	7	54	35
Lower Obi Obi Creek	935	-	296	-	140	-	499	-
Mid Obi Obi Creek	546	17	83	17	101	-	61	267
Upper Obi Obi Creek	740	95	344	124	29	-	148	-
Skene Creek	117	-	92	1	-	-	24	-
Walkers Creek	306	119	29	-	-	-	158	-
Whardjin Creek	228	-	14	-	133	-	81	-
Willow Creek	38	-	-	-	-	-	-	38
TOTAL	7,120 ⁽¹⁾	624	2,411	169	1,583	18	1,956	359

⁽¹⁾ Does not include the Lake Baroon surface.
Note – sub-catchments are based on named creeks in the catchment only and do not reflect land use, area or any other particular characteristic.



Upper Obi Obi Creek Sub-Catchment

The Obi Obi Creek is the most significant watercourse in the Lake Baroon catchment, consisting of 71 km of waterway in a sub catchment of 2,880 ha. A mere 18% of the sub catchment is covered in vegetation, with much of the area significantly disturbed, mostly supporting beef or dairy cattle; but also including urban Maleny (Dunstan 2007).

The Upper Obi Obi Creek sub-catchment covers an area of 1,094 Ha, for this project Clark Creek and Daley Creek catchments have been included in the upper Obi Obi Creek sub-catchment. Beef cattle grazing is the dominant land use (49 %), followed by 19 % dairy farming, and 18 % rural residential.

The Lake Baroon Annual Plan (2021/22) considers this part of the catchment as a low priority property based on its distance to Baroon Pocket Dam off take tower, however, when you look at land use, riparian health, readiness to implement projects and the likelihood of gaining additional funding, a case can be made that this is a high priority project. Historically the upper Obi Obi Creek catchment supported dairy grazing which, along with the rural residential, likely yielded poor water quality results - high levels of nutrients (and likely pathogens).

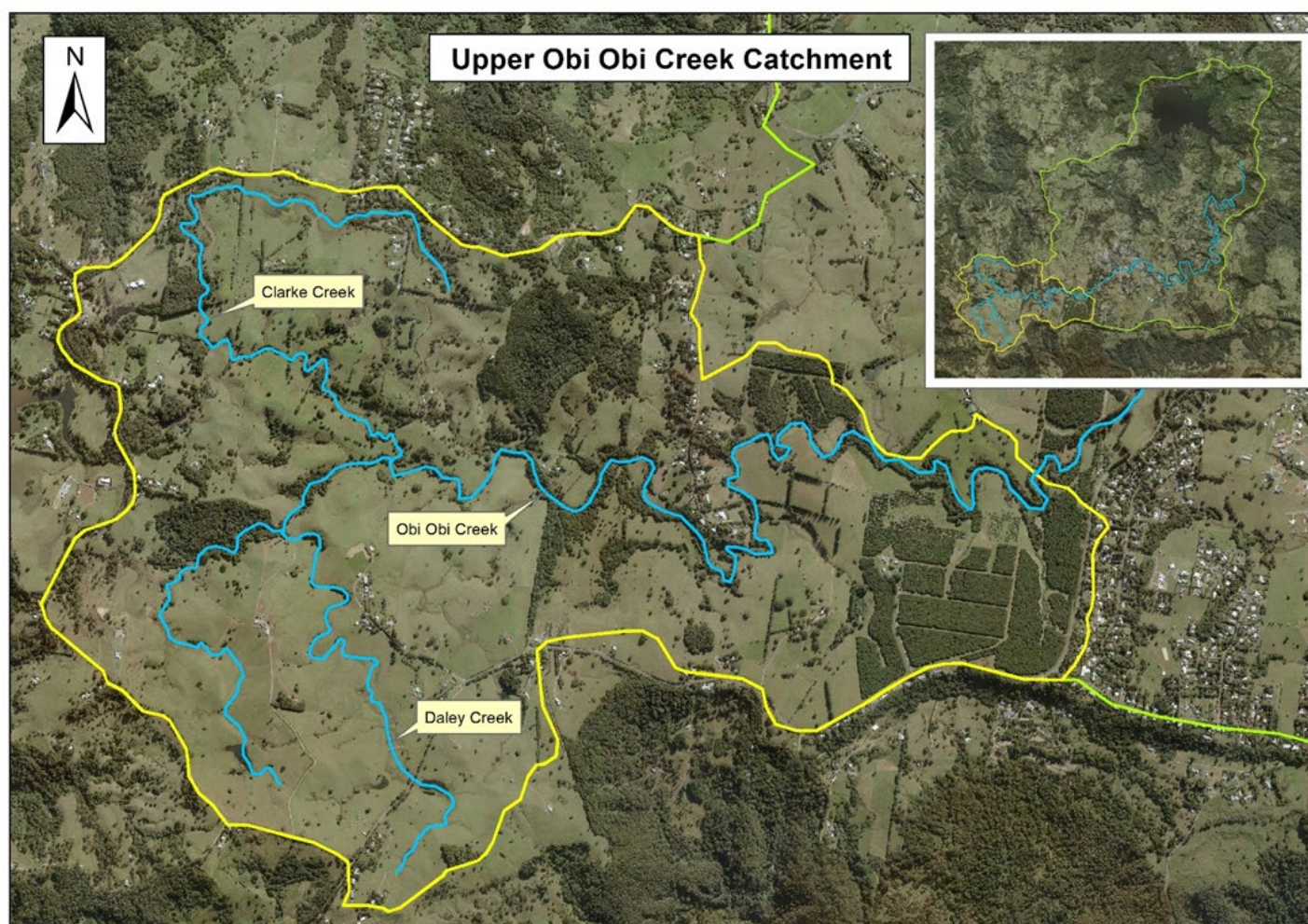


Table 2 Riparian zone grazing assessment (as of March 2022; * indicates updated in November 2023)

Sub-catchment	Total stream length	No livestock grazing	Managed livestock grazing	Unmanaged livestock grazing
Graves Creek	5,021 m	1,286 m (26%)	849 m (17%)	2,886 m (57%)
Arley Creek	5,857 m	482 m (8%)	1,583 m (27%)	3,792 m (65%)
Fryar Creek	8,746 m	5,523 m (63%)	0 m (0%)	3,223 m (37%)
Falls Creek*	17,806 m	15,203 m (85%)	680 m (4%)	1,923 m (11%)
Skene Creek*	5,490 m	1,689 m (31%)	288 m (5%)	3,513 m (64%)
Whardjin Creek	8,372 m	7,959 m (95%)	0 m (0%)	413 m (5%)
Alcorn Creek	20,641 m	8,296 m (40%)	3,520 m (17%)	8,825 m (43%)
Clark Creek	11,730 m	3,429 m (29%)	172 m (2%)	8,129 m (69%)
Daley Creek	5,338 m	0 (0%)	2,296 m (43%)	3,042 m (57%)
Walkers Creek	12,124 m	5,666 m (47%)	2,063 m (17%)	4,395 m (36%)
Elston Creek	24,447 m	24,257 m (99%)	0 m (0%)	190 m (1%)
North & South Fryar Creek	8,930 m	4,898 m (55%)	0 m (0%)	4,032 m (45%)
Willow Creek	913 m	913 m (100%)	0 m (0%)	0 m (0%)
Lawley Creek	12,287 m	10,672 m (87%)	152 m (1%)	1,463 m (12%)
Upper Obi Obi Creek	34,959 m	9,696 m (28%)	6,005 m (17%)	19,258 m (55%)
Lower Obi Obi Creek	45,888 m	33,496 m (73%)	1,466 m (3%)	10,926 m (24%)
Mid Obi Obi Creek	23,368 m	20,572 m (88%)	832 m (4%)	1,964 m (8%)
Bridge Creek	48,535 m	31,015 m (64%)	423 m (1%)	17,097 m (35%)
Totals	300,452 m	185,052 m (62%)	20,329 m (7%)	95,071 m (32%)

	Livestock excluded from riparian zone
	Riparian zone fenced but intermittent livestock grazing
	No riparian fencing, livestock have unmanaged access

Note - it is unlikely 100% exclusion is possible as identified streams include Order 1 waterways that are ephemeral and are usually merely grassed swales. It is not practical or cost effective to include these waterways in funded fencing projects.

Appendix 3: Project works

Riparian fencing

The project will see the installation of approximately 750m of riparian fencing along Obi Obi Creek, resulting in the permanent removal of livestock from the Obi Obi Creek riparian zone. This riparian fencing will be a permanent wooden split post fence, with 4 strands of barb wire.

Livestock grazing is a land use that has the potential to alter the condition of a stream and riparian area if not managed properly. Improper livestock use of riparian areas can negatively affect riparian areas by changing, reducing or eliminating the vegetation within them.

In the sub-tropics, the majority of overland flow events occur during the summer to early autumn period. Conversely during the winter and spring months, most faecal contamination in water channels occurs from an animal defecating directly into the water. Any practice that reduces the amount of time cattle spend in a stream will therefore reduce the manure loading and decrease the potential for adverse effects on water from grazing livestock.

The direct effects of improperly managed livestock grazing on riparian vegetation include:

- change, reduce, or eliminate vegetation;
- decrease the vigour, biomass and alter species composition and diversity;
- change the channel morphology by widening and shallowing of the streambed;
- alter the stream channel through trenching or braiding depending on soil and substrate composition;
- alter the water column by increasing water temperatures, nutrients, suspended sediments and bacterial counts;
- alter the timing and volume of water flow;
- cause bank sloughing leading to accelerated sedimentation and erosion; *and*
- decrease wildlife habitat and species.

However, when tightly controlled, fencing can be an invaluable, and sometimes essential tool to manage grazing in riparian zones whether permanent exclusion or managed grazed is performed.

This project will enhance vegetation buffers along Obi Obi Creek. The effectiveness of a riparian buffer to provide multiple environmental and water quality benefits varies depending on several key factors, namely bank slope, vegetation species composition and age, and soil type. Slope gradient appears to be the most important variable in removal of sediment or particulate pollutants, whereas buffer width is most important for the effective removal of dissolved nutrients.⁷

⁷ Barwick, M, Wassman, D & Pitman, K. 2009, *Maleny Community Precinct Environmental Management Scoping Document*, Australian Wetlands Pty Ltd, Caloundra, Qld

Appendix 4: 2023/24 RCI & API projects

Estimated budgets v actual budgets & approvals

Project number, landholder name, sub-catchment & key works	2023/24 Annual Work Plan budget (includes Project mgt)	2023/24 Actual budget	Project plan status
CBP2324-002 Falls Creek <i>(Riparian revegetation)</i>	\$ 24,928	\$ 26,158	APPROVED
CBP2324-011 Obi Obi Creek <i>(Riparian fencing)</i>	\$ 76,000	\$ 83,840	APPROVED
CBP2324-013 Falls Creek <i>(Riparian fencing, revegetation, stream crossing & off stream water)</i>	\$ 45,973	\$ 52,310	APPROVED
CBP2324-023 Obi Obi Creek <i>(Riparian fencing, revegetation & stream crossing)</i>	\$ 44,665	\$49,734	APPROVED
CBP2324-024 Obi Obi Creek <i>(Riparian fencing, revegetation & OSW)</i>	\$ 51,300	\$33,004	APPROVED
CBP2324-027 Good Neighbour Program - Elston Creek <i>(Revegetation)</i>	\$ 15,200	?	POSTPONED
CBP2324-040 Agriculture Practice Improvement Workshops	\$ 6,080		ONGOING
Revegetation maintenance <i>(Maintenance of revegetation planted in previous years projects)</i>	\$ 115,854		ONGOING
Totals	\$ 380,000	\$245,046	