



Lake
Baroon
Catchment
Care
Group

Working with our community...for our waterways

Projects 2023-24

Obi Obi Creek, Stage 2 (Riparian Fencing)



PROJECT PLAN

Riparian Condition
Improvement & Agricultural
Practice Improvement Program

CBP2223-011

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

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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. 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.

Previous Plans

2223 – 011 Lower Obi Obi Creek Riparian Fencing and Off Stream Watering, Stage 1

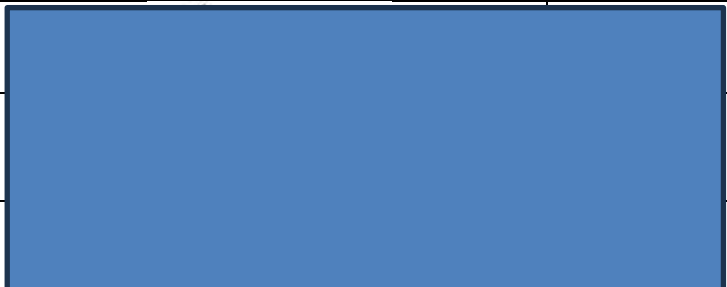
Confidentiality

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	July 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: Paul Mackay - Project Manager, LBCCG		
Approved by: LBCCG Management Committee (signed by Peter Stevens – President)		
Approved by (Seqwater):		

Cover: Obi Obi Creek bordering the Engle property.

Contents

Introduction.....	4
Background.....	4
Project Location	5
Project Map	6
Project Plan.....	7
Monitoring.....	10
Future Investment Options	11
References	12
Appendices	13
Appendix 1: Budget.....	14
Appendix 2: Background Information	15
Lake Baroon Catchment Care Group	15
Catchment Land Use and Associated Impacts	15
Lower Obi Obi Creek Sub-Catchment	16
Appendix 3 Project Activities.....	18
Riparian Fencing	18
Off stream water system (Stage 1, 2022-23)	20
Weed management.....	22

Introduction

Obi Obi Creek, Stage 2 (Riparian Fencing), will be implemented in a high priority area, that delivers very high volumes of nutrients, sediment and faecal material (E.coli and pathogens) to Obi Obi Creek and ultimately Baroon Pocket Dam. This project is the final stage of a two-stage project plan. Stage 1, delivered in 2022/23, focused on the installation of an off-stream watering system. Stage 2 will involve the installation of 2,200 m of riparian fencing along Obi Obi Creek, to exclude and manage livestock grazing in the riparian zones on the Property. This project was identified as a priority in the LBCCG Annual Work Plan 2023/24.

The Landholder owns 44.1 Ha of land located in the lower half of the Obi Obi Creek catchment (and a further 76 hectares in the Mooloolah catchment), where he runs over 100 cows and calves. The property has 2,200 metres of frontage to Obi Obi Creek, and currently the livestock have unrestricted access to the riparian zone.

Off stream watering, riparian fencing and weed control are all control measures that will be implemented throughout this multistage project. All of these measures are best practice for reducing the risk to water quality.

The Lower Obi Obi Creek catchment is characterized by moderate beef grazing (32%), with considerable areas of rural residential (53%) and conservation properties (15%) with good coverage of native vegetation including along watercourses. The Engle property is a high priority property based on its distance to Baroon Pocket Dam off take tower, land use, riparian health, and the landholder's readiness to implement projects. 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).

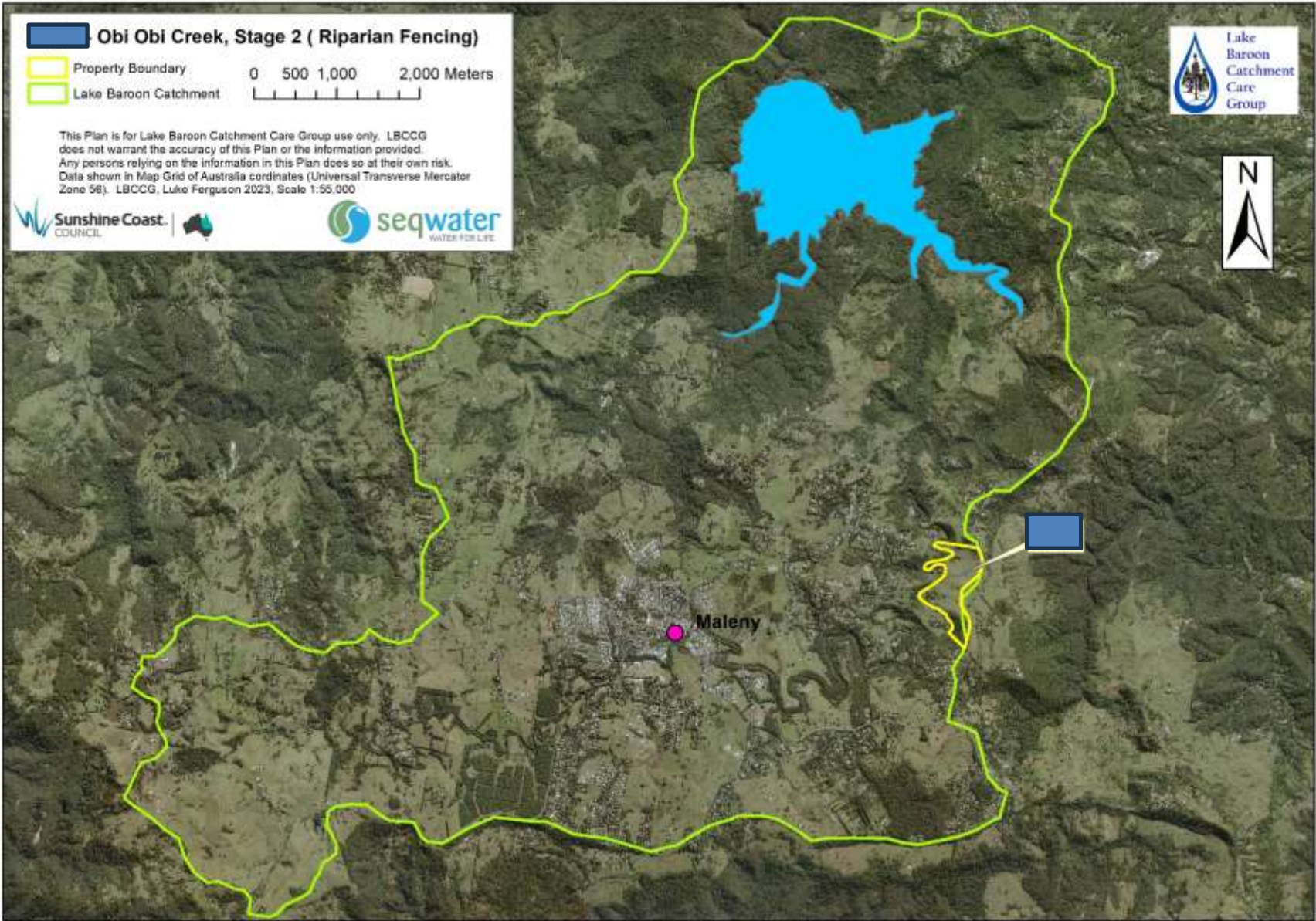
Maintaining water quality is critical to providing safe bulk drinking water for the population of South east Queensland. All of the raw water storages managed by Seqwater are located in catchments which are developed to varying extents and support active and growing communities, including important industrial 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

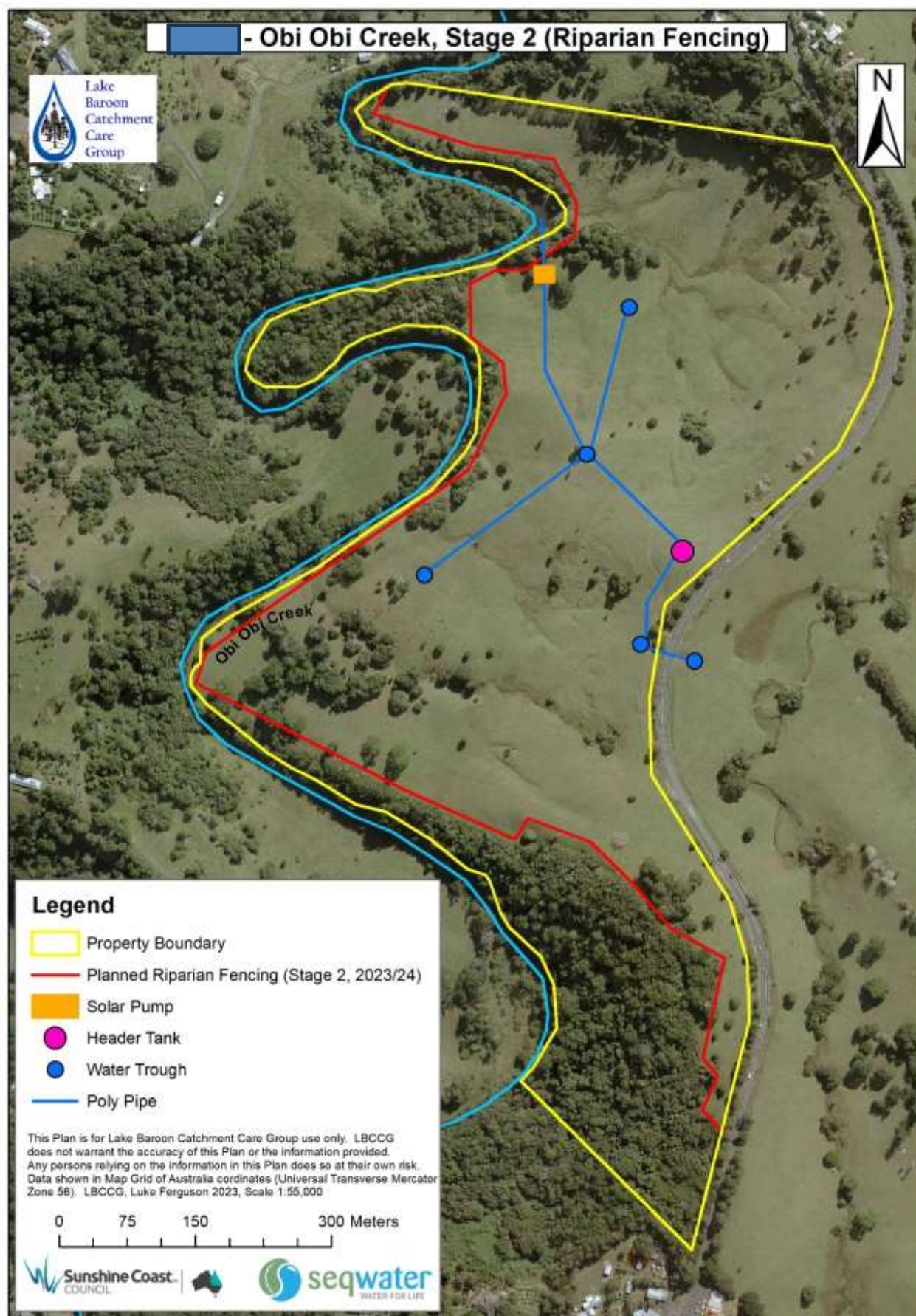
The landholder has owned the Obi Obi Creek property since 2001, prior to this, they managed the property for the Beacom sisters since 1980. The property has always been used for livestock grazing and stocking rates have been adjusted seasonally. Livestock have always relied on access to Obi Obi Creek 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.

With the lower Obi Obi Creek being primarily a grazing region, the priority action is to reduce livestock contact with natural water through riparian fencing, restoring riparian buffers, and providing alternative watering points away from the creek.

Project Location



Project Map



Project Plan

Project Plan Name	Obi Obi Creek Riparian Fencing & Off Stream Watering, Stage 2 (Engle)	
Site	Balmoral Ridge, QLD, 4552	
Project Start Date	August 2023	
Project End Date	June 2024	
Landholder details	Property owner / Manager	
	Contact Details	
	Real Property description	Lot 1 RP144490 Lot1 SP268257
	Property Size	44 hectares
	Land use	Cattle grazing (beef)
	Stock carried	100 cows plus calves
	Latitude/longitude	152.886 -26.753
	Water quality hazards present	1) Stock access to riparian zones 2) Poor riparian vegetation & groundcover 3) Moderate stream bank instability 4) Damage to existing native vegetation 5) Moderate weed coverage
Water Quality Risk (assessed according to <i>Scope of Works: Development of an implementation plan for the Baroon Pocket Catchment Water Quality Improvement Program</i>)		
Distance from Baroon Dam off take	Moderate Priority	Property is 2-5 km from off take
Prioritisation of land use	Moderate to High	Intensive beef grazing
Riparian condition	High Priority	Moderate riparian health – livestock have unrestricted access to Obi Obi Creek
Landholder readiness & willingness	High Confidence	High confidence – Completion of off stream watering system in Stage 1
Complimentary funding availability	Low Priority	Less likely to receive additional funding
Land management weightings	High to Very High Priority	Intensive grazing, no riparian fencing in place. Off-stream watering system installed, Stage 1
OVERALL PROJECT PRIORITY	HIGH PRIORITY	

Cash & in-kind contributions			
(Seqwater funding stream – Riparian Condition Improvement [RPI])			
Project Funding	Seqwater 2023-24	Agricultural Practice Improvement	\$ 57,840
Project Management	Seqwater 2023-24 Project Management Funding		\$ 26,000
Landholder contribution	Cash & In-kind		\$ 55,000
Other contributors	LBCCG Management Committee in-kind		\$ 1,516
TOTAL			\$ 140,356
Project Plan & Scope of Works			
Description of hazards on site and how they are to be addressed	Livestock access to 2.2 kilometres of Obi Obi Creek		Installation of off-stream watering system (Stage 1, 2022/23 - Completed) in conjunction with riparian fencing along Obi Obi Creek (Stage 2, 2023/24)
	Erosion and turbidity produced from livestock movement through Alcorn Creek		
	Very limited vegetative buffer between Obi Obi Creek and grazed paddocks		Remove reliance on natural streams for livestock water by installing alternative watering system (Stage 1 - Completed). Install riparian fencing to manage grazing in riparian zone and enhance the buffer to overland flow (Stage 2)
	Lack of vegetation diversity in riparian zone including 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		
	Impacted wildlife corridor		
Activities to be delivered as part of project & Schedule of works	1. Riparian Fencing	2,100 m, 6 gates	Sept 2023
	2. Internal property fencing	TBD (landholder responsibility)	June 2024
	4. Weed Management	Obi Obi Creek riparian zone (landholder responsibility)	June 2024
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 Falls Creek; and</i>	Improved riparian buffer in the lower Obi Obi Creek Catchment	Installation of off-stream watering reduces the time free ranging cattle spend in or immediately adjacent to watercourses. This shift assists the riparian buffer zone to trap and/or process sediment, nutrients and faecal material.	
	Reduced erosion of the bed and banks in the catchment of Obi Obi Creek	Riparian fencing of Obi Obi Creek and off-stream watering to allow the management of cattle in the riparian zone.	

<i>b. raw water intake at Lake Baroon</i>	reducing turbidity and sedimentation	
	Reduce pathogen delivery to waterways	Off stream watering, riparian fencing and livestock management in the riparian zone will prevent the direct faecal deposition (nutrients and pathogens) into the waterways and improve the riparian buffers ability to trap sediment, nutrients and pathogens.
	Improved aquatic habitats	A reduction in turbidity, sediments, nutrients and pathogens will improve water quality and contribute to improving in-stream biodiversity.
	Improved land management	Support Gordon Engle to improve management of livestock in riparian zones and environmentally sensitive areas.
	Increased awareness of water quality issues and causes	Utilise the Engle property as a demonstration site that displays the practical tools that landholders can incorporate on their land to help improve water quality.

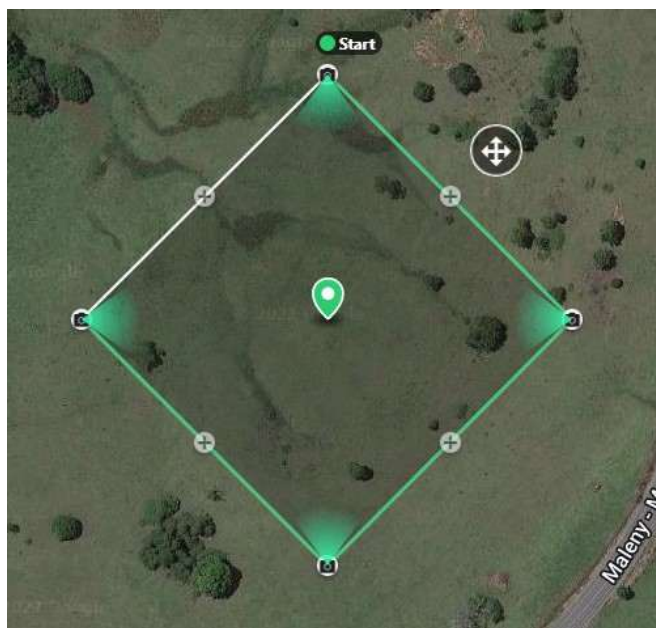
Monitoring

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

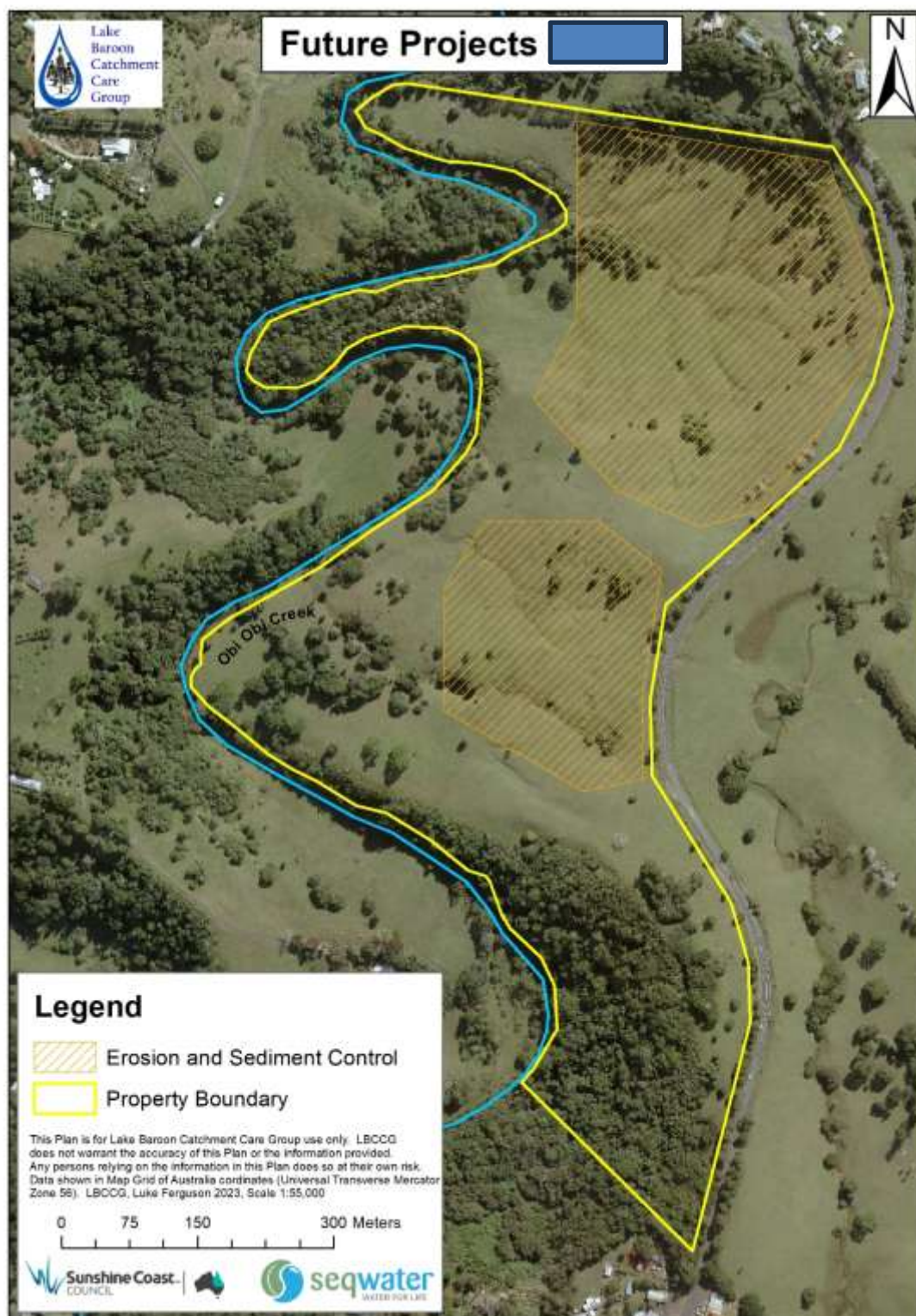


Above: An example of the mapping of the Engle property using the drone which will be used for monitoring the project. The picture on the left shows the drone area for the mapping of the site. The right-hand picture is an example of the photo monitoring that will be undertaken during the project.

Future Investment Options

Location	Future Work Options	Priority	Indicative Cost
Landslip zone, Obi Obi Creek	19 Hectares landslip stabilization (Approx. 500-1000 Hoops and Bunyas)	High	\$ 20,000*

*Funding through Erosion and Sediment Control Program. A time frame has not been allocated to this potential project.



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 2012¹).

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 2011²).

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 restore riparian buffers, 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 2010³).

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 (Keys 2009⁴).

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.

CBP2324-011 Obi Obi Creek, Stage 2 (Riparian Fencing)

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 (Keys 2009).

Presently the catchment is susceptible to a number of land use impacts (Traill, 2007⁵; Dunstan, 2007⁶) 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.

Lower Obi Obi Creek Sub-Catchment

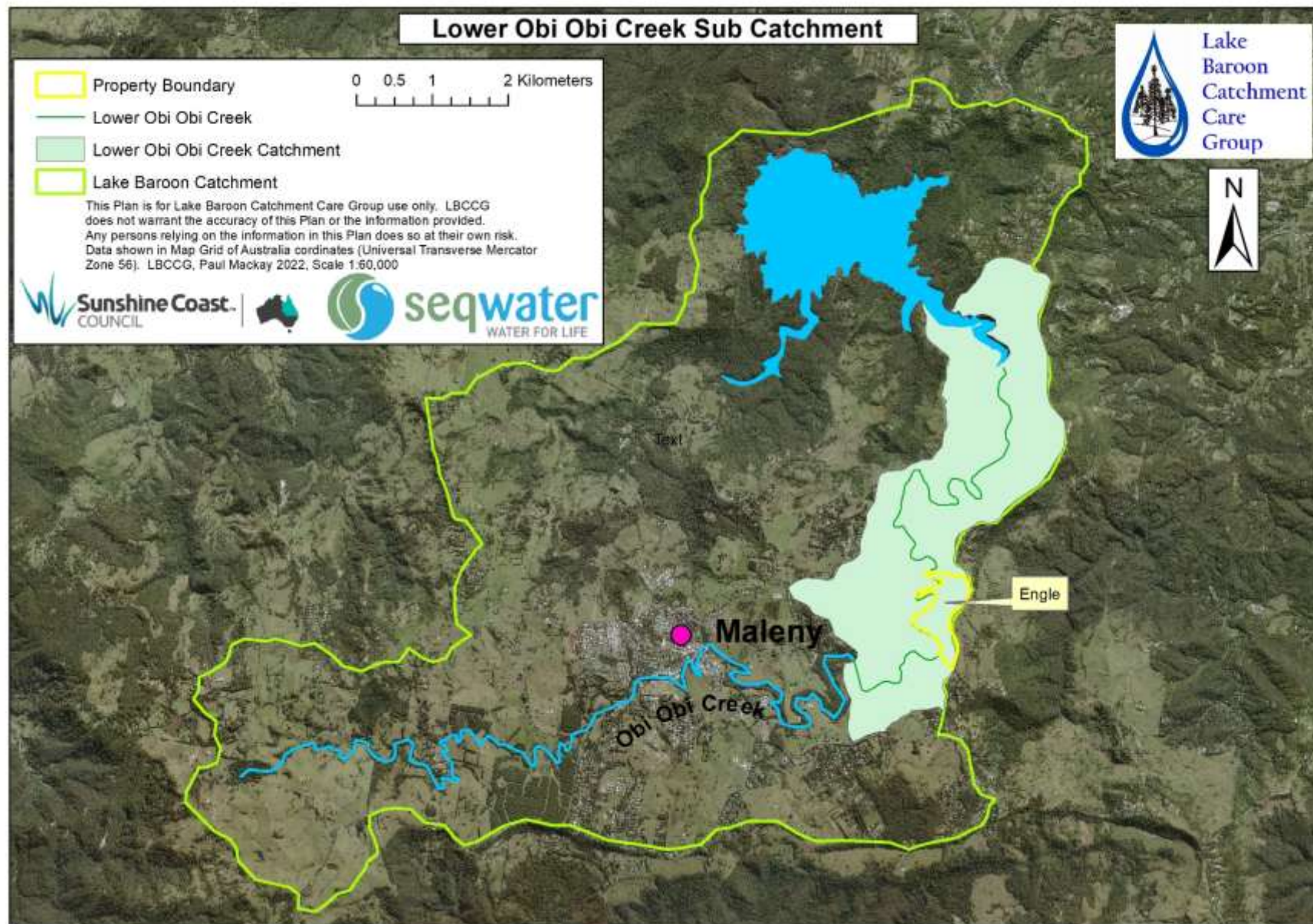
The Obi Obi Creek is the most significant watercourse in the Lake Baroon catchment, consisting of 71 km of waterway in a sub catchment of 2,880 ha. A mere 18% of the sub catchment is covered in vegetation, with much of the area significantly disturbed, mostly supporting beef or dairy cattle; but also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

The Lower Obi Obi Creek sub-catchment covers an area of approximately 935 Ha, with approximately 46 kilometres of waterways. The lower Obi is very different from the rest of Obi Obi Creek with a far greater percentage of rural residential and conservation properties. This is largely due to the unsuitability of the catchment for modern agriculture (steep and poorer soils). Most of the lower Obi Obi Creek has good riparian vegetation although much of this is impacted by environmental weeds. Only around 24% of the remaining riparian zones are still grazed so large projects such as this are important.

The Lake Baroon Annual Plan (2021/26) considers this part of the catchment as a moderate 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 lower Obi Obi Creek catchment supported beef cattle grazing which, along with the rural residential, likely yielded poor water quality results - high levels of nutrients (and likely pathogens).

⁵ Traill, C.B. 2007, State of the Lake Baroon Catchment, Volume 2: Appendices, AquaGen Water and Renewable Energy, Palmwoods

⁶ Dunstan, M 2007, Lake Baroon Catchment Implementation Plan, AquaGen Water & Renewable Energy, Palmwoods



Appendix 3 Project Activities

Riparian Fencing

The project will see the installation of 2.1 Km of riparian fencing along the 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. Where the terrain is excessively rocky or steep steel picket fencing will be installed.

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.

The 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 nutrients⁷.

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



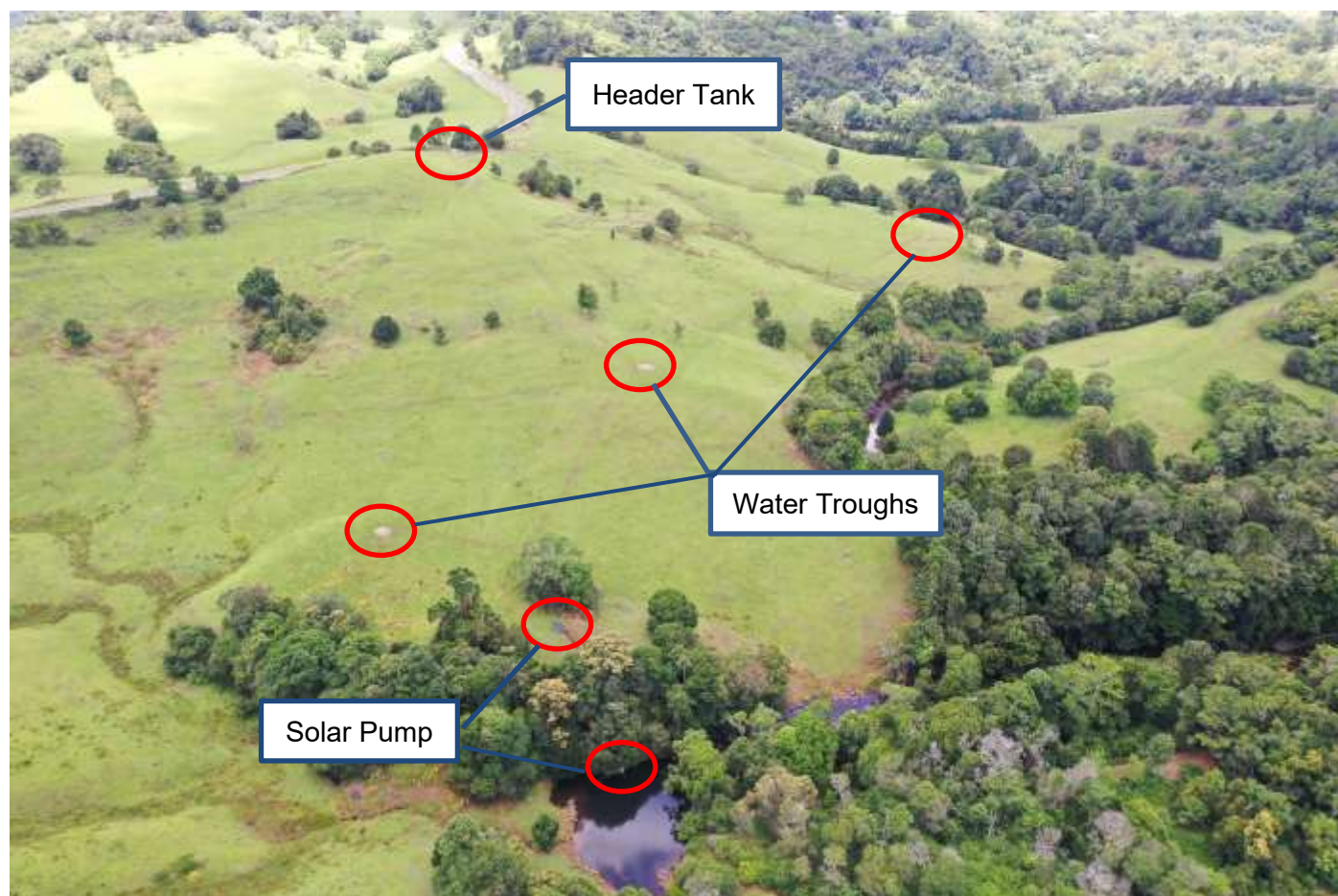
Above: Riparian fencing combined with off stream watering, delivered in Stage 1 (2022-23), will assist in limiting the time livestock spend in the riparian zone, decreasing the risk to water quality. Currently cattle are overgrazing the riparian zone and causing stream bank instability resulting in erosion and sediment loss.

Below: Shaded areas along Obi Obi Creek and tributaries have become poplar drinking areas with the cattle resulting in erosion and the destabilization of stream banks, as well as the direct deposition of faecal matter into the waterways.



Off stream water system (Stage 1, 2022-23)

Stage 1 of the Engle Project successfully delivered an extensive off-stream watering system. A solar unit was installed that pumps water from a reliable water hole on Obi Obi Creek to a header tank, situated centrally in the Engle property. From the tank, water is then gravity feed out to five troughs spread throughout the Engle property, via high pressure blue line 40 mm poly pipe. The water troughs will provide all water requirements of the cattle and as a result there will be no need for the cattle to have access to Obi Obi Creek for water, other than in emergency situations.



Above: The completed off stream watering system from stage 1, 2022-23. The red circles are highlighting the solar unit and pump, water troughs and header tank. The off stream water system will provide all of the necessary water for the livestock, once Obi Obi Creek is fenced off. The positioning of the troughs will also assist in spreading the grazing pressure over the paddock, which prevents livestock overgrazing and spending long periods of time in the riparian zone.



Above: Gordon Engle putting out mineral supplement to his breeding herd. Gordon regularly inspects his cattle and has an ongoing weed management program in his pastures and along the riparian areas of Obi Obi Creek. Cattle on the Engle farm are free to graze and move through the riparian areas as they please. Off stream watering and riparian fencing will improve the management of cattle in the riparian zone, decreasing the risk to water quality.

Below: Currently cattle have unrestricted access to the waterways, and as a result erosion and the destabilization of stream banks is occurring.



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).

In this project the landholder is responsible for all onsite weed management.



Above: Riparian vegetation on along the waterways on Engle block is impacted by woody weeds (primarily small leaf privet, lantana, wild tobacco, yellowberry and blackberry). Overgrazing of the riparian zones leaves the area prone to weed infestation.