

Lake Tuakitoto

Implementation Plan

Updated 7 January 2025

Acknowledgements

This plan has been developed through collaboration with mana whenua, stakeholders, and the community. Kā mihi nui to the following people for their contributions: Ruth Baldwin (Mana Whenua); Marc Schallenberg (Cawthron Institute); Simon Davies, Ben Cameron, Craig Simpson (Otago South River Care); Lilly Paterson (Clutha District Council); Nicole Foote (NZ Landcare Trust); Hannah Zwalue, Ben Davies, Craig Woodward, Marine Richardson (Department of Conservation); Ian Hadland (Fish & Game Otago); Jane Young (South Otago Forest & Bird); Joyce Beck (Kaitangata Promotions). This is a living document for the duration of the project and additional contributors may be added/ acknowledged. A summary of the changes made to the draft plan through this collaborative process can be found in Appendix 1.

1. Purpose

The purpose of this Implementation Plan is to provide clarity on the actions required to implement recommended management actions from the ecological assessment of Roto-Nui-a-Whatu / Lake Tuakitoto (hereon in referred to as Lake Tuakitoto). The actions were identified during consultation with partners/stakeholders and through the ecological assessment of Lake Tuakitoto¹. The intention is that the Implementation Plan will remain a living document, used to achieve two primary purposes:

1. To guide the development of workstream project plans
2. To use as a basis for discussion with mana whenua, key stakeholders, and community representatives

2. Context

In response to concerns about water quality, the 2017/18 Annual Plan provided for Otago Regional Council (ORC) staff to work with the local community to scope lake restoration works for Lake Tuakitoto. Engagement and consultation with the local community around Lake Tuakitoto was initiated as water quality was found to be degrading. Through ORC's State of Environment (SoE) monitoring it was identified that elevated levels of chlorophyll a, nitrates and phosphates are found within the lake, and the catchment has elevated levels of nitrate-nitrate nitrogen and E. coli.

The engagement and consultation process included the following steps:

- In April 2018, a workshop was held with the community which identified goals and values for the Lake Tuakitoto catchment. In June 2018, a second workshop was held where potential projects were identified at a high level following on from the first workshop.

- In early 2021, ORC staff prepared a draft outline management plan based on the above consultation feedback.
- In January 2022 a key stakeholder meeting for the Lake Tuakitoto catchment was held to discuss the draft outline management plan and feedback was provided. At this meeting stakeholders also had the opportunity to vote for the projects within the plan which they identified as being the highest priority for implementation.
- In January and February 2022 online consultation was held with the community so that they could vote on projects that they identified as being the highest priority for implementation. 59 people participated in this consultation exercise.
- The three projects that received the highest votes for implementation within the Lake Tuakitoto catchment were:
 - ▶ An Ecological Assessment of the lake and catchment;
 - ▶ Water Quality Data;
 - ▶ Hydrological Assessment.

The sum of \$100,000 has been provided for in the 2021-2031 Long Term Plan for the 2021/22 Financial Year for projects to improve biodiversity and water quality within the Lake Tuakitoto catchment. The sum of \$80,000 has been provided in 2022/2023 and \$80,000 in 2023/2024.

On 14 April 2022, report ENV2201² was presented to ORC's Environmental Implementation Committee where the proposed Management Plans including priority projects for implementation for Lake Tuakitoto were considered. The resolution made was that the Committee:

1. **Notes** this report.
2. **Approves** the initial management plan and ongoing development of management plans for Tomahawk Lagoon and Lake Tuakitoto catchments with their communities.
3. **Approves** commencement of project implementation.
4. **Notes** that project implementation will proceed this financial year, slightly accelerated for Tomahawk Lagoon, and as planned for Lake Tuakitoto.
5. **Notes** implementation in future years is dependent on Annual Plan decisions of Council and will be guided by the ecological assessments and priorities that arise through these.

Following the approval of the implementation of the initial management plan by the Implementation Committee:

- In April 2022, Otago Regional Council submitted a Request for Proposal (RFP) on the Government Tender Services (GETs) website for: "Lake Tuakitoto and Tomahawk Lagoon – Ecological Assessment".
- In June 2022, ORC awarded the contract to Cawthron Institute, who would deliver an ecological assessment for Lake Tuakitoto to identify and provide guidance on where action could be delivered for best investment and environmental outcomes.
- In March 2023, Cawthron Institute undertook a field study at Lake Tuakitoto.
- In July 2023, Cawthron Institute delivered a report¹ on the ecological assessment and potential management actions for Lake Tuakitoto, which incorporates historical and field study data.
- In July 2023, ORC shared this report with community representatives, mana whenua, and key stakeholders.

The ecological assessment identified several recommended management actions with the goal to enhance freshwater quality of Lake Tuakitoto and the wider catchment. These are summarised in Table 1.

Table 1 Summary of potential recommended management actions from the Ecological Assessment of Lake Tuakitoto.

Goal	Management Action	Priority
Reducing stream nutrient loads in inflows	Divert more flows from Lovells / Frasers Creek to drain to wetland to increase nutrient removal before entering Lake Tuakitoto	Highest
	Riparian enhancement and farm plans in Upper Lovells and Stony Creeks to reduce catchment nutrient losses from agricultural land and forestry	High
	Evaluate adding Stony Creek inflow to wetland diversion or realignment of diversion race bypassing the lake to the outlet channel	Medium
Improving kākahi recruitment	Monitoring of fish passage at outlet channel sill and Kaitangata Locks to assess passage and operational requirements	High
	Pest fish control to reduce perch populations and spawning, and enhance native fish that could serve as hosts for kākahi larvae	Medium
Controlling internal phosphorous loading	Applying phosphorous binding / capping agents (e.g., alum, Phoslock) to the lakebed to reduce phosphorous recycling	Trials needed
	Mechanical harvesting of macroalgal mats to reduce dissolved oxygen and pH variation that drive internal loads	Trials needed

In addition, modelling used in the 2015 ORC report ‘Groundwater Contamination Risk, Septic Tank Density and Distribution within Otago’ determined that the Inch Clutha had a medium level of contamination risk due to the possibility of failing septic tanks. The Lake Tuakitoto catchment provides an opportunity to pilot an Onsite Wastewater Management System education programme that could then be extended to the wider region.

To monitor long-term outcomes, ORC established water quality monitoring sites in Stony Creek and Frasers Stream in June 2023. These are sampled monthly along with the SoE sites.

3. Scope

The Implementation Plan sets out the outcomes, objectives, activities, deliverables, tasks for the implementation of the potential management actions listed in Table 1. It also identifies potential roles and responsibilities of mana whenua, key stakeholders, community groups, key risks, and mitigation strategies.

Lake Tuakitoto has multifaceted values amongst the community. These were taken into consideration in the preparation of this plan. Values include cultural and spiritual beliefs, water quality, flood protection, recreational access, hunting and fishing, and the importance of the area for native biodiversity.

The Implementation Plan covers the period from receipt of the ecological assessment from Cawthron Institute (July 2023). The date to which funding from the ORC Long-term and Annual plans is allocated for this project ends in June 2024, however a carry-over of funding into 2024/25 has been endorsed to allow appropriate timeframes for delivery.

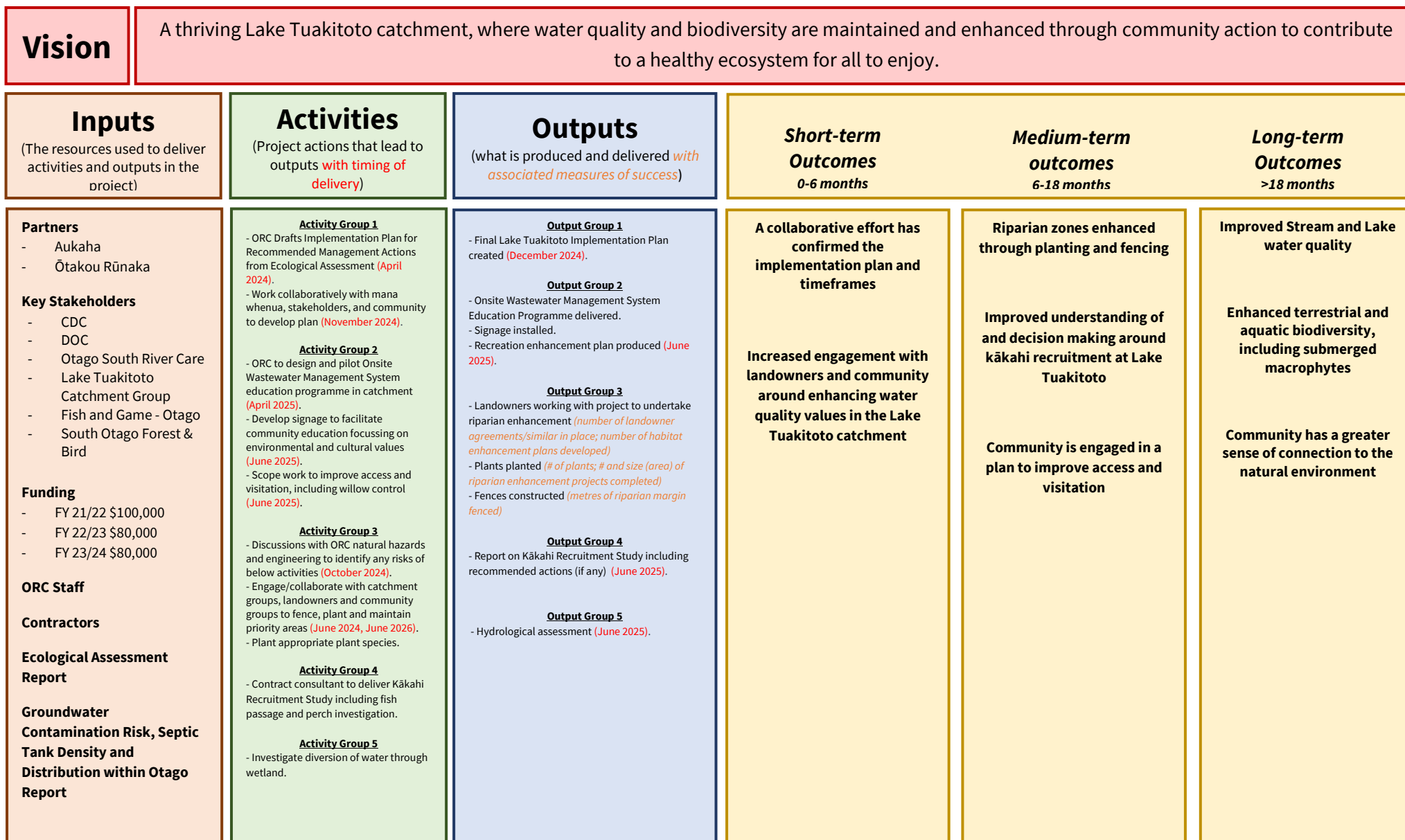
4. Structure of Plan

The Implementation Plan:

- i. Presents a logic model to conceptualise management action implementation and timeframes.
- ii. Defines potential roles and responsibilities of those involved in implementation.
- iii. Identifies risks to delivery and risk mitigations.



i. Implementation Programme



ii. Roles and Responsibilities

This project is a collaborative project between mana whenua, key stakeholders, community, and ORC. It is important to understand the roles that different parties could potentially have in delivery of the management actions for Lake Tuakitoto. These are summarised in Table 2.

Table 2 Potential roles for Mana whenua, ORC, stakeholders, community

Organisation/s	Potential roles
Mana whenua and Aukaha	Provide feedback on sign content. Advice on rongoā species to include in plantings. Check for significant cultural sites.
Otago Regional Council (ORC)	Project delivery and oversight. Deliver the Onsite Wastewater Management System Education pilot. Oversee the scoping of work to improve access and visitation. Identify natural hazards and risks of activities. Manage contractors. Sign production and install. Provide best practice advice to landowners. Work with OSRC to agree upon site selection criteria for fencing and planting.
Clutha District Council (CDC)	Feedback on works to improve access and visitation, particularly access from road. Provide input into Onsite Wastewater Management System Education pilot.
Community members	Attend planting days and other events. Feedback on works to improve access and visitation. Feedback on draft Onsite Wastewater Management System education pilot.
Department of Conservation (DOC)	Input on kākahi recruitment study. Feedback on works to improve access and visitation.
Fish and Game - Otago	Discuss options to control perch as part of wider fish management plan. Feedback on works to improve access and visitation. Carry out fish surveys.
Kaitangata Promotions	Feedback on works to improve access and visitation.
Otago South River Care Group/ Lake Tuakitoto Catchment Group	Delivery of fencing and planting activities, including landowner agreements that specify who's responsible for plant maintenance. Support with landowner engagement. Feedback on works to improve access and visitation.
South Otago Forest and Bird	Engage in project and identify opportunities. Advertise planting days. Feedback on works to improve access and visitation.

iii. Risks and Mitigations

There are some potential risks in delivery of management actions at Lake Tuakitoto. Identifying these risks and potential mitigations is a useful first step in minimising these risks.

Table 3 Risks and mitigations

Activity	Risk	Likelihood	Impact	Mitigations
Undertake fencing and planting in priority areas	Lack of buy-in from landowners	Low	High	Direct fund existing, well-established catchment groups to plan and deliver work. Provide co-funding incentives.
Onsite Wastewater Management System education pilot	Low levels of participation Messaging is ineffective.	Medium	Low	Provide incentives for initial participation. Use plain language with engaging messaging. Get feedback from community members on draft programme.
Delivery of Kākahi Recruitment Study and Hydrological assessment	Contractors unavailable	Medium	High	Prioritise engagement of contractors.

5. Budget

Note that while the total spend remains the same, the annual budget allocations differ to allow appropriate timeframes for delivery.

Activity Group	Activities	2022/23		2023/24		2024/25		Total - Budget	Total - Actual	
		Budget	Actual	Budget	Actual	Budget	Actual			
1	Ecological Assessment and consultation	Cawthron Institute Contract	56,125.50	56,125.50				56,125.50	56,125.50	
		May 2023 Open Day Event and Workshop	250.00	205.53				205.53	205.53	
		April 2023 Robson Lagoon Event	450.00	423.53				423.53	423.53	
2	Education and engagement	ORC Environmental Monitoring			5,000.00	5,000.00	5,000.00	10,000.00	5,000.00	
		Onsite Wastewater Management System education pilot			750.00			750.00	0.00	
		Signage - production and installation					2,450.00	2,450.00	0.00	
		Contractor - Scope works to improve access and visitation			5,000.00			5,000.00	0.00	
3	Enhancing riparian habitat	Fencing and planting			20,000.00		90,045.44	110,000.00	110,045.44	110,000.00
4	Investigate fish passages	Contractor - Kākahi Recruitment Study			30,000.00			30,000.00	0.00	
5	Investigate stream diversion	Contractor - Hydrological assessment			45,000.00			45,000.00	0.00	
Total			\$ 56,825.50	\$ 56,754.56	\$105,750.00	\$ 5,000.00	\$ 97,495.44	\$110,000.00	\$ 260,000.00	\$ 171,754.56

6. References

1. Kelly DJ, Schallenberg M, Waters S. 2023. Ecological assessment of Lake Tuakitoto and Tomahawk Lagoon and options for lake rehabilitation. Nelson: Cawthron Institute. Cawthron Report 3947. Prepared for Otago Regional Council.
2. Otago Regional Council. 2022. Implementation Committee Agenda – 14 April 2022 Report No. ENV2201. <https://www.orc.govt.nz/news-and-events/events/2022/april/implementation-committee-14-april>
3. Otago Regional Council. 2015. Groundwater Contamination Risk, Septic Tank Density and Distribution within Otago. <https://www.orc.govt.nz/media/1654/groundwater-contamination-risk.pdf>

Appendices

Appendix 1. Summary of changes from feedback on draft Implementation Plan

This document summarises the feedback and resulting amendments to the Lake Tuakitoto Implementation Plan. Partners and stakeholders were consulted in November/December 2024. Note that the Implementation Plan is a living document.

Amendment made	Reasons
Added 'To monitor long-term outcomes, ORC established water quality monitoring sites in Stony Creek and Frasers Stream in June 2023. These are sampled monthly along with the State of the Environment sites in the catchment'.	This is the key indicator of success for the highest priority management action – to reduce stream nutrient loads in inflows.
Added 'Enhanced terrestrial and aquatic biodiversity, including submerged macrophytes to the long-term outcomes.	To acknowledge that the Long Term Plan focusses on degraded water bodies, the Vision is catchment-wide, and the values of the community are multi-faceted. Improving water quality will improve fisheries. Planting will increase terrestrial biodiversity. An increase in submerged macrophytes will provide more resilience to the lake.
Noted that Lake Tuakitoto is highly valued, and the multifaceted values were taken into consideration in the preparation of the plan.	Values include cultural and spiritual beliefs, flood protection, recreational access, hunting and fishing, and native biodiversity, not just water quality.
<p>Role of Clutha District Council (CDC):</p> <p>Removed 'Permission for signage installation'.</p> <p>Added 'Provide input into Onsite Wastewater Management System Education pilot.</p> <p>Added 'particularly access from road' to 'Feedback on works to improve access and visitation'.</p>	<p>Location of sign is on ORC land.</p> <p>There is an opportunity to collaborate on this activity.</p> <p>Consultation highlighted that the safety of access from the road to the carpark is of concern to users. The CDC roading team may be able to help scope this element.</p>
Added 'Recreation enhancement plan produced (due June 2025)' to Output Group 2.	A recreation enhancement plan will ensure community buy-in in the long term.
Add 'including willow control' to the 'scoping of work to improve access and visitation'	Willows were raised as a potential community issue. Feasibility and impact of willow control needs to be considered.
Added 'agree upon site selection criteria for fencing and planting' to the roles of ORC and Otago South River Care (OSRC) .	To ensure funds and support are utilised transparently and fairly in a way that maximises impact.

Added 'including landowner agreements that specify who's responsible for plant maintenance' to OSRC's role of delivering fencing and planting activities.	Plant maintenance is an important factor in survival rates. It needs to be clear who is accountable for this.
Added 'Check for cultural sites that may be positively or negatively impacted by restoration activities' to Mana whenua and Aukaha potential roles.	Knowledge of sites of importance to Māori will be added to, and influence, the prioritisation of habitat restoration.
Changed 'Contract to provide content for signage' to 'provide feedback on sign content' to Mana whenua and Aukaha potential roles.	Capacity uncertain. Mana whenua recently produced videos about the important history of local Māori in the area.
Added 'Get feedback from community members on draft programme' to the Onsite Wastewater Management System education pilot.	To increase the level of participation and engagement.
Added 'Provide feedback on signage' to the potential roles for OSRC	Expressed interest in helping with this activity to ensure that signage is accurate, engaging and highlights the community's effort.
Changed 'Fish Passage Study' to 'Kākahi Recruitment Study'.	To focus this activity on increasing the biomass of kākahi, as this will provide more resilience for the lake. Native fish are vital for the life cycle of kākahi. This study will focus on what interruptions are occurring in the kākahi lifecycle, and what can be done about them. This may include obstacles to fish passage, and perch control.
Added 'Input on kākahi recruitment study' to Department of Conservation (DOC) role.	DOC can provide technical advice.
Role of Fish and Game - Otago	
Added 'Feedback on works to improve access and visitation'	Game bird hunters are big recreational users of the lake for three months of the year.
Changed 'Discuss options to control perch as part of wider fish management plan' to 'Input into kākahi recruitment study'.	The feasibility of perch control needs to be considered if it's a recommended management action from the kākahi recruitment study.
Added 'Carry out fish surveys' to potential role.	This information could be helpful for the kākahi recruitment study.
Changed 'Access and visitation improved' to 'Community is engaged in a plan to improve access and visitation' in the Medium-term outcomes	A collaborative project with recreational users (current and potential) will give the community a longer-term 'master-plan' to aim for.