



**Whakaora Te Waihora Annual Report
2019/2020
*WEB VERSION***



Executive Summary

The Whakaora Te Waihora programme successfully delivered the majority of projects in the 2019/2020 work plan (Figure 1), and ended the financial year within a -12.2% variance of the budget (Figure 2). This underspend was mainly because: for the trial establishment of macrophyte beds no planting tasks could progress due to COVID-19; and, for the Whakaora Te Ahuriri project costs for supervising the planting phase and project management were less than expected, and savings had been made on the costs for the engineering and earthworks.

In 2019/2020, the programme encompassed 10 projects that spanned six work packages.

- For the **hui with stakeholders to discuss the updated nutrient model for Te Waihora**, and scenarios for in-lake activities, the hui was convened by Te Taumutu Rūnanga, and GEOKEM undertook a literature review of options to reduce the legacy phosphorus in Te Waihora.
- For the **trial establishment of macrophyte beds and artificial habitat creation**, it was not possible to translocate the water plant *kōrepo/Ruppia megacarpa* or undertake more planting because of the impact of COVID-19, and the wave barrier and floating wetlands needed to be removed because they were breaking down due to the strong wind and wave action on the lake.
- For the **water monitoring programme**, monthly monitoring was completed.
- For the **Whakaora Te Ahuriri project**, the construction phase was completed (120,000 plants installed, and the wetland was connected to the Huritini/Halswell River), the Mātauranga Māori monitoring programme progressed, and there were media releases and one event. The commencement of the applied research methodology was postponed so that the constructed wetland can fully establish before monitoring begins, and the Kids Discovery Plant-out events with schools were postponed due to the impacts of COVID-19.
- For the **maintenance of plantings at Ahuriri Lagoon**, sites were maintained that contribute to achieving the vision of Te Mahere Whakahaumanu o Ahuriri/Ahuriri Lagoon Restoration Plan.
- For the **Greenpark wetland restoration**, a feasibility study for a constructed wetland at the end of Embankment Road was completed and a concept plan was drafted.
- For the **Weed Strikeforce**, despite the impacts of COVID-19 all targets for 2019/2020 were achieved with willows and weeds controlled over 817.53 hectares in 12 management blocks, and outcomes were noted such as the return of native plant and animal species.
- For the **Whakaora Te Waikēkēwai project** (in partnership with Te Taumutu Rūnanga), to allow restoration works for Papatahōra (a tributary of Te Waikēkēwai/Waikēkēwai Stream) in 2020/2021, in 2019/2020 preparation works were completed (sediment survey, aquatic survey, and the translocation of harakeke/flax blocking the waterflow flow) and the resource consent applications are almost complete.
- For the **maintenance of priority, riparian sites**, the spring 2019 maintenance was conducted, however, only six sites could be maintained for the autumn 2020 maintenance due to the impacts of COVID-19 on contractor staff capacity.
- For the **Kids Discovery Plant-out**, three school events were held, but further planned events were postponed to 2020/2021 due to the impact of COVID-19.

Programme management

- A robust programme management platform was maintained (managing specific projects, finances, relationships, Health & Safety, risks, administration, procurement, contracting, and reporting).
- For Health & Safety: the programme transitioned the Whakaora Te Waihora Health & Safety Management System to a new structure; there were no incidents or near misses; and, three new hazards were identified and mitigated.
- For risk management: the programme transitioned its risk management from the Risk Manager on-line tool to a risk register table; added two new risks to the Whakaora Te Waihora Risk Register (COVID-19 and installed structures/fixtures/equipment); and, during the March – May 2020 COVID-19 lockdown, programme staff,
 - Worked with project partners and contractors to identify what and when works could be progressed under the different Alert Levels, and to ensure the extra Health & Safety assurances were completed and approved to allow works to progress; and,
 - Were part of Environment Canterbury's Crisis Management Team.

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Further information: For further information on the Whakaora Te Waihora programme, please contact the Whakaora Te Waihora Programme Lead, David Murphy, at david.murphy@ecan.govt.nz.

Cover image: Kotuku/white heron at Lakeside Domain photographed by Stephen Howard. (This photo was taken specifically for the cover of this report).

Purpose

The purpose of this Annual Report is to provide results and a programme update against the Annual Work Plan for the financial year ending 30 June 2020.

Context

Whakaora Te Waihora is an operational programme of the Te Waihora Co-Governance Group, which includes Te Rūnanga o Ngāi Tahu, Environment Canterbury, Selwyn District Council, Christchurch City Council, and the Department of Conservation.

The programme is a shared commitment to the restoration and rejuvenation of the mauri and ecosystem health of Te Waihora/Lake Ellesmere. The Joint Cultural and Ecological Restoration Plan was approved by the Te Waihora Co-Governance Group on 9 December 2011. The overall long-term aims of the plan are to:

- Accelerate the restoration of ecosystem health of a significant wetland, notable for its outstanding wildlife and native vegetation values.
- Restore and enhance specific cultural sites and mahinga kai.
- Protect and restore the lake margin wetland habitats, existing indigenous vegetation and wildlife and restoration of specific lowland tributary streams and riparian habitats.
- Improve lake and catchment management practices by focusing on sustainable land use and drainage practices within the catchment.
- Establish a robust monitoring and investigations programme that ensures the lake response to management is understood and management activities are adapted accordingly.

All outcomes of Whakaora Te Waihora will be achieved within the context of “Ki Uta Ki Tai” (“Mountains to the Sea”), which is a philosophy that reflects the Ngāi Tahu view of environmental resource management through the concept of kaitiakitanga (guardianship) from the mountains to the sea.

All projects/works in this Annual Report correspond to the ‘work packages’ identified for the programme’s Phase two, which are:

1. Reducing the legacy Phosphorus and sediment in Te Waihora.
2. Major water quality improvement of Te Waihora.
3. Transforming the lake shore to wetlands.
4. Enhancing the riparian linkages from the catchment to the lake shore.
5. Te Waihora established as a centre for education and research
6. Mahinga kai values will be restored in Te Waihora. This ‘work package’ informs all the others, where most projects also contributed to this work package (such as the Whakaora Te Ahuriri project, Whakaora Te Waikēkēwai project etc.).

Progress

Figure 1. Programme Gantt chart for 2019/2020.

Colour-key to status

On track	Ahead of schedule	Behind schedule
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Shaded cells symbolise months when work is scheduled

WORK PACKAGE	FOCUSSED PROJECTS	PROJECT	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	STATUS	
1. Reducing the legacy Phosphorus and sediment in Te Waihora	Research options	Hui with stakeholders to discuss the updated nutrient model for Te Waihora, and scenarios for in-lake activities.													Hui convened by Te Taumutu Rūnanga to discuss the scenarios for in-lake activities. Following this hui, the consultant GEOKEM undertook a literature review of options to reduce the legacy phosphorus in Te Waihora.	
	2. Major water quality improvement of Te Waihora	Macrophyte establishment	Trial establishment of macrophyte beds and artificial habitat creation.													Works partially POSTPONED. Due to COVID-19 impacts, there was inadequate time to translocate kōrepō/ <i>Ruppia megacarpa</i> into sheltered areas in 2019/2020. Wave barrier and floating wetlands removed.
3. Transforming the lake shore to wetlands	Restoration and natural regeneration of wetlands	Water monitoring programme.													Monthly monitoring completed.	
		Whakaora Te Ahuriri (the Restoration of Ahuriri): Constructing a wetland to attenuate nutrients and sediment, and improve biodiversity and mahinga kai, in Ahuriri Lagoon.														Construction phase completed with engineering and earthworks completed, 124,000 plants installed, and wetland now connected to the Huritini/Halswell River. Some activities (such as the Kids Discovery Plantout and the installation of the in-field monitoring equipment) were POSTPONED to 2020/2021. See page 13 for the project's Gantt chart.
		Maintenance of plantings at Ahuriri Lagoon.														Maintenance work completed for 2019/2020.
	Land management	Greenpark wetland restoration.													A feasibility study for a constructed wetland at the end of Embankment Road was completed and a concept plan was drafted.	
4. Enhancing the riparian linkages from the catchment to the lake shore	Land management	Weed Strikeforce (willow and weed control): Co-funded by Environment Canterbury's Regional Flagships, Whakaora Te Waihora, and the Department of Conservation.													All targets willow and weed control targets met for 12 management blocks around Te Waihora/Lake Ellesmere. No impact on delivery from COVID-19, as work was ahead of schedule before the lockdown began.	
	Restoration and natural regeneration of riparian margin	Whakaora Te Waikēkēwai (the Restoration of Waikēkēwai Stream): Working to achieve the vision in 'Te Waikēkēwai Stream Restoration and Rehabilitation report' (approved by Te Taumutu Rūnanga).													To allow restoration works for Papatahōra (a tributary of Te Waikēkēwai/Waikēkēwai Stream) in 2020/2021, in 2019/2020 preparation works were completed (sediment survey, aquatic survey, and the translocation of harakeke/flax blocking the waterflow) and the resource consent applications are almost complete.	
5. Te Waihora established as a centre for education and research	Targeted riparian margin planting	Maintenance of existing planted, riparian sites.													Spring 2019 maintenance conducted. However, only six sites could be maintained for the autumn 2020 maintenance due to the impacts of COVID-19 on contractor staff capacity.	
	School and tertiary engagement projects	Kids Discovery Plant-out.													Three school events were held. Further planned events were postponed to 2020/2021 due to the impact of COVID-19.	
		Management and ongoing support of the WTW programme of activities and associated relationships and accountability.													Monthly tasks completed for programme management, which managed: specific projects, finances, relationships, Health & Safety, risks (including the COVID-19 response), administration, procurement, contracting (there are 29 procurements in progress), and reporting.	

Financial Report

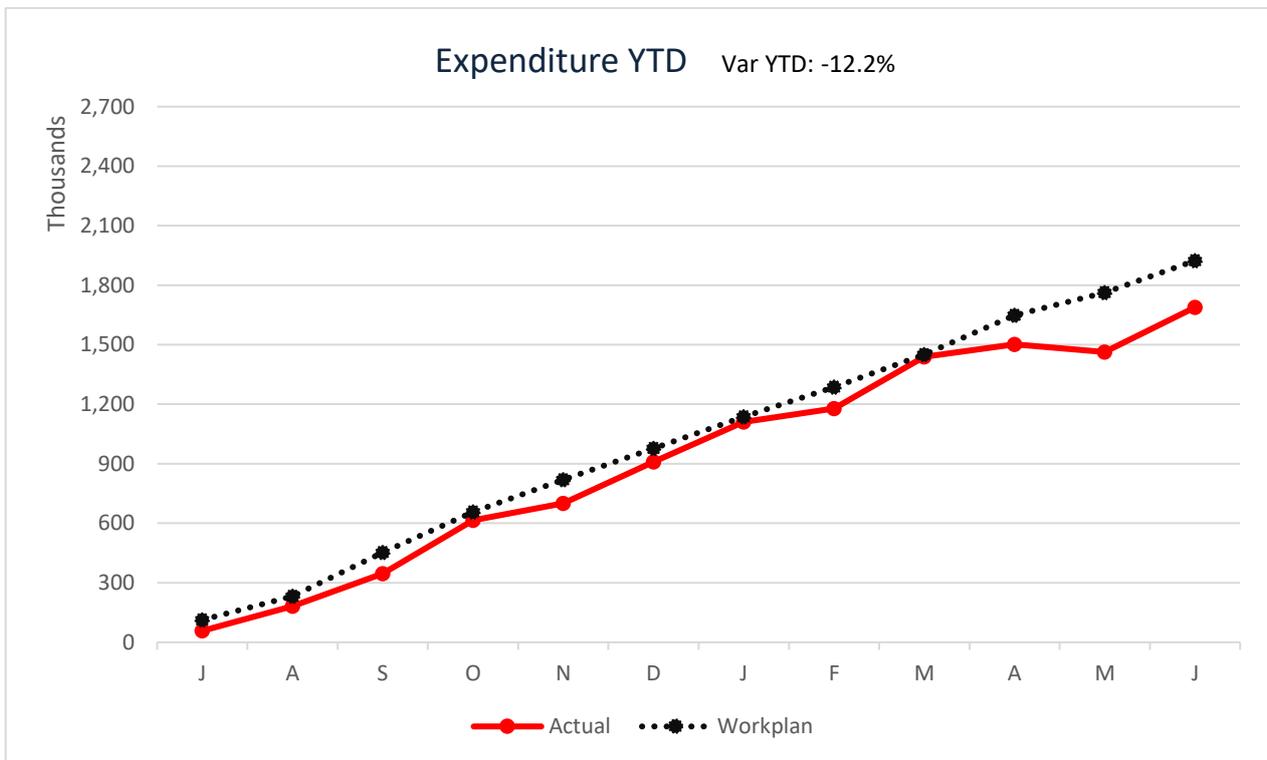


Figure 2. Financial performance of the Whakaora Te Waihora programme in 2019/2020.

Commentary on Expenditure

Total expenditure for the year 2019/2020 was \$1,688,264. This was a -12.2% variance when compared to the workplan budget of \$1,923,631. This underspend was mainly because: for the trial establishment of macrophyte beds no planting tasks could progress due to COVID-19; and, for the Whakaora Te Ahuriri project costs for supervising the planting phase and project management costs were less than expected, and savings had been made on the costs for the engineering and earthworks.

Project Reports

Project:
Hui with stakeholders to discuss the updated nutrient model for Te Waihora, and scenarios for in-lake activities.

Co-Governance work package:
Reducing the legacy Phosphorus and sediment in Te Waihora.

Management & Funding

Project lead:
Te Taumutu Rūnanga and Environment Canterbury.

Funder:
Environment Canterbury.

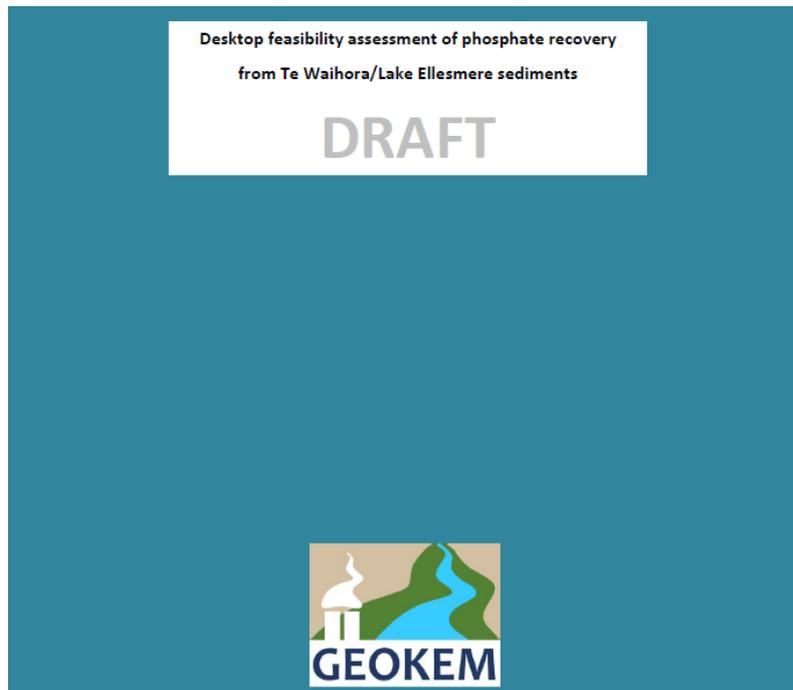


Figure 3. The cover of the draft report for the desktop feasibility assessment of phosphate recovery from Te Waihora/Lake Ellesmere sediments.

Project Report

Project purpose: To identify and trial options to remove legacy phosphorus from the lake-bed.

Measure of success in 2019/2020: Hui held to discuss the updated nutrient model for Te Waihora, and scenarios for in-lake activities; Hui held to present the modelled results of scenarios; Priority options selected by Co-Governors; and, investigations into priority options commenced.

Report on activities in 2019/2020:

- Te Taumutu Rūnanga led a hui with invited participants to discuss the scenarios for in-lake activities, which was convened on 5 July 2019.
- Using scenarios identified in the hui, GEOKEM were contracted to undertake a desktop feasibility assessment of phosphate recovery from Te Waihora/Lake Ellesmere sediments, and submitted the draft report for feedback (Figure 3).

Status: Ongoing.

Plan for 2020/2021: Review the desktop feasibility assessment of phosphate recovery from Te Waihora/Lake Ellesmere sediments, and identify if there are any feasible options that could be progressed as a trial.

Project:
**Trial establishment
of macrophyte beds.**

**Co-Governance work
package:**

Major water quality
improvement of Te Waihora.

Management & Funding

Project lead:
NIWA.

Funder:
Environment Canterbury.



Figure 4. The wave barrier being winched ashore.



Figure 5. Decoupled logs being lifted ashore.

Project Report

Project purpose: To trial methods to re-establish macrophyte beds in Te Waihora/Lake Ellesmere, in order to improve water quality, fish habitat, and mahinga kai values.

Measure of success in 2019/2020: Kōrepo/*Ruppia megacarpa* successfully translocated to the culture facility; Culture facility maintained; and, existing macrophytes planted behind the remaining wave barrier and at Overton's Bay.

Report on activities in 2019/2020:

- The timing of the COVID-19 lockdown prevented the translocation of Kōrepo/*Ruppia megacarpa*.
- In February 2020 a report was received that the floating wetland, which is anchored behind the wave-barrier, had started to disintegrate, and chunks of material (a recycled polyethylene terephthalate/PET, a plastic) were floating in the water and washed up on shore. The Harbourmaster was notified and a hazard notice was placed on the Environment Canterbury website; NIWA quickly responded to remove the large pieces of floating material and three out of the six floating wetland units; and, a plan is in place to remove the remaining three wetland units.
- In June 2020 annual maintenance of the wave-barrier identified that the metal shackles anchoring the wave-barrier to the lake-bed were very worn and at risk of breaking. Given the scenario that the wave-barrier would form a significant hazard if it broke free, and the prohibitive costs of repairing the structure, the decision was made to remove the structure. Over 23-25 June 2020 the wave barrier was removed (Figures 4 and 5). Although a successful planting of macrophytes behind the wave-barrier was not achieved; the structure lasted longer than anticipated; the wear of the metal shackles confirmed the power of the natural elements on Te Waihora; and, it had already been planned that future planting trials would be focussed in the natural shelter of nearby Overton's Bay.

Status: Not completed.

Plan for 2020/2021: Translocate kōrepo/*Ruppia megacarpa* to the culture facility and grow plants for installation in the 2021/2022 year; maintenance of existing plants in the culture facility, and a further trial planting of these plants in the naturally sheltered site of Overton's Bay.

Project:
Water monitoring programme.

Co-Governance work package:
Major water quality improvement of Te Waihora.

Management & Funding

Project lead:
Environment Canterbury (Science).

Funder:
Environment Canterbury.



Figure 6. Environment Canterbury staff undertaking water sampling.

Project Report

Project purpose: To monitor the water quality of Te Waihora/Lake Ellesmere.

Measure of success in 2019/2020: Environmental monitoring maintained (i.e. 12 water level recorders, 14 sites where stream ecosystem health is measured, 13 water quality monitoring sites, and two real-time stations in the Lake); and, accurate data collated, building information to feed into long term planning.

Report on activities in 2019/2020:

- Monthly water monitoring activities were completed (Figure 6).

Status: Ongoing.

Plan for 2020/2021: Maintain works for water quality monitoring, lake opening monitoring including water quality, and hydrology.

Project:
Whakaora Te Ahuriri.

Co-Governance work package:

Transforming the lake shore to wetlands.

Management & Funding

Project lead:

Environment Canterbury.

Funder:

Environment Canterbury, the Government's Freshwater Improvement Fund, and NIWA (for applied research).



Figure 7. The completed Whakaora Te Ahuriri constructed wetland.

Project Report

Project purpose: To develop a constructed wetland at Ahuriri Lagoon to improve water quality, mahinga kai, and biodiversity values.

Measure of success in 2019/2020: Installation of plants completed; Kids Discovery Plant-out plantings completed; annual report for Mātauranga Māori monitoring; annual report for applied research; field day held; media releases; and, three hui for the Ahuriri Lagoon Steering Group.

Report on activities in 2019/2020:

- The project has achieved its key milestones for 2019/2020 (Figure 8) within a -21% variation of the budget (Figure 9). This underspend was because certain works (e.g. Kids Discovery Plant-out, field days) were postponed because of the timing of the COVID-19 lockdown.
- **Planting:** The installation of 40,000 terrestrial plants, and 80,000 aquatic plants was completed (Figures 10 and 11). The 2,000 remaining plants are to be planted by schools in spring 2020, with some additional infill planting in July 2020. There has been excellent growth from the aquatic plants (Figure 12), and there are many birds using the site such as herons, royal spoonbills/kōtuku ngutupapa, and scaup/papango (Figure 13).
- **Engineering and earthworks:** The consultant designer inspected the works on 18 October 2019 and issued a certificate of practical completion, with minor outstanding items to be completed. In May 2020 the final earthworks that connected the Whakaora Te Ahuriri constructed wetland to the Huritini/Halswell River, making the constructed wetland operational (Figures 7 and 14).
- **Mātauranga Māori monitoring programme:** Two monitoring visits were undertaken with consultants and rūnanga representatives – one on 11 October 2019 during the construction phase (Figure 15), and the other on 16-17 June 2020 after construction.
- **Applied research methodology:** The commencement of the applied research methodology was postponed so that the constructed wetland can fully establish before monitoring begins (of the water quality entering and leaving the wetland).
- **Communications:** An event for the installation of the first plants was held on 2 September 2019 and was well attended by Co-Governors, rūnanga and community representatives, contractors, and staff (Figure 16). There were also three media releases (<https://tewaihora.org/ourstories/>); an article in the May/June 2020 issue of the Water Journal (<https://www.waternz.org.nz/214>); and periodic drone footage on the project's website (<https://tewaihora.org/whakaora-te-ahuriri/>).

Status: Construction completed, and maintenance and monitoring are ongoing.

Plan for 2020/2021: Maintain planting and Mātauranga Māori monitoring; initiate the applied research methodology; begin the Kids Discovery Plant-out activities; and, hold field days.

Colour-key to status

On track Ahead of schedule Behind schedule Shaded cells symbolise months when work is scheduled

OBJECTIVE	WORK	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	STATUS
CONSENTS	Resource consents assessed.	Shaded	Completed.											
INVESTIGATIONS	Archaeological monitoring of engineering and earthworks.	Shaded	Completed.											
ENGINEERING & EARTHWORKS	Retain consultant to provide design advice.	Shaded	Completed.											
	Undertake engineering and earthworks.	Shaded	Completed.											
PLANTING	Site prepared.	Shaded	Completed.											
	Aquatic and terrestrial plants sourced/grown.	Shaded	Completed.											
	Terrestrial plants installed.	Shaded	Completed.											
	Aquatic plants installed.	Shaded	Completed.											
	Terrestrial plants maintained and aquatic plants monitored.	Shaded	Completed.											
	Engage a contractor to supervise planting.	Shaded	Completed.											
MĀTAURANGA MĀORI	Retain consultant to provide advice.	Shaded	Completed.											
	Deliver Mātauranga Māori monitoring programme.	Shaded	Completed.											
APPLIED RESEARCH	Deploy in-field measuring equipment.	Shaded	POSTPONED. Will be carried over into 2020/2021.											
	Monthly data collection and analysis.	Shaded	POSTPONED. Will be carried over into 2020/2021.											
COMMUNICATIONS	Drone footage.	Shaded	Completed.											
	Create permanent signage at Ahuriri site.	Shaded	POSTPONED. Will be carried over into 2020/2021.											
	Deliver regular information / stories to project partners.	Shaded	Completed.											
	Media releases.	Shaded	Completed.											
	Field-day stakeholder session.	Shaded	POSTPONED. Will be carried over into 2020/2021.											
COMMUNITY ENGAGEMENT	Meetings of the Ahuriri Lagoon Steering Group.	Shaded	Completed. However, a meeting was postponed due to the impacts of COVID-19.											
	Kids Discovery Plant-out.	Shaded	POSTPONED. Will be carried over into 2020/2021.											

Figure 8. The Whakaora Te Ahuriri project Gantt chart for 2019/2020.

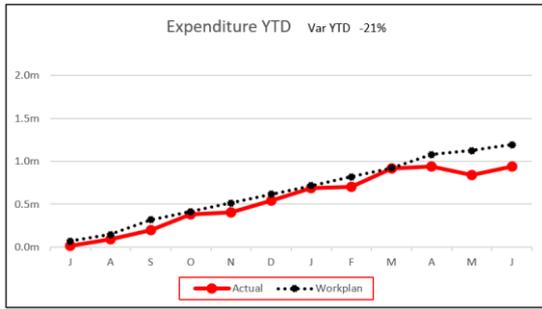


Figure 9. Financial performance of the Whakaora Te Ahuriri project for 2019/2020.



Figure 10. Staff from City Care installing the 40,000 terrestrial plants around the wetland.



Figure 11. Staff from Wai-ora Forest Landscapes installing the 80,000 aquatic plants.



Figure 12. Aquatic plants growing well at the edge of the constructed wetland.



Figure 13. Papango/scaup enjoying the completed constructed wetland.



Figure 14. The completed wetland, with Te Waihora/Lake Ellesmere in the background.



Figure 15. Staff from Boffa Miskell catch a tuna/eel as part of the Mātauranga Māori monitoring visit on 11 October 2019.



Figure 16. The event for the installation of the first plants on 2 September 2019.

Project:
Maintenance of plantings at Ahuriri Lagoon.

Co-Governance work package:
Transforming the lake shore to wetlands.

Management & Funding

Project lead:
Environment Canterbury.

Funder:
Environment Canterbury.



Figure 17. Planted sites at Ahuriri Lagoon (adjacent to the Whakaora Te Ahuriri constructed wetland).

Project Report

Project purpose: To maintain sites planted at Ahuriri Lagoon (separate from, but adjacent to, the Whakaora Te Ahuriri constructed wetland) that contribute to achieving the vision of Te Mahere Whakahaumanu o Ahuriri/Ahuriri Lagoon Restoration Plan, which is a plan to restore the greater landscape of Ahuriri Lagoon (Figure 18) that was endorsed by the Te Waihora Co-Governance Group on 26 August 2016.

Measure of success in 2019/2020: Annual maintenance completed.

Report on activities in 2019/2020:

- Annual maintenance was completed at planted sites (Figure 17).

Status: Ongoing.

Plan for 2020/2021: Progress maintenance of existing planted sites.

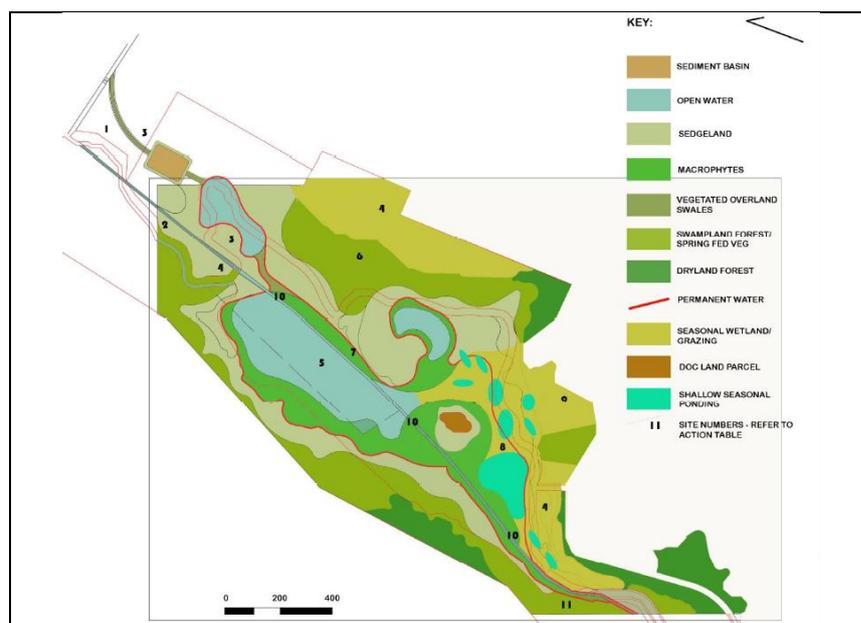


Figure 18. The concept masterplan from Te Mahere Whakahaumanu o Ahuriri.

Project:
Greenpark wetland restoration.

Co-Governance work package:
Transforming the lake shore to wetlands.

Management & Funding

Project lead:
Selwyn District Council,
Department of Conservation,
and Environment
Canterbury.

Funder:
Selwyn District Council and
Environment Canterbury.

Constructed wetland



Figure 19. Excerpt from the draft concept plan for a constructed wetland at the end of Embankment Road, Greenpark.

Project Report

Project purpose: To undertake a feasibility study for a constructed wetland at the end of Embankment Road, and, if it is feasible, develop a concept plan for a constructed wetland to enhance biodiversity, water quality, and mahinga kai values. Such a wetland also has the potential to help protect the existing, sensitive wetlands by limiting the access of four-wheel drive vehicles, which are currently damaging this area <https://www.youtube.com/watch?v=boDz4vqm24c>.

Measure of success in 2019/2020: Develop a partnership project plan; and, develop a concept/landscape plan.

Report on activities in 2019/2020:

- A project team was formed with staff of Selwyn District Council, Te Taumutu Rūnanga, Department of Conservation, and Environment Canterbury.
- Morphum Environmental were contracted to undertake a feasibility study for a constructed wetland at the end of Embankment Road (Greenpark), and if feasible, develop a concept plan.
- The timing of the COVID-19 lockdown prevented the consultant from undertaking a site visit, and a face-to-face hui.
- However, the work was able to progress using field observations from members of the project team, input from stakeholders via phone and email, and a virtual hui held with stakeholders on 25 May 2020.
- The feasibility study concluded that it would be feasible to develop a constructed wetland on Selwyn District Council land (and edging on to Department of Conservation land) at the end of Embankment Road to enhance biodiversity, water quality and mahinga kai values, and a concept plan was drafted (Figure 19).

Status: Feasibility study and draft concept plan completed.

Plan for 2020/2021: No work scheduled for 2020/2021. However, if there was the commitment and funding from partners then the draft concept plan could be finalised through further hui, and a detailed design produced, before a constructed wetland could then be developed.

Project:
Weed Strikeforce.

Co-Governance work package:

Transforming the lake shore to wetlands.

Management & Funding

Project lead:

Department of Conservation.

Funder:

Environment Canterbury (Biodiversity/Regional Flagships, and Whakaora Te Waihora) and the Department of Conservation.



Figure 20. Aerial view of the William's Block showing the progress of the willow control.

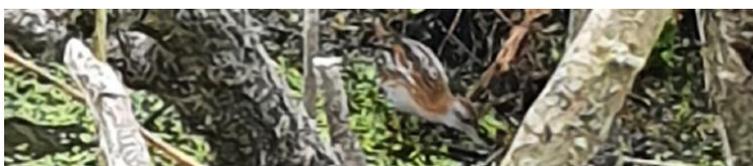


Figure 21. A marsh crake/koitareke, in raupō habitat under controlled willow near the mouth of the Ararira/LII River.

Project Report

Project purpose: To eliminate willows and weeds from the lakeshore of Te Waihora/Lake Ellesmere to allow the natural regeneration of lakeshore wetlands.

Measure of success in 2019/2020: Minutes from annual stakeholder coordination meeting confirming the priorities and areas agreed for control; An agreed work plan for willow and weed control is developed; and, willow and weed control completed.

Report on activities in 2019/2020:

- Despite the impacts of COVID-19, all targets for 2019/2020 were achieved as work was ahead of schedule before the lockdown began.
- Willows and weeds were controlled over 817.53 hectares in 12 management blocks, including: William's Wildlife Management Reserve, Lakeside Wildlife Management Reserve and off Greenpark Road, the mouth of the Irwell River, William's Block (Figure 20), Block 26, and Hart's Creek.
- In January 2020, the work crew focused on the maintenance of the trees installed under the One Billion Trees project
- Evidence of the outcomes of the project have been seen where there is raupō and saltmarsh ribbonwood beginning to spread under controlled willow near the mouth of the Ararira/LII River, and where a marsh crake/koitareke was spotted in the raupō (Figure 21). (Marsh crake are one of New Zealand's most secretive birds, which are in decline because of the loss of their wetland habitats).
- Team members, and one site, featured in a TVNZ [Seven Sharp story on 11 August 2020](#).

Status: Ongoing.

Plan for 2020/2021: Confirm the priorities, the agreed areas for control, and workplan for 2020/2021; and, undertake the willow and weed control.

Project:
**Whakaora Te
Waikēkēwai.**

**Co-Governance work
package:**

Enhancing the riparian linkages from the catchment to the lake shore.

Management & Funding

Project lead:

Te Taumutu Rūnanga and Environment Canterbury.

Funder:

Environment Canterbury and Te Taumutu Rūnanga.



Figure 22. Environment Canterbury River Engineering staff assessing the sediment in Papatahora.



Figure 23. EOS Ecology staff conducting the aquatic survey.

Project Report

Project purpose: To restore Te Waikēkēwai/Waikēkēwai Stream to achieve the vision in 'Te Waikēkēwai Stream Restoration and Rehabilitation report' (approved by Te Taumutu Rūnanga).

Measure of success in 2019/2020: Maintenance of riparian planting installed between the Ngāti Moki Marae and Te Repo Orariki in 2018/2019; follow-up willow control; and, additional actions.

Report on activities in 2019/2020:

- The Ngāti Moki Marae groundskeeper maintained the riparian planting installed between the Ngāti Moki Marae and Te Repo Orariki in 2018/2019.
- Te Taumutu Rūnanga identified that the next priority for the Whakaora Te Waikēkēwai project is the restoration of Papatahora (a small tributary of Te Waikēkēwai/Waikēkēwai Stream). It was identified that the required restoration actions would be removal of sediment from the stream bed and riparian planting; and, it was decided that the remainder of 2019/2020 be focussed on the preparations required to allow restorations works to be delivered in 2020/2021.
 - To prepare for the consent applications for the restoration of the Papatahora tributary, Environment Canterbury River Engineering assessed the sediment depth in Papatahora (Figure 22).
 - Te Taumutu Rūnanga engaged Enviser to develop the resource consent applications, which are almost complete.
 - To inform the consent applications, EOS Ecology were engaged to undertake an assessment of freshwater effects for the removal of sediment from Papatahora (Figure 23).
- Instead of follow-up willow control, two higher priority works to prepare for the restoration of Papatahora were progressed, which were: the translocation of harakeke/flax plants that had been growing in the stream bed of Papatahora and impeding water flow, and the removal of a shipping container and concrete pad adjacent to Papatahora.

Status: Preparations completed to allow restorations works for Papatahora in 2020/2021.

Plan for 2020/2021: Deliver restorations works (sediment removal and planting) for Papatahora.

Project:
Maintenance of existing planted, riparian sites.

Co-Governance work package:
Enhancing the riparian linkages from the catchment to the lake shore.

Management & Funding

Project lead:
Environment Canterbury.

Funder:
Environment Canterbury.



Figure 24. Plants at the Tai Tapu Domain riparian site growing well after maintenance.

Project Report

Project purpose: To maintain 11 riparian sites planted in the first phase of the Whakaora Te Waihora programme, to ensure ecological and cultural values are retained at priority, riparian sites, and to have a consistent approach to the maintenance of these sites between years for operational efficiency. These sites were chosen because of their ecological linkages, visibility, and/or presence on public land.

Measure of success in 2019/2020: Maintenance completed, and 90%+ survivorship of plants at priority sites.

Report on activities in 2019/2020:

- Selwyn District Council staff undertook pre-maintenance site-inspections to identify work priorities.
- *Spring 2019 maintenance:*
 - Nova Sylva Forestry maintained the six sites they are contracted to maintain (Scarlett's River Bank, Blackler's below Tancred's, Tai Tapu Rhodes Domain (Figure 24); Geddes on Halswell; River Road; and, the public, riparian land at the Lower Kaituna Paddocks).
 - Wai-ora Forest Landscapes maintained the five sites they are contracted to maintain (Marshall's 1 and 2; Gulliver's Road; Pohau Road; Burke's on McCartney's Road; and, Hewitt's on Halswell).
- *Autumn 2020 maintenance:*
 - Nova Sylva Forestry maintained the six sites they are contracted to maintain.
 - Due to work-disruptions following the COVID-19 lockdown, Wai-ora Forest Landscapes did not have the capacity to undertake the autumn maintenance of the five sites they are contracted to maintain
- Selwyn District Council staff undertook post-maintenance site-audits before invoices were paid.

Status: Ongoing.

Plan for 2020/2021: Undertake the final year of the three-year contracts to maintain the 11 sites; and, evaluate the need for further maintenance.

Project:
**Kids Discovery
Plant-out.**

**Co-Governance work
package:**

Te Waihora established as a centre for education and research.



Figure 25. Te Ara Kākāriki Trustee Craig Pauling speaking to students from Darfield High School at their planting day at Joyce Reserve.

Management & Funding

Project lead:

Te Ara Kākāriki and
Enviroschools.

Funder:

Environment Canterbury,
Selwyn District Council, Rata
Foundation and others.



Figure 26. DOC staff help students from Leeston Consolidated Primary School plant trees at Ararira/Yarr's Flat Reserve.

Project Report

Project purpose: To support Kids Discovery Plant-out events that involve students from local schools in planting sites where they learn about water quality, biodiversity, and Ngāi Tahu values.

Measure of success in 2019/2020: Engagement activities delivered with three schools.

Report on activities in 2019/2020:

- In September 2019 two planting days was conducted – the first with Ararira Primary School at the Ararira/Liffey waterway on 3 September, and with second with Darfield High School at Joyce Reserve on 19 September (Figure 25).
- In October 2019 one planting day was conducted with Leeston Consolidated Primary School at Ararira/Yarr's Flat Reserve that engaged with 112 Year 3 and 4 students. Students investigated aquatic invertebrates, were excited to find three long finned tuna/eels, one inanga/whitebait and lots of common bullies, and learned about their habitat requirements. The day was also supported by staff from the Department of Conservation (Figure 26), including the Weed Strikeforce team, and the Waihora Ellesmere Trust.
- In November 2019 the Kids Discovery Plant-out programme won an award – winning the school category at the New Zealand Plant Conservation Network Awards.
- Further school activities in 2020 were postponed due to the impact of COVID-19.

Status: Not completed; activities carried over into 2020/2021.

Plan for 2020/2021: Complete the activities carried over from 2019/2020.

Programme management.

Co-Governance work package:

Management of the Whakaora Te Waihora operational programme.

Management & Funding

Lead:

Environment Canterbury.

Funder:

Environment Canterbury.

Report

Purpose: To provide a robust programme management platform to deliver existing projects and, through the success of projects, build confidence for future funders.

Measure of success in 2019/2020: Performance reviews completed satisfactorily, and agreed goals achieved.

Report on activities in 2019/2020: The programme staff (Whakaora Te Waihora Programme Lead/Manager, Whakaora Te Waihora Programme Assistant, and Environment Canterbury Business Partner), completed the following:

- Ensured projects were delivered;
- Managed specific projects (such as Whakaora Te Ahuriri);
- Managed project relationships (such as for Whakaora Te Ahuriri, Figure 27);
- Managed the Health & Safety for all projects;
- Managed operational risks for all projects, including risk mitigation and assurances;
- Manage procurement processes and contracts;
- Managed the financial performance of projects;
- Provide project administration;
- Provided secretarial support to the Joint Officials Group, and other fora/hui as required; and,
- Provided reporting to Co-Governance and funders.

Status: Ongoing.

Plan for 2020/2021: Maintain a robust programme management platform, and provide support for applications for future funding.

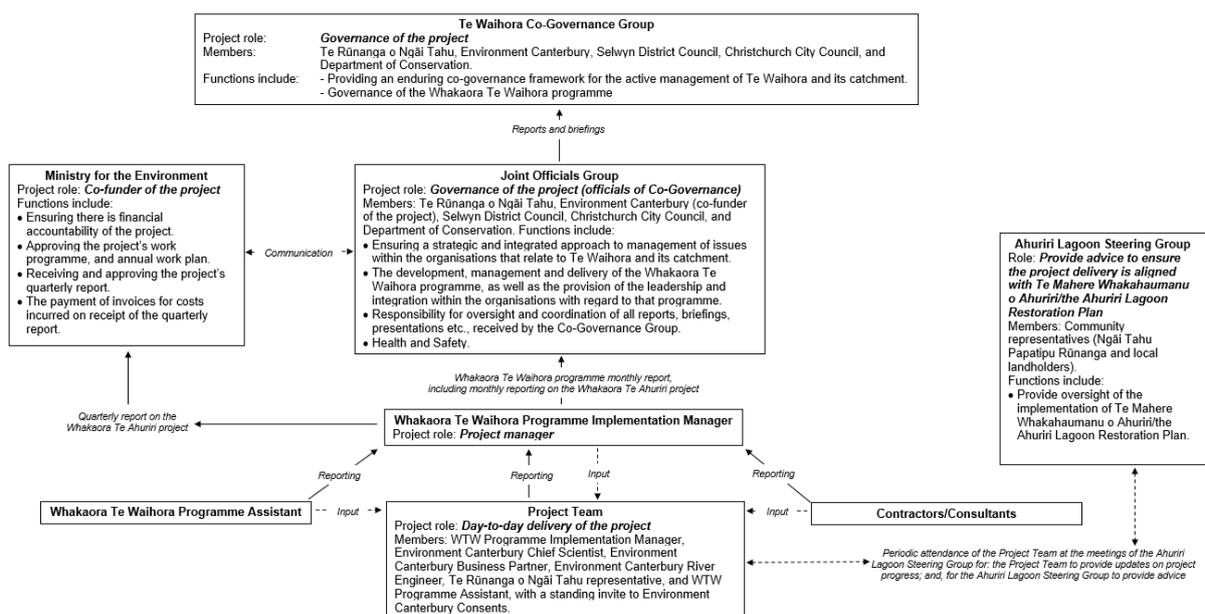


Figure 27. The structure of the Whakaora Te Ahuriri project.

Health & Safety

As approved by Co-Governors at the 30 August 2019 meeting of the Te Waihora Co-Governance Group, the programme transitioned the Whakaora Te Waihora Health & Safety Management System/WTW HSMS from its former structure (Figure 28) to a new structure (Figure 29) that included:

- A revised, simple, overarching policy and system;
- Alignment of works funded/managed by Environment Canterbury on behalf of the Whakaora Te Waihora programme with Environment Canterbury’s new Health & Safety procedures, and reported back through the WTW HSMS; and,
- Management of any future works funded/managed by other Co-Governance partners on behalf of the Whakaora Te Waihora programme by their own Health & Safety procedures, and reported back through the WTW HSMS.

There were no incidents or near misses in 2019/2020.

During 2019/2020 three hazards were identified (a deep pothole at the Tai Tapu Domain planting site, the disintegration of floating wetlands behind the wave barrier, and the wear on the metal shackles on the wave barrier itself that created the risk of the wave barrier breaking free), and all were mitigated.

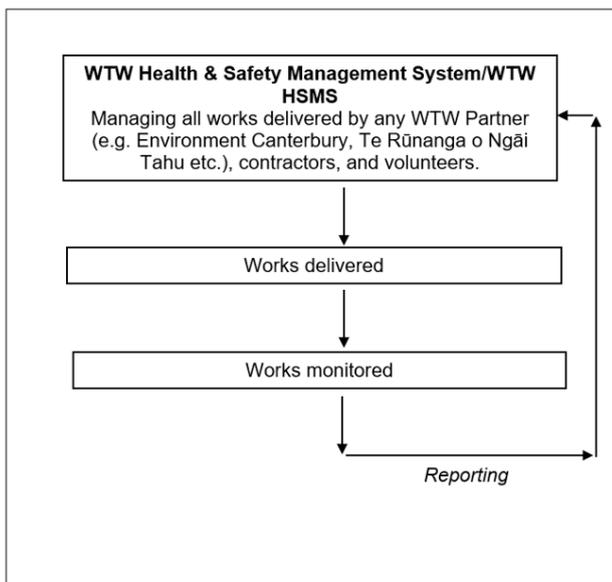


Figure 28. The structure of the former WTW HSMS.

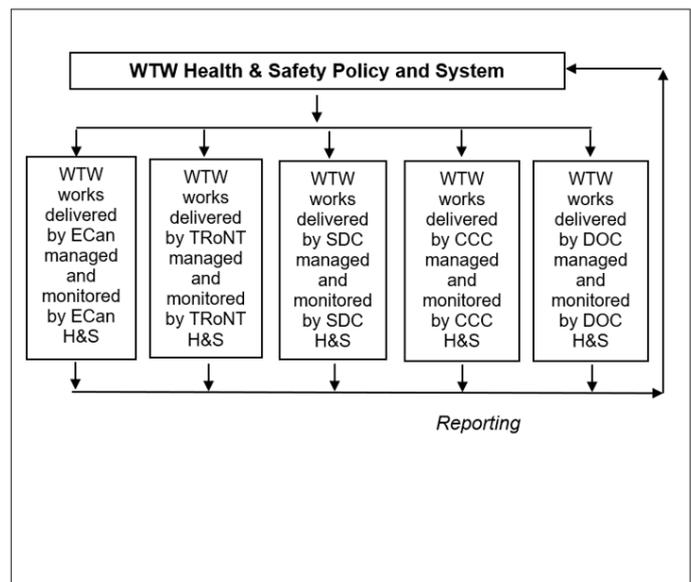


Figure 29. The structure of the current WTW HSMS.

Risk Management

As approved by Co-Governors at the 30 August 2019 meeting of the Te Waihora Co-Governance Group, the programme transitioned its risk management from the Risk Manager on-line tool to a risk register table, and with a one-page risk management report template used for future reporting of operational risks to the Te Waihora Co-Governance Group.

In 2019/2020 two new risks were added to the Whakaora Te Waihora Risk Register, which were: COVID-19 (that has impacts for Health & Safety; operational delivery, and the ability to secure future funding); and, installed structures/fixtures/equipment (Table 1). During the March – May 2020 COVID-19 lockdown, programme staff: worked with project partners and contractors to identify what and when works could be progressed under the different Alert Levels, and to ensure the extra Health & Safety assurances were completed and approved to allow works to progress; and, were part of Environment Canterbury’s Crisis Management Team.

As of 30 June 2020 there were 20 risks in the Whakaora Te Waihora Risk Register, of which the current risk ratings are: two High risk, eight Moderate risks, and 10 Low risks (Table 1). Priorities for risk management for the Whakaora Te Waihora programme are:

1. Implement mitigating actions for the two High risks (Resourcing insufficient to meet the targets of Phase Two of the programme); and,
2. Maintain current mitigating actions for the eight Health & Safety risks with a Moderate risk rating (where the risk rating cannot be lowered further because of the potentially fatal consequences and/or the unreliability of some controls).

Table 1. Summary of the Whakaora Te Waihora Risk Register.

Risk Register Summary		Current Risk Rating			
		 Extreme	 High	 Moderate	 Low
RISK CATEGORY	RISK	Current Risk Rating in 2019/2020			
		Oct	Dec	Feb	Jun
H&S/Operations/ Finance	COVID-19				
Finance	Resourcing insufficient to meet the targets of Phase Two of the programme				
Health & Safety	Open water				
Health & Safety	Waterways/ drains				
Health & Safety	Driving motor vehicles				
Health & Safety	Traffic management				
Health & Safety	Machinery – Heavy: Excavators, Bulldozers, Tractors and Other				
Health & Safety	Machinery – Light (Farm plant): Chainsaws, Scrub Bars and Other				
Health & Safety	Installed structures / fixtures / equipment				
Health & Safety	Environment – Terrain				
Health & Safety	Electric fishing				
Health & Safety	HSNO – Herbicides				
Health & Safety	Hand and power tools				
Health & Safety	Drones				
Health & Safety	Environment – Flora & Fauna				
Health & Safety	HSNO – Residual herbicide-chemicals				
Health & Safety	Electricity – Fences				
Relationships	The programme is not seen as a high priority, stand-alone programme				
Relationships	Lack of engagement with Rūnanga				
Operations	Inadequate monitoring to gauge outcomes				

As per the reporting to the Ministry for the Environment on the Whakaora Te Ahuriri project, this project was required to have its own separate risk register (Table 2).

Table 2. Risk Register for the Whakaora Te Ahuriri project.

Risk/issue identified during this financial year	Impact on project	Consequence on project	Strategy to mitigate	Resolved (yes/no)
COVID-19	<p><i>On the Health & Safety of people.</i> COVID-19 is spread during close contact, and by small droplets produced when people cough, sneeze or talk. While the majority of cases result in mild symptoms, some progress to viral pneumonia and multi-organ failure.</p>	Severe.	<ul style="list-style-type: none"> • All project works that were outside of the restrictions of the current alert level in the New Zealand Government's Alert Level System, are postponed until it is safe and within the Government's direction to proceed with those works. • At Alert Level 3 and 4, for project staff, the All of Environment Canterbury Standard Operating Procedure for COVID-10 Exposure Practices was followed: <ul style="list-style-type: none"> - For Type A Work Exposure if working alone; - For Type B Work Exposure if working at known sites and/or with other staff in small groups; and, - For Type C Work Exposure is working at unknown sites, with staff in large groups, or with other people who are not staff. 	Yes (at present).
	<p><i>On the project.</i> Restrictions on the movement of people has an impact on the delivery of project works. At Alert Level 4, all people, apart from essential services and lifeline utilities, are required to stay home and self-isolate, and therefore most project works cannot progress.</p>	Severe.	<p>Discussions were held with project partners and suppliers.</p> <ul style="list-style-type: none"> ○ Where possible, current project works were progressed. All works were assessed to: <ul style="list-style-type: none"> - Identify and postpone works that were outside of the restrictions of the current alert level in the New Zealand Government's Alert Level System (e.g. under Alert Level 4 lockdown, this includes most work such as all fieldwork, events, face-to-face hui/meetings etc.); and, - Identify and progress works that could be progressed within the restrictions of the current alert level in the New Zealand Government's Alert Level System (e.g. virtual hui/meetings, office-based work etc.) ○ Plans were then developed to deliver remaining works under two scenarios: <ol style="list-style-type: none"> 1. The work plan to progress works for when a current alert level was downgraded; and, 2. The work plan for if a current alert level was extended. 	Yes (at present).
Inability to secure resource consent for engineering and earthworks.	If the design of the constructed wetland does not meet consenting conditions, this could mean delays to the project and the required re-design.	Severe.	Staff of Environment Canterbury's Consent team are part of the Project Team, and so are involved in the design phase to provide advice during the design process, and to facilitate the consent process.	Yes.

Inability to secure suitable consultants and contractors.	If suitable consultants and contractors are not found through the tender process this would cause delays in the design, consent application, and construction of the wetland.	Moderate.	Follow the Environment Canterbury procurement process to allow tenders to be published on TenderLink to access a greater market, and ensure tenders are published to allow adequate time for contract development.	Yes.
Phosphorus-rich soils at Ahuriri Lagoon.	If the soils are rich in phosphorus, it could increase the phosphorus in the water and reduce water quality in the completed wetland	Severe.	Undertake an analysis of soil samples, and if the soils are rich in phosphorus identify possible mitigation measures (e.g. the addition of lime to the soil to reduce the mobilisation of phosphorus).	Yes.
Health & Safety risks.	If Health & Safety isn't managed appropriately then this could cause harm to individuals working on the delivery of the project.	Severe.	Follow the controls and assurances in the Whakaora Te Waihora/WTW Health and Safety Management System, and the WTW Assurance Monitoring Plan.	No (ongoing).
Increased flood risk with constructed wetland.	If the constructed wetland is not designed properly, then this could result in an increased flood risk with constructed wetland, which would also decrease the community support for the project.	Severe.	Ensure that the design phase: (a) includes input from an Environment Canterbury river engineer and a consultant engineer/designer; and, (b) Use flood modelling in the design phase, incorporating modelling results in the detailed design, to demonstrate how the project will not increase the risk of flooding on neighbouring land.	No (ongoing).
Lack of stakeholder commitment.	A breakdown of working relationships, resulting in a breakdown of joint decision-making and the halting of works.	Severe.	There are regular meetings of stakeholders – such as: the Ahuriri Lagoon Steering Group, the Project Team, the Te Waihora Co-Governance Group and its Joint Officials Group – with regular updates on project achievements, and communication of realistic timelines and targets. In addition, the Mātauranga Māori monitoring programme engages Ngāi Tahu Papatipu Rūnanga.	No (ongoing).
Lack of engagement with Ngāi Tahu Papatipu Rūnanga.				
Not meeting stakeholder expectations regarding the speed of progress.				
Unforeseen delays (such as	Delays in the achievement of KPIs and objectives.	Moderate.	Maintain regular monitoring and reporting on the project's financial performance, and regular meetings of stakeholders, where any	No (ongoing).

weather, procurement etc.) that impact on the timing of deliverables.			potential delays/events and their impact can be discussed and responded to.	
Lack of community support from local landowners.	A lack of community support from local landowners could result in reduced buy-in to the project.	Moderate.	<p>No landowners will be directly affected by this project, as the site is all Environment Canterbury land and under grazing licences. There has been communication with grazing licence holders about the planned restoration of the site, and licences are currently on short terms to allow works to progress when required.</p> <p>Maintain regular meetings, and the involvement, of the Ahuriri Lagoon Steering Group, which contains representatives of local landowners.</p> <p>Landowners will be invited to attend field-days to understand more about the project.</p>	No (ongoing).
Unforeseen delays (such as weather, procurement etc.) that impact on the timing of deliverables.	Delays in the achievement of KPIs and objectives.	Moderate.	Maintain regular monitoring and reporting on the project's financial performance, and regular meetings of stakeholders, where any potential delays/events and their impact can be discussed and responded to.	No (ongoing).