Agenda

Canterbury Water Management Strategy Waimakariri Zone Committee

Monday 3 July 3.30pm

Council Chamber
215 High Street, Rangiora

Members:

Claire Aldhamland
Kirk Blumers
John Cooke (Te Ngai Tūāhuriri Rūnanga)
Tim Fulton (WDC Councillor)
Ruby Gill-Clifford (Youth Representative)
Erin Harvie
Martha Jolly
Carolyne Latham
Claire McKay (ECan Councillor)
Arapata Reuben (Te Ngai Tūāhuriri Rūnanga)

WAIMAKARIRI DISTRICT COUNCIL

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Chairperson and Members
CWMS WAIMAKARIRI ZONE COMMITTEE

AGENDA FOR THE MEETING OF THE CANTERBURY WATER MANAGEMENT STRATEGY WAIMAKARIRI ZONE COMMITTEE TO BE HELD IN THE COUNCIL CHAMBER, 215 HIGH STREET, RANGIORA ON MONDAY 3 JULY 2023 COMMENCING AT 3:30PM.

Recommendations in reports are not to be construed as Council policy until adopted by the Council

BUSINESS

PAGES

KARAKIA

1. BUSINESS

1.1 **Apologies**

1.2 **Welcome and Introductions**

1.3 **Acknowledgments**
Clare Williams and Michael Blackwell.

1.4 **Register of Interests**
Advice of any changes or updates. *5 - 7*

2. OPPORTUNITY FOR THE PUBLIC TO SPEAK

3. REPORTS

3.1 **Waimakariri Zone Delivery Team Environment Canterbury – Update – M Griffin (CWMS Facilitator, ECan)**
8 - 9

RECOMMENDATION

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** this update for information taking into consideration the Committee's 2021/24 Acton Plan priorities.

3.2 **Taranaki Stream Inanga Spawning Improvement Project Final Update – M Griffin (CWMS Facilitator, ECan) and S Allen (Water Environment Advisor, WDC)**

10 - 39

RECOMMENDATION

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** this report for information taking into consideration the Committee's CWMS Action Plan priorities in 2023-24.

3.3 **CWMS Action Plan Budget Initiatives 2023/24 – for decision – M Griffin (CWMS Facilitator, ECan)**

40 - 46

RECOMMENDATION

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** the information provided on the proposed CWMS Action Plan Budget project initiatives to support for the 2023/24 financial year.

(b) **Approves** its support for this project initiative based on the $75,000 CWMS Action Plan Budget allocated for each CWMS Water Zone for the 2023/24 financial year.

4. COMMITTEE UPDATES – M GRIFFIN (CWMS FACILITATOR, ECAN)

4.1 **Co-opting an advisory member onto the Waimakariri Water Zone Committee.**

4.2 **Zone Committee Working Groups.**

4.3 **Farmers Field Trip for Mahinga Kai – 21 June 2023.**

4.4 **Committee Communications Update – June Quarter 2021**

4.5 **ECan Water and Land Committee Meeting – 28 June 2023.**

4.6 **Rangiora Reach – Masterplan Final.**

4.7 **A New Regional Integrated Plan – Opportunities to Contribute.**

4.8 **Otuwharekai / Ashburton Lakes Lesson-Learnt Report.**

4.9 **Further Information Links.**

4.10 **Action Points from the Previous Zone Committee Meetings.**

RECOMMENDATION *47 - 75*

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** these updates for information.

5. CONFIRMATION OF MINUTES

5.1 Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee Meeting – 1 May 2023

76 - 84

RECOMMENDATION

THAT the CWMS Waimakariri Zone Committee:

(a) **Confirms** the Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee meeting, held on 1 May 2023, as a true and accurate record.

6. GENERAL BUSINESS

KARAKIA

NEXT MEETING

The next meeting of the CWMS Waimakariri Water Zone Committee is scheduled for 4 September 2023 at 3:30pm.

AGENDA ITEM NO: 1.4	Register of Interests
Waimakariri Water Zone Committee	**MEETING DATE:** 3 July 2023

WAIMAKARIRI WATER ZONE COMMITTEE

Register of Interests – at 1 June 2023

Keeping a Zone Committee Members' declarations of interest register allows Zone Committees to identify and manage a conflict of interest when it arises.

The Office of the Auditor General notes a conflict of interest can arise when: "A member's or official's duties or responsibilities to a public entity could be affected by some other interest or duty that the member or official may have."[1]

If a member is in any doubt as to whether or not they have a conflict of interest, then the Member should seek guidance from General Counsel, Environment Canterbury, the Zone Facilitator, and/or refer to the following guidance: https://oag.parliament.nz/2020/lamia

Types of Interest to be documented in the register:

- Employment, trade or profession carried on by the Member or the Member's spouse for profit or gain
- Company, trust, partnership etc for which the Member or their spouse is a director, partner or trustee, or a shareholder of more than 10% shares
- Address of any land in which the Member has a beneficial interest and which is in the area of the Zone Committee
- The address of any land where the landlord is Environment Canterbury, Mackenzie District Council or Waitaki District Council and:
    - The Member or their spouse is a tenant; or
    - The land is tenanted by a firm in which the Member or spouse is a partner, a company of which the Member or spouse is a director, or a Trust of which the Member or spouse is a Trustee.
- Any other matters which the public might reasonably regard as likely to influence the Member's actions during the course of their duties as a Member.
- Any contracts held between the Member or the Member's spouse and Environment Canterbury, Mackenzie District Council or Waitaki District Council. Including contracts in which the Member or their spouse is a partner, a company of which the spouse is a director and/or holds more than 10% in shares, or a Trust of which the Member or their spouse is a trustee (noting that no committee member should be a party to a contract with Environment Canterbury or the relevant TLA if that value is more than $25,000 per annum)

Zone Committee members are to ensure that the information contained in this register is accurate and complete.

Name	Committee Member Interests
Claire Aldhamland	- Teacher – Rangiora High School
Kirk Blumers	- To be confirmed.
John Cooke	- Director/Shareholder – Executive Limousines 2015 Limited

[1] Office of the Auditor General Good Practice Guide – Managing Conflicts of Interest: Guidance for public entities

	- Director/Shareholder – Express Hire Limited - Director/Shareholder – Testpro Limited - Director/Shareholder – Acropolis Wedding and Event Hire Limited - Director/Shareholder – Pines Beach Store Limited - Director/Shareholder – Coastal Dream 2005 Limited – 4Ha property, Kaiapoi - Interim Trustee – Section 6 Survey Office Plan 465273 Ahu Whenua Trust
Cr Tim Fulton	- Waimakariri District Councillor - Freelance Writer in the agricultural business sector
Erin Harvie	- Shareholder – Bowden Consultancy Limited, trading as Bowden Environmental - Co-ordinator - Waimakariri Landcare Trust - Member – NZ Hydrological Society - Member – NZ Institute of Primary Industry Management - Involvement with Cust River Water User Group
Martha Jolly	- Veterinary surgeon (Companion animal) - PhD Student in Water Resource Management (2nd year) - Volunteer assistant the Styx Living Laboratory Trust - Volunteer educator Vets for Compassion - Volunteer clinician SPCA NZ - Member – Forest and Bird NZ
Carolyne Latham	- Farmer – Sheep, beef - Director – Latham Ag Ltd Consulting - Shareholder – Silver Fern Farms, Farmlands - Registered Member – New Zealand Institute of Primary Industry Management
Cr Claire McKay	- Canterbury Regional Councillor - Dairy Farming/Grazing - Ihenga Holdings – Partner (with spouse) - Woodfields Partnership – Partner (with spouse) - McKay Family Trust – Trustee (spouse also a Trustee) - Shareholder – Waimakariri Irrigation Limited, Ravensdown Ltd, Balance Agri-nutrients Ltd, Fonterra, and Farmlands - Member – Federated Farmers, Irrigation NZ - Water take and use consents CRC: 050222.1, 990908.1, 102890, 185900 - Effluent discharge consents CRC: 990910.4, 210035

	- Domestic Wastewater discharge consents CRC: 102594, 122318, 144865
Arapata Reuben	- Trustee – Tuhono Trust - Member – National Kiwi Recovery Group - Rūnanga Rep – Christchurch/West Melton Water Zone Committee - Rūnanga Rep – Ashburton Water Zone Committee

AGENDA ITEM NO: 3.1	SUBJECT MATTER: Waimakariri Zone Delivery Team, ECan – update
REPORT TO: Waimakariri Water Zone Committee	MEETING DATE: 3 July 2023
REPORT BY: Murray Griffin, CWMS Facilitator, ECan	

PURPOSE

This agenda item provides the Zone Committee with an update and overview of the Waimakariri Zone Delivery Team at Environment Canterbury.

Nerida Theinhardt, Zone Delivery Lead – Waimakariri will lead this overview and introduce the team members who will provide a short update on their role and current priorities.

RECOMMENDATION

That the Zone Committee

> **Receive** – this update for its information and with consideration to the committee's 2021-2024 Acton Plan priorities.

BY WHO

This update will be led by:

- Nerida Theinhardt, Zone Delivery Lead – Waimakariri, ECan

BACKGROUND

The Zone Delivery Teams at Environment Canterbury are part of the Operations Section and are responsible for attending pollution events, monitoring consents, land management advice and delivering biodiversity projects. Also within the team we have a Pou Mātai Kō - Cultivating an Understanding of Mahinga Kai.

I am very proud of this amazing team they work with passion and love for the environment. Please let me introduce Waimakariri Zone Delivery Team:

Bernice Corbett: Resource Management Officer, she managed the disturbance portfolio (example gravel extraction, subdivisions), she also was in charge or rural portfolio. This year Bernice is working in the after hours programme.

Kiri Kirkwood: Senior Incident Response officer, she attends to pollutions events such as burning events, stock in water ways and others, within Waimakariri zone but also supporting others zone if necessary. Recently, Kiri travelled to the North Island to attend and support flooded events, she is always helping other teams within the organization. She is also working in after hours calls and supervising the after-hours programme.

Steph Scheirlinck: Incident Response officer she attends to pollutions events within Waimakariri zone but also supporting others zone if necessary. She did a great job helping the Christchurch team for the pollution event (PE) in the Avon River recently. Also working in the after hours programme.

James Schaap: BioLma (Biodiversity and Land management advisor), he started recently as permanent in the team, he delivers biodiversity projects such as weed control, pest control, fencing projects. He is also involved in advancing biodiversity projects and confirming funding options.

Anna Veltman: Lma (Land Management Advisor). Anna has just received recognition for working at Ecan for 25 years. She runs the Waimakariri North Primary Industry Network Group Meeting.

- *Ballance Farm Environment Awards Alistair and Genna Bird of The Grange, owners of a sheep and beef farm in Oxford, won three awards, including the Environment Canterbury Water Quality Award. In their acceptance speech, they acknowledged Anna Veltman, one of our fantastic Land Management Advisors, for her support in helping them improve their farming practices. I should note that this is the first time that a winner has recognised and thanked one of our employees by name!*

Sam Thompson: Lma (Land Management Advisor), he is running in Hurunui SCAR (Soil Conservation and Revegetation programme), that will start during this new financial year in Waimakariri, he is a great instructor and mentor for the SCAR project, helping Anna and James to bring it to Waimakariri. Sam is also delivering Mahinga Kai workshops with Makarini Rupene.

Please refer to this clip on the SCAR programme: Soil Conservation and Revegetation pole planting - YouTube

The SCAR Programme has been planting willow and poplar poles over farms in North Canterbury with the goal of reducing erosion and sediment loss.

Makarini Rupene: Pou Mātai Kō - Makarini works with industry, community groups, and landowners, alongside mana whenua, to enhance mahinga kai – he helps people understand what it is, how to protect it, and how it interacts with the natural environment.

Makarini works across North Canterbury and can offer advice on how to protect mahinga kai on your property or in your community.

Robert Anding: RMO (Resource Management Officer), Robert is new in the team. He is running the 2-water portfolio (Waste Water treatment plants and Storm Water) not only for Waimakariri, but for the Northern Mega zone, including Hurunui and Kaikoura. He will also be dealing with irrigation schemes in Waimakariri.

Carys Marulli De Barletta: RMO, also new in the team and running the industrial portfolio.

For more information:
Meet your northern Environment Canterbury team | Environment Canterbury (ecan.govt.nz)

AGENDA ITEM NO: 3.2	**SUBJECT MATTER:** Taranaki Stream Inanga Spawning Improvement – project final update
REPORT TO: Waimakariri Water Zone Committee	**MEETING DATE:** 3 July 2023
REPORT BY: Murray Griffin, CWMS Facilitator, ECan & Sophie Allen, Water Environment Advisor, WDC	

PURPOSE

This agenda item provides the Zone Committee with a report and final update on the Taranaki Stream Inanga Spawning Improvement project supported by the committee through the 2021/22 CWMS Action Plan Budget.

RECOMMENDATION

That the Zone Committee

> **Receive** – this report and update for its information and with consideration to the committee's CWMS Action Plan priorities in 2023-24.

BY WHO

This update will be led by:

- Sophie Allen, Water Environment Advisor, Waimakariri District Council

BACKGROUND

This project aligns with the following WWZC 2021 – 2024 Action Plan Priorities:

> *(2) Increased indigenous biodiversity in the zone, - To protect and improve the indigenous biodiversity, habitat, or ecosystems in the Zone*
> *&*
> *(5) Improved mahinga kai within the Waimakariri Water Zone – To protect and enhance mahinga kai practices in waterways within the Waimakariri Water Zone*

Project Description

Inanga spawning habitat has been greatly modified by land use, therefore restoration of spawning habitat is key for increasing abundance of this popular mahinga kai species.

This project is focused on regrading and planting of 105m of the true Right bank of Taranaki Stream above the floodgate to improve inanga spawning habitat.

This bank was steep and undercut, with limited spawning vegetation present at the correct water level. The aim of this bank regrading is to provide more spawning habitat.

Please refer to the attached report included in the papers as **agenda item 3.2 – 1 and the AEL inanga spawning habitats report as agenda item 3.2 – 2**

Taranaki Stream Inanga Spawning Habitat Improvement – Final Report

Prepared by Waimakariri District Council
June 2023

Prepared for: Murray Griffin Environment Canterbury
On behalf of the Waimakariri Water Zone Committee

Prepared by:

Sophie Allen Water Environment Advisor

on behalf of Waimakariri District Council

Published: June 2023

File / Record Number: WAT-10-14 / 230619090690

Version Number	Prepared By	Comments	Date
1	S Allen	Submitted to ECan for review	June 2023

1. Summary

1.1. Details of outcomes achieved

Six bays were created with earthwork on the True Right bank of the Taranaki Stream, just upstream of the floodgate at Waikuku Beach during Phase 1 of the project. These bays have a reduced slope, to increase the area of flooded vegetation available for inanga spawning. With funding from the Waimakariri Water Zone Committee the planting of 800 native grasses and low shrubs (Phase 2) was carried out in winter 2022 within the six bays. A fence was installed to prevent stock grazing on the native planting.

A re-survey of inanga spawning was carried out in autumn 2023 to assess outcomes for inanga spawning, with some spawning detected in the first downstream bay. It was noted by the survey contractor that vegetation had not grown to its full extent, with potential for much more suitable habitat to develop over time.

Surveys of the inanga spawning area were completed by Aquatic Ecology Ltd in 2019, 2021, and 2023 (see Appendix 1), which will be used for comparison of the outcome of the works to a baseline prior to works.

1.2. Project costs

The total project cost for Phase 2, the native planting (plant supply, planting, and guards) and fencing was an estimated $10,490 (excl GST), this is in addition to the Phase 1 costs of $12,587 for WDC staff hours, Aquatic Ecology Ltd advice, and CORDE Ltd physical works. The total project cost was $23,077.

Item	Notes	Quantity	Amount (excl GST)
Plant supply		800	$2,340
Plant guards		800	$1,600
Planting		800	$3,047
Fencing – Temporary + permanent	Temporary fencing was installed to exclude stock until permanent fence could be installed once ground conditions permitted access.	110 m	$3,503
		Total	**$10,490**

Table 1: costs of Phase 2, planting and fencing

1.3. Photopoints (before and after photos)

Figure 1: Before earthworks

Figure 2: After completion of earthworks, January 2022. The spoil piles are located to the far left of the image, well back from the edge of the waterway.

Figure 3: After completion of native planting and installation of a fence, 16 February 2023

1.4. Maintenance and monitoring

The native plants have successfully established, as of June 2023, with some plants large enough to have their plant guards removed. Grass seed was sown in January 2022 as interim sediment control, which did not have a successful strike. This was potentially due to bird theft, lack of moisture, and/or lack of topsoil in some areas of the works.

Inanga Spawning Habitats in the Waimakariri District, 2023:

an update

Prepared for:

Waimakariri District Council

AEL Report No. 201

Riley Payne
Lucy Barltrop
Mark Taylor

Final Report

April 2023

Developoing inanga eggs on the lower Taranaki Creek, 20th April 2023

Aquatic Ecology Ltd.
Telephone 03 366 4070
Email: info@ael.org.nz

Contents

1 Executive Summary

During the March spring tide sequence, seven established inanga spawning habitats were re-assessed for egg presence, habitat suitability and the identification of management issues. The spawning ground of one of these, on McIntosh Drain, could not be assessed due to adjacent construction activity.

A priority is the removal and poisoning of swiftly-developing willow regrowth at the Courtenay Stream site, which is threatening the otherwise suitable and sizeable inanga spawning habitat.

Willow regrowth needs to be controlled at almost all the other habitats, albeit of a lower priority. Yellow-flag iris is an encroaching issue in the Kaiapoi River habitat, as is *Lagarosiphon* oxygen weed in the shallows. These two weeds are likely to be a problem elsewhere along the Kaiapoi River. There may be some amenity conflicts with the small inanga spawning habitat on the true left bank of the Kaiapoi River. On Taranaki Stream, the first inanga eggs were discovered in the most downstream of six embayments constructed nearly 1.5 years ago (NZISDB No. 576). However, many slugs were also observed in the planted *Carex* crowns, and underwater silt deposits in the embayments on Taranaki Stream need to be removed, possibly mechanically achievable from the east bank with a long-arm excavator. Well-developed inanga eggs were also identified from a historic (1988) spawning site (NZISDB No. 578) on a coastal tributary of Taranaki Stream downstream of the tide gates.

For each waterway, a list of management issues are presented in the summary, along with management priorities. The old inanga spawning database, including the most recent Waimakariri District records, has been upgraded to MS Access 365 and stored on the Microsoft Cloud (OneDrive).

2 Introduction

Early work identified the semi-terrestrial nature of inanga spawning, and the importance of conserving and managing spawning grounds (Hefford 1932). However, it was not until the whitebait fishery was in a clear decline that research in the environmental triggers for inanga spawning commenced in the 1950 and 1960s (Benzie 1968).

Following a directive from the Department of Conservation to the Ministry of Fisheries in 1987, a co-ordinated initiative was undertaken to identify inanga spawning grounds throughout New Zealand (Taylor *et al.* 1992). Surveys started in 1988, and actually commenced at "Benzies" Creek, an officially unnamed tributary of Saltwater Creek.
Since then, a number of inanga spawning sites have been identified in the Waimakariri District, and these were most recently summarised in Webb and Taylor (2019). Since then, the Waimakariri District Council (WDC) has actioned staged recommendations to enhance inanga spawning on some of these sites, including Courtenay Stream and Taranaki Stream. For Taranaki Stream, some funds were available to regrade the favoured true right (east) bank upstream of the tide gates into 6 embayments on 10th December 2021, which was subsequently planted with a palette of native rushes and grasses suitable for inanga spawning.

Bank works were also undertaken in the vicinity of Courtenay Stream on removal of willow on the true left (west) bank, and native plantings.

3 Objectives

The purpose of this small study was provided an update to WDC on known inanga spawning grounds and provide recommendations on their ongoing management. The habitats to be assessed, from north to south, were:

- Saltwater Creek
- Benzies Creek – tributary of Saltwater Creek
- Taranaki Creek – tributary of the Ashley River
- Cam River – tributary of the Cam River
- Kaiapoi River
- McIntosh Drain – tributary of the Waimakariri River
- Courtenay Stream – tributary of the Waimakariri River

4 Methods

4.1 Field methods

Some fieldwork was undertaken to identify the extent of saltwater penetration at high tide, the so-called 'saltwater wedge'. The 'saltwater wedge' is the tongue of deep saline water which penetrates up the river during a high tide event. Since inanga eggs are often distributed around the area of where the saltwater wedge terminates on a river course (Hickford & Schiel 2011), the purpose of this work was to reduce the subsequent search area for inanga eggs when the tide had fallen.

However, for most waterways, this location was determined during previous inanga spawning surveys in 2017 and 2019 (Taylor & Marshall 2017; Webb & Taylor 2019). Searches were restricted to the locations previously surveyed to assess for changes in spawning behaviour and habitat suitability. Each egg search was restricted to approximately 2-3 minutes, to avoid site-specific bias.

For egg habitats which had not been checked recently, measurements were undertaken to determine the saltwater wedge location, using a small dinghy. Water conductivity readings, to detect the 'saltwater wedge' were taken with a field conductivity meter (Schott HandyLab LF12) with the weighted sensor dropped into the stream waters at the end of a long 5m cable. Brackish water is denser than freshwater, so readings were taken in the deepest part of the bed cross-section, which were determined in the field using a weighted line. Often, but not always, the wedge terminus is near the centre of the channel. Care was taken to avoid sampling in water disturbed by the boat.

To accurately determine inanga eggs, egg searches were carried out on foot by experienced ecologists at each of the relevant waterways. Surveys were conducted following a spring high tide, to ensure eggs had been recently deposited. All surveys took place on a low or receding tide, so an approximate high-tide level could be discerned as a tide mark prior to searching. This narrowed the search area across the bank elevation.

Along with the presence or absence of eggs, habitat suitability was determined during each egg search through an evaluation of the root matrix microclimate, bank gradient, vegetation and soil composition. If eggs were present, an approximate height from the observed water level was recorded. This height varied throughout each survey due to receding tide levels. Eggs were also marked using flags, to show WDC staff, but also to determine inanga egg elevations against RL (reduced level). RL levels of the egg distribution layer are useful for the development of other habitat enhancements in the river. Egg elevations were translated to nearby river staff gauges affixed to local bridge and gate assemblies. Translation of the egg horizon was undertaken with an automatic level (dumpy level) and surveyor's stage.

The worked field itinerary is provided below (Table 1).

Table 1. Worked field itinerary for 2023 inanga spawning surveys in the Waimakariri district. Recent spring tide occurred on 22/03/2023.

Waterway	Survey Date	Time at Start of Survey	High Tide	Tide Gate Status	Work Completed
Kaiapoi River	23/03/2023	10:30 am	6:15 am	N/A	Spawning search
Lower Cam River	23/03/2023	12:30 pm	6:15 am	Tide gates open	Spawning search
Courtenay Stream	24/03/2023	11:15 am	7:12 am	All (4) tide gates open	Spawning Search
Benzies Creek	27/03/2023	11:25 am	9:54 am	N/A	Spawning search
Taranaki Creek	03/04/2023	1:15 pm	2:33 pm	Tide gate closed	Spawning search & salt wedge survey
Saltwater Creek	04/04/2023	10:25 am	3:17 pm	N/A	Spawning search
All Waterways	05/04/2023	9:20 am	3:59 pm	N/A	Egg horizon survey & flag retrieval
McIntosh Drain	06/04/2023	8:30 am	4:16 am	Tide gates bunded	Spawning search
Taranaki Creek tributary	20/04/2023	10:05 am	4:06 am	N/A	Spawning search

4.2 Desktop methods and approach

Similar to previous surveys, the results of both the habitat surveys and egg searches were assessed and subjectively grouped into the following three categories: unsuitable (no potential for inanga spawning); suitable, but no spawning identified; and confirmed spawning location (eggs present). These areas were mapped graphically using Google Earth Pro and QGIS, and trends were identified between the 2023 surveys and previous spawning surveys. Cited in the results, inanga spawning egg and suitable habitat distributions are provided in App. I, with site photographs in App. II.

The national inanga spawning database has been upgraded to Microsoft Access 365 and stored on the Microsoft cloud (OneDrive). This version links in the original egg distribution maps and data from the 1980s and 1990s, but also includes the data, maps and photographs from this survey.

5 Results

5.1 Saltwater Creek

5.1.1 Mainstem

Location and habitat extent

Eggs, and suitable spawning habitat, were located within the boundaries of a previously identified saltwater wedge on Saltwater Creek (App. I, Fig. i). This location was identified in 2017, and is approximately 550 m upstream from the eggs located during the historic 1992 survey (Taylor *et al.* 1992). The 2023 survey reach was approximately 230 m in length. While eggs were only observed on the true right (southern) bank within this reach, areas of suitable spawning habitat were identified on both banks (App. II, Fig. i). The survey was executed at low tide, and the observed egg deposits were approximately 130 cm above surface water at the time of survey (App. II, Fig. ii).

Shoaling inanga and mullet were observed during the 2023 spawning survey, between the confirmed spawning site and the State Highway 1 bridge.

Spawning habitat quality and quantity

Upstream of the survey reach, the bank was almost vertical, unsuitably steep for spawning. Mature native planting was present on the true left bank. If the banks upstream were of a more gentle gradient, these native plants could facilitate a suitable spawning habitat.

Within the survey reach, the bank slope on the true right bank was moderately steep, and eggs were located in mature bank slumps, or on top of the bank toe. Bank slope on the true left bank was more gradual than that of the true right bank, due to its location on the inside of a river bend. This slope was too gentle in some areas, causing potential difficulties regarding access for adult inanga at high tide, and a risk of stranding if the fish cannot escape during outgoing tide. Signs of bank erosion were visible along both banks within the survey reach.

Riparian vegetation types and root matrices in the spawning reach of Saltwater Creek maintained a moist and suitable microhabitat for inanga spawning and egg development. Riparian vegetation was dominated by tall fescue, twitch grass, and *Carex* sp., most of which was likely *Carex geminata* (Table 2). On the true right bank within the survey reach, where egg deposits were observed, this combination of plant species created a dense root matrix. The upstream-most egg deposit appeared to be drying, indicated by a slightly wrinkled chorion (shell). Inanga eggs must remain moist at all times to ensure survival. Mottled shade, in the form of native shrubs and small trees, should be added on the true right bank to prevent the drying of eggs. Plants that provide minimal shade, such as lancewood (*Pseudopanax crassifolius*) or kowhai (*Sophora* sp.), would be suitable in this instance. On the true left bank, root and runner matrices were sparse, under twitch grass and *Isolepis* riparian vegetation. Areas of suitably dense root mats were present, but patchy. This sparse mat was consistent with a lower level of sunlight on the true left bank, resulting in slower vegetation growth. No egg deposits were identified on the true left bank. Another factor impacting the spawning suitability of the Saltwater Creek true left bank was the presence of willow saplings (*Salix* sp.). Willow can have a significant negative impact on the growth of understory riparian vegetation, due to the shade caused by the dense willow canopies during the growth season (Wagenhoff & Young 2013). A lack of understory vegetation results in unsuitable root matrices, and therefore unsuitable spawning habitat for inanga.

Table 2. Predominant herbs and grasses in the Saltwater Creek spawning ground.

Common name	Scientific name	Association *
Carex	*Carex* sp.	Associated
Knobby club rush	*Isolepis*	Associated
Twitch	*Elytrigia (Arrhenatherum) repens*	Associated
Edgar's rush	*Juncus edgariae*	Associated
Tall fescue	*Festuca arundinacea (Schedonorus phoenix)*	Eggs attached
Creeping buttercup	*Ranunculus repens*	Associated
Sedge	*Eleocharis* sp.	Associated
Mint	*Mentha* sp.	Associated
Bachelors Button	*Cotula coronopifolia*	Associated
Cutty grass	*Carex geminata*	Associated
Willow	*Salix* sp.	Not Associated

* Eggs attached, not attached but associated.

Site management options and ideas

The improvement of inanga spawning habitat suitability in Saltwater Creek would require re-grading of the TRB slope within the spawning reach, and the addition of native shrubs for erosion protection and moisture control. Native shrub options could include, but are not limited to, harakeke (*Phormium tenax*), toetoe (*Austroderia* sp.) and cabbage tree (*Cordyline australis*). More *Carex geminata* plantings may reinforce the bank toe. These species were observed growing well on the true left bank, upstream of the spawning reach (App. II, Fig. iii). The re-grading and native planting are unlikely to completely prevent future erosion, however they will greatly increase the longevity of suitable spawning habitats. It is also highly recommended that willow saplings on the true left bank be removed, and ongoing controls

are implemented to restrict future willow growth. This may have a negative impact on bank stability, and the replanting of native shrubs may be required to counteract any erosion increases. The removal of debris from historic whitebait stations within the spawning reach would also increase the availability of spawning habitat (App. II, Fig. i).

5.1.2 Benzies Creek

Location and habitat extent

The location of inanga egg deposits in Benzies Creek during the 2023 survey was consistent with that of a 2017 survey, but further upstream than historically recorded inanga spawning (Taylor *et al.* 1992). Eggs were observed on the true right (north) bank of the waterway, approximately 180 m upstream of the Amesbury Road bridge (App. I, Fig. ii). Surveyed suitable habitat on the true right bank extended for approximately 25 m. While no eggs were observed on the true right bank, a small distance of suitable habitat was identified at the upstream end of the survey reach. The survey was executed on an outgoing tide, and identified eggs were located approximately 20 cm above the surveyed water level.

Spawning habitat quality and quantity

Spawning habitat on the bank of Benzies Creek was mostly restricted to a reach on the true right bank with a canopy of mature poplar trees (App. II, Fig. iv). No tree canopy was present on the true left (south) bank, however due to the small width of Benzies Creek, this bank also receives morning shade from the poplars. Upstream and downstream of the poplars, the shade from willows restricted the growth of suitable understory plants. This was particularly noticeable downstream of the survey reach, which had a dense willow canopy with bare banks and very sparse understory vegetation, consisting mostly of ivy (App. II, Fig. v). Understory vegetation in the survey reach was dominated by *Carex geminata* on both banks. However, the root matrix beneath the *C. geminata* was significantly denser on the true right bank, in the vicinity of the observed egg deposits. This is consistent with the levels of sunlight received by each bank; the west-facing true right bank receives significantly higher levels of sunlight than that of the east-facing true left bank, therefore primary production is significantly more prominent on the true right bank.

The gradient of the bank in the vicinity of observed eggs was slightly steeper than the optimal inanga spawning bank gradient, but still suitable for spawning, as evidenced by egg deposits. Bank erosion was deemed minimal during the survey, and re-grading of the banks at the Benzies Creek spawning reach is not required.

Table 3. Predominant herbs and grasses in Benzies Creek spawning ground.

Common name	Scientific name	Association *
Cutty grass	*Carex geminata*	Eggs attached
Edgar's Rush	*Juncus edgariae*	Associated
Common spikerush	*Eleocharis acuta*	Eggs attached
Tall Fescue	*Festuca arundinacea* (*Schedonorus phoenix*)	Associated
Creeping buttercup	*Ranunculus repens*	Associated
Poplar	*Populus spp.*	Canopy above eggs

* Eggs attached, not attached but associated.

Site management options and ideas

The removal of poplars in the spawning reach is not recommended, as they appear to be aiding in the habitat suitability for inanga spawning. The spawning reach could be lengthened by removing the willows either side of the poplars, and replacing them with native shrub species to retain soil moisture and erosion protection. If the willows are to be removed, ongoing control will be required to prevent future regrowth.

Bank re-grading is not recommended within the confirmed spawning reach. However, re-grading the areas from which willows have been removed could increase the likelihood of spawning occurring outside of the current spawning reach.

5.2 Ashley River

5.2.1 Taranaki Creek

Location and habitat extent

The true right (east) bank of the Taranaki Creek, immediately upstream of the tide gates, was re-graded into six embayments and replanted with native grasses, rushes and shrubs in late 2021, for the purpose of improving inanga spawning habitat availability (App. II, Fig. vi). Before this bank modification, this reach was a known inanga spawning location, as proven by the presence of eggs in a 2019 survey (Webb & Taylor 2019). The site planting appears relatively recent, and the native plants have not yet matured enough to support a microhabitat which would support large numbers of inanga eggs. However, one egg deposit was identified in the particularly luxuriant patch of bachelors button (*Cotula coronopifolia*) in the downstream-most embayment. This vegetation formed a low sward over the soil surface, with a matrix of horizontal runners and rootlets trapping eggs in a humid microenvironment (App. II, Fig. vii).

To determine the likely future extent of inanga spawning, a survey of the salt wedge extent was executed in conjunction with the spawning survey. This survey was completed across an incoming high tide. The salt wedge was not well defined in this waterway, possibly because the design of the tide gates may cause significant mixing between salt water and fresh water. The salt wedge (or mixing zone in this case) was determined by a conductivity reading of >350 µS/cm, and therefore ended upstream of the second embayment (App. I, Fig. iii).

The recent bank modification is well-fenced, with no access possible for stock from a nearby farm or the general public. This aides in creating a safe and undisturbed spawning environment for inanga.

Spawning habitat quality and quantity

As the native planting in the modified spawning area of Taranaki Creek is still immature, suitable spawning habitat was restricted to the root matrix of bachelors button, between young *Carex* sp. and *Juncus* sp. stands (App. II, Fig. vii). When the native planting has matured, the vegetation and root matrices of the modified bank will be highly suitable for inanga spawning. A significant number of slugs were also observed in the crowns of *Carex* sp. and *Juncus* sp. in the modified spawning reach (Mitchell *et al.* 1992). Most species of slug are known to prey on inanga spawning eggs, and a high population can have significant negative impacts on overall egg survival. Predation pressure may be increased by the concentration of slugs in the few locations with high moisture levels, and therefore more likely to encounter and ingest inanga eggs. This may be a temporary phenomenon, until the site matures, and the eggs are more distributed.

With regard to bank slope, excavated levels in the true right bank embayments appear correct in respect to the level of the spring tide, across which spawning occurs.

Table 4. Predominant herbs and grasses in Taranaki Creek spawning ground.

Common name	Scientific name	Association *
Bachelors Button	*Cotula coronopifolia*	Eggs attached
Carex	*Carex* sp.	Associated
Edgar's Rush	*Juncus edgariae*	Associated

* Eggs attached, not attached but associated.

Site management options and ideas

The success of the bank improvements to-date is reliant on the maturation of planted native vegetation. Areas labelled not suitable based on the 2023 spawning survey may improve once vegetation is mature.

While the banks of the embayments are of a suitable height and slope for inanga spawning, the shallow submerged approach slope may dissuade spawning shoals from approaching the banks. This could be remedied through the removal of substrate in the embayments, during periods of low tide. These silt deposits could be accessible by a long-arm excavator from the true right (east) bank. However, with the improved slope and vegetation, once the spawning microhabitat has matured, the embayments should significantly improve the availability of spawning habitat in the Taranaki Creek, in relation to the previous steep and eroding bank. This positive improvement will be more visible when the native vegetation has matured.

5.2.2 Taranaki Creek coastal tributary

Location and habitat extent

Inanga egg nests were identified on the true right (south) bank of a tributary of the Taranaki Creek. This tributary meets the Taranaki Creek mainstem downstream of the tide gates. Eggs were located alongside a pooled section of waterway, approximately 25 m upstream of a public access pathway (App. I, Fig. iii). Eggs were c. 0.4 m above the surface water level at the time of survey, and most were eyed, probably in the late stages of development.

The location of this spawning habitat was consistent with spawning habitat identified during a survey in 1988 (Taylor *et al.* 1992). Prior to 2023, no known spawning surveys have been executed at this location since 1988.

Spawning habitat quality and quantity

Spawning habitat in the Taranaki Creek tributary was limited to high density root matrices in luxuriant tall fescue growth on the true right bank of the waterway. Both the bank gradient and root mats in the vicinity of the egg deposits were highly suitable to facilitate inanga spawning. Root mats were dense and moist to the touch, with minimal sediment retention. Eggs were therefore clean, and well protected from desiccation and predation. The bank gradient was moderately steep, minimising the risk of the stranding of spent adults during tide recession. Other vegetation in the vicinity of the confirmed spawning habitat included watercress and *Eleocharis* sp. in the wetted channel. At low tide, surface water flow past the spawning habitat was sluggish.

In the confirmed spawning reach, the true left (north) bank of the waterway was not suitable for inanga spawning. While the vegetation was dominated by tall fescue, the bank was unsuitably steep for spawning. Downstream of the footpath, the banks and root matrices were highly sedimented and contained numerous crab-holes, indicative of a higher salinity. The saltwater wedge was not identified during this survey due to a low tide at the time of survey. Upstream of the confirmed spawning habitat, both banks were shaded by a canopy of young willow trees, making the banks unsuitable for inanga spawning.

Site management options and ideas

Due to the small size of this waterway in the vicinity of the spawning habitat, remediation or management is of this habitat is a low priority. The spawning ground identified is of sufficient size and quality to support spawning for the adult inanga population in this waterway. If remediation was to occur, the willows upstream of the spawning habitat should be removed, and the true left (north) bank should be re-graded and planted with native *Juncus* and *Carex* species, extending the suitable spawning habitat to both banks and further upstream.

5.3 Kaiapoi River

Location and habitat extent

Inanga egg deposits were observed in two locations on the Kaiapoi River during the 2023 survey. Both locations were consistent with similar locations during the 2019 survey. On the true right (southern) bank, eggs were observed in an embayment approximately 120 m upstream of the walking bridge.

On the true left (northern) bank, eggs were observed on the upstream side of the Cam River confluence (App. I, Fig. iv). These eggs were located on top of the bank toe, above a highly vertical bank.

Spawning habitat quality and quantity

The embayment on the true left bank of the Kaiapoi River was dominated by tall fescue and *Carex* sp., resulting in a suitably dense and moist root matrix at the high-tide level. However, a dense row of yellow flag iris was present between the river and the bank (App. II, Fig. viii), likely restricting access to the suitable spawning habitats on the bank. The only egg nest in this reach was located in a section that did not contain yellow flag iris. A stand of young willows was also present in this embayment. Due to the significant amount of shade created by these willows, understory vegetation was limited. The habitat in the vicinity of the willows was therefore not suitable for inanga spawning. Overall, egg distribution was light, and the stands of yellow-flag iris (*Iris pseudacorus*), along with a thick growth of in-channel Lagarosiphon aquatic weed, may be inhibiting spawning at this location. These plants are both weeds, and yellow-flag iris has a reputation of shading out suitable spawning vegetation in the inter-tidal zone on inanga spawning reaches. A CCC spraying programme was successful at significantly reducing the yellow-flag iris at the Avondale spawning site in Christchurch, and we would recommend a programme along this reach.

The spawning habitat identified on the true left (i.e., north) bank of the Kaiapoi River, near the Cam River confluence, consisted of tall fescue stands on the bank toe of a vertical bank (App. II, Fig. ix). While the root matrix, bank slope and height of the bank toe were considered suitable where eggs were observed, other areas in this vicinity were not suitable, due to an excessive bank toe height, or sparse root mats. This area has public amenity, and people have been observed fishing in the vicinity of the egg nests. This makes the eggs liable to being trampled or mown.

Table 5. Predominant herbs and grasses in Kaiapoi River spawning ground.

Common name	Scientific name	Association *
Carex	*Carex* sp.	Associated
Yellow flag iris	*Iris pseudacorus*	Not Associated
Knobby club rush	*Isolepis*	Associated
Tall fescue	*Lolium arundinaceum*	Eggs attached
Creeping buttercup	*Ranunculus repens*	Associated
Juncus	*Juncus* sp.	Eggs attached
Watercress	*Nasturtium officinale*	Not Associated
Willow	*Salix* sp.	Not Associated
Twitch	*Agropyron repens*	Associated
Edgar's Rush	*Juncus edgariae*	Associated
Harakeke	*Phormium tenax*	Associated
Dock	*Rumex* sp.	Associated

* Eggs attached, not attached but associated.

Site management options and ideas

To facilitate further inanga spawning in the embayment on the Kaiapoi River true right bank, the removal of willows and yellow flag iris is required. Providing the existing vegetation is retained during the removal of both willows and yellow flag iris, no further management is required in this area.

Management of the Kaiapoi River true left bank is difficult due to the multi-use nature of this site. Spawning here could be greatly improved and extended through the re-grading of the bank, and planting with native grasses and rushes at the high tide line, and native shrubs further up the bank to prevent erosion. However, the result of these bank works may impact on the ability of the public to access the river from this location for recreational purposes.

5.3.1 Lower Cam River

Location and habitat extent

Egg nests, and a significant length of suitable spawning habitat, were identified on the true left (eastern) bank of Cam River, between Smith Street and the Cam River tide gates (App. I, Fig. iv). The suitable habitat was approximately 60 m in length. Eggs were located at a reduced level (R.L) of 0.860-0.890 m RL, as referenced to the R.L staff on the Cam River tide gates. No eggs were identified on the true right (western) bank of the Cam River, upstream of Smith Street.

These locations are consistent with the 2019 inanga spawning survey of the Cam River. However, eggs were identified on the true right bank upstream of Smith Street in 2019. During 2023, short patches of suitable spawning habitat were identified in bank slumps on this bank, but no eggs were located.

Spawning habitat quality and quantity

The riparian vegetation in the positively identified spawning habitat on the true left bank of the Cam River was dominated by tall fescue grass during the 2023 survey (App. II, Fig. x). The eggs were adhered to a mixed-species root matrix, with species including tall fescue, creeping buttercup and monkey musk (Table 6). The bank gradient at the high tide level was suitable for eggs to adhere without risk of stranding for the adult inanga during deposition. There were no visible signs of recent mowing, resulting in a dense root matrix with high moisture levels and a sun-lit west-facing aspect, facilitating luxuriant vegetation growth. With the exception of one willow stand, no overhead canopy was present in the suitable spawning habitat upstream of Smith Street. The long, continuous suitable spawning habitat identified on the true left bank significantly increases the likelihood of spawning inanga to favour this area.

The majority of the true right bank was unsuitable for spawning during the 2023 survey, due to its vertical nature. The bank was also highly eroded, and the only suitable spawning areas on this bank consisted of mature bank slumps, with appropriately gentle gradients and dense tall fescue root mats. These bank slumps offered patchy spawning habitat, with long reaches of unsuitable habitat between them. Approximately 50% of the true right bank, between Smith Street and the Cam River tide gates, was also shaded by mature tree canopies. This significantly limited the density of understory vegetation, therefore limiting suitable root matrices on the true right bank.

Upstream of the Cam River tide gates, mature willows created a dense overhead canopy, resulting in high levels of bank shade (App. II, Fig. xi). Root matrixes of understory vegetation were sparse on both banks, and the river upstream of the tide gates was therefore unsuitable for inanga spawning.

Table 6. Predominant herbs and grasses in Cam River spawning ground.

Common name	Scientific name	Association *
Tall fescue	*Lolium arundinaceum*	Eggs attached
Creeping buttercup	*Ranunculus repens*	Associated
Monkey Musk	*Erythranthe guttata*	Associated
Willow	*Salix* sp.	Not Associated

* Eggs attached, not attached but associated.

Site management options and ideas

The true left bank of the Cam River, between Smith Street and the Cam River tide gates, is currently suitable as inanga spawning habitat, and does not require remediation. However, the removal of the willow stand on this bank would elongate the suitable spawning habitat, and prevent the willow from damaging the suitable undergrowth in the future. If erosion control is necessary, harakeke could be planted in the riparian zone, away from the high tide level to retain the current suitable root matrices.

The true right bank would require significant remediation works to become suitable inanga spawning habitat. This would include the removal of mature trees, especially willow, re-grading of the banks to a more suitable spawning gradient (possibly 1:3 like Taranaki Stream) and the planting of native grasses and rushes at the high tide level (0.862 m RL), and native shrub species in the riparian zone for erosion control.

Upstream of the gates, the riparian habitat is so heavily shaded by large trees, that complete construction of inanga spawning habitat would be difficult, and limited resources may be better placed on more suitable habitats downstream of the gates.

5.3.2 Courtenay Stream

Location and habitat extent

During the 2023 spawning survey, upstream of the tide gates, numerous egg nests were identified on the true right (east) bank of Courtenay Stream (App. I, Fig. v; App. II, Fig. xii). While the majority of this bank in the surveyed reach was suitable for inanga spawning, suitable areas were separated by multiple stands of willow saplings with a sparse understorey of spawning vegetation. Combined, the suitable spawning habitat on the true right bank was approximately 80 m in length. The survey was conducted on a receding tide (Table 1), and eggs were located approximately 20-30cm above the surface water at time of survey. The level of eggs on this bank was measured at 0.200-0.265 m RL.

Suitable inanga spawning habitat was also located on the true left (west) bank, with one egg nest identified. Suitable areas on this bank were patchy, with the majority of the survey reach unsuitably steep for spawning. Some of the areas in which large willow had been removed require regrading.

The extents of spawning habitats identified during the 2023 survey were consistent with previous surveys in 2017, 2019 and 2021.

Spawning habitat quality and quantity

Spawning habitat on the true right bank of the Courtenay River was highly suitable, due to dense root matrices formed by tall fescue, creeping buttercup and stands of Edgar's rush (App. II, Fig. xiii). The bank slope at the high tide level was varied due to bank slumping and erosion, but sufficient to adhere eggs without risk of stranding during spawning. The high-quality spawning habitat on the true right bank was hindered in many places by riparian willow and gorse regrowth, some growing very close to the high tide line (Fig. 1). Willow saplings on the true right bank were recorded during a 2017 inanga spawning survey, however these were not present in the 2019 and 2021 surveys. The rapid willow regrowth has therefore occurred between 2021 and 2023.

Figure 1. Willows on the true right bank of the Courtenay Stream require removal.

Suitable spawning areas on the true left bank were patchy, and significantly restricted in length. Riparian vegetation was a mixture of many species, both native and introduced. Species on this bank included, but were not limited to, *Carex* sp., *Juncus* sp., tall fescue, creeping buttercup, harakeke, blackberry, and willow. The significant variety of plants, combined with steep bank gradients, resulted in sparse root matrices and overall unsuitable spawning habitat. The only suitable habitat on this bank was found in a mature bank slump, and eggs were identified in a stand of *Juncus* sp. Within this slump.

Table 7. Predominant herbs and grasses in Courtenay Stream spawning ground.

Common name	Scientific name	Association *
Tall fescue	*Lolium arundinaceum*	Eggs attached
Creeping buttercup	*Ranunculus repens*	Eggs attached
Juncus	*Juncus* sp.	Eggs attached
Willow	*Salix* sp.	Not associated
Gorse	*Ulex* sp.	Not associated
Blackberry	*Rubus* sp.	Not associated
Twitch	*Agropyron repens*	Associated
Harakeke	*Phormium tenax*	Associated
Carex	*Carex* sp.	Associated
Edgar's Rush	*Juncus edgariae*	Associated
Dock	*Rumex* sp.	Associated

* Eggs attached, not attached but associated.

Site management options and ideas

It is highly recommended that willows and gorse (Fig. 1) be removed from the true right bank of the Courtenay Stream, upstream of the tide gates. The willows, when mature, will shade the bank and restrict the growth of understory vegetation. This is highly detrimental for inanga spawning habitat. Once all existing willows have been removed, willow regrowth should also be controlled regularly. Care should be taken to avoid disturbing surrounding riparian vegetation when removing willows. Any bank destabilisation caused by the removal of willows should be remedied through the planting of native grasses and shrubs such as harakeke.

5.3.3 McIntosh Drain

A survey of the spawning habitat at McIntosh Drain was attempted on 06/04/2023, however construction of a pumphouse at the tide gates was underway during this survey attempt. Bunds had been installed either side of the tide gates, and the area within the bunds was dewatered at the time of survey. Spawning habitat previously identified in this waterway was located on the true left (east) bank, immediately upstream of the tide gates. In 2023, this area was within the dewatered construction area, and spawning was therefore not viable. The presence of a bunded section across the tide gates also prevented fish passage, both upstream and downstream, and removed all tidal fluctuations and salt intrusion upstream of the tide gates. Combined, these factors created an inadequate habitat for inanga spawning.

The re-grading and future planting of the true left bank around the newly-installed pumphouse is based on providing suitable spawning habitat for future spawning seasons (App. II, Fig. xiv). No spawning will take place on this waterway during the 2023 spawning season.

6 Discussion

The quality of inanga spawning habitat is determined through an assessment of multiple factors, including bank gradient, riparian vegetation, root mat density, and access for spawning inanga.

Overall, eyed (i.e., developing) eggs were identified in six of the seven waterways surveyed in the 2023 inanga spawning season. The lack of any apparent dead eggs, implies that the habitats, as a whole, are functioning in providing a suitably moist environment for inanga egg development.

However, there are still improvements that can be made to ensure the longevity of inanga spawning habitats in the Waimakariri district. Willow saplings were present in the vicinity of spawning habitats in five of the seven waterways surveyed in 2023. When foliate, the dense canopies of all willow species create high levels of shade. This shade restricts the growth of understory vegetation, creating bare banks or sparsely vegetated areas around the base of trees (Wagenhoff & Young 2013). Inanga spawning requires a moist environment with protection from predators, meaning spawning will not occur in sparsely vegetated riparian zones. It is therefore highly recommended that these are removed before they mature and restrict the growth of understory vegetation. This is especially urgent on the true right bank of the Courtenay Stream, upstream of the tide gates. This site is a highly productive inanga spawning location, with six separate egg deposits identified during the 2023 survey. Willow saplings were removed from this location between 2017 and 2019, therefore all willow regrowth has occurred in the last 4 years. Ongoing willow control is therefore necessary in this reach.

As proven through the number of eggs located during these spawning surveys, the current survey method of searching in the tidal zone, in the vicinity of a saltwater wedge, is accurate and moderately efficient (Richardson & Taylor 2002). However, the plausibility of using eDNA samples to trace unknown spawning grounds is being explored. High concentrations of inanga DNA, as degrading milt, or coelomic fluid during egg extrusion, may be present for some time following spawning. The results of eDNA water samples collected from near the water margin at or near high tide may provide insight on where spawning occurs in waterways that have not previously been identified as spawning habitat. Concentration spikes in past eDNA samples are believed to be the result of smelt spawning behaviour (Wilderlab, email comms.), therefore the same may be possible for inanga spawning. This technique would likely be most suitable for larger waterways such as Saltwater Creek. While finding eggs will remain the most conclusive proof of inanga spawning, this new technique, where and if possible, may provide insights on the overall extent of inanga spawning in a particular waterway.

Table 8. Elevation of observed egg deposits in relation to the local reduced level (RL). In this case RL is in terms of the Lyttelton Vertical Datum 1937.

Waterway	Survey waypoint	Egg elevation (R.L m)
Taranaki Creek TRB	31	0.650
Cam River TLB	82	0.862
Cam River TLB	79	0.887
Courtenay Stream TRB	93	0.265
Courtenay Stream TRB	96	0.200
Courtenay Stream TRB	92	0.245

7 Recommendations

AEL would recommend the following, along with priorities in respect to ecological significance. Owing to construction activity, we cannot comment on McIntosh Drain, but this habitat can be taken as low priority at the time of survey as much of the habitat will be reconstructed from bare earth.

Recommendation	Priority (1 = high priority
Courtenay Stream – removal/poisoning of willow saplings and regrowth, especially the favoured true right (east) bank. This area is a high priority and willows are easily removed when small.	1
Benzies Creek – the poplar trees to be retained, but the adjacent willow tree regrowth and blackberry thickets should be sprayed/poisoned. Bank slope is already suitable and should not be regraded.	2
Taranaki Creek – if practicable, removal of underwater silt deposits within the embayments. Options for slug control.	3
Kaiapoi River – control of willow, yellow-flag iris, and Lagarosiphon.	4
Saltwater Creek – regrade true right slope and more native plantings to provide suitable vegetation and support the bank toe. Removal of willow saplings on true left bank.	5
Cam River - Mowing of banks (e.g., Cam River TLB) close to the waters should be avoided. One willow stand on the true left (east) bank, between Smith St and tide gates, should be removed.	6
Taranaki Creek tributary – removal of young willow canopy upstream of confirmed spawning. Also re-grading and replanting of true left (north) bank.	7

8 Acknowledgements

We thank the Waimakariri District Council for expeditiously financing this field study, and staff member Kate Steel for field assistance.

9 References

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10 Appendix I. Maps of inanga spawning survey reaches, 2023

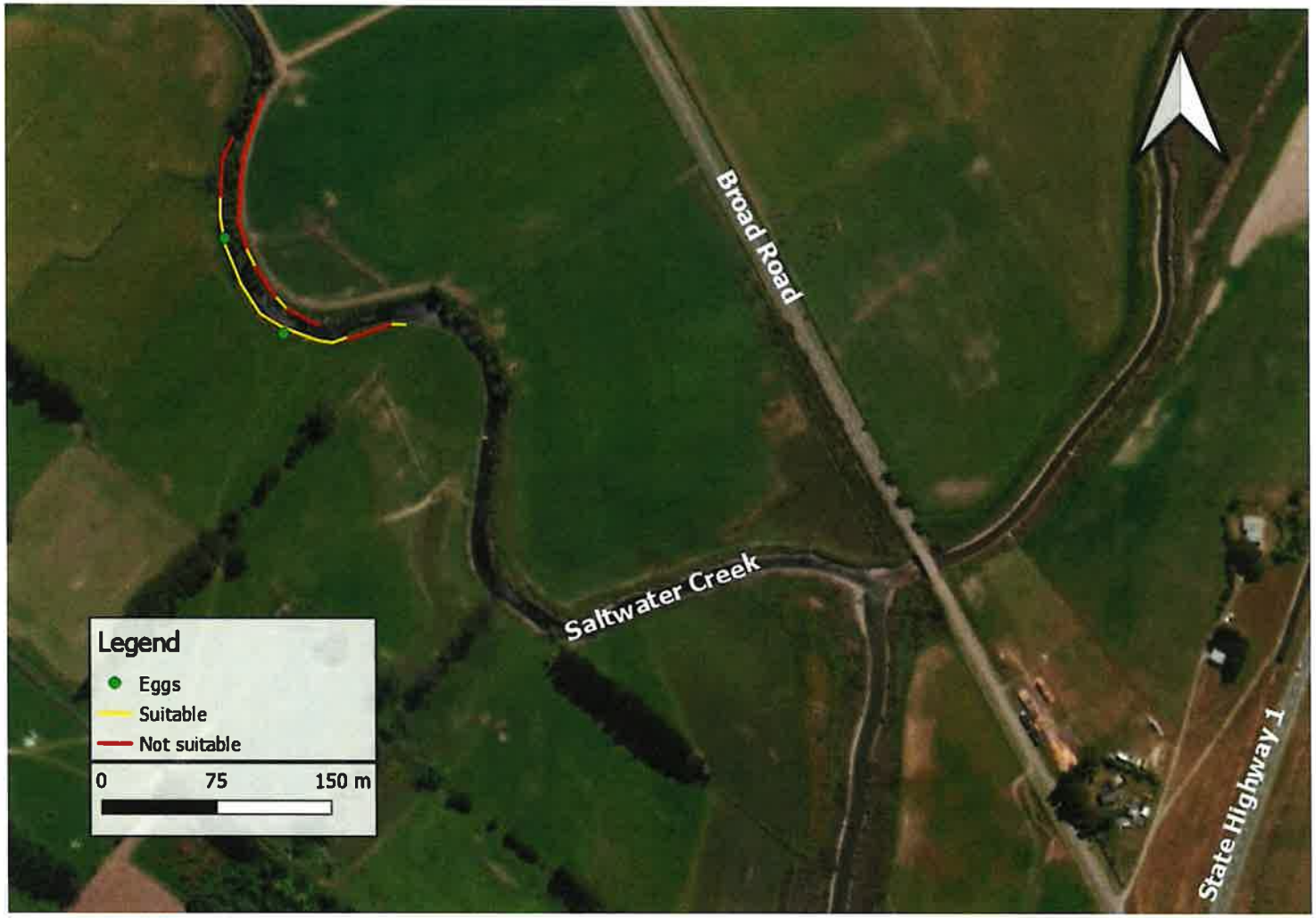


Figure i. Map showing habitat suitability for inanga spawning at Saltwater Creek, as assessed on 04/04/2023.

Figure ii. Map showing habitat suitability for inanga spawning at Benzies Creek, as assessed on 27/03/2023.

Figure iii. Map showing habitat suitability for inanga spawning and saltwater wedge location in the Taranaki Creek catchment, as assessed on 03/04/2023.

Figure iv. Map showing habitat suitability for inanga spawning on the Kaiapoi River and lower Cam River assessed on 23/03/2023.

Figure v. Map showing habitat suitability of inanga spawning on the Courtenay Stream, as of 24/03/2023. Lake Courtenay , with the Aqua Play recreational facility can be seen bottom left.

11 Appendix II. Site Photographs

Figure i. Saltwater Creek, looking downstream at the spawning reach.

Figure ii. Inanga spawning location on Saltwater Creek true right bank. Egg location circled.

Figure iii. Looking upstream from the spawning reach upstream limit. Note the steep banks on the left bank, and mature native vegetation on the right bank.

Figure iv. Benzies Creek, looking upstream at the true right bank spawning reach, with a mature poplar canopy.

Figure v. Benzies Creek, looking downstream away from the spawning reach.

Figure vi. Looking upstream at Taranaki Stream true right bank. Note the recently planted spawning habitat.

Figure vii. Macro photo of egg deposit in bachelor's button turf on Taranaki Stream true right bank.

Figure viii. Egg location (circled) at Kaiapoi River true right bank. Note yellow flag iris in right of frame.

Figure ix. Egg location (circled) on the Kaiapoi River true left bank, at the confluence with the Cam River.

Figure x. Cam River, looking downstream from the tide gates at the true left bank spawning habitat. Note the willow sapling in the middle of spawning reach.

Figure xi. Cam River, looking upstream from the tide gates. No spawning habitats were identified upstream.

Figure xii. Courtenay Stream, looking upstream from the tide gates.

Figure xiii. Egg nest within the base of native Edgars Rush (*Juncus edgariae)*, situated on the true right bank of Courtenay Stream. One of few examples of eggs amongst native rush.

Figure xiv. Looking at the true left (east) bank of McIntosh Drain, upstream of the tide gates. The graded bank around the pumphouse will provide inanga spawning habitat when planted.

AGENDA ITEM NO: 3.3	**SUBJECT:** CWMS Action Plan Budget Initiatives 2023/24 – for decision
REPORT TO: Waimakariri Water Zone Committee	**DATE OF MEETING:** 3 July 2023
REPORT BY: Murray Griffin, CWMS Facilitator – Waimakariri	

1. PURPOSE

The purpose of the agenda item is to enable the Waimakariri Water Zone Committee to confirm its support for a project from the $75,000 available in the Zone Committee's Canterbury Water Management Strategy (CWMS) Action Plan Budget for the 2023/24 financial year.

The committee received information on this project to review in April, and the decision to carry this project over to the 2023/24 financial year was confirmed at its 1 May meeting, as part of confirming the final recommendations for support of projects in the 2022/23 financial year.

This initiative for the committee's consideration is provided as **agenda item 3.3 – 1**: Ashley Rakahuri Rivercare Group – Estuary Shorebird Monitoring ($9,000).

2. RECOMMENDATION

That the Waimakariri Water Zone Committee:

1) **Receives** the information provided on the proposed CWMS Action Plan Budget project initiatives to support for the 2023-24 financial year.

2) **Approves** its support for this project initiative based on the $75,000 CWMS Action Plan Budget allocated for each CWMS Water Zone for the 2023/24 financial year.

3. BACKGROUND

As part of their Long-Term Plan 2021-2031, Environment Canterbury established the Zone Committee Action Plan Budget and committed $50,000 per Water Zone for the 2021-22 and 2022/23 financial years. Another $75,000 for each CWMS Water Zone was confirmed by Environment Canterbury it its 2023/24 Annual Plan.

The purpose of the budget is to support Zone Committees to focus on implementing their action plan and leverage other funding opportunities to achieve their Canterbury Water Management Strategy (CWMS) priorities.

CWMS Action Plan Budget Initiatives – Assessment

The Waimakariri Water Zone Committee has considered the above initiatives as options to support in this initial year of their 2021-24 Action Plan. In doing so, the committee has contributed to developing an assessment approach and template for the above and future Action Plan initiatives.

Assessment details for each initiative have been provided to the Zone Committee prior to the meeting to support its decision making.

AGENDA ITEM NO: 3.3 – 1	**Application for funding – CWMS Action Plan Budget 2022/23:** Ashley Rakahuri Rivercare Group Inc
Waimakariri Water Zone Committee	**MEETING DATE:** 3 July 2023

Application for funding – CWMS Action Plan Budget 2022/23

Applicant details

Organisation (if applicable):	**Ashley Rakahuri Rivercare Group Inc (ARRG)**
Contact name:	
Contact email:	

About your project

The amount of information and detail we would like you to provide is in proportion to the amount of funding you are requesting. If it is smaller amount, then a simple description of your project, who's involved and what you will be doing, along with a simple budget is sufficient.

Project name:	*Ashley Rakahuri Estuary Shorebird Monitoring 2023/24*
CWMS zone where the activity will occur:	*Waimakariri in the Saltwater Creek and Ashley Rakahuri estuary areas.*
Provide a brief project summary:	
- *The project will continue monitoring the breeding of shorebirds around the Ashley-Rakahuri /Saltwater Creek estuary – the species, their nest locations and their breeding outcomes.* - *Such work has been undertaken by ARRG on the Rakahuri riverbed above the estuary for almost 20 years, but to our knowledge, has not been done before around the estuary itself.*	

Waimakariri Water Zone Committee

- *The main species monitored would be banded dotterel (turiwhatu), pied stilt (piako), black-fronted and white-fronted tern (tarapirohe and tara), S. Island pied oystercatcher (torea) and black-billed and black-backed gull (tarapuka and karoro).*
Describe the outcomes or impacts of this project: *Outcomes or impacts are what will change or who will benefit from this work, including enduring benefits. For example, fencing off springheads will improve biodiversity and improve stream health.*
Much improved knowledge of shorebird breeding attempts and success, plus knowledge of reasons for nesting failures
List the key outputs of the project: *An output describes what your group is proposing to do and is measurable. For example, install 250 m of fencing, or train 25 volunteers. Outputs are important and may be used as milestones in a funding agreement.*
A progress report by the end of December, 2023. *A final report by the end of March 2024 - following the end of the next shorebird breeding season.* *We wish to establish reasons for nesting failures of the previous season so steps can be taken to minimise factors that result in failure and thus attract threatened and vulnerable nesting shorebirds to successfully fledge chicks to increase species numbers. This is achieved in part through annual monitoring and bird counting in the selected area.*
Please state how the project aligns with the relevant Zone Committee's 2021-24 Action Plan: *All action plans can be found as a link at the bottom of the "What's happening in my zone" page on the Environment Canterbury website. (https://www.ecan.govt.nz/your-region/your-environment/water/whats-happening-in-my-water-zone/)*
- *This project aligns with the WWZC Action Plan Priorities:* - *(2) Increased indigenous biodiversity in the zone,*   - *To protect and improve the indigenous biodiversity, habitat or ecosystems in the Zone*
Tell us what activities you're intending to do and when you intend to have the project completed (timeline):
Visits to locate and monitor shorebird nesting in estuary at least weekly from Sept 2023 until end of February 2024 when fieldwork finishes. Final report completed by end of March, 2024.

Waimakariri Water Zone Committee

Tell us about the project management, including leadership and financial oversight:
The MSc project will be undertaken by UoC MSc student, Eleanor Gunby, supervised by UoC Professor Jim Briskie. ARRG members, particularly Operations Manager, Grant Davey, will provide field guidance and assistance, with financial oversight from the UoC, and ARRG treasurer, Sue Mardon.
List any other groups or organisations you are partnering with on this project, such as community groups, schools etc:
The main partner is the UoC student.
How will you engage the community on the project:
ARRG is a North Canterbury (Rangiora) based community group with 185 members. Woodend is the nearest township to the estuary, and its community will be addressed on the project at its completion.

Do you know of any cultural values associated with this site? **If yes, what engagement has occurred or is planned (if any) with local Papatipu Rūnanga about this project?**	**YES**
The estuary has always been important to Te Ngāi Tūāhuriri Rūnanga as a cultural site, particularly for mahinga kai. They are well aware of, and have supported, ARRG's shorebird activities since ARRG's formation in 1999.	
Please provide an accurate location with grid reference and/or map (if relevant to your project):	

***Map**: of the intended project area for Ashley Rakahuri Estuary Shorebird Monitoring by ARRG*

Who owns the land? *Attach evidence of permission from the landowner, or their representative.*

ECan.

Funding details

Please attach a budget to your application if one has been prepared. Your budget should include estimates of income and expenditure, including other funding and in-kind contributions. You should show clearly what you are planning to spend the Action Plan funds on if successful. We would like more detail if your application is for a larger amount e.g.$15,000. We have some example budgets for different types and sizes of projects in our resource pack. These will show you what we are expecting you to provide.

How much funding are you requesting?	**$9,000.00**

Waimakariri Water Zone Committee

If you are successful with this application, what components of your project will you spend the money on?*   *If you have a project budget, please attach it to your application.*
-*Project admin costs* *In-kind*   -*Monitoring co-ordinator, Eleanor Gunby* *$9,000*   -*Total project costs* *$9,000*   -*WWZC Action Plan request:* *$9,000*   -*Funding from other sources will be sourced as/if required.*   *Note: The increased funding application compared to last year's is due to Eleanor being paid to monitor from mid Nov to 6 Feb. Grant Davey monitored voluntarily from 7 Sep to mid Nov. Eleanor found $5,000 insufficient to cover her costs. UC covered some of her travel expenses. Therefore, ARRG is applying for sufficient funding to cover Eleanor Gunby to monitor the full nesting season 2023/24*

Have you applied to or received funding from other organisations for this project? **If yes, please provide details below or note if it is included in your attached budget.**	**YES**
ECan – CWMS Action Plan Budget support from the Waimakariri Zone Committee funded year 1 of the project in 2021/22 ($5,000 received 15 July 2022).	
Is the project receiving any other monetary or "in-kind" contributions from your organisation or others e.g. volunteer time, use of resources, facilities and equipment? **If yes, please provide details below:**	**YES**
Voluntary supervision by ARRG Operations Manager.	

Working with us and Environment Canterbury

In the last three years have you received funding or other support from Environment Canterbury for this, or any other project? **If yes, what was the funding/support for, and when did you receive it:**	**NO**

Waimakariri Water Zone Committee

Are you intending on applying to another Environment Canterbury fund this financial year for this, or any other project? **If yes, what fund are you applying to?**	**YES**
ECan – CWMS Action Plan Budget through the Waimakariri Zone Committee to support weed clearing in the Ashley Rakahuri River in 2022/23 ($5,000).	

Do you have supporting information you would like to provide (optional):

*Please attach any supporting information with your application***.**

Once completed, please send this application form to: Facilitator, Murray Griffin, email: murray.griffin@ecan.govt.nz

AGENDA ITEM NO: 4	SUBJECT: Committee Updates
REPORT TO: Waimakariri Water Zone Committee	MEETING DATE: 3 July 2023
REPORT BY: Murray Griffin, CWMS Facilitator – Waimakariri, ECan	

PURPOSE

The purpose of the agenda item is to provide the committee with an overview of updates to be tabled.

RECOMMENDATION

That the Zone Committee:

Receives these updates for its information.

Requests an option for co-opting an advisory member onto the Zone Committee to be confirmed at the 4 September Zone Committee meeting.

COMMITTEE UPDATES

The following updates will be addressed with the committee:

1. Co-opting an advisory member onto the Waimakariri Water Zone Committee

Following on from the discussion at the committee's 1 May meeting it is proposed that M Griffin, as the committee's facilitator, follow up on the options available for the committee to co-opt an advisory member onto the committee through until the next CWMS Zone Committee Refresh in 2024.

It is requested, and a motion proposed, for this to be confirmed at the next Zone Committee meeting on Monday 4 September.

2. Zone Committee Working Groups

Biodiversity Working Group

Martha Jolly has provided the following update:

- The Working Group met on 12 June and discussed the upcoming environmental awards. Bex Dollery confirmed all information has been passed onto WDC comms. They can get the work done in the timeframe and are able to make an application form for the web link. A draft will be available for review and input prior to it going live.

  The Group have opted to name each award after a species found within the zone.

  - Youth: Inanga
  - Group: Kōwhai
  - Individual: Bellbird

- The awards will be made by Moller-Young. Each one will be metal on Rimu. A braided river design in the border, the species picture in the centre of the award with a water drop above it and "Waimakariri Environmental Award Youth", etc below. A metal plate on the back of the award can be engraved with the recipient's details and the certificates that are handed out with

the awards will include “Waimakariri Water Zone Committee” and WDC/ECan logos, year, award received.

Lifestyle Block Working Group

Carolyne Latham had provided the following update:

- The Top Ten Tips for Lifestyle/small block owners resource has now been completed. The working group met on 12th June 2023 to discuss the next steps. A list of ideas was compiled and those identified for prioritising were:
    - Identification of the best location for the web page on Ecan’s website, and support documents to go under each point.
    - Investigate sending out hard copies to rural addresses with WDC rates demands.
    - Promotion via various publications.
    - Emailing the leaflet directly to various groups in the zone.
    - Trialling a TTT workshop.
    - Working with WDC and ECan on different ways of promotion including social media.
- A copy of the Top 10 Tips is provided as **agenda item 4.1**

Monitoring Working Group

Erin Harvie provided the following update:

- The Working Group has been working with the Waimakariri Landcare Trust to confirm a project focused on analysis of the current freshwater monitoring within the zone. This project will build the understanding of the existing monitoring already being undertaken by various stakeholders within the Waimakariri District and to determine where the spatial and temporal data gaps are in the monitoring programme and what additional monitoring needs to be undertaken to meet the new freshwater management targets and outcomes. A proposal to support this initiative from the CWMS Action Plan Budget for 2022/23 is provided as agenda item 3.2.4 in these meeting papers.

3. Farmer’s Field Trip for Mahinga Kai – 21 June 2023

Zone Committee Chair, Carolyne Latham, was able to attend this field trip across the Cust catchment on Wednesday 23 June. She will provide the committee with an update on this field trip at the meeting.

4. Committee Communications Update – June Quarter 2021

ECan Communications and Engagement Advisor, Emily O’Connell, has provided the latest quarterly update on the Zone Committee’s communications, which is included as **agenda item 4.2**.

5. ECan Water and Land Committee Meeting – 28 June 2023

Please find the link below to the upcoming meeting of the Environment Canterbury Water and Land Committee to be held on Wednesday 28 June. The agenda can be viewed and downloaded from this link:

- Link: Council and committee meetings: Current month | Environment Canterbury (ecan.govt.nz)

6. Rangiora Reach – Masterplan Final

Environment Canterbury's Rivers Team are pleased to be able to share the Rangiora Reach Masterplan, which aims to deliver a landscape plan for a section of the Ashley River/Rakahuri.

The masterplan will guide future development and management of Rangiora Reach – the part of the awa/river from Dunlops Road to Beatties Road on the north side near Rakahuri, and Merton Road to Smarts Road on the south side near Rangiora.

It will be used by agencies managing this land – Environment Canterbury and Waimakariri District Council, in collaboration with mana whenua and the community.

The masterplan reflects around two years of conversation, consultation, feedback, workshops and hui we've had with the community. We hope it reflects people's values and priorities, but also helps meet the need to keep them safe through a changing climate.

The values and priorities included throughout the development of the masterplan include:

- Significance to Ngāi Tūāhuriri
- Ongoing flood protection
- Climate change
- Landscape and natural character
- Indigenous biodiversity
- Recreation
- Braided River Revival

The braided river revival team is happy to be able to deliver a plan to the community that balances their values and priorities alongside flood protection and climate change too.

As our environment changes, it's important to shape future planning in a way that protects both the ecosystems within that environment, but also the people who call that place home. While there were some non-negotiable structural elements like flood protection, we hope the masterplan will help to set the vision as we work towards achieving a living, thriving awa.

Continued conversations and future opportunities

"We'd like to thank everyone who took the time to let us know their thoughts," says Greg Stanley, Regional Lead for Braided River Revival.

"Although we haven't been able to offer increased amenities for absolutely every suggestion we received, the conversations around those suggestions will continue and we look forward to identifying future opportunities to enhance them in this reach, or along other areas of the awa," he says.

With an agreed set of values established, the masterplan is a way we can ensure future development of the area will reflect those values.

Work is already underway with the community, such as the planting in the Cones Road area. Other components will require continued planning by Environment Canterbury and Waimakariri District Council to see how we can create collaborate to achieve the masterplan outcomes.

"It's a big step forward and something we're proud to have partnered with the community on, but the mahi is just beginning!" he says.

A copy of the Masterplan is provided as agenda Item 4.3 in these meeting papers.

For more information, follow the link below:

- Link: Rangiora Reach Masterplan highlights future opportunities for part of Ashley River/Rakahuri | Have Your Say (ecan.govt.nz)

7. A new Regional Integrated Plan – Opportunities to contribute

Environment Canterbury is commencing with the first phase of the public campaign aimed at creating a new Regional integrated planning framework.

For more information on this campaign, and how you can be involved, **please refer to agenda item 4.4**

8. Ōtūwharekai/Ashburton Lakes lessons-learnt report

This report was written following a request from the Minister for the Environment to examine the reported decline in freshwater quality and ecosystems in the Ōtūwharekai/Ashburton Lakes area of Canterbury (around 50 kilometres west of Methven).

The aim of the report was to identify any issues with the resource management system that have contributed to the reported decline in the lakes, as a case study for the wider resource management regime.

Multiple vulnerabilities were found to exist within the system and are detailed in the report together with recommended actions.

This report is not about the actions or intentions of the people who operate within the system. The Ministry recognises that farmers, advisors and council officers are all doing their best to operate within the current regulatory system. The farmers in the catchment are compliant with the regional plan, and are working with Environment Canterbury and multiple agencies to find solutions for the lakes.

- To get a copy of the full report go to:
  Ōtūwharekai/Ashburton Lakes lessons-learnt report | Ministry for the Environment

9. Further Information Links

- Link to the ECan updates on the **Essential Freshwater Package**:

Essential Freshwater package | Environment Canterbury (ecan.govt.nz)

- Link to the ECan updates on **Plan Change 7 & 2 to the Canterbury Land & Water Plan**

Plan Change 7 and Plan Change 2 - What you need to know | Environment Canterbury (ecan.govt.nz)

10. Action points from the previous zone committee meetings

Action points from the previous meetings:

- Information on the realignment of the North Brook tributary and water quality sampling at Tutaepatu Lagoon.
- Follow up on testing for pesticides in the Kaiapoi River.
- An update on the Kaiapoi River salinity logger data.
    - Further updates on the above action points is being facilitated.

Action points from the 1 May 2023 meeting:

- M Griffin to confirm the 2023/24 CWMS Action Plan budget – which has been confirmed at $75,000 for each Water Zone through the Environment Canterbury 2023/24 Annual Plan.

Fin.

WAIMAKARIRI HAS MORE THAN 6,500 LIFESTYLE BLOCKS COVERING NEARLY 13% OF THE DISTRICT — ABOUT 29,780HA AND GROWING.

Collectively, lifestyle blocks can have a significant impact on our environment as they typically have more people and infrastructure on a smaller land area, and are concentrated in areas where they become the dominant land use.

Check out the Waimakariri Water Zone Committee's **TOP TEN TIPS** to love your land and help keep our rivers and streams healthy.

Advice and support is available from NZ Landcare Trust, Waimakariri Biodiversity Trust, Environment Canterbury and Waimakariri District Council.

Top Ten Tips for Lifestylers was produced by Waimakariri Zone Committee with support from NZ Landcare Trust, Environment Canterbury and Waimakariri District Council.

Visit **ecan.govt.nz/get-involved/news-and-events/zone-news/waimakariri/keep-your-block-tip-top**

WAIMAKARIRI DISTRICT COUNCIL

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

NZ LANDCARE TRUST
NGĀ MATAPOPORE WHENUA

E23/74/54

KEEP YOUR BLOCK TIP TOP!

PROTECTING OUR WATERWAYS, WETLANDS, DRAINS, SPRINGS, DAMS AND PONDS — ANYTHING THAT CONNECTS TO A WATERWAY WHETHER NATURAL OR MAN-MADE, PERMANENT OR TEMPORARY.

HERE ARE YOUR TOP TEN TIPS

1 UNDERSTAND YOUR LAND

Know where water flows and where it goes! What's it like in a drought? And in a flood? Know where NOT to put fences, troughs and buildings. Avoid blockages and potential contaminants getting into water by clearing branches and debris, especially near culverts. Keep stored materials, equipment, containers and animal facilities away from areas that flood.

2 KEEP ANIMALS OUT

Heavy animals such as cattle, deer, horses and pigs can damage soil, drain and stream banks, and put mud, faeces and urine in our water.

3 STABILISE AND BUFFER

Keep waterway and drain banks well vegetated as bare banks can easily collapse and erode. Spot spray weeds if needed. Have a wide buffer strip each side — long grass does a good job of filtering sediment.

4 WATER IS PRECIOUS

Ensure that trough ballcocks are well protected from stock. Check troughs and tanks regularly for leaks and fix straight away. If irrigating, monitor soil moisture to determine requirements, make sure water use is within any take limits*, and avoid ponding, run-off, and wasting water.

5 LOVE YOUR NATIVE PLANTS AND ANIMALS

Big and small! Get help* to identify and protect what you have, and plan to enhance. Control weeds and pests to protect these native treasures. Bring back your natives e.g. *Carex secta* is an ideal native grass for bank protection and drain/waterway weed suppression.

6 MANAGE YOUR STOCK

Match your animal numbers to the pasture you can grow. Avoid overgrazing and pugging paddocks. Fewer well fed stock stay in better health and can give better returns than under-fed stock. If in doubt, get advice.

7 MONITOR SEPTIC TANKS

If it pongs, something's wrong! If your tank hasn't been emptied for more than 5 years consider getting a septic tank contractor to pump it out. Regularly check the land application area to make sure effluent is not ponding. Filters need cleaning 3-6 monthly or get your system serviced by a professional. Use eco-friendly cleaning and laundry products to keep your wastewater treatment bugs happy.

8 FIND YOUR HOT SPOTS

Identify areas of bare ground and spots that become muddy when it's wet, making our water dirty. Keep animals out with temporary fencing and only graze when dry.

9 MANAGE FERTILIZER AND MANURE

Apply in warmer months when pasture is actively growing and best able to absorb nutrients. Avoid spreading if heavy rain is forecast and keep well away from waterways and gullies. Seek professional advice to avoid over-application.

10 RESPONSIBLE RUBBISH DISPOSAL

Recycle waste such as baleage wrap, expired chemicals and containers, and household waste. Rubbish holes and waste can degrade your land and cause contamination. Compost dead stock or bury well away from waterways. Burning dry tree trimmings produces less smoke than green/wet.

Help is available! Go to **ecan.gout.nz/get-involved/news-and-events/zone-news/waimakariri/keep-your-block-tip-top*

January - June 2023 communications report for Waimakariri Water Zone Committee

- **Prepared by:** Emily O'Connell, Communications and Engagement Advisor, Environment Canterbury
- **Prepared for:** Waimakariri Water Zone Committee meeting, July 2023

This report provides an overview of communication and engagement activity completed by Environment Canterbury communications and engagement staff (and contracted communications professionals). Normal channels used include:

- Environment Canterbury website and Facebook
- Selwyn District Council channels
- Local Water Zone email newsletter (through Environment Canterbury)
- Local media

All Waimakariri-specific content can be found on the Environment Canterbury website at: www.ecan.govt.nz/get-involved/news-and-events/?q=&zone=11&category=&subject=&sortOrder=DESC

Date	Content	Overview
March	Newest leaders in Waimakariri: www.ecan.govt.nz/get-involved/news-and-events/zone-news/waimakariri/newest-leaders-in-waimakariri/	This story introduces the new committee chairs and youth representative.
April	Keep your lifestyle block tip top: www.ecan.govt.nz/get-involved/news-and-events/zone-news/waimakariri/keep-your-lifestyle-block-tip-top/	This story marks months of work to collate 10 top tips for lifestyle block owners. This was also created into a pamphlet and work is underway to make a distribution plan.
May	Farmers field trip for mahinga kai: www.ecan.govt.nz/get-involved/news-and-events/events-2023/farmers-field-trip-for-mahinga-kai/	This advertised an upcoming field trip in Waimakariri.
	Soil Conservation funding boost from central government: www.ecan.govt.nz/get-involved/news-and-events/2023/soil-conservation-funding-boost-from-central-government/	This column talks about our SCAR programme continuing and expanding into Waimakariri.
June	A Minute with Marco – June: www.ecan.govt.nz/get-involved/news-and-events/zone-news/kaikoura/a-minute-with-marco-june/	Kaikōura and Hurunui Waiau Uwha zone delivery lead Marco Cataloni's bi-monthly column also talks about the SCAR programme funding boost.
Regional content of interest:		

- Annual Plan: www.ecan.govt.nz/get-involved/news-and-events/2023/highlights-a-reason-to-celebrate-as-annual-report-is-adopted/
- Big turnout for Bioblitz at Muriwai o Whata: www.ecan.govt.nz/get-involved/news-and-events/zone-news/selwyn-waihora/big-turnout-for-bioblitz-at-muriwai-o-whata/
- Using AI to identify pest plants: www.ecan.govt.nz/get-involved/news-and-events/2023/using-artificial-intelligence-to-identify-pest-plants/
- Stubble burning: www.ecan.govt.nz/get-involved/news-and-events/2023/stubble-burning/
- Healthier Homes Canterbury update: www.ecan.govt.nz/get-involved/news-and-events/2023/healthier-homes-canterbury-interest-payments-to-be-refunded/

Planned communication activity: Water zone committee action plan funding stories and snapshots, water zone committee newsletters and related news from regional communications.

Rangiora Reach Masterplan

DATE: 20/12/2022

Revision: Final

THRIVE
SPACES & PLACES

www.thrivespacesandplaces.nz

CONTEXT

The purpose of this masterplan is to guide future development and management of the Rangiora Reach, located along the Ashley River/Rakahuri. The masterplan will ensure cohesive and clearly communicated landscape planning can occur across agencies managing the land, and contribute to a living, thriving river system. It reflects community values and priorities such as:

Significance to Ngāi Tūāhuriri:

The Rakahuri River and its catchment has strong mahinga kai associations for Ngāi Tūāhuriri hapū. The river and its associated tributaries, wetlands and lagoons were known as the food basket of Kaiapoi pā.

The Ngāi Tahu Claims Settlement Act (1998) describes mahinga kai as "the customary gathering of food and natural materials and the places where those resources are gathered." The concept includes species, places, and practices, including cultivation. Mahinga kai are central to Ngāi Tahu culture, identity and relationship with landscapes and waterways of Te Waipounamu.

The deeds of purchase for land across Canterbury came with promises of reserves, schools, hospitals, and access to mahinga kai which were not fulfilled. The Rakahuri was one of the three waterways (the others being Waimakariri and Ruataniwha/Cam) that continued to sustain Ngāi Tūāhuriri during the ongoing alienation from their land and resources.

Since the late 1800's the Rakahuri has been managed with an emphasis on flood control and land preservation rather than mauri (an intrinsic life force) or mahinga kai. The substantial physical modification of the river and its tributaries has had significant effects on the relationship of Ngāi Tūāhuriri and their culture and traditions with this ancestral river. The loss of mahinga kai has impacted how the hapū exercise manaakitanga (hospitality) and whakawhanaungatanga (relationship building).

The restoration of the Rakahuri as a mahinga kai will require a "ki uta ki tai (mountains to the sea)" approach and this is beyond what can be achieved by a masterplan. However, the masterplan is an opportunity to highlight the associations Ngāi Tūāhuriri hold with the Rakahuri, and their aspirations for its revival.

"Ahi ka is about being brought up on the river and our continuous use over seven generations. It is about the river being more precious to us than any possession we may have. It is very hard to explain - it is how we live, it is what we know, it is what we have been taught. The Rakahuri is part of who we are."

-Ngāi Tūāhuriri Kaumātua

BELOW: Stopbanks are a vital piece of flood protection infrastructure used along the Rangiora Reach.

Ongoing flood protection

The Rangiora Reach is a highly developed area of the Rakahuri adjacent to several thriving communities including Rangiora, Ashley Township, and Loburn. As a result, the river berms play a critical role in protecting these communities from flooding. Much of the river berm in the Rangiora Reach is vested in Environment Canterbury for flood protection and includes a number of critical flood protection assets including:

- Primary and secondary stopbanks that contain high river flows and enable the area in between the stopbanks to function as a floodway, should the primary stopbank fail, passing flood water around the Cones Road/Inland Scenic Route 72 bridge and returning it to the river downstream
- Deliberately planted vegetation to protect the riverbanks from erosion and deflect/slow flows to reduce the risk of damage and breaches both in the immediate vicinity and further downstream
- Rock and dirt groynes designed to redirect and slow down high river flows.

Climate change

In May 2019, Environment Canterbury declared a climate emergency, highlighting both the urgent need to address the issue, and the work already being done in response. Climate change presents significant challenges, risks and opportunities—it's already impacting ecosystems and communities around the world, with increasingly frequent and severe storms, floods and droughts; melting polar ice sheets; sea level rise and coastal inundation and erosion; and impacts on biodiversity including species loss and extinction. Changes to air temperatures, soil, and weather patterns will ultimately mean changes to land use which is why deliberate and long-term planning on how land is used is essential, to ensure communities increase their resiliency to climate change. Rapid and far-reaching transitions are needed, with everyone having a part to play in delivering the change required.

Landscape and natural character

The Rakahuri is a globally rare, braided river ecosystem with a very specific combination of climate and geology, causing ever-changing and highly dynamic channels or braids that weave across a wide, dry, gravelly riverbed known as the braidplain. This ever-changing, diverse environment gives rise to a unique ecosystem of plants, animals, and invertebrates, the most visible of which are the braided river birds.

Indigenous biodiversity

The Rakahuri is considered 'outstanding' in terms of its wildlife and conservation values and was recently classified as a river of national importance. The Rangiora Reach is home to a number of indigenous and threatened species unique to the braided rivers of the Canterbury Plains.

These include:

- Bird species dependent on healthy braided river habitats include the wrybill/ngutu pare, black-fronted tern/tarapirohe and black-billed gull/tarāpuka
- Invertebrates including endangered butterfly species such as the Canterbury plains Boulder copper and the New Zealand blue butterfly
- Fish species including tuna/eel and pātiki/flounder
- Native plants including *Muehlenbeckia complexa, Melicytus alpinus, Kunzea serotina, Sophora prostrata, Sophora microphylla* and *Podocarpus totara.*

Future planning for these areas is crucial, to understand the present values and how we can work together to provide the best chance for these rare ecosystems and species to survive.

Photos of bird species dependent on braided rivers (from left): juvenile black-fronted tern in flight, black-billed-gull chicks, wrybill. Images sourced from Environment Canterbury.

Recreation

The Rakahuri is also highly valued by the community for its recreational values. The river is home to a wide range of water and land-based recreation and leisure activities, including:

- Cycling and mountain biking
- Walking, running and hiking
- Dog walking
- Swimming
- Fishing and whitebaiting
- Picnic
- Motorcross and 4WD activities
- Horse riding.

The Ashley Rakahuri Regional Park is operated by Environment Canterbury. It opened in October 2012 and encompasses the Rakahuri and berm area from the Ōkūkū River confluence downstream to the Ashley Estuary. The Ashley Rakahuri Regional Park Management Plan* describes the key recreational uses of the park area and sets out the management for these areas and activities.

*To learn more about the Ashley Rakahuri Regional Park Management Plan visit www.ecan.govt.nz/ashley-rakahuri-regional-park/

Braided River Revival

Rangiora Reach is one of nine reaches that make up the Ashley Rakahuri Revival Strategy, which is part of Environment Canterbury's Whakahaumanu Ngā Awa ā Pākihi / Braided River Revival – a programme initiated by Environment Canterbury that takes a landscape scale approach to the development and implementation of actions for river revival across Waitaha/Canterbury. The programme seeks to empower the cohesion of local communities by integrating their shared vision, determination, funding, and delivery of enhancement projects.

To learn more about the Braided River Revival Programme visit www.ecan.govt.nz/braided-rivers/

MASTERPLAN PROCESS

COMMUNITY VALUES

Since early 2022, we've been gathering information about what the community most values about the Rangiora Reach area, and what they'd like to see happen here. This final masterplan is a way forward to honour the key community values while ensuring flood protection, biodiversity enhancement, mahinga kai, and recreational values are upheld during future development and management of the area.

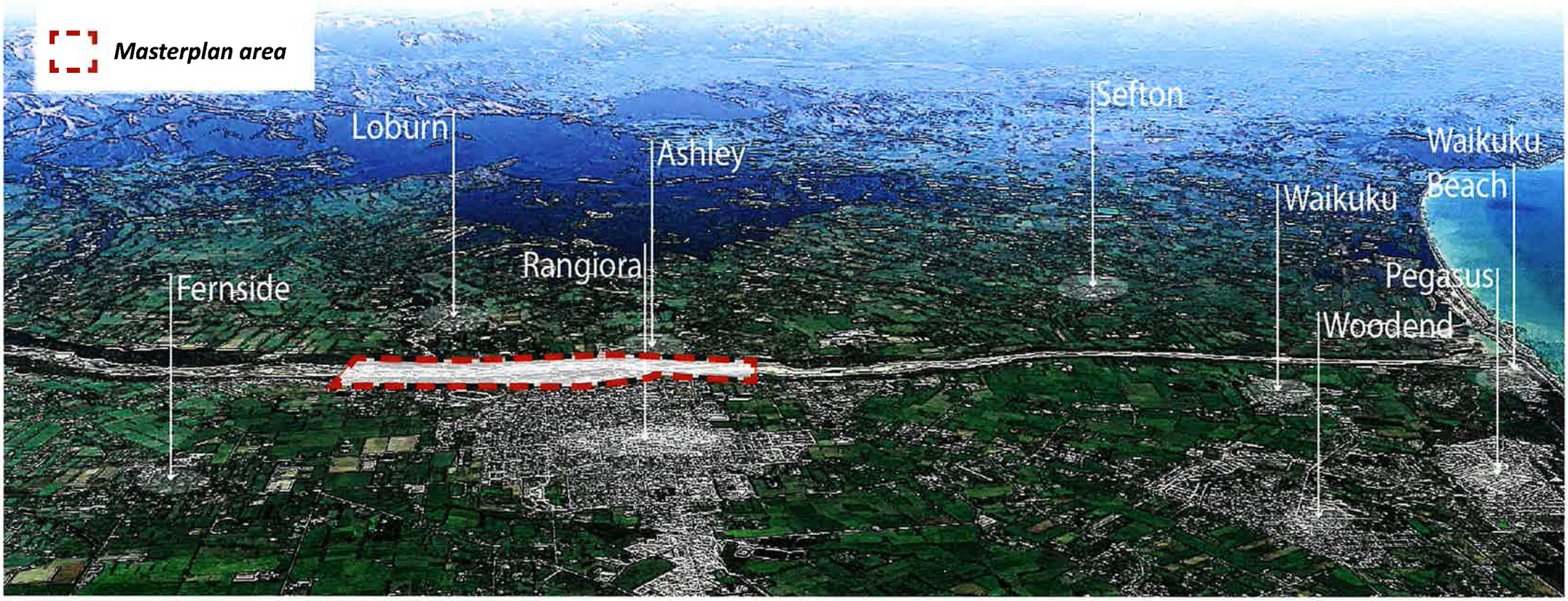
Key considerations, as noted by the community, for the future of this area includes:

- Education regarding flood protection values, and the biodiversity present via interpretation signage
- Wayfinding throughout the entire site
- Signage to delineate recreational use types in areas for safety and to provide clear information on the trails network opportunities
- Improve the Cones Road area with planting, a carpark extension, a mountain biking skills area, and investigate further interventions accommodating for flood control work
- Improve the carpark surfacing and layout in some access areas
- Identify key biodiversity areas and include protection and enhancement strategies where appropriate in the masterplan
- Review the flood control work plan along with flood modeling to determine what areas require modification
- Introduce extensive native planting to attract native birdlife, and consider selected exotic species where they attract native birds as well
- Enhance the amenity values of the site through the introduction of exotic and native feature planting
- Work with clubs and volunteer groups to refine their suggestions for the site.
- Consideration and of horse riding trails and amenities
- An enhanced recreational space that will cater for various users
- Less access to areas prone to flytipping
- Cycle barriers which can be passed through without dismounting
- Limited dog access during breeding season
- Restricted vehicle access.

While we haven't been able to include every suggestion, conversations will continue and we look forward to identifying future opportunities to increase or enhance provisions for those suggestions such as through Braided River Revival. We are committed to continue working with those who use and value the area to ensure a space for all to enjoy.

SPATIAL CONTEXT

Located 35 km north of Christchurch City, the Rakahuri lies just north of Rangiora. This masterplan is for the Rangiora Reach of the Rakahuri, identified below.



HABITAT FOR NATIVE SPECIES

RIVER BIRDS

Rangiora Reach provides vital nesting habitat for several key native and endemic bird species that are currently threatened or declining in numbers. These species rely on the braided form of the river to raise chicks in nests concealed in the riverbed.

Protection of these areas has involved prohibiting access to the riverbed during nesting times, and ensuring the river fairway is kept clear of larger woody weed species. Extensive rat trapping along the banks of the river has also proven successful and is continually monitored by Ashley Rakahuri Rivercare Group (ARRG).

BELOW: Map summarising nesting sites recorded by ARRG from 2004 - 2021. The recorded nesting sites include native and endemic species as shown in the images below.

Data and photos replicated with permission from ARRG.

BUTTERFLIES

The Reach area also provides habitat for several endemic butterfly species. The species listed below rely on varied natural features within the reach area. The common copper occurs in open country and is a short-lived butterfly with individuals only known to live one to two weeks. Known host plants are *Muehlenbeckia sp/* pohuehue.

The Canterbury plains Boulder copper frequents riverbeds, stream edges and shingle beds. It is often overlooked because of its small size and its habit of flying close to the ground over its host plant *Muehlenbeckia axillaris,* sunning itself on stones or shingle, from which it absorbs heat. Males are a shining purple / yellow (photographed), with females an orange blue colour.

The New Zealand blue's habitat is in river terraces. This endemic species has already been displaced throughout most of New Zealand by hybridisation with the invasive Australian blue butterfly species. Only populations in the south-east of the South Island are still unaffected. Known hosts plants include low-growing native brooms *(Carmichaelia sp*) and low-growing legume plants such as clover, trefoil.

Winter copper
Lycaena 'canterbury common copper'
Image source: Rob Herd

Canterbury plains Boulder copper
Lycaena sp.
Image source: Brian Patrick

New Zealand blue
Zizina oxleyi
Image source: Angela Moon-Jones

Ngutu pare/ wrybill

Poaka/ pied stilt

Tarāpuka/ black-billed-gull

Tūturiwhatu/ banded dotterel

Tarapirohe/ black-fronted tern

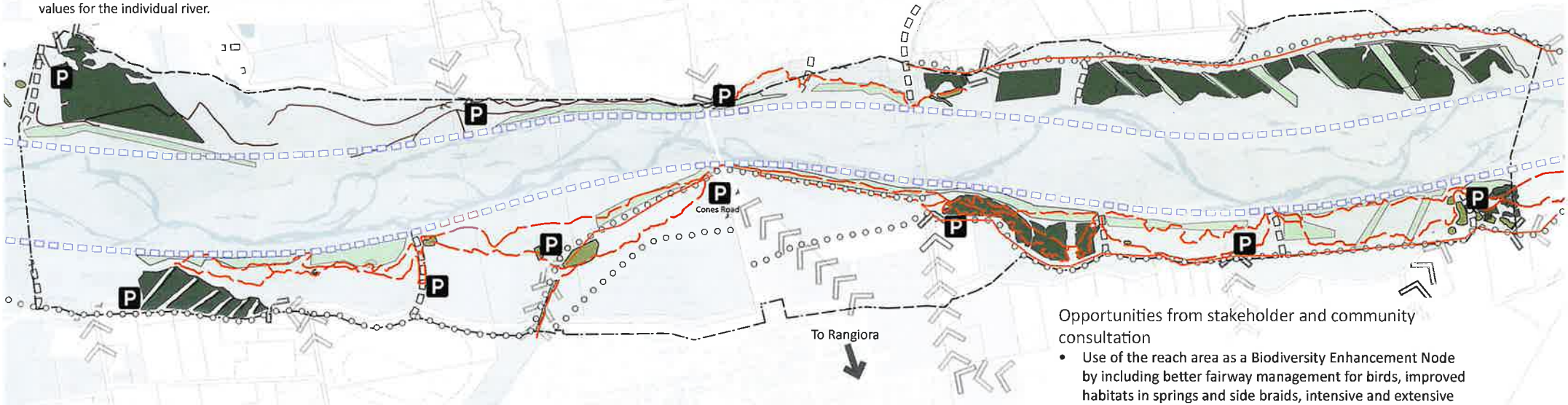
Tōrea/ pied oystercatcher

SITE ANALYSIS

MAP KEY

- Flood Control Lines
- Groyne Structures
- Stopbanks
- Access Points
- Formed Trails
- Unformed Trails
- Planted Forest
- Planted Flood Control
- Scheduled Biodiversity Planting

*Flood control lines are zones identified by river engineers that require vegetation clearance in order to have clear fairways for flood protection. These zones are calculated using flood capacity data and take into account natural character and biodiversity values for the individual river.



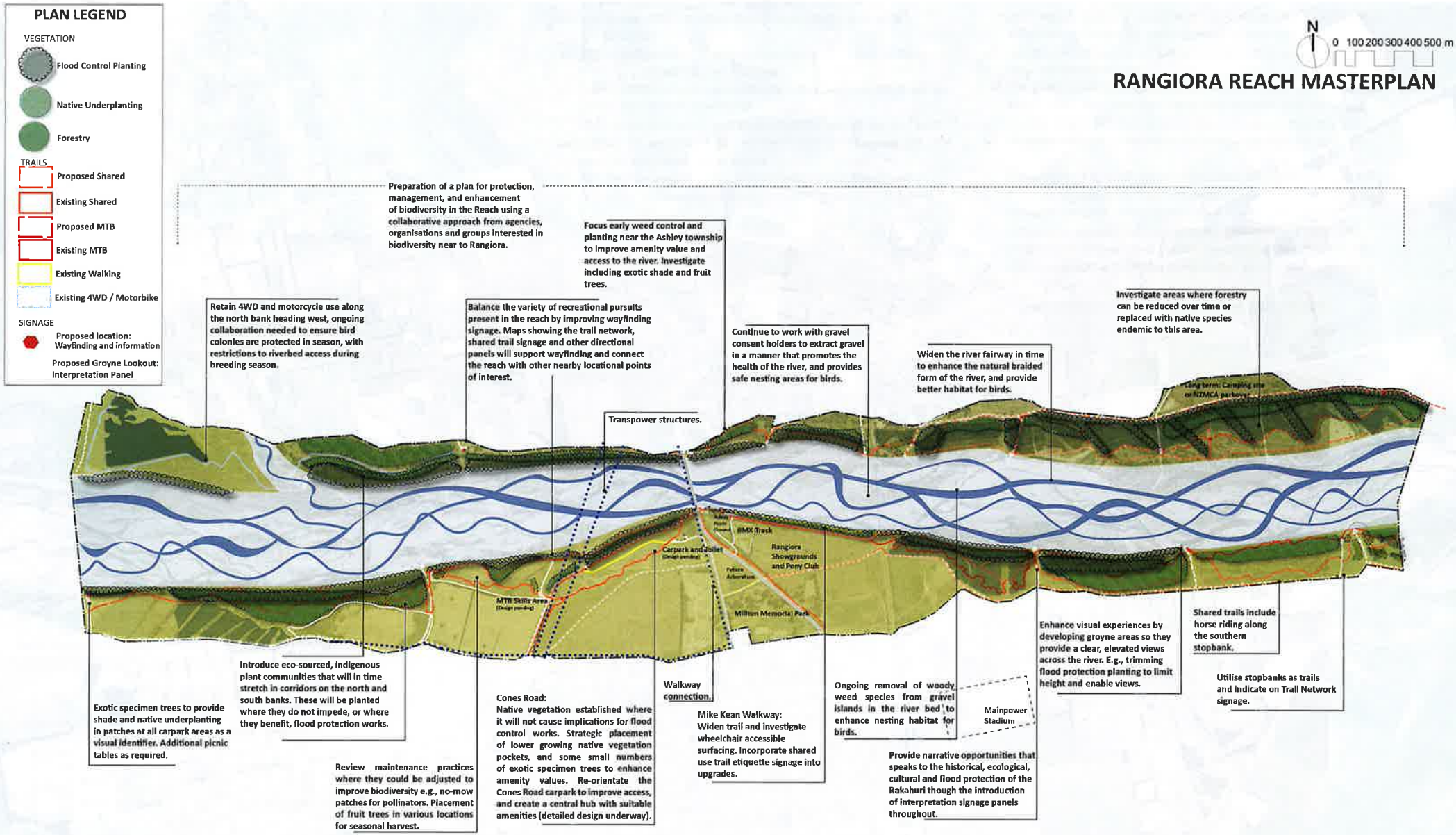
Issues from stakeholder and community consultation

- Ongoing flood control works sometimes compromised by recreational users of the reach
- Use of the reach area for recreational purposes is anticipated to grow in popularity due to population growth in Rangiora and other nearby townships
- Cones Road requires development to bring back the amenity value the community has missed
- Safety improvements in trail areas near to where vehicles are involved
- Limited awareness/education opportunities about site history, cultural values and flood protection works and biodiversity.

Opportunities from stakeholder and community consultation

- Use of the reach area as a Biodiversity Enhancement Node by including better fairway management for birds, improved habitats in springs and side braids, intensive and extensive riparian planting, and linkages up and downstream
- Existing recreation access points across the site are frequent and well maintained. Some areas may require larger carparking areas
- Accentuate access points as key nodes throughout the site
- Access points could be a focus for community planting and weed /pest control at the same time as providing areas with exotic planting and recreational amenity within the constraints of flood management
- Develop main visitor area at the Cones Road entry
- Accommodate for the requirements of recreational visitors; wayfinding, shade /shelter, rest areas, carparking, longer term: space for concessionaires
- The maturity of existing planting provides a valuable nursery canopy for a native understory planting.

RANGIORA REACH MASTERPLAN



NOTE: Design is subject to further amendments.

RANGIORA REACH MASTERPLAN

Detail page 1 of 3

PLAN LEGEND

VEGETATION
- Flood Control Planting
- Native Underplanting
- Forestry
- 2020 -'22 Native Planting

TRAILS
- Proposed Shared
- Existing Shared
- Proposed MTB
- Existing MTB
- Existing Walking
- Existing 4WD / Motorbike

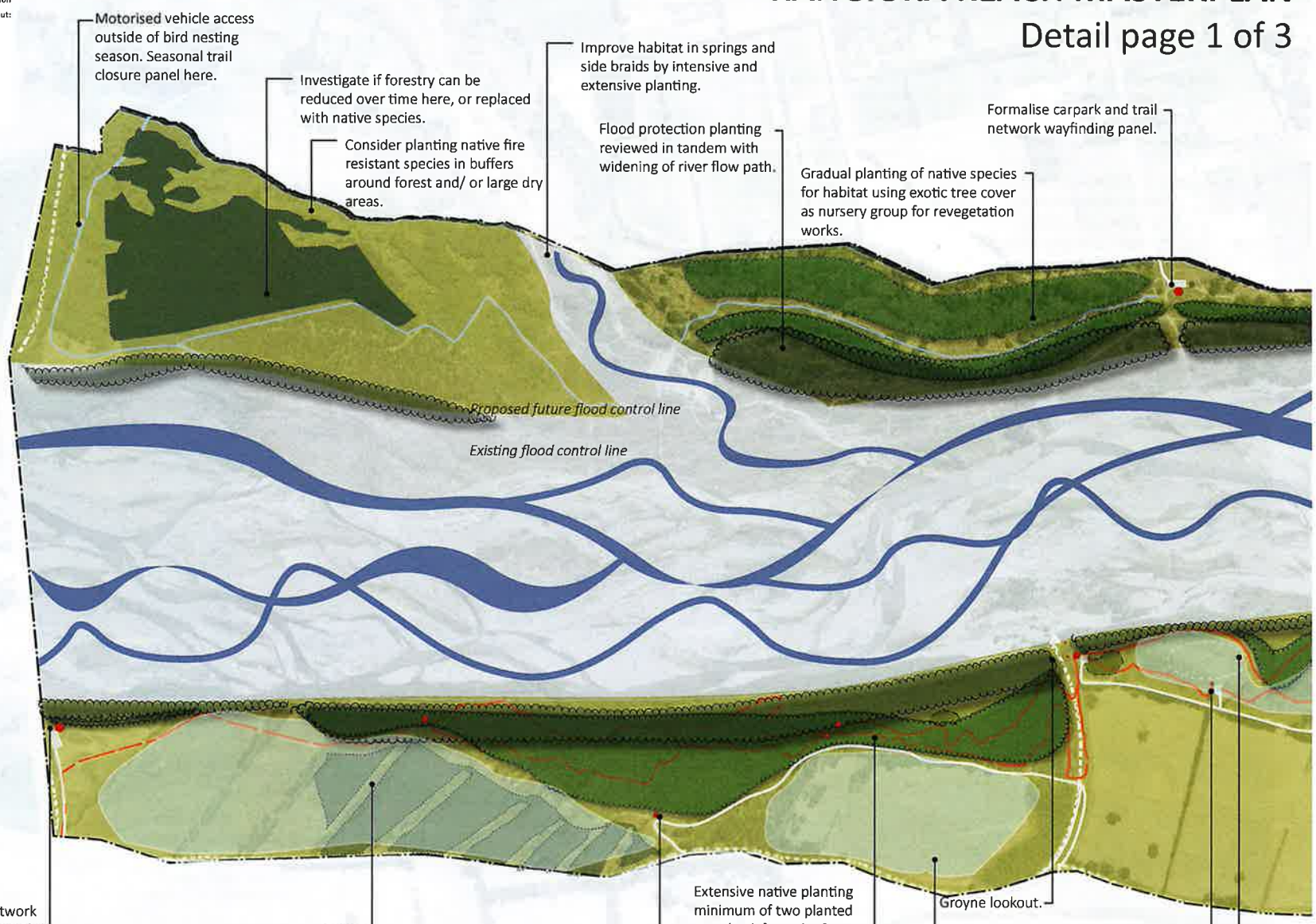
SIGNAGE
- Proposed location: Wayfinding &Information
- Proposed Groyne Lookout: Interpretation Panel

KEY INTERVENTIONS

SHORT TERM (0-5 YEARS)
- Updating of wayfinding and interpretation signage
- Continue and increase sub-canopy planting
- Upgrade trails e.g., resurfacing were needed
- Review maintenance requirements and budget for works.

MID TERM (6 - 12 YEARS)
- Installation of new recreational trails
- Investigate future of forestry planting in alignment with other regional land use strategies
- Flood control planting and expansion of river corridor in alignment with flood control works
- Review masterplan.

LONG TERM (12 - 30 YEARS)
- Connect sub-canopy planting
- Flood protection planting established allowing a wider river flow path.



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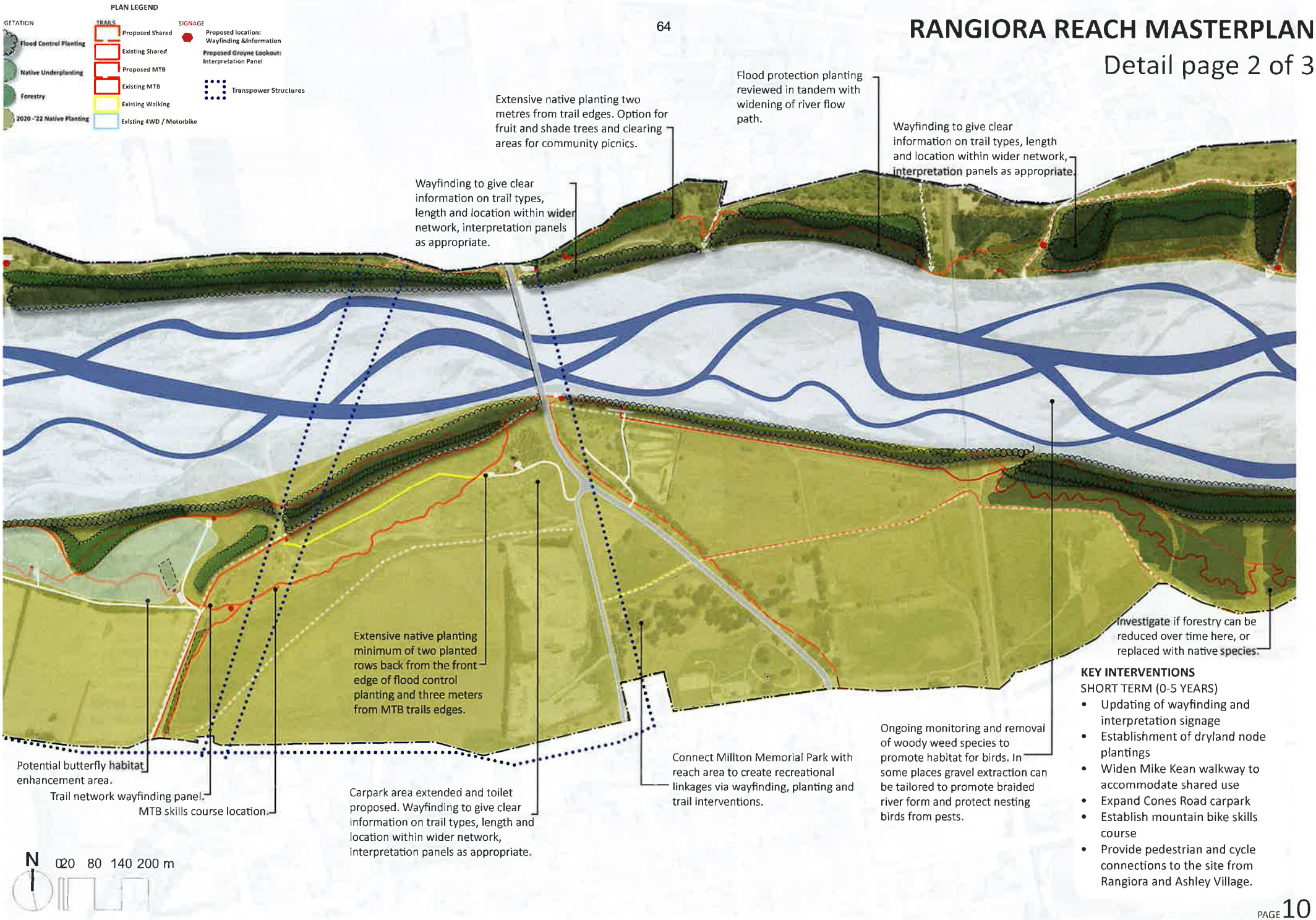
RANGIORA REACH MASTERPLAN

Detail page 2 of 3



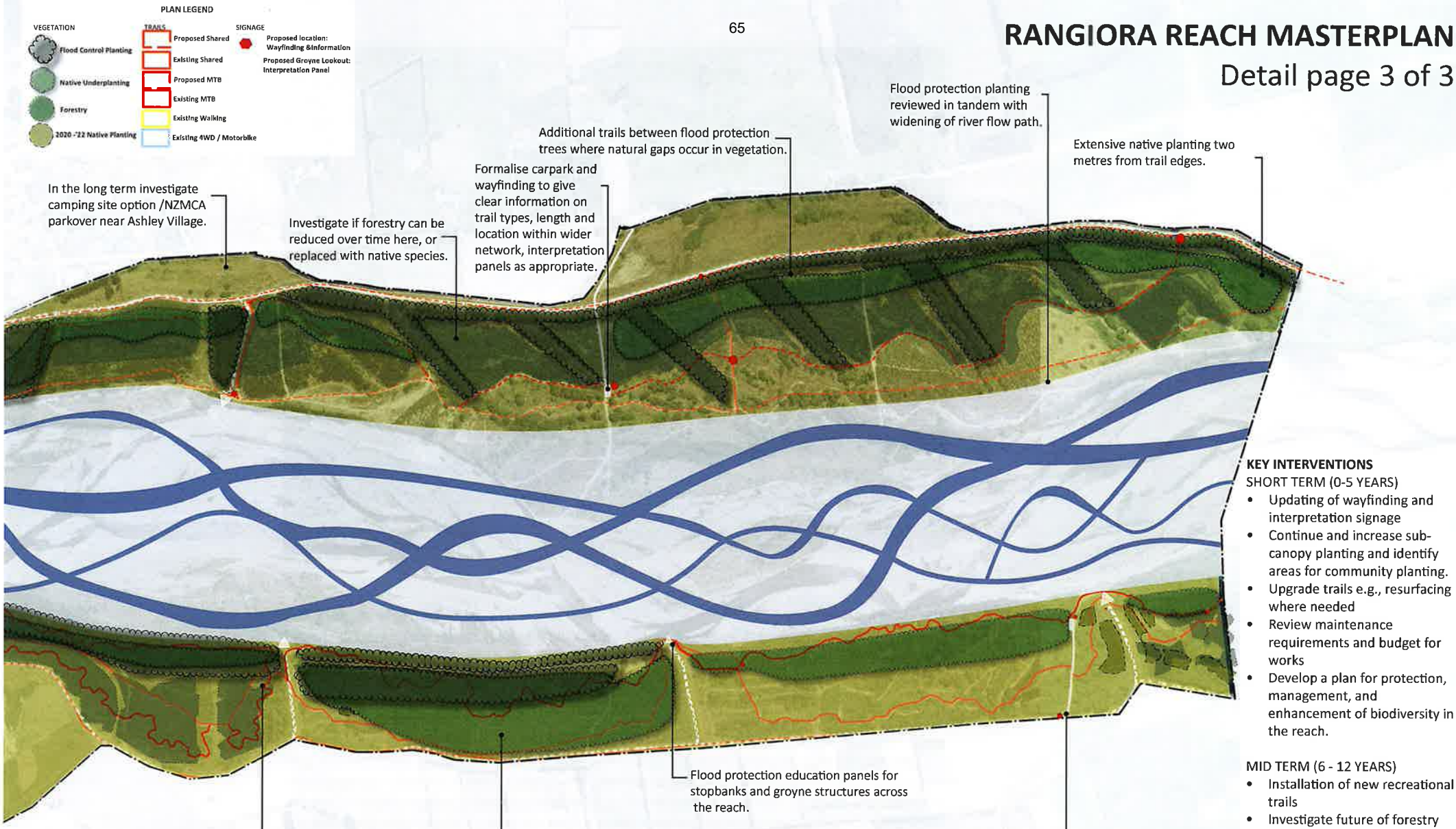
KEY INTERVENTIONS

SHORT TERM (0-5 YEARS)

- Updating of wayfinding and interpretation signage
- Establishment of dryland node plantings
- Widen Mike Kean walkway to accommodate shared use
- Expand Cones Road carpark
- Establish mountain bike skills course
- Provide pedestrian and cycle connections to the site from Rangiora and Ashley Village.

RANGIORA REACH MASTERPLAN

Detail page 3 of 3



KEY INTERVENTIONS

SHORT TERM (0-5 YEARS)

- Updating of wayfinding and interpretation signage
- Continue and increase sub-canopy planting and identify areas for community planting.
- Upgrade trails e.g., resurfacing where needed
- Review maintenance requirements and budget for works
- Develop a plan for protection, management, and enhancement of biodiversity in the reach.

MID TERM (6 - 12 YEARS)

- Installation of new recreational trails
- Investigate future of forestry planting in alignment with other regional land use strategies
- Flood control planting and expansion of river corridor in alignment with flood control works
- Review masterplan.

PLANTING STRATEGY

The open node strategy seeks to install nodes of native plants that follow succession patterns. Over time, these will establish into areas of native vegetation dispersing into the wider environment.

This approach mirrors that of a natural braided river – where flooding would wipe out vegetation. The braided-river adapted species would start to grow, occupying a site, building and capturing sediments and layering organic matter – giving way to the next species then the next. Certain plant species grow better together with different types of soils or shelters already established. The shelter of the willow or poplar can offer some of the benefits that the previous plant community would have had.

Typically, our two primary planting strategies are sub-canopy planting installations and dryland node installations. These build on the successional behaviours of the plants and emphasise growth in protection rather than depending on plants to tolerate what can be hard and arid conditions to establish in.

BELOW: Example of native dryland node planting for open, exposed areas.

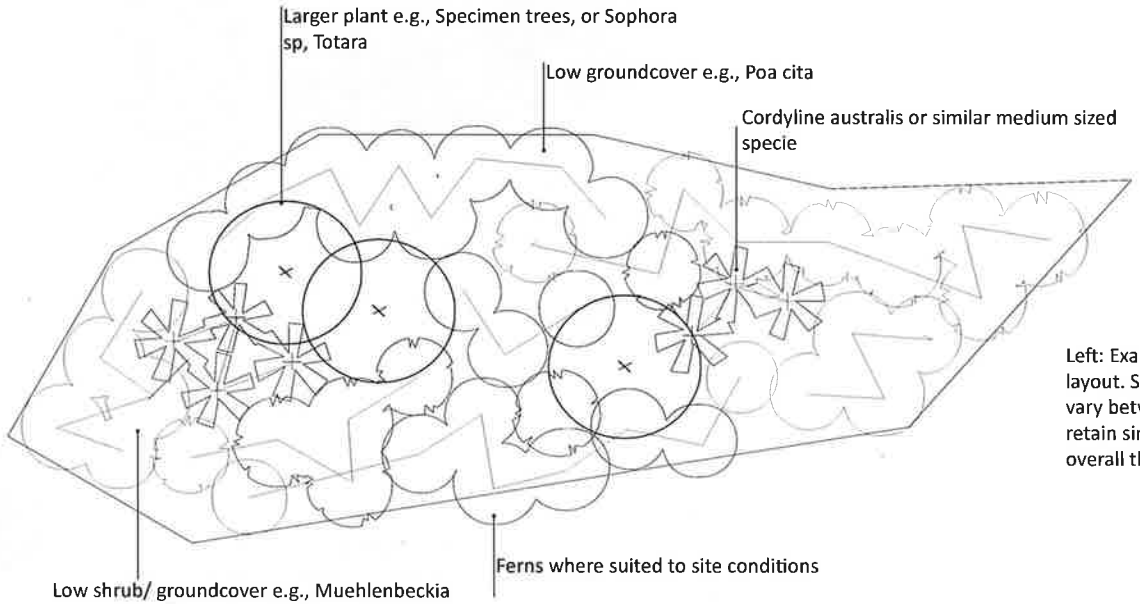
BELOW: Example of native sub-canopy planting proposed under flood control planting.

SUGGESTED PLANT SPECIES LISTS

DRYLAND NODE PLANT LIST

Dryland node species are tolerant of dry, arid conditions and are intended to be an early step towards improving biodiversity in exposed sites such as Cones Road, South Bank.

- *Poa cita/wī*
- *Austroderia richardii/toetoe*
- *Phormium tenax/harakeke*
- *Coprosma propinqua/miki*
- *Coprosma crassifolia/mikiminki*
- *Coprosma intertexta*
- *Muehlenbeckia complexa/pohuehue*
- *Melicytus alpinus*
- *Kunzea serotina/kānuka, makahikātoa*
- *Sophora prostrata/kowhai*
- *Sophora microphylla/kowhai*
- *Podocarpus totara/tōtara.*



Left: Example of node planting layout. Species and form will vary between nodes but will retain similar planting forms and overall theme.

SUB-CANOPY PLANT LIST

Sub-canopy species are planted underneath mature planting areas such as exotic trees. The flood control planting provides opportunities to integrate native sub-canopy species amongst flood control vegetation in locations suitable for additional planting.

- *Aristotelia serrata/makomako*
- *Austroderia richardii/toetoe*
- *Coprosma crassifolia / mikimiki*
- *Coprosma propinqua/miki*
- *Cordyline australis/tī kōuka*
- *Corokia cotoneaster/korokio*
- *Dacrycarpus dacrydioides/kahikatea*
- *Festuca novaezealandiae/pātītī taranui*
- *Griselinia littoralis/kāpuka*
- *Veronica salicifolia/koromiko*
- *Hoheria angustifolia/houhere*
- *Kunzea serotina/kānuka, makahikātoa*
- *Leptospermum scoparium/mānuka*
- *Melicytus alpinus*
- *Melicytus ramiflorus/māhoe*
- *Muehlenbeckia complexa/pohuehue*
- *Ozothamnus leptophyllus/tauhinu*
- *Phormium tenax/harakeke*
- *Pittosporum eugenoides/tarata*
- *Pittosporum tenuifolium/kōhūhū*
- *Plagianthus regius/mānatu*
- *Poa cita/wī*
- *Podocarpus totara/tōtara*
- *Prumnopitys taxifolia/matai*
- *Pseudopanax arboreus/whauwhaupaku*
- *Pseudopanax crassifolia/horoeka*
- *Sophora microphylla/kowhai*
- *Streblus heterophyllus/tūrepo.*

SPECIMEN TREES AND FERNS LIST

Specimen trees to provide shade and autumn colour whilst also building on the existing exotic trees throughout the site. Specimen trees suggested to be planted at carpark entry points and picnic areas to enhance visual amenity and seasonal colour. Fruit trees to be confirmed.

Common Name	Latin Name	Comments	Summer Colour	Autumn Colour
Pin Oak	*Quercus sp*	Sterile cultivar specimen tree for shade and autumn colour	Green	Red / Yellow
Poplar	*Populus sp.*	Sterile cultivar specimen tree for shade and autumn colour	Green	Yellow
Plane Tree	*Platanus sp.*	Sterile cultivar specimen tree for shade and autumn colour	Green	Yellow / Brown
Sweetgum	*Liquidambar styraciflua 'Rotundiloba'*	Sterile cultivar specimen tree for shade and autumn colour	Green	Red / Purple

Common Name	Latin Name	Comments
Tī kōuka	*Cordyline australis*	
Aruhe	*Pteridium esculentum*	
Pānako	*Botrychium australe and Botrychium biforme*	
Harakeke	*Phormium tenax*	

TRAIL AND INFORMATION SIGNAGE

Community feedback indicated improved signage was required throughout the reach. As a result, enhanced wayfinding, and informative signage throughout the area through the introduction of trail network maps, shared trail signage and other direction panels will be installed throughout the reach (see locations on masterplan, page 8). This will include other nearby local points of interest as well as the wider trail networks.

Wayfinding

ABOVE: Example of current wayfinding signage installed along the reach. These panels would benefit park users with an upgrade and to include shared/single use trail information, trail length and carpark names. Historic and/or cultural narratives could be included in some places along with biodiversity education panels.

TYPICAL FEATURES:

- Wider site context e.g., reach area
- Locations of key features e.g., carparks, stopbanks
- Trail names and locations.

ABOVE: Example of a simple yet effective directional marker used to delineate trails and user groups.

TYPICAL FEATURES:

- Name and direction of trail/s
- Trail type e.g., shared use, walking only
- Other information e.g., dogs on lead.

Cultural and historical information

ABOVE: Example of historical interpretation information board used in the Waimakariri Regional Park. Recommended installing a similar structure with two facing sides at the Cones Road entrance.

TYPICAL FEATURES:

- River history and context
- Biodiversity
- Flood control/engineering
- Cultural history as appropriate.

LEFT: Example of accessway signage which are located at most river/road entry points. The current design works well. Some panels may benefit from a future upgrade and the addition of riverbed closure and trail closure options recommended for flooding events and to assist with the ongoing management operations of the reach.

TYPICAL FEATURES:

- Name of entry point
- Features within proximity to entry e.g., parking, angler access.

ACKNOWLEDGEMENTS

This plan is the result of collective inputs from individuals, community groups and stakeholders. The project team would like to acknowledge those who have participated in developing the masterplan, and those who will contribute further as we refine the masterplan into a final operational version.

The masterplan process has involved input from Environment Canterbury, Waimakariri District Council, The Ashley Rakahuri Rivercare Group, Mahaanui Kurataiao Ltd (in consultation with Te Ngāi Tūāhuriri Rūnanga). Values and aspirations for the masterplan area were explored with the wider community, stakeholders and other clubs that utilise and enjoy the Rangiora Reach of the Ashley River/Rakahuri.

This work connects and complements work being undertaken by other organisations such as the Ashley Rakahuri Rivercare Group, Waimakariri District Council, the Department of Conservation and others.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

WAIMAKARIRI DISTRICT COUNCIL

Ashley Rakahuri RIVERCARE GROUP

www.thrivespacesandplaces.nz

Offices in: Tauranga | Whakatane | Christchurch | Queenstown

New opportunities to help create a new integrated plan

Kia ora tatou.

We are writing to you to regarding our engagement programme aimed at creating an integrated planning framework. During this first campaign we are asking for your visions for freshwater in Canterbury/Waitaha, and what outcomes would you like to see for our environment, our people and our communities.

The second phase of our public engagement towards an integrated plan will be in October/November this year. At that time we will reflect back on what we have heard, and share draft freshwater visions and outcomes for our natural resources and built environment. We will also outline some options for how we can move towards achieving those visions and outcomes. During this second phase, you will have further opportunities to tell us what you think.

Our wider public engagement campaign starts on 3 July and you will see adverts and other messages encouraging people to visit the Have Your Say pages of our website throughout July and August. The Have Your Say information is tailored specifically for the general public, but also provides opportunities to respond online on some specific resource management issues. You are welcome to use these channels too if you wish.

The main reason for this message is to provide information on opportunities for you to take part in shaping our plans, the first of which is a series of webinars. Below is a schedule of dates and times, together with a link for you to register for that specific webinar. This does two things: It lets us know how many people plan to attend which gives us some idea of the level of interest and ensures we can keep you informed if anything changes. We will not pass any of your registration information on to anyone else or use it for any other purpose.

Coastal Issues and Challenges

Subtopics: Effects of activities on the coastal environment and water quality, point-source discharges and accessibility in the Coastal Marine Area, biodiversity loss, invasive species, natural hazards, and managing landscapes and natural features.

Please register in advance to join these webinars:
Tuesday 4 July 10am to 12noon
Tuesday 8 August 5:30pm to 7:30pm
Tuesday 15 August 3:00pm to 5:00pm

Freshwater Issues and Challenges

Subtopics: Effects of activities on freshwater quality and quantity, effects on natural character, effects of activities on the coastal environment, biodiversity loss, and invasive species.

Please register in advance to join these webinars:
Tuesday 4 July 1:00pm to 3:00pm
Tuesday 8 August 3:00pm to 5:00pm

Tuesday 15 August 5:30pm to 7:30pm

Climate Change Issues and Challenges

Subtopics: Energy, reducing greenhouse gas emissions, and natural hazards.

Please register in advance to join these webinars:

Wednesday 5 July 10am to 12noon

Wednesday 9 August 5:30pm to 7:30pm

Thursday 17 August 3:00pm to 5:00pm

Air Issues and Challenges

Subtopics: Air quality and reducing greenhouse gas emissions.

Please register in advance to join these webinars:

Wednesday 5 July 1:00pm to 3:00pm

Wednesday 9 August 3:00pm to 5:00pm

Thursday 17 August 5:30pm to 7:30pm

Land Issues and Challenges

Subtopics: Soil erosion and degradation, contaminated land, waste minimisation and management, effects on heritage issues, Identification and management of landscapes and features, effects of activities on the coastal environment, biodiversity loss, invasive species, and urban development.

Please register in advance to join these webinars:

Thursday 6 July 10am to 12noon

Thursday 10 August 5:30pm to 7:30pm

Wednesday 16 August 3:00pm to 5:00pm

Built Environment Issues and Challenges

Subtopics: Energy, reverse sensitivity effects on infrastructure, effects on heritage issues, urban development, and natural hazards.

Please register in advance to join these webinars:
Thursday 6 July 1:00pm to 3:00pm
Thursday 10 August 3:00pm to 5:00pm
Wednesday 16 August 5:30pm to 7:30pm

Note:
These webinars are open to everyone and are likely to be a mixture of stakeholders and members of the public.

This is not a once-only opportunity. The second phase of our public engagement towards an integrated plan will be in October/November this year. At that time, we will share draft visions for freshwater and outcomes for our natural and built resources, reflecting back on what we have heard. We will also outline some options for how we can move towards achieving those visions.

We encourage you to keep up to date by visiting the regional planning page on our website regularly. You can also email rpsreview@ecan.govt.nz to share your thoughts or if you have any questions.

We look forward to hearing from you.

Ngā mihi, mā te wā.

Taking action together to shape a thriving and resilient Canterbury, now and for future generations.

Toitū te marae o Tāne, toitū te marae o Tangaroa, toitū te iwi.

www.ecan.govt.nz

MINUTES OF THE MEETING OF THE CANTERBURY WATER MANAGEMENT STRATEGY WAIMAKARIRI ZONE COMMITTEE HELD IN THE RAKAHURI ROOM RANGIORA CIVIC CENTRE, 215 HIGH STREET, RANGIORA, ON MONDAY 1 MAY 2023 AT 3.30PM.

PRESENT

C Latham (Chairperson), C Aldhamland, E Harvie, M Jolly, J Cook (Te Ngāi Tūāhuriri Runanga), , Councillor T Fulton (WDC Councillor) and Councillor C McKay (Ecan Councillor), R Gill-Clifford (Youth Representative)

IN ATTENDANCE

A Burton (WDC Water Environment Advisor), N Theinhardt (ECan Zone Delivery Lead Waimakariri) S Worthington (ECan Braided River Revival Advisor), M Griffin (ECan CWMS Facilitation Team Leader) and T Kunkel (WDC Governance Team Leader).

M Bate (Kaiapoi Resident), and J Benn (Department of Conservation),

KARAKIA

C Aldhamland opened the meeting with a karakia.

1. BUSINESS

Apologies

Moved: C Latham Seconded: C McKay

THAT apologies for absence be received and sustained from committee members M Blackwell and A Reuben.

CARRIED

Welcome and Introductions

C Latham welcomed everyone present at the meeting and requested members and those in the public gallery to introduce themselves.

Register of Interests

E Harvie advised that she was the co-ordinator of the Waimakariri Landcare Trust and not a Trustee. J Cook advised that he was no longer a Director/Shareholder of Secure Property Management Limited. M Jolly reported that she was now a PhD student with a scholarship through the University of Canterbury. They requested that the Register of Interest be updated accordingly.

2. OPPORTUNITY FOR THE PUBLIC TO SPEAK

2.1 **James Ensor**

C Latham advised that J Ensor would not be attending today's meeting, however, he had expressed his support for the Waimakariri Biodiversity Trust – Wetland Restoration Daiken project. He suggested that it would be good to involve other schools such as Loburn and Pegasus as well as the Woodend-Sefton Community Board.

2.2 **Michael Bate**

M Bate expressed his concerns regarding the report on New Zealand Rivers and Lakes which indicated that the waterways were deteriorating. He tabled photos of the Kaiapoi Lakes in 2019 and November 2022, and was happy to report that the water quality in the lakes had improved since the Council had stopped using chemicals in the lakes to control the aquatic plant life. There was also an increase in aquatic and bird life at the lake.

Councillor T Fulton questioned the use of herbicides in the Kaiapoi Lakes. A Burton confirmed that the Council had not sprayed the lakes in over 15 years due to public pressure and concern over the environmental impact of herbicides.

M Bate also provided videos of the Pegasus Wetland area and reported that the aeration of Pegasus Lake had improved the water quality in the lake. He was able to see signs of fish activity in the lake, however, no plant life. He did note there seemed to be an increase in aquatic and bird life in the wetlands due to the return of insects.

3. SUSPENSION ON SECTIONS 9.4 OF THE STANDING ORDERS

The Chairperson advised that the CWMS Waimakariri Zone Committee was subject to the Council's Standing Orders, which did not allow for the public to provide input on reports. She therefore moved that Sections 9.4 of the Standing Orders be suspended for Items 3 and 4 to allow members of the public ask questions prior to the item being moved.

Moved: C Latham Seconded: J Cooke

THAT the CWMS Waimakariri Zone Committee:

(a) **Agrees** that Sections 9.4 of the Standing Orders be suspended for Items 3 and 4 to allow members of the public ask questions prior to the item being moved.

CARRIED
T Fulton Against

4. REPORTS

4.1 **Ashley Rakahuri Braided River Revival Draft Strategy** – M Griffin (CWMS Facilitator, ECan)

S Worthington provided an update on the Ashley/Rakahuri Braided River Revival draft strategy development.

In response to questions from C Latham, S Worthington elaborated on the relationship between the Braided River Revival Strategy and the Regional Policy Statement. Councillor C McKay explained that the Regional Policy Statement (RPS) would include the "vision and aspiration" for the region as the first stage of developing a new integrated planning framework for the Region. S Worthington confirmed that the RPS would not slow down the development of the Ashley/Rakahuri Braided River Revival strategy,

however, there needed to be alignment between the RPS and the strategy.

M Jolly questioned what the timeframe was for finalising the draft Ashley/Rakahuri Braided River Revival Strategy. S Worthington advised that it was envisaged that the draft would be finalised by the end of 2023 whereafter public engagement would be undertaken. Currently interest groups were being contacted to ascertain if they wished to be part of the process.

C Latham raised a concern that people did not seem aware of the Ashley/Rakahuri Braided River Revival Strategy. S Worthington acknowledged that at present only the groups that were involved in the project seemed to be aware of it. She agreed that the project would have to be promoted to secure broader buy-in.

Councillor T Fulton advised that the Council was currently undertaking a review of the Northern Pegasus Bay Bylaw, which aimed to manage recreation by enhancing environmental values whilst minimising any negative impact along the Northern Pegasus Bay strip. He noted that the updated Bylaws should be taken into consideration during the drafting of the Ashley/Rakahuri Braided River Revival Strategy.

C Latham noted that Dr J Roper-Lindsay from the Waimakariri Biodiversity Trust had previously indicated that a discussion would be held on the coastal wetlands as part of the Biodiversity Winter Lecture Series. She suggested that the Ashley/Rakahuri Braided River Revival, and human impact on the estuary, could be mentioned as part of the discussion.

S Worthington reported that Environment Canterbury (ECan) was also conducting a River Rating Scheme review and she was liaising with the project group to ensure alignment with the Ashley/Rakahuri Braided River Revival Project. Councillor T Fulton suggested that ECan may wish to interact with the Council's Drainage Advisory Groups, as members had substantial historic knowledge about drainage.

S Worthington highlighted the engagement with Ngāi Tūāhuriri Rūnanga for the Ashley/Rakahuri Braided River Revival Project, noting Ngāi Tūāhuriri had some questions that ECan's Science Team were currently addressing..

Councillor T Fulton noted that the priorities in the Action Plan included the *'promoting and improved community understanding of land and water use'* measured by encouraging improved understanding. He questioned if there was a mechanism to test the improved understanding periodically. S Worthington commented that the Action Plan priorities were usually measured via feedback from community groups which ECan had dealt with through the project's development. R Gill-Clifford suggested that a good indicator of improved understanding may be an increase of people participating in biodiversity projects, i.e. an increase in volunteer numbers.

C Latham noted that the impact of the proposed Ashley/Rakahuri Braided River Revival Strategy on landowners along the Ashley/Rakahuri River should be clear to the landowners. S Worthington undertook to ensure this would be addressed during public consultation.

J Cook requested an update on the Rangiora Reach Project and S Worthington undertook to provide feedback at a subsequent meeting. She noted that the Climate Resilience Project was funded with COVID funding. Hence, this would be a good time to reflect on ECan's learnings and what it meant going forward. J Cook agreed and requested that the CWMS Waimakariri Zone Committee should also be advised if there would be sufficient funding available going forward.

The CWMS Waimakariri Zone Committee had an extensive discussion on future public consultation on the Braided River Revival, to ensure that the public would be sufficiently briefed on the aims of the strategy. It was agreed that consultation should focus on only a few main issues to ensure healthy consultation and guard against 'consultation burnout'. The Committee requested that updates on the Braided River Revival Strategy be included as part of the regular standard Committee updates.

Moved: R Gill-Clifford Seconded: E Harvie

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** this update for its information taking into consideration the Committee's 2021/24 Acton Plan priorities in the Ashley / Rakahuri River catchment.

CARRIED

Councillor T Fulton noted that eminent accomplished scientists throughout New Zealand were working on well-funded science projects, which included water management and sustainable land use. He, therefore, believed that there was a concerted effort across the scientific community to deal with these challenges, and local government was not being negligent in dealing with these matters nor was there a void of information.

4.2 **CWMS Action Plan Budget Initiatives 2022/23** – M Griffin (CWMS Facilitator, ECan)

As she previously declared a conflict of interest, E Harvie sat back from the table for all discission pertaining to Waimakariri Landcare Trust – Water Quality Gap Analysis.

C Latham commented that the CWMS Waimakariri Zone Committee had held a workshop in advance of this meeting to review information and to consider supporting the following five initiatives:

- Ashley Rakahuri Rivercare Group – Estuary Shorebird Monitoring $ 9,000
- Ashley Rakahuri Rivercare Group – Nesting Area Weed Clearing $ 5,000
- Waimakariri Biodiversity Trust – Wetland Restoration Daiken property $20,000
- Waimakariri Landcare Trust – Water Quality Gap Analysis $28,050
- Waimakariri Biodiversity Working Group – Environmental Awards $ 3,000

C Latham noted that the total amount applied for was $65,050, which meant that the fund was oversubscribed by $15,050. The fund would have been oversubscribed by $20,050, however, one of the applicants was able to secure plants and plant protectors directly from ECan for riparian planting. She further noted that the Estuary Shorebird Monitoring Project would only be undertaken in the summer of 2024, she therefore suggested that the project be pushed out for funding from the 2023/24 Action Plan Budget. M Griffin was requested to confirm the amount of potential funding available in the next financial year. The CWMS Waimakariri Zone Committee agreed that funding of the Estuary Shorebird Monitoring Project should be postponed to early in the 2023/24 financial year.

C Latham advised that the Wetland Restoration Daiken Property Project included a contingency of $4,400, which could be applied for at a later date, once there was a clearer understanding of what the contingency funding would be used for. The CWMS Waimakariri Zone Committee concurred that Wetland Restoration Project should be funded from the 2022/23 Action Plan Budget, excluding the $4,400 contingency funding.

The CWMS Waimakariri Zone Committee agreed that the Environmental Awards and the Nesting Area Weed Clearing should be recommended for funding from the 2022/23 Action Plan Budget

C Latham requested that the Waimakariri Landcare Trust would ensure that the Nitrate Sensor Project be retained as part of the Water Quality Gap Analysis, even though the trust may be receiving less funding.

Moved: Councillor C McKay Seconded: Councillor T Fulton

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** the information provided on the proposed CWMS Action Plan Budget project initiatives to support for the 2022/23 financial year.

(b) **Agrees** that consideration of the application from the Ashley Rakahuri Rivercare Group for the Estuary Shorebird Monitoring Project be laid on the table until the Committee's July 2023 meeting.

(b) **Supports** the allocation of funding for project initiatives listed below from the CWMS Action Plan Budget allocated for the 2022/23 financial year:

i.	Waimakariri Landcare Trust – Water Quality Gap Analysis Project, provided that the Nitrate Sensor Project be retained as part of the project	$26,400
ii.	Waimakariri Biodiversity Trust – Wetland Restoration Daiken Property Project	$15,600
iii.	Ashley Rakahuri Rivercare Group – Nesting Area Weed Clearing Project	$ 5,000
iv.	Waimakariri Biodiversity Working Group – Environmental Awards	$ 3,000

CARRIED

4.3 **Review of the CWMS Waimakariri Zone Committee Action Plan 2021-24** – M Griffin (ECan, CWMS Facilitator)

M Griffin advised that the aim of the report was to provide the CWMS Waimakariri Zone Committee with an opportunity to review it 2021/24 CWMS Action Plan and priorities.

C Latham requested that the priorities be numbered. She noted that the recreation use could lead to damage to the natural environments, and she therefore suggested that the key action of 'Protecting and enhancing of recreation in the zone' should be amended to read as follows:

"Protection and enhancement of recreation in the zone in a way that was in harmony with nature."

However, subsequent to discussion the CWMS Waimakariri Zone Committee agreed to the following amendment:

"Protection and enhancement of environmentally sustainable recreation in the zone"

Councillor T Fulton recommended that a priority reflecting on climate change should be added to the Action Plan. Councillor C McKay concurred that combating climate change was important, however, she believed that it should be embedded in all the priorities and should therefore form part of the CWMS Waimakariri Zone Committee purpose.

C Latham noted that when applying for funding from the CWMS Action Plan Budget, applicants were requested to indicate how their projects aligned with the 2021/24 Action Plan. She therefore agreed that a priority reflecting on climate change should be added.

J Cook and R Gill-Clifford thought that combating climate change was already implied in all the 2021/24 Action Plan.

Councillor T Fulton commented that climate change was having an impact on the natural environment, such as the insertion of brackish water into estuaries and there may be groups that specifically targeted solving such problems. He therefore believed that climate change should be made more explicit in the Action Plan

However, after discussion the CWMS Waimakariri Zone Committee agreed to the following statement should be added to the 2021/24 Action Plan:

Climate Change Impacts
The Canterbury Water Management Strategy and its effective implementation is one of the adaptation strategies Canterbury has in place to respond to climate change and support community resilience.

Moved: E Harvie Seconded: C Aldhamland

THAT the CWMS Waimakariri Zone Committee:

(a) **Confirms** the following amendments to its 2021/24 CWMS Action Plan for the 2023/24 financial year:

(i) Priorities to be numbered.

(ii) Priority four to read as follows:
"Protection and enhancement of environmentally sustainable recreation in the zone"

(iii) The following statement be added:
"Climate Change Impacts
The Canterbury Water Management Strategy and its effective implementation is one of the adaptation strategies Canterbury has in place to respond to climate change and support community resilience."

CARRIED

E Harvie supported the motion as the amendments aligned with the current thinking of the CWMS Waimakariri Zone Committee.

5. COMMITTEE UPDATES – M GRIFFIN (CWMS FACILITATOR, ECAN)

5.1 Zone Committee Working Groups.

The Working Group updates were taken as read.

5.2 Hurunui Mahinga Kai and Biodiversity Workshop 2 – 15 March 2023

R Gill-Clifford reported that Lockerbie Farm hosted a workshop on Wednesday 15 March 2023. A site visit to John Faulkner's farm at Mouse Point near Culverden had been arranged where he was converting part of the farm as an indigenous habitat which would be open to the public in future.

5.3 Kaikōura Wetlands as Farm Assets Tour – 16 and 17 March 2023.

Councillor T Fulton advised that he had attended the second day of the Farm Tour in Kaikōura on Friday 17 March 2023. The day included visit to the Boyd's dairy farm near Kaikōura. They had done significant native plating on the property, which had been derelict when they had started. The farmers had seen the benefit of setting aside non-productive farmland to develop it with native plating as a recreational area. They also visited Rakautara for a hands-on session about plant propagation with the Wai Ora Trust Team.

5.4 **CWMS Committees Forums – Northern and Southern Hui on 27 and 31 March 2023.**

M Griffin noted that engagement with the CWMS Waimakariri Zone Committee would increase as the Ashley/Rakahuri Braided River Revival draft strategy development continued. It was also anticipated that further hui would be held with CWMS Zone Committees in 2023.

5.5 **ECan Water and Land Committee Meeting – 3 May 2023**

Councillor C McKay urged members to review the outcomes from ECan's formal Consent Review of water quantity in the Ashburton River/Hakatere. As a result of the review the Ashburton River/Hakatere minimum flow would be increased on 1 July 2023. She highlighted the high cost of the review needed to be taken into consideration in the planned Consent Review for the Ashley/Rakahuri River and Silverstream.

5.6 **Where Next for Catchment Groups? – Cawthron Guidance Report published**

No discussion emanated from this point.

5.7 **How long will it take? – Environment Canterbury Science Summary information about nitrate time lags in Canterbury**

E Harvie questioned if future ECan reports on the state of ground water would include some of the information regarding nitrate time lags. M Griffin undertook to follow up and report back to the CWMS Waimakariri Zone Committee.

5.8 **Further Information Links**

No discussion emanated from this point.

5.9 **Action points from the previous zone committee meetings**

M Griffin reported as follows:

- Realignment of the North Brook tributary and water quality sampling at Tutaepatu Lagoon – M Griffin to follow up with the Council about the realignment of the North Brook tributary, as it was a Council led project. However, water sampling at Tutaepatu Lagoon had been done by helicopter and would now be followed up on land.
- Testing for pesticides in the Kaiapoi River – It was confirmed that the work had been done and was targeted towards the Yellow Flag Water Iris.
- Kaiapoi River salinity logger data – ECan confirmed that the data logger still operated in the Kaiapoi River. However, analysis of the data had yet to been undertaken.

Moved: Councillor T Fulton Seconded: M Jolly

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** these updates for its information.

CARRIED

6. CONFIRMATION OF MINUTES

6.1 Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee Meeting – 6 March 2023

Councillor C McKay requested that paragraph 4.2 (Environment Canterbury Water and Land Committee Meeting – 22 February 2023) on page 103 be amended to read as follows:

"This decided that ECan would develop an education campaign without water testing but would invite other agencies to work with them to have an education campaign for private well owners as well as well water testing."

Moved: Councillor C McKay Seconded: R Gill-Clifford

THAT the CWMS Waimakariri Zone Committee:

(a) **Confirms** the amended Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee meeting, held on 6 June 2023, as a true and accurate record.

CARRIED

7. GENERAL BUSINESS

Councillor T Fulton advised that the development of the Lineside Road property purchase by the Council would be led by the Council's Greenspace Team. It was agreed that this was an area suitable for environmental and biodiversity projects. It was anticipated that the Council would use the next one to two years, to investigate the best use of the site.

C Latham noted that Kirk Blumers had not been attending CWMS Waimakariri Zone Committee meetings and M Griffin would be contacting him to confirm if he wished to continue as a member of the Committee. If K Blumers either resigns, or his place on the committee is deemed vacant through his non-attendance, then the Committee would only consist of five community representatives. The next Zone Committee Refresh, where new members were appointed would likely not be finalised until August 2024. However, the next 18 months were important in terms of public consultation and work to be done, therefore, C Latham suggested that a new community representative be co-opted to the Committee.

T Kunkel noted that the CWMS Waimakariri Zone Committee may only co-opt expert or advisory members that it deemed necessary to ensure it was able to achieve its purpose. She, therefore, suggested that the Committee should first establish what expertise was required. The Committee's Terms of Reference referred to co-opting an additional community representative. In accordance with the Committee's Terms of Reference community representatives should be appointed by the Council and ECan. The Committee would need, therefore, to request ECan to appoint a new member in conjunction with the Council.

KARAKIA

C Aldhamland provided a karakia to close the meeting.

NEXT MEETING

The next meeting of the CWMS Waimakariri Water Zone Committee is scheduled for

Monday 3 July 2023 at 3:30pm, in the Waimakariri District Council Chambers, 215 High Street, Rangiora.

THERE BEING NO FURTHER BUSINESS, THE MEETING CLOSED AT 6.08PM.

CONFIRMED

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Chairperson
Carolyn Latham

1 May 2023
Date