Agenda

Canterbury Water Management Strategy Waimakariri Zone Committee

Monday 11 November
at 4pm

Council Chamber
215 High Street, Rangiora

Members:

Claire Aldhamland
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 11 NOVEMBER 2024 COMMENCING AT 4PM.

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 **Register of Interests**
Advice of any changes or updates. *4 – 6*

2. OPPORTUNITY FOR THE PUBLIC TO SPEAK

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

3.1 **Zone Committee Working Groups.**

3.2 **Environment Canterbury Updates.**

3.3 **Waimakariri District Council Updates.**

3.4 **CWMS Zone Committee – Review.**

3.5 **Future Committee Meetings.**

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

RECOMMENDATION *7 – 78*

THAT the CWMS Waimakariri Zone Committee:

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

4. CONFIRMATION OF MINUTES

4.1 Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee Meeting – 2 September 2024

RECOMMENDATION *79 – 87*

THAT the CWMS Waimakariri Zone Committee:

(a) **Confirms** the Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee meeting, held on 2 September 2024, as a true and accurate record.

5. GENERAL BUSINESS

KARAKIA

NEXT MEETING

The next meeting of the CWMS Waimakariri Water Zone Committee is scheduled for Monday 3 February 2025 at 4pm.

AGENDA ITEM NO: 1.1	Register of Interests
Waimakariri Water Zone Committee	**MEETING DATE:** 11 November 2024

WAIMAKARIRI WATER ZONE COMMITTEE

Register of Interests – at 2 September 2024

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 or Waimakariri 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 or Waimakariri 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.

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

Name	Committee Member Interests
Claire Aldhamland	- Teacher – Rangiora High School
John Cooke	- Director/Shareholder – Executive Limousines 2015 Limited - 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 - Member – Kaiapoi Club executive - Trustee on several Māori land blocks, all located in Otago
Ruby Gill-Clifford	- Student at University of Canterbury - 2023/24 summer work at Tūhaitara Coastal Part Trust
Cr Tim Fulton	- Waimakariri District Councillor - Freelance Writer in the agricultural business sector - Contracted to write a book on Central Plains Water Scheme
Erin Harvie	- Director – 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 and 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 grazing - Ihenga Holdings – Partner (with spouse)

	- McKay Family Trust – Trustee (spouse also a Trustee) - Shareholder – Waimakariri Irrigation Limited, Ravensdown Ltd, Fonterra, and Farmlands - Member – Federated Farmers, Irrigation NZ - Water take and use consents CRC: 050222.1
Arapata Reuben	- Trustee – Tūhono Trust - Member – National Kiwi Recovery Group - Rūnanga Rep – Christchurch/West Melton Water Zone Committee - Rūnanga Rep – Ashburton Water Zone Committee

AGENDA ITEM NO: 3	SUBJECT MATTER: Committee Updates
REPORT TO: Waimakariri Water Zone Committee	MEETING DATE: 11 November 2024
REPORT BY: Murray Griffin, CWMS Facilitator, 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.

COMMITTEE UPDATES
The following updates will be addressed with the committee:

3.1 Zone Committee Working Groups

3.1.1 Biodiversity Working Group
Martha Jolly notes the Biodiversity Working Group (BWG) were pleased to have organised another successful Waimakariri Zone Committee Environmental Awards, presented to recipients at the Mayoral Community Awards on 10th of October. These Awards saw some outstanding environmental champions celebrated for work protecting and enhancing natural values in our District. The Working Group would like to thank our partner organisations, WDC, ECan, The Waimakariri Biodiversity Trust and hard-working Zone Committee members for support and hard work that goes into bringing this event together. We are looking forward to facilitating a similar event in 2025.

3.1.2 Lifestyle Block Working Group
Carolyne Latham will provide a short update at the meeting.

3.1.3 Monitoring Working Group
Erin Harvie will provide a short update at the meeting.

3.2 Environment Canterbury Updates

Councillor Claire McKay will lead this update.

3.2.1 Water quality for contact recreation: Annual summary report 2023-24 season
Please find this report attached for the committee's information as **agenda item 3 – 1**.

Key messages

- Environment Canterbury staff routinely monitor 57 freshwater (rivers and lakes) and 47 coastal (estuary, beach, and harbour) popular contact recreational sites weekly over the summertime across the region. These sites are commonly used for swimming, boating, and paddling.
- At each of these sites water quality is sampled for Faecal Indicator Bacteria (Escherichia coli (E. coli) and / or enterococci) concentrations to establish suitability for swimming. We also undertake surveys for toxic algae at freshwater sites where blooms may pose a risk to public health.

- At the conclusion of the 2023-24 summer, 85% of coastal sites (estuaries, harbours, and beaches) were graded as generally suitable for swimming. The number of sites suitable for contact recreation has improved compared to the previous two years.
- Over half the sites within Lyttelton Harbour / Whakaraupō (63%) remain unchanged and are still considered 'unsuitable for swimming'.
- At the conclusion of the 2023-24 summer, 72% of the freshwater sites were graded as generally suitable for contact recreation. Out of these freshwater sites, 88% of the lake sites were graded as suitable for contact recreation and 65% of rivers.
- During the 2023-24 summer, there were no temporary public health warnings issued due to high faecal contamination. Twenty-two river sites and six lake sites had health warnings issued due to blooms of toxic algae.

3.2.2 Council Meetings

Council Meeting agendas can be viewed and downloaded from this link:

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

3.3 Waimakariri District Council updates

In the absence of Councillor Tim Fulton for this meeting, Sophie Allen will lead this update.

3.3.1 Council Report – Saline incursions in the Kaiapoi and Ruataniwha Cam Rivers

Please find this report attached for the committee's information as **agenda item 3 – 2**.

Summary

1. This report examines community observations this year (2024) regarding changes in the Kaiapoi and Ruataniwha Cam Rivers, including emergent and submerged macrophyte (weedbed) dieback and freshwater mussel (kākāhi) deaths.
2. This report raises possible options for management by Waimakariri District Council (WDC) and areas for WDC to work with Environment Canterbury to understand better and consider management options.
3. Increasing saline incursions during 2024, potentially combined with frost effects, rather than herbicide usage, is the likely cause of the ecological dieback in the Kaiapoi and lower part of the Ruataniwha Cam River. Low flows in the Waimakariri River are believed to increase the frequency of saline incursions into the Kaiapoi and Ruataniwha Cam Rivers.
4. The Kaiapoi Ruataniwha Cam Rivers area could be part of a Climate Adaptation Plan under the WDC Climate Resilience Programme. Additional ecological monitoring and modelling of these river systems is recommended for further understanding of the drivers of saline incursions. No replanting of intertidal plants that have experienced dieback in 2024 is proposed until there has been an assessment of future species suitability for saline, and confirmation of any regrowth of the existing plants in the summer growth period.
5. WDC could consider whether to request Environment Canterbury to gather further understanding of Waimakariri River flows including any impact of the minimum flow set in the Waimakariri River Regional Plan.
6. This report does not consider coastal erosion caused by coastal inundation by storms, saltwater intrusion and raised groundwater levels in the Kaiapoi area due to climate change and sea level rise. This work is part of the WDC Climate Resilience Programme.

3.4 CWMS Zone Committee – Review

ECan Facilitation Team Leader, Murray Griffin, will provide a short update on this review at the meeting.

3.5 Future Committee meetings

Confirming the next two committee meeting days are:

- Monday 2 December 2024 – field visit
- Monday 3 February 2025 – meeting

3.6 Action points from the previous zone committee meetings

- An update on the water quality sampling at Tutaepatu Lagoon.

Fin.

Water quality for contact recreation:

Annual summary report 2023-24 season

Environment Canterbury Science Summary:
R24/35

Water quality for contact recreation:

Annual summary report 2023-24 season

Environment Canterbury Science Summary:
R24/35

Melanie Burns
Gary Rushworth

September 2024

Reviewed by: *Elaine Moriarty*
Section Manager – Surface Water Science

Key messages

- Environment Canterbury staff routinely monitor 57 freshwater (rivers and lakes) and 47 coastal (estuary, beach, and harbour) popular contact recreational sites weekly over the summertime across the region. These sites are commonly used for swimming, boating, and paddling.

- At each of these sites water quality is sampled for Faecal Indicator Bacteria (*Escherichia coli (E. coli)* and / or enterococci) concentrations to establish suitability for swimming. We also undertake surveys for toxic algae at freshwater sites where blooms may pose a risk to public health.

- At the conclusion of the 2023-24 summer, 85% of coastal sites (estuaries, harbours, and beaches) were graded as generally suitable for swimming. The number of sites suitable for contact recreation has improved compared to the previous two years.

- Over half the sites within Lyttelton Harbour / Whakaraupō (63%) remain unchanged and are still considered ‘unsuitable for swimming’.

- At the conclusion of the 2023-24 summer, 72% of the freshwater sites were graded as generally suitable for contact recreation. Out of these freshwater sites, 88% of the lake sites were graded as suitable for contact recreation and 65% of rivers.

- During the 2023-24 summer, there were no temporary public health warnings issued due to high faecal contamination. Twenty-two river sites and six lake sites had health warnings issued due to blooms of toxic algae.

Table of contents

1 Introduction

The Canterbury Regional Council's (Environment Canterbury) recreational water quality programme monitors key swimming sites in the region. The monitoring programme follows the national microbiological water quality guidelines for marine and freshwater recreational areas (Ministry for the Environment [MfE] & Ministry of Health [MoH], 2003) and the interim national guidelines for cyanobacteria[1] in recreational freshwaters (MfE & MoH, 2009). Full details of the programme can be found in the report by Arthur (2020).

Environment Canterbury staff routinely monitor popular freshwater (stream, river, and lake) and coastal (beach, harbour, and estuary) sites for faecal indicator bacteria (FIB). *Escherichia coli* (*E. coli*) is the FIB that is analysed at freshwater sites, enterococci at marine sites, and both *E. coli* and enterococci at estuarine sites. In addition, Environment Canterbury monitors for toxic algae at sites which are popular for recreation and considered to be at-risk of developing blooms. This list of sites is reviewed at the end of each sample season.

Monitoring results are published on the Land Air Water Aotearoa (LAWA) – Can I swim here? website[2] as soon as the data is available. Te Mana Ora – National Public Health Service (Te Mana Ora - NPHS) are notified of high-risk results (including exceedances of cyanobacteria guidelines) and may issue human health warnings. These are displayed on LAWA and Environment Canterbury's website[3].

The responsibility for various response actions falls to the different agencies involved (e.g., Environment Canterbury, Te Mana Ora - NPHS, and relevant Territorial Authorities). Prior to the start of each summer monitoring season, sampling and response protocols are established by the agencies for each district.

The purpose of this summary report is to report on:

- last season's microbial surveillance monitoring results,
- provide updated Suitability for Recreation Grade (SFRG) assessments for microbial quality,
- summary of toxic algae bloom surveillance results, and
- investigations from the 2023-24 season.

A summary of faecal coliform concentrations in marine waters over shellfish will be circulated in a separate memorandum and is therefore not included in this report.

[1] Cyanobacteria are a group of bacteria that can photosynthesise like true algae. Some species are benthic and grow on the beds of rivers and lakes while others live suspended in the water column. Unlike freshwater algae, some species of cyanobacteria produce toxins. In this report we use the term 'toxic algae' for cyanobacteria, which is consistent with national advice to avoid potential confusion with other faecal indicator bacteria, such as *Escherichia coli* and enterococci.

[2] https://www.lawa.org.nz/explore-data/swimming

[3] https://www.ecan.govt.nz/your-region/your-environment/water/health-warnings/

2 Microbial surveillance programme in 2023-24 season

2.1 Surveillance Response Framework

Weekly surveillance monitoring is an essential component of the recreational water quality programme. It is particularly important for sites that are graded 'good', 'fair', and 'poor' which tend to have variable water quality and contaminant risks. While weekly monitoring results do not change a site's SFRG over the course a summer, it does detect discrete contamination events and informs the need for management interventions (e.g., temporary health warnings). Seasonal surveillance monitoring also provides data for the reassessment of SFRGs at the end of each season.

During the summer monitoring season (mid-November to end of March), individual sample results are used to determine surveillance response modes (Table 2-1). When a sample result exceeds the Alert or Action level, the site is resampled as soon as possible. If two consecutive samples at a site exceed the Action level, the site may be put into a temporary warning by Te Mana Ora – NPHS until sample results fall below the Alert level. The sites that have 'poor' or 'very poor' grades have permanent warning signage in place and are not generally resampled following a high result.

Table 2-1: Response modes for sampling results during the summer monitoring period (MfE & MoH, 2003)

Action level	Single sample result	Response protocol
Surveillance	• ≤ 260 *E. coli*/100 mL • ≤ 140 enterococci/100 mL	• Continue routine monitoring
Alert	• 261 – 550 *E. coli*/100 mL • 141 – 280 enterococci/100 mL	• Increase sampling frequency • Identify and report on possible sources
Action	• > 550 *E. coli*/100 mL • > 280 enterococci/100 mL	• Increase sampling • Identify and report on possible sources • Erect warning signs • Inform public

2.2 Weekly surveillance sampling sites

Faecal indicator bacteria concentrations were monitored at 57 freshwater and 47 coastal sites throughout Canterbury (Figure 2-1) during the 2023-24 summer. Monitoring commenced at one new coastal site (Cass Bay main beach) this season. For freshwater monitoring sites, one was discontinued, (Lake Tahi) and a new site established (Lake Rua). We also undertook microbial investigations at Waipara River, Lyttelton Harbour / Whakaraupō, and Akaroa Harbour (details provided in the Appendices).

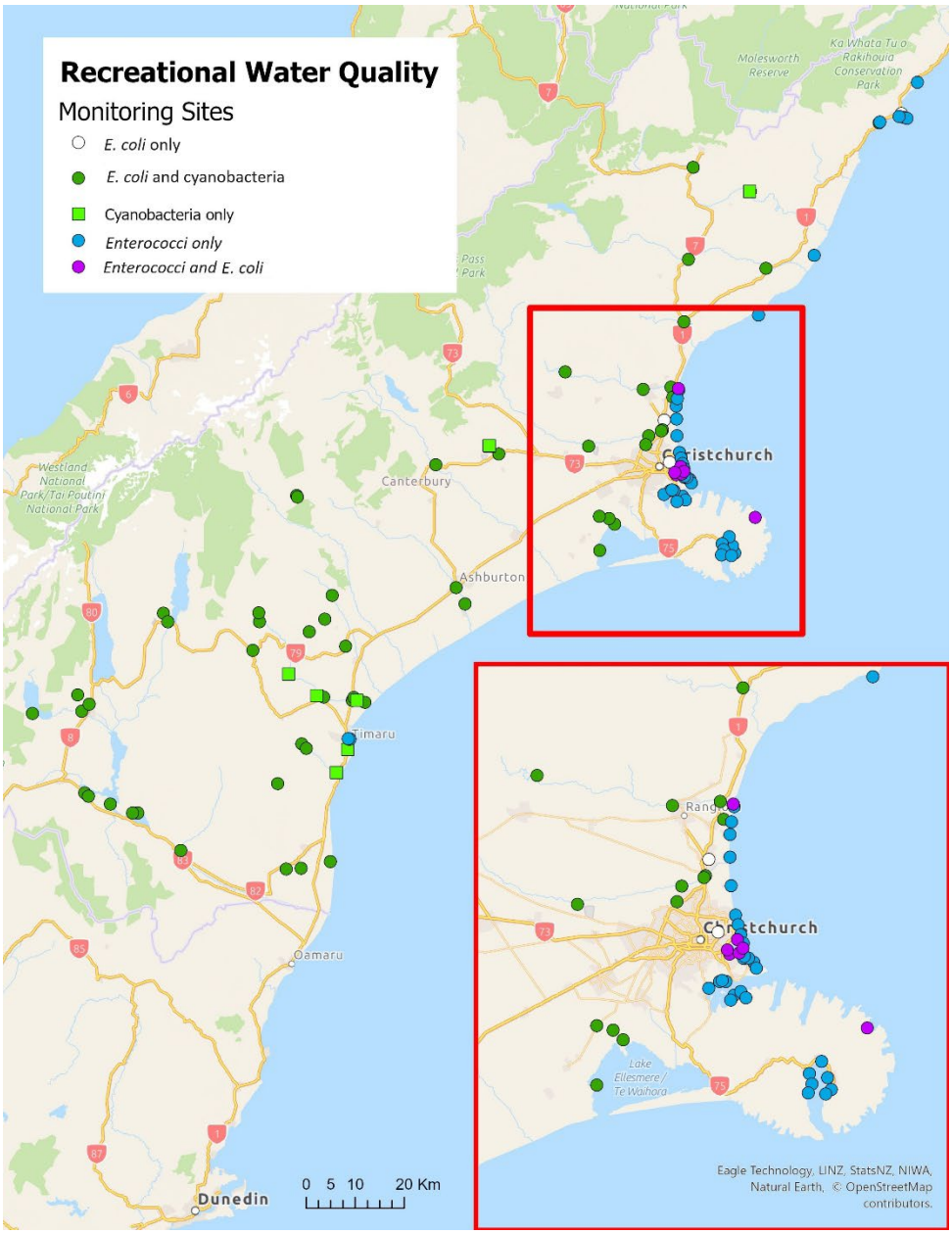

Figure 2-1: Map of contact recreation sites monitored for microbiological water quality (*E. coli* and enterococci) and toxic algae in Canterbury

2.3 Microbial water quality health warnings from surveillance monitoring

Temporary public health warnings are issued at the discretion of Te Mana Ora – NPHS where the results of single or consecutive samples exceed the Action level for the microbial contamination of water. There were no temporary health warnings issued for microbial exceedances at any of the sites in the 2023-24 season.

There were exceedances of the Alert and Action levels for *E. coli* and enterococci at some sampling sites, but these did not meet the criteria for a public health warning to be issued by Te Mana Ora - NPHS.

3 Suitability for Recreation Grade for 2023-24 season

3.1 Suitability for Recreation Grade assessment methodology

The MoH & MfE (2003) guidelines implement a qualitative risk assessment of potential faecal contamination within a waterbody's catchment to determine a Sanitary Inspection Category (SIC). This is coupled with faecal indicator bacteria concentration data (used to determine a Microbiological Assessment Category (MAC)) to assign each recreational site a Suitability for Recreation Grade (SFRG). The SFRG describes the general condition of a site at any given time and the health risks associated with microbial water quality at a site. A complete outline of the SIC and MAC methodology can be found in Arthur (2020). Table 3-1 outlines the SFRG assessment matrix.

Escherichia coli (*E. coli*) is measured in freshwaters and enterococci in marine waters. Both *E. coli* and enterococci are monitored in brackish environments (e.g., estuaries) where freshwater and saline influences are dynamic due to tidal cycles and river flows.

The most recent five seasons of microbiological monitoring results are used to calculate the MAC. For new sites, at least three seasons of data are needed before an interim MAC grade can be calculated. At estuary sites, both enterococci and *E. coli* are measured, the FIB with the worst MAC grade is used in the calculation of SFRG.

Table 3-1: Suitability for Recreation Grading assessment matrix for freshwater and marine sites adapted from MfE & MoH (2003)

		Microbiological Assessment Category (MAC) (95th percentile - max. 5 seasons data)			
		A	**B**	**C**	**D**
Freshwater		≤ 130 *E. coli*/100 mL	131-260 *E. coli*/100 mL	261-550 *E. coli*/100 mL	>550 *E. coli*/100 mL
Marine		≤ 40 enterococci/100 mL	41-200 enterococci/100 mL	201-500 enterococci/100 mL	>500 enterococci/100 mL
Sanitary Inspection Category (SIC)	Very low	Very good	Very good	Follow-up*	Follow-up*
	Low	Very good	Good	Fair	Follow-up*
	Moderate	Follow-up*	Good	Fair	Poor
	High	Follow-up*	Follow-up*	Poor	Very poor
	Very high	Follow-up*	Follow-up*	Follow-up*	Very poor

* Indicates unexpected results requiring investigation (e.g., reassessment of SIC).

The risk of illness from swimming increases progressively at sites graded from 'very good' to 'very poor'. Sites with a SFRG of 'very good', 'good' and 'fair' are generally considered suitable for contact recreation although may at times not be suitable (e.g., after heavy rainfall resulting in high FIB concentrations). Sites with a SFRG of 'poor' and 'very poor' are generally considered unsuitable for contact recreation and public notification is therefore recommended via permanent signage at these sites and media releases. Note that suitability for swimming grades only considers the microbial health risks and does not consider other aspects of a site's physical features (e.g., hazards, currents, rips) or other water quality contaminants.

3.2 Rainfall affected data

Many of Canterbury's freshwater and marine bathing sites have reasonably good microbial water quality during periods of dry, stable weather. However, increased runoff from moderate to heavy rainfall events

often increase FIB concentrations in waterbodies for short periods (up to 48 hours). The MoH & MfE (2003) guidelines state that data collected during or immediately following rainfall, as part of routine sampling, should be included in the overall MAC assessment as this gives an indication of water quality over an extended period, and allows for variations in climatic conditions. Modifying SFRGs by removing rainfall affected data should only occur where interventions are demonstrated to be effective in discouraging recreational use.

Many of our river sites have high flows and turbid waters after moderate to heavy rainfall and it is reasonable to assume that this is an effective deterrent for swimmers. Therefore, it is appropriate to modify the MACs for river bathing sites where rainfall is known to influence results. The MACs were calculated on a subset of data that had rainfall-affected results removed. The removal of rainfall-affected data was based on assessments of flow, rainfall data (if available) and field observations noted at the time of sampling. The exclusion of data collected during these conditions allows an assessment of microbial water quality during times when swimming is more likely to occur in rivers.

The criteria for removing rainfall-affected data aimed to only remove data that match climatic conditions that would deter people from swimming at a site. The criteria are:

- moderate to heavy rain on the day of, or day before sampling;
- river in flood, i.e., high flows (max. 2 days following peak flood);
- water is reported as turbid, i.e., flood continues to influence water quality.

River sites that have a better SFRG when rainfall-affected datapoints are removed (i.e., were graded 'poor' or 'very poor' based on all datapoints and improve to 'fair' or better), are assigned that corresponding rainfall adjusted grade. **Permanent signage is required at sites with rainfall adjusted grades to inform the public that the human health risks from microbial contamination may persist up to 48 hours after significant rainfall.** River sites where suitability for swimming remains unchanged after rainfall assessment will retain their original grade to provide consistency with the LAWA approach[4]. The summary results of rainfall adjusted grades are provided in Appendix 1.

In open water sites (marine, estuarine and lake sites), there are often no visible indications that heavy rainfall has occurred within the last 48 that would deter people from swimming hours (e.g., turbid water or high flow/flooded waters are not apparent). Our monitoring has observed that despite signage people will swim at these sites within 48 hours of heavy rainfall, therefore the risk of people getting sick is much higher. We can't assume that everyone will assess if rainfall had fallen in the 48 hours prior to visiting a marine or lake environment so a cautionary approach is applied and the MACs at lake, estuarine and marine sites are not rainfall adjusted.

3.3 Suitability for Recreation Grades for 2023-24

The SFRGs for the 2023-24 season are presented in Figure 3-3 and Table 3-2, along with the grades for the previous four seasons as a comparison. The summary results for the MAC and SIC grades for each site are provided in Appendix 1.

3.3.1 Freshwater

At the conclusion of the 2023-24 summer, 41 of 57 (72%) freshwater sites (lakes and rivers) were graded as 'very good', 'good' or 'fair' and are considered generally suitable for swimming (Table 3-2 & Figure 3-1). Two of these sites (3%) had interim grades as they only had three years of data. Fourteen sites (25%) were graded as 'poor' or 'very poor' and are considered unsuitable for swimming. These sites were mostly located in the lower reaches of rivers. Most lake sites (88%) were graded as 'fair' to 'very good' compared to 65% of river sites (Figure 3-1). Two sites were relatively new and ungraded due to insufficient data (i.e., <3 years of data).

No freshwater sites deteriorated from being suitable to unsuitable for swimming. One site improved from being unsuitable to suitable for swimming (except for up to 48 hours after rainfall).

[4] https://www.lawa.org.nz/learn/factsheets/coastal-and-freshwater-recreation-monitoring

Five freshwater sites had an improved grade, while seven freshwater sites had a deteriorated grade as follows:

- Pareora River/Pureora at Evans Crossing had an improved grade from ‘poor’ to ‘fair’. Note, these data were rainfall adjusted making it unsuitable for swimming up to 48 hours after rainfall.

- Ōrāri River at Gorge, Hakataramea River at SH82, Lake Aviemore at Te Akatarawa Camp and Lake Aviemore at Loch Laird, had improved grades from ‘fair’ to ‘good’.

- The following sites deteriorated from a grade of ‘good’ to ‘fair’:
    - Ashley River / Rakahuri above Rangiora-Loburn bridge;
    - Ashley River / Rakahuri u/s Gorge bridge;
    - Selwyn River / Waikirikiri at Chamberlains Ford;
    - Ōpihi River at Saleyards bridge;
    - Lake Alexandrina at bottom huts;
    - Twizel River / Whakatipu at picnic area; and
    - Waihao River at Bradshaws Road.

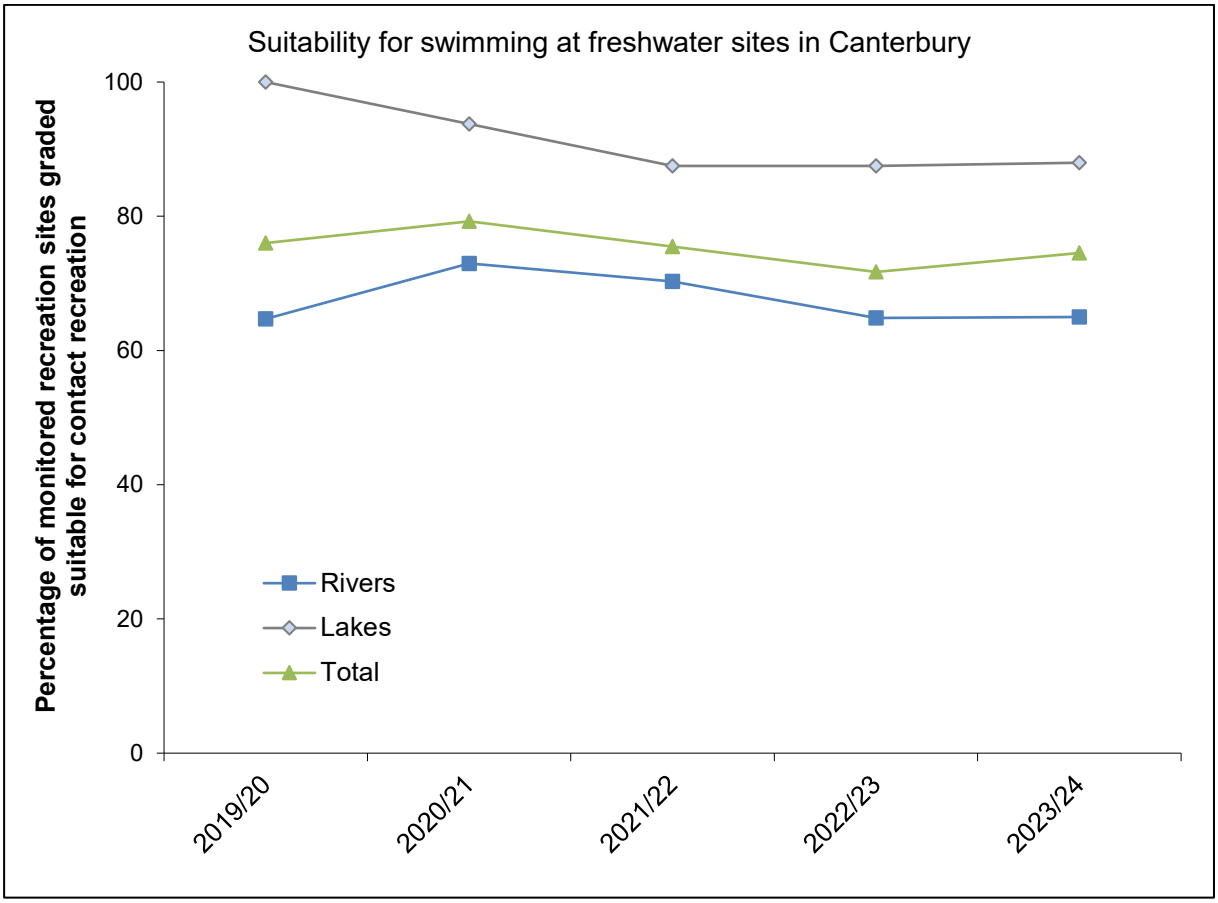

Figure 3-1: Percentage of freshwater sites in Canterbury graded as generally suitable for swimming for the last 5 seasons

Table 3-2: Suitability for Recreation Grades (SFRGs) over the past 5 years at freshwater sites in Canterbury. Arrows represent an improvement (↑) or degradation (↓) in SFRG after the 2023-24 season. (Interim) indicates that the grade is based on 3 years of data only

Site	Suitability for Recreation Grade (*excludes rainfall data)					Change in grade
	2019-20	2020-21	2021-22	2022-23	2023-24	
Kaikoura District						
Kahutara River u/s SH1	Good*	Good*	Fair	Fair	**Fair**	
Lyell Creek / Waikōau Lagoon	Very Poor	Very Poor	Very Poor	Very Poor	**Very Poor**	
Hurunui District						
Hanmer River at Swimming/Picnic Area	-	-	-	-	**Good (Interim)**	
Hurunui River at SH1	Poor	Fair*	Fair*	Fair*	**Fair***	
Hurunui River at SH7	Poor	Poor	Very Poor	Very Poor	**Very Poor**	
Waiau Uwha River upstream SH70	Good	Good	Fair	Good*	**Good***	
Waipara River at Swimming Hole	Fair	Fair	Poor	Poor	**Poor**	
Waimakariri District						
Ashley River / Rakahuri above Rangiora-Loburn bridge	Good*	Good*	Fair	Good*	**Fair**	↓
Ashley River / Rakahuri at SH1	-	Good*	Good*	Good*	**Good**	
Ashley River / Rakahuri u/s Gorge Bridge	Good*	Good*	Good*	Good*	**Fair**	↓
Kaiapoi River at Boat Ramp	Very Poor	Very Poor	Very Poor	Very Poor	**Very Poor**	
Pegasus Lake at Moto Quay	Very Good	Very Good	Very Good	Very Good	**Very Good**	
Christchurch City						
Avon River / Ōtākaro at Kerrs Reach	Very Poor	Very Poor	Very Poor	Very Poor	**Very Poor**	
Ōtūkaikino Creek at swimming hole	Poor	Poor	Fair*	Poor	**Poor**	
Roto Kōhatu Reserve at Lake Rua	-	-	-	-	**Insufficient data**	
Waimakariri River at Rock Spur	Fair*	Fair*	Fair*	Fair*	**Fair***	
Waimakariri River u/s old Highway Bridge	-	-	-	-	**Insufficient data**	
Selwyn District						
Te Waihora / Lake Ellesmere at Lakeside Domain	Fair	Fair	Poor	Poor	**Poor**	
Rakaia River at Gorge	-	Good*	Fair	Good	**Good**	
Selwyn River / Waikirikiri at Chamberlains Ford	Good	Good*	Good*	Good*	**Fair**	↓
Selwyn River / Waikirikiri at Coes Ford	Poor	Poor	Poor	Poor	**Poor**	
Selwyn River / Waikirikiri at Glentunnel	Fair*	Fair*	Fair*	Fair*	**Fair***	
Selwyn River / Waikirikiri at Upper Huts	Very Poor	Very Poor	Very Poor	Very Poor	**Very Poor**	
Waimakariri River at Thompsons Road (The Willows)	Poor	Poor	Poor	Poor	**Poor**	
Ashburton District						
Ashburton River / Hakatere at SH1	Very Poor	Very Poor	Very Poor	Very Poor	**Very Poor**	
Lake Camp at beach	Very Good	Very Good	Very Good	Very Good	**Very Good**	
Lake Clearwater west of huts	Very Good	Very Good	Very Good	Very Good	**Very Good**	
Lake Hood at Bayliss Beach	Very Good	Very Good	Very Good	Very Good	**Very Good**	
Timaru District						
Hae Hae Te Moana River at Gorge	Good*	Good	Fair	Fair	**Fair**	
Ōpihi River at Saleyards Bridge	Good*	Good*	Good*	Good*	**Fair**	↓
Ōpihi River at SH1	Good	Good	Fair	Good*	**Good***	
Ōpihi River at Waipopo Huts	Good*	Good*	Good*	Good*	**Good***	
Ōrāri River at Gorge	Good*	Good	Good	Fair	**Good**	↑
Temuka River / Te Umu Kaha at SH1	Fair*	Fair*	Fair*	Fair*	**Fair***	
Waihī River at Gorge	Fair	Fair	Fair	Fair	**Fair**	
Waihī River at Wilson St footbridge	Poor	Fair*	Fair*	Fair*	**Fair***	
Mackenzie District						
Lake Alexandrina at bottom huts	Good	Good	Good	Good	**Fair**	↓
Lake Opuha at Ewarts Corner Boat ramp	Fair	Poor	Poor	Poor	**Poor**	
Lake Opuha at Recreation Reserve	Very Good	Very Good	Very Good	Very Good	**Very Good**	
Lake Ruataniwha at camping ground	Fair	Very Good	Very Good	Very Good	**Very Good**	
Lake Tekapo / Takapō Beach	Very Good	Good	Good	Very Good	**Very Good**	
Loch Cameron at South Bank	-	-	-	-	**Very Good (Interim)**	
Ōpihi River at SH79/Fairlie	-	Good*	Good*	Good*	**Good***	
Twizel River / Whakatipu at picnic area	Fair*	Fair*	Fair*	Good*	**Fair**	↓
Waimate District						
Pareora River / Pureora at Evans Crossing	Fair*	Fair*	Fair*	Poor	**Fair***	↑
Pareora River / Pureora at Pareora Huts	Fair*	Fair*	Poor	Poor	**Poor**	
Hakataramea River at SH82	Fair	Fair	Fair	Fair	**Good**	↑
Lake Aviemore at Te Akatarawa Camp	Good	Good	Fair	Fair	**Good**	↑
Lake Aviemore at Waitangi	Good	Good	Good	Fair	**Fair**	
Otaio River / Ōtaia at Gorge	Good*	Good*	Fair	Fair	**Fair**	
Waihao River at Black Hole	Very Poor	Very Poor	Very Poor	Very Poor	**Very Poor**	
Waihao River at Bradshaws Road	Fair	Fair	Good*	Good*	**Fair**	↓
Waihao River at Gum Tree Flat Rd (Don's Hole)	Fair*	Fair*	Fair*	Fair*	**Fair***	
Waitaki District						
Lake Aviemore at Loch Laird	Fair	Fair	Fair	Fair	**Good**	↑
Lake Benmore at Pumpkin Bay	Good	Good	Good	Good	**Good**	
Lake Benmore at Sailors Cutting	Good	Good	Good	Good	**Good**	
Lake Middleton at north end of lake	Fair	Fair	Fair	Fair	**Fair**	

3.3.2 Coastal

At the end of the 2023-24 season 85% of coastal sites (estuaries, harbours, and beaches) were graded as either 'very good', 'good' or 'fair' which is generally suitable for swimming (Table 3-3 and Figure 3-2). This is an improvement from the previous two years (81% suitable for swimming in 2021-22 and 77% in 2022-23) (Gray, 2023).

There were 10 sites that had improved grades and no sites where the grades deteriorated. Three sites (Akaroa Main Beach, Tikao Bay and Caroline Bay mid beach) improved from being unsuitable for swimming to suitable for swimming. Overall, the number of sites that are considered unsuitable for swimming has dropped from ten to seven.

All the beach sites (100%) had grades of 'very good', 'good', or 'fair' and are therefore considered suitable for swimming (Figure 3-2).

All the sites (100%) in Akaroa Harbour were graded as 'fair' or 'good' and suitable for swimming, which is an improvement from the 2022-23 season. The number of sites considered suitable for swimming in Lyttelton Harbour / Whakaraupō remains unchanged from the 2022-23 season with only three out of the eight sites considered suitable for swimming (Table 3-3). Overall, 67% of harbour sites were graded 'fair' or better and considered suitable for swimming (Figure 3-2). Monitoring started in the 2023-24 season at a new site in Cass Bay at the main beach. However, an interim grade cannot be calculated for this site until there is three years of data.

Most estuary sites (78%) were graded as 'good' or 'fair' and considered suitable for swimming (Figure 3-2). There has been an improvement in the grades in the Avon-Heathcote Estuary / Ihutai with two sites improving from 'fair' to 'good'. There are only two estuary sites with poor SFRGs which are the Ashley River/ Rakahuri Estuary and Avon-Heathcote Estuary / Ihutai at Humphries Drive.

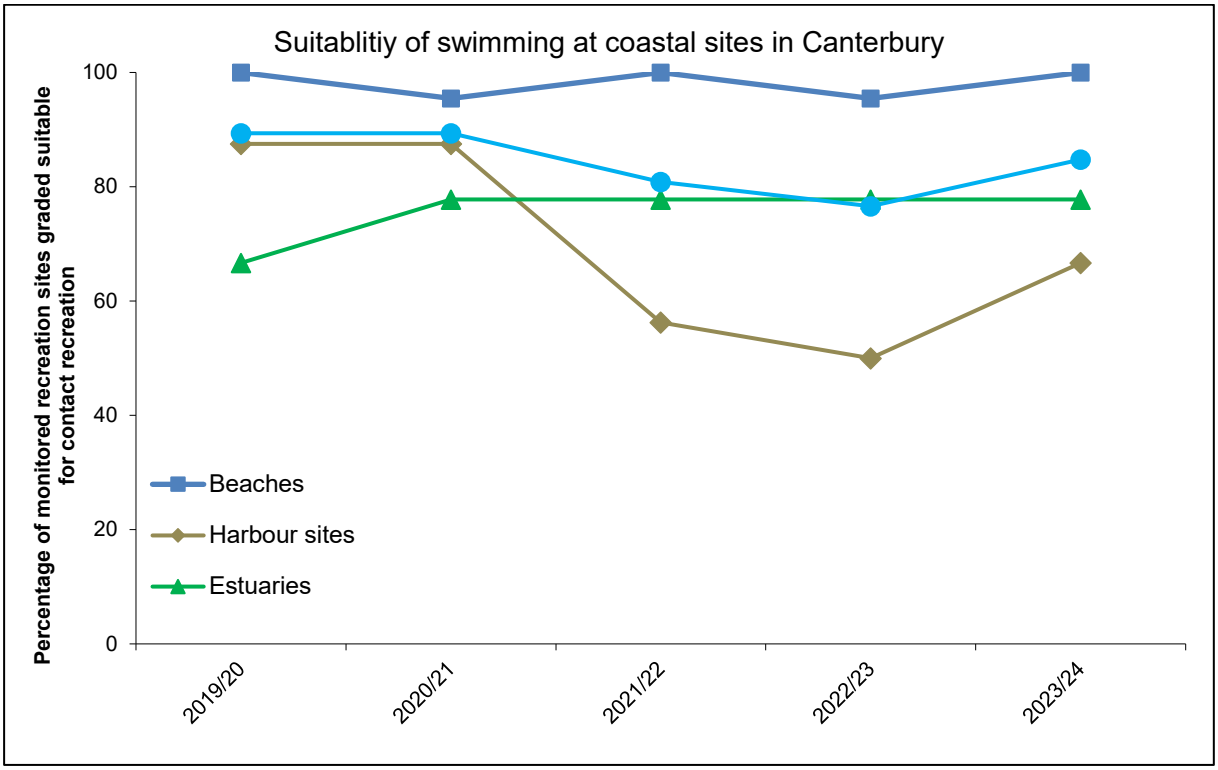

Figure 3-2: Percentage of coastal sites in Canterbury graded as generally suitable for swimming for the last 5 seasons

Table 3-3: Suitability for Recreation Grades (SFRGs) over the past 5 years at coastal and estuarine sites in Canterbury. Arrows represent an improvement (↑) or degradation (↓) in SFRG after the 2023-24 season

Site	Suitability for Recreation Grade (*excludes rainfall data - adjustment ceased in 2019-20) (^SFRG based on *E. coli* MAC)					Change in grade
	2019-20	2020-21	2021-22	2022-23	2023-24	
Kaikoura District						
Armers Beach	Good	Good	Good	**Good**	**Good**	
Gooches Beach	Good	Good	Good	**Good**	**Good**	
Mangāmāunu	Very Good	Very Good	Very Good	**Very Good**	**Very Good**	
Peketā Beach	Good	Good	Good	**Good**	**Good**	
South Bay / Te Hiku-o-te-waeroa Beach	Good	Good	Good	**Good**	**Good**	
Hurunui District						
Gore Bay / Pariroa	Very Good	Very Good	Very Good	**Very Good**	**Very Good**	
Motunau Beach	Very Good	Very Good	Good	**Good**	**Good**	
Waimakariri District						
Ashley River / Rakahuri Estuary	Poor	Poor	Poor	**Poor**	**Poor**	
Pegasus Beach	Very Good	Very Good	Very Good	**Very Good**	**Very Good**	
Pines Beach	Good	Good	Fair	**Fair**	**Fair**	
Waikuku Beach	Very Good	Very Good	Very Good	**Very Good**	**Very Good**	
Woodend Beach	Very Good	Very Good	Very Good	**Very Good**	**Very Good**	
Christchurch City						
Avon-Heathcote Estuary / Ihutai at Beachville Rd jetty	Good	Good	Good	**Good**	**Good**	
Avon-Heathcote Estuary / Ihutai at Humphreys Drive	Poor	Poor	Poor	**Poor**	**Poor**	
Avon-Heathcote Estuary / Ihutai at Moncks Bay	Good	Good	Good	**Good**	**Good**	
Avon-Heathcote Estuary / Ihutai at Mt Pleasant Yacht Club	Fair	Fair	Fair	**Fair**	**Fair^**	
Avon-Heathcote Estuary / Ihutai at Penguin Street	Poor	Fair	Fair	**Fair**	**Fair^**	
Avon-Heathcote Estuary / Ihutai at South New Brighton Park	Fair*	Fair	Fair	**Fair**	**Fair^**	
Avon-Heathcote Estuary / Ihutai at South Spit	Good	Good	Good	**Fair**	**Good**	↑
New Brighton Beach at surf club	Good	Good	Good	**Good**	**Good**	
Scarborough Beach	Good*	Fair	Fair	**Fair**	**Fair**	
South Brighton Beach at Caspian St	Good	Good	Good	**Good**	**Good**	
South Brighton Beach at surf club	Good	Good	Good	**Good**	**Good**	
Spencerville Beach	Very Good	Very Good	Very Good	**Very Good**	**Very Good**	
Sumner Beach	Good	Good	Good	**Good**	**Good**	
Taylors Mistake / Te Onepoto	Good	Very Good	Good	**Good**	**Good**	
Waimairi Beach	Good	Good	Fair	**Fair**	**Good**	↑
Lyttelton Harbour/Whakaraupō						
Cass Bay at boat ramp / Motu-kauati-rahi	Good	Good	Fair	**Fair**	**Fair**	
Cass Bay main beach	-	-	-	**-**	**Insufficient Data**	
Church Bay / Kaioruru	Fair	Fair	Fair	**Fair**	**Fair**	
Corsair Bay / Motu-kauati-iti	Good*	Fair	Poor	**Poor**	**Poor**	
Diamond Harbour / Te Waipapa Beach	Good*	Fair	Poor	**Poor**	**Poor**	
Charteris Bay / Te Wharau at Paradise Beach	Good	Good	Good	**Fair**	**Fair**	
Purau Bay	Good	Good	Poor	**Poor**	**Poor**	
Rāpaki Bay	Good*	Fair	Poor	**Poor**	**Poor**	
Governors Bay Sandy Beach	Poor	Poor	Poor	**Poor**	**Poor**	
Banks Peninsula/Te Pātaka-o-Rākaihautū						
Akaroa main beach	Good	Good	Poor	**Poor**	**Fair**	↑
Duvauchelle Bay	Good	Good	Good	**Fair**	**Good**	↑
French Farm Bay	Very Good	Good	Good	**Good**	**Good**	
Glen Bay	Good	Good	Fair	**Fair**	**Good**	↑
Okains Bay Estuary	Good*	Good	Fair	**Fair**	**Good**	↑
Takamatua Bay boat ramp	Fair	Fair	Fair	**Fair**	**Good**	↑
Tikao Bay / Ōkoropeke	Fair	Fair	Fair	**Poor**	**Fair**	↑
Wainui Beach	Good*	Fair	Fair	**Fair**	**Fair**	
Timaru District						
Caroline Bay mid beach	Good*	Good	Fair	**Fair**	**Good**	↑
Timaru Coast Yacht Club	Very Good*	Very Good	Very Good	**Very Good**	**Very Good**	
West Caroline Bay	Fair*	Poor	Fair	**Poor**	**Fair**	↑

3.4 Summary

The majority of Canterbury's freshwater and coastal swimming sites (77%) that were monitored seasonally for microbial water quality are considered suitable for swimming according to MfE & MoH (2003) microbial water quality guidelines (Figure 3-1 & Figure 3-2). This number has increased slightly from the previous season (75%). Three sites in the monitoring network had insufficient data to calculate a SFRG because they were added to the programme in the last two years. Appendix 2 provides district maps of the swimming sites and their SFRGs, which are to be adopted for the 2024-25 season.

The microbiological water quality at 88% of lake sites were considered suitable for swimming with 75% of these containing a grade of 'good' or 'very good'. There was one lake site not suitable for swimming and another lake site that is ungraded as it was only added to the monitoring network in 2023-24.

River sites in Canterbury are variable with most (65%) considered to be suitable for swimming under stable flow conditions. Many rivers which are not considered suitable for swimming are in the lower reaches of predominantly urban or agricultural catchments. They are particularly prone to elevated *E. coli* concentrations even under baseflows.

Most coastal, estuary and harbour sites (85%) were considered suitable for swimming. This is an improvement from the previous season (2022-23) when only 77% were suitable for swimming. The sites that are unsuitable for swimming are two estuary sites and five sites within Lyttelton Harbour / Whakaraupō.

4 Toxic algae monitoring

4.1 Toxic algae response framework

The *New Zealand Guidelines for Cyanobacteria in Recreational Fresh Waters: Interim Guidelines* (MfE & MoH, 2009) outlines a monitoring and response framework for benthic and planktonic toxic algae in streams, rivers and lakes (Table 4-1). It addresses the public health risks associated with bathing in recreational waters, but not drinking water. The guidelines do not address the health risks to animals (e.g., dogs or livestock) from contact or ingesting toxic algae.

Table 4-1: Response framework for toxic monitoring of popular contact recreational waters

Alert level	Observations of benthic toxic algae	Observations of planktonic toxic algae	Actions
Surveillance	• Up to 20% coverage of potentially toxic algae attached to substrate.	• The cell concentration of total toxic algae does not exceed 500 cells/mL; or • The biovolume equivalent for the combined total of all toxic algae does not exceed 0.5 mm^3/L.	• Undertake weekly or fortnightly visual inspections and/or water samples.
Alert	• 20-50% coverage of potentially toxic algae attached to substrate.	• Biovolume equivalent of 0.5 to < 1.8 mm^3/L of potentially toxic algae; or • 0.5 to < 10 mm^3/L total biovolume of all toxic algae material.	• Increase visual inspections and/or water sampling. • Notify public health unit. • Multiple sites should be inspected and sampled
Action	• Greater than 50% coverage of potentially toxic algae attached to substrate; or • 20-50% where potentially toxic algae are visibly detaching from substrate, accumulating along river's edge, or becoming exposed on the river's edge as the river levels drop.	• ≥ 12 µg/L total microcystins; or biovolume equivalent of ≥ 1.8 mm^3/L of potentially toxic algae; or • ≥ 10 mm^3/L total biovolume of all toxic algal material; or • toxic algae scums consistently present.	• Continue monitoring as for alert (amber mode); • If potentially toxic taxa are present, then consider testing samples for cyanotoxins; • Notify the public of a potential risk to health.

4.2 Toxic algae monitoring methodology

Lakes and rivers are monitored from mid-November to March each summer. Bankside visual assessments are carried-out on a weekly basis. Monitoring of sites which are at Alert or Action level continue to be monitored irrespective of the time of year. The monitoring network for toxic algae is reviewed by Environment Canterbury and Te Mana Ora - NPHS in between seasons to ensure that the network remains fit for purpose.

Two growth forms of toxic algae are monitored: benthic (also known as mat forming) are generally found in rivers; and planktonic forms which occur in lakes and deep, slow-moving rivers. Established methodologies are used to determine if either growth forms are in bloom.

The coverage of benthic toxic algae is estimated using two methods. Bankside visual inspections are carried-out once a week. If cover is estimated to be at or above 15% then a fully quantitative transect survey is performed (MfE & MoH, 2009). If results from the transect assessment indicate Alert or Action levels then weekly bankside assessments and fortnightly transect surveys are carried-out, this continues irrespective of the time of year once a bloom is established.

For planktonic toxic algae if bankside observations indicate the presence of planktonic blooms or scums, then samples of the water are collected. The samples are analysed to determine the species present and their biovolumes. Samples continue to be collected once a fortnight while the site is at Alert or Action level.

4.3 Benthic toxic algae surveillance results

During the 2023-24 monitoring season, 48 river sites were monitored for benthic toxic algae, of which 21 (44%) were placed into health warning due to an exceedance of the Action level threshold. All the warnings for 2023-24 were related to species of *Microcoleus,* formerly known as *Phormidium*. Table 4-2 (below) highlights the sites issued with temporary health warnings based on the coverage of *Microcoleus* throughout the Canterbury region.

Nine of the ten sites which had health warnings issued in 2022-23, were also in warning during 2023-24. In addition, another 12 sites were placed into warning during 2023-24. In total, there were 21 sites that had health warnings issued this season compared to ten during the previous season (2022-23). Warnings started earlier this season, with the first occurring in the latter half of November, and sites were in warning for longer. Eight health warnings remained in place at the end of May 2024.

Table 4-2: Benthic toxic algae health warnings for 2023-24 season. (Note: toxic algae bloom monitoring and health warnings may extend beyond summertime period)

Site	Action	Date	Reason
Waimakariri District			
Ashley River / Rakahuri at SH1	Temporary public health warning issued	5/12/2023	Microcoleus - 29% cover with exposed and detaching mats
	Warning removed	11/03/2024	<20% cover
Ashley River / Rakahuri at Rangiora-Loburn bridge	Temporary public health warning issued	20/12/2023	Microcoleus - 23% cover with exposed and detaching mats
	Warning removed	29/02/2024	<20% cover
Selwyn District			
Selwyn River / Waikirikiri at Glentunnel	Temporary public health warning issued	6/12/2023	Microcoleus - 23% cover with detaching mats
	Warning removed	12/03/2024	<20% cover
Selwyn River / Waikirikiri upstream Whitecliffs Road (picnic area)	Temporary public health warning issued	23/01/2024	Microcoleus - 34% cover with exposed and detaching mats
	Warning removed	26/03/2024	<20% cover
Selwyn River / Waikirikiri at Whitecliffs Domain (camping area)	Temporary public health warning issued	5/01/2023	Microcoleus - 23% cover with exposed and detaching mats
	Warning removed	9/05/2024	<20% cover
Selwyn River / Waikirikiri above Upper Huts	Temporary public health warning issued	18/01/2024	Microcoleus - 42% cover with detaching mats
	Warning removed	27/02/2024	<20% cover
Hurunui			
South Bank Tributary of the Waiau River above Waiau bridge	Temporary public health warning issued	12/12/2023	Microcoleus - 30% cover with exposed mats
	Warning removed	9/05/2024	<20% cover
Ashburton District			
Ashburton River u/s SH1	Temporary public health warning issued	27/02/2024	Microcoleus - 23% cover with exposed and detaching mats
	Warning removed	08/05/2024	<20% cover
Timaru District			
Ōpihi Whole catchment warning	Temporary public health warning issued	8/03/2024	Multiple sites in warning
	Warning removed	26/06/2024	<20% cover
Ōpihi River at SH1	Temporary public health warning issued	5/11/2023	Microcoleus - 33% cover with detaching mats
	Warning removed	5/04/2024	<20% cover
Ōpihi River at Grassy Banks (not a contact recreation site)	Temporary public health warning issued	14/12/2023	Microcoleus - 37% cover with exposed and detaching mats
	Warning removed	5/02/2024	<20% cover
Ōpihi River at Saleyards bridge	Temporary public health warning issued	4/01/2024	Microcoleus - 35% cover with detaching mats
	Warning removed	16/5/2024	<20% cover
Ōpihi River at Raincliff bridge	Temporary public health warning issued	17/01/2024	Microcoleus - 27% cover with exposed and detaching mats
	Warning removed	26/06/2024	<20% cover
Te Moana River at Te Moana Gorge	Temporary public health warning issued	22/11/2023	Microcoleus - 29% cover with detaching mats
	Warning removed	18/04/2024	<20% cover
Temuka River / Te Umu Kaha at SH1	Temporary public health warning issued	23/01/2024	Microcoleus - 21% cover with detaching mats
	Warning removed	10/07/2024	<20% cover

Site	Action	Date	Reason
Waihi River upstream Wilsons Footbridge bridge	Temporary public health warning issued	20/3/2024	Microcoleus - 25% cover with exposed and detaching mats
	Warning removed	26/06/2024	<20% cover
Mackenzie District			
Ōpihi River at Allendale bridge SH79	Temporary public health warning issued	8/03/2024	Microcoleus - 28% cover with exposed and detaching mats
	Warning removed	26/06/2024	<20% cover
Waimate District			
Pareora River / Pureora at Pareora Huts	Temporary public health warning issued	30/11/2023	Microcoleus - 22% cover with exposed and detaching mats
	Warning removed	29/02/2024	<20% cover
Pareora River / Pureora at SH1	Temporary public health warning issued	1/02/2024	Microcoleus - 22% cover with exposed and detaching mats
	Warning removed	4/04/2024	<20% cover
Waihao River at Bradshaws Road	Temporary public health warning issued	30/11/2023	Microcoleus - 26% cover with exposed and detaching mats
	Warning removed	12/03/2024	<20% cover
	ADVISORY NOTE	10/04/2024	Microcoleus - 34% cover with exposed and detaching mats
Waihao River at Gumtree Flat Rd (Dons Hole)	Temporary public health warning issued	14/12/2023	Microcoleus - >21% cover with exposed and detaching mats
	Warning removed	29/02/2024	<20% cover

During the monitoring season, Environment Canterbury were aware of blooms of benthic toxic algae for locations outside of the contact recreation monitoring network. These included sites on the Ōpihi, Temuka, and Waihi rivers which are monitored by Environment Canterbury for 'state of the environment' reporting (Stevenson & Bayer, 2024). There were also reports of suspected toxic algae from partner organisations and the community. In all instances the information was shared with Te Mana Ora - NPHS, and technical advice was provided to the appropriate territorial authority.

Between January 2024 and February 2024, we received two reports of dog illness associated with locations which were subsequently confirmed to have low levels of benthic toxic algae. These were Boyer Stream/Taylors Stream (Ashburton district) and Middle Creek (Kaikōura district). As the amount of benthic toxic algae cover was assessed as below the threshold for human-health risks, health warnings were not issued.

There were also reports of benthic toxic algae at rivers which were not associated with reports of human or animal illness. These were the Garry River (Waimakariri District), and Bowyer Stream (Ashburton District). Health warnings were not issued but advice was provided to Waimakariri District Council, and the Department of Conservation respectively.

4.4 Planktonic toxic algae surveillance results

Six lake sites and one river site had blooms of planktonic toxic algae which led to health warnings during the 2023-24 recreational season. Table 4-3 describes the timing and duration of these events. Temporary health warnings can be removed when there are two consecutive results below Alert level. There are two lakes (Lake Rotorua and St Annes Lagoon / Mata Kōpae) in permanent warning, these warnings will continue until there is sustained improvement in water quality or changes in recreational use. Note: the protocol stipulates that the time of year (end of summer) should not influence the downgrading of warnings and associated bloom monitoring.

All sites in warning during 2023-24 also had warnings issued during 2022-23. However, the main differences between the 2023-24 season and 2022-23 season were:

- Lake Opuha did not go into warning during 2023-24.
- Lake Hood went into warning much earlier and for longer i.e. five months compared to circa. two months.
- Lake Pegasus went into warning relatively early and was of similar duration to the previous season.

- Saltwater Creek (Timaru) went into warning much later than the previous season and for a shorter duration.
- At Saltwater Creek there were no reports of the bloom extending up into Centennial Park.

Blooms of planktonic toxic algae were reported for two locations not included in the contact recreation programme. These were the Eastern Kaiapoi Lake, and Ferrymead ponds, which were reported by Waimakariri District Council and Christchurch City Council respectively. No health warnings were issued for these locations, although advisory signage was recommended by Environment Canterbury and Te Mana Ora - NPHS.

Table 4-3: Planktonic toxic algae health warnings for 2023-24

Locations in bold text remain in warning at the time of publishing.

Site	Action	Date	Reason
Kaikoura District			
Lake Rotorua	Permanent public health warning issued	09/03/2019	Lake in permanent warning
Hurunui District			
St Annes Lagoon / Mata Kōpae	Permanent public health warning issued	31/08/2022	Lake in permanent warning
Waimakariri District			
Pegasus Lake	Temporary public health warning issued	6/01/2024	Biomass exceeded guideline
	Warning removed	23/04/2024	Biomass below guideline
Christchurch City			
Lake Forsyth / Wairewa	Temporary public health warning issued	1/02/2024	Biomass exceeded guideline
	Warning removed	02/04/2024	Biomass below guideline
Selwyn District			
Lake Ellesmere / Te Waihora	Temporary public health warning	8/02/2022	Biomass exceeded guideline
		Ongoing warning	
Ashburton District			
Lake Hood	Temporary public health warning issued	4/01/2024	Biomass exceeded
	Warning removed	07/06/2024	Biomass below guideline
Timaru District			
Saltwater Creek / Ōtipua (Timaru) at SH1	Temporary public health warning issued	02/02/2024	Scums and biomass exceeded guidelines
	Warning removed	12/03/2024	Biomass below guideline

5 Further assessments

5.1 Microbial water quality investigations

Three pre-planned or ongoing investigations relating to the microbial quality of recreational waters were undertaken during the 2023-24 season. These are summarised below; the full details can be found in Appendices 3-4.

Waipara River and swimming hole at Waipara Adventure Camp	The Waipara Adventure Centre (WAC) swimming hole was graded unsuitable for swimming following on from the 2020-21 season. This caused concerns for WAC who manage the swimming hole and regularly use it as part of their outdoor education programme. Environment Canterbury staff collected samples for faecal source tracking (FST) in the swimming hole and additional samples from the Waipara River to understand the source of the poor water quality. For the second consecutive sample season, no samples were viable for FST analysis. A full summary of the investigation is provided in Appendix 3.
Lyttelton Harbour / Whakaraupō and Akaroa Harbour	Several sites in Lyttelton Harbour / Whakaraupō and Akaroa Harbour were graded as poor and considered unsuitable for swimming at the end of the 2022-23 season. Environment Canterbury has continued with its investigation into the sources of faecal contamination at these sites and the pathways that contamination is entering the bays/beaches. A full summary of the investigation is provided in Appendix 4

6 Recommendations and signage for the 2024-25 season

6.1 Recommendations

Many sites in Lyttelton Harbour / Whakaraupō continue to have poor microbial water quality. Environment Canterbury has continued to investigate the sources of faecal contamination and work with the stakeholders to improve water quality (Appendix 4). Furthermore, additional wet weather monitoring has been undertaken to support the development of a predictive model that can communicate the health risk of swimming at these sites based on rainfall and other influences. We are continuing to collect data to support model development and explore model options. It is recommended that these investigations and additional monitoring continue during the 2024-25 swimming season.

It is important that Environment Canterbury and the Waipara Adventure Centre continue to share information and to discuss ways to improve the Suitability for Recreation Grade for their swimming hole.

Environment Canterbury intends to review the current monitoring network to enable us to focus our monitoring resources on the most popular swimming sites within the Canterbury region.

6.2 Warning signage

6.2.1 Freshwater

The following monitoring sites are recommended to have permanent warning signage erected to warn the public that swimming is not recommended.

***** a popular recreational site which is no longer monitored but known to be consistently unsuitable for swimming

- Lyell Creek / Waikōau Lagoon;
- Hurunui River at State Highway 7;
- Waipara River at swimming hole;
- Kaiapoi River at boat ramp;
- Ōtūkaikino Creek at swimming hole**;**
- Avon River / Ōtākaro at Kerrs Reach;
- Heathcote River / Ōpāwaho at Catherine Street*****;
- Te Waihora / Lake Ellesmere at Lakeside Domain;
- Waimakariri River at Thompsons Road (The Willows);
- Selwyn River / Waikirikiri at Upper huts;
- Selwyn River / Waikirikiri at Coes Ford;
- Ashburton River / Hakatere at State Highway 1;
- Paeroa River / Pureora at Paeroa Huts;
- Lake Opuha at Ewarts Corner boat ramp; and
- Waihao River at Black Hole.

Signage warning that sites may be unsuitable for swimming up to 48 hours after rainfall is recommended at:

- Hurunui River at State Highway 1;
- Waiau Uwha River upstream State Highway 70;
- Waimakariri River at Rock Spur;
- Selwyn River / Waikirikiri at Glentunnel;
- Ōpihi River at State Highway 1;

- Ōpihi River at Waipopo Huts;
- Paeroa River/Pureora at Evans Crossing;
- Temuka River / Te Umu Kaha at State Highway 1;
- Waihī River at Wilsons Street footbridge;
- Ōpihi River at State Highway 79 (Fairlie); and
- Waihao River at Gum Tree Flat Road (Dons Hole).

6.2.2 Coastal

It is advised that the following monitoring sites have permanent warning signs erected informing the public that swimming is not recommended.

- Ashley River / Rakahuri Estuary;
- Avon-Heathcote Estuary / Ihutai at Humphreys Drive;
- Corsair Bay / Motu-kauati-iti;
- Rāpaki Bay;
- Governors Bay at Sandy Beach;
- Diamond Harbour Beach; and
- Purau Beach.

7 References

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Appendix 1: Two-seasons microbiological sampling result summaries

Freshwater (*E. coli*)

Note that "(Interim)" indicates that the grade is based on 3 years of data only, and '*" indicated rainfall corrected data.

Site	SIC	End of 2022-23 season							End of 2023-24 season						
		All data			Rainfall affected data removed			SFRG (*excludes rainfall-affected data)	All data			Rainfall affected data removed			SFRG (*excludes rainfall-affected data)
		E. coli 95th percentile	MAC	Provisional SFRG	*E. coli* 95th percentile	MAC	Provisional SFRG		*E. coli* 95th percentile	MAC	Provisional SFRG	*E. coli* 95th percentile	MAC	Provisional SFRG	
Kaikoura District															
Kahutara River at SH1	M	481	C	Fair	169	B	Good	**Fair**	324	C	Fair	184	B	Good	**Fair**
Lyell Creek / Waikōau Lagoon	H	1923	D	Very poor	1733	D	Very poor	**Very Poor**	1923	D	Very Poor	1733	D	Very Poor	**Very Poor**
Hurunui District															
Hanmer River at Swimming/Picnic Area	L							**Insufficient data**	206	B	Good	137	B	Good	**Good (Interim)**
Hurunui River at SH1	M	1426	D	Poor	443	C	Fair*	**Fair***	1030	D	Poor	438	C	Fair	**Fair***
Hurunui River at SH7	H	1308	D	Very poor	1120	D	Very poor	**Very poor**	1553	D	Very Poor	1553	D	Very Poor	**Very Poor**
Waiau Uwha River at SH70	M	618	D	Poor	212	B	Good*	**Good***	618	D	Poor	212	B	Good	**Good***
Waipara River at Boys Brigade Swimming Hole	M	1948	D	Poor	1250	D	Poor	**Poor**	1746	D	Poor	922	D	Poor	**Poor**
Waimakariri District															
Ashley River / Rakahuri above Rangiora-Loburn bridge	M	828	D	Poor	112	A	Good*	**Good***	454	C	Fair	112	A	Follow-up	**Fair**
Ashley River / Rakahuri at SH1	M	363	C	Fair	120	A	Good*	**Good***	150	B	Good	128	A	Follow-up	**Good**
Ashley River / Rakahuri u/s Gorge Bridge	M	640	D	Poor	200	B	Good*	**Good***	287	C	Fair	199	B	Good	**Fair**
Kaiapoi River at Boat Ramp	H	2420	D	Very poor	2420	D	Very poor	**Very Poor**	2420	D	Very Poor	2420	D	Very Poor	**Very Poor**
Pegasus Lake at Moto Quay	VL	36	A	Very good				**Very Good**	38	A	Very Good				**Very Good**
Christchurch City															
Avon River / Ōtākaro at Kerrs Reach	H	2420	D	Very poor	2420	D	Very poor	**Very Poor**	2312	D	Very Poor	2008	D	Very Poor	**Very Poor**
Ōtūkaikino Creek at Swimming Hole	M	2317	D	Poor	792	D	Poor	**Poor**	2420	D	Poor	624	D	Poor	**Poor**
Roto Kōhatu Reserve at Lake Tahi	M	154	B	Good				**Good**	208	B	Good				**Good**
Waimakariri River at Rock Spur	M	770	D	Poor	266	C	Fair*	**Fair***	883	D	Poor	354	C	Fair	**Fair***
Waimakariri River u/s old HB	M							**Insufficient data**							**Insufficient data**
Selwyn District															
Te Waihora / Lake Ellesmere at Lakeside Domain	M	551	D	Poor				**Poor**	551	D	Poor				**Poor**
Rakaia River at Gorge	M	191	B	Good	140	B	Good	**Good**	175	B	Good	97	A	Good	**Good**
Selwyn River / Waikirikiri at Chamberlains Ford	M	2076	D	Poor	248	B	Good*	**Good***	303	C	Fair	268	C	Fair	**Fair**
Selwyn River / Waikirikiri at Coes Ford	M	2420	D	Poor	1214	D	Poor	**Poor**	1553	D	Poor	1203	D	Poor	**Poor**
Selwyn River / Waikirikiri at Glentunnel	M	2420	D	Poor	274	C	Fair*	**Fair***	2420	D	Poor	313	C	Fair	**Fair***
Selwyn River / Waikirikiri at Upper Huts	H	2420	D	Very poor	730	D	Very poor	**Very Poor**	1733	D	Very Poor	687	D	Very Poor	**Very Poor**
Waimakariri River at Thompsons Road (The Willows)	M	952	D	Poor	816	D	Poor	**Poor**	821	D	Poor	579	D	Poor	**Poor**
Ashburton District															
Ashburton River / Hakatere at SH1	H	2420	D	Very poor	698	D	Very poor	**Very Poor**	2420	D	Very Poor	2420	C	Poor	**Very Poor**
Lake Camp at beach	VL	28	A	Very good				**Very Good**	28	A	Very Good				**Very Good**
Lake Clearwater west of huts	VL	79	A	Very good				**Very Good**	48	A	Very Good				**Very Good**
Lake Hood at Bayliss Beach	L	110	A	Very good				**Very Good**	110	A	Very Good				**Very Good**

Site	SIC	End of 2022-23 season							End of 2023-24 season						
		All data			Rainfall affected data removed			SFRG (*excludes rainfall-affected data)	All data			Rainfall affected data removed			SFRG (*excludes rainfall-affected data)
		E. coli 95th percentile	MAC	Provisional SFRG	*E. coli* 95th percentile	MAC	Provisional SFRG		*E. coli* 95th percentile	MAC	Provisional SFRG	*E. coli* 95th percentile	MAC	Provisional SFRG	
Timaru District															
Hae Hae Te Moana River at Gorge	L	308	C	Fair	228	B	Good	**Fair**	341	C	Fair	308	C	Fair	**Fair**
Ōpihi River at Saleyards Bridge	M	780	D	Poor	226	B	Good*	**Good***	480	C	Fair	225	B	Good	**Fair**
Ōpihi River at SH1	M	991	D	Poor	187	B	Good*	**Good***	676	D	Poor	186	B	Good	**Good***
Ōpihi River at Waipopo Huts	M	929	D	Poor	206	B	Good*	**Good***	711	D	Poor	201	B	Good	**Good***
Ōrāri River at Gorge	M	272	C	Fair	112	A	Good*	**Fair**	211	B	Good	110	A	Follow-up	**Good**
Temuka River / Te Umu Kaha at SH1	M	1986	D	Poor	389	C	Fair*	**Fair***	1525	D	Poor	379	C	Fair	**Fair***
Waihī River at Gorge	M	361	C	Fair	183	B	Good*	**Good***	361	C	Fair	203	B	Good	**Fair**
Waihī River at Wilson St footbridge	M	2420	D	Poor	488	C	Fair*	**Fair***	2140	D	Poor	443	C	Fair	**Fair***
Mackenzie District															
Lake Alexandrina at bottom huts	M	208	B	Good				**Good**	287	C	Fair				**Fair**
Lake Opuha at Ewarts Corner Boat ramp	M	1002	D	Poor				**Poor**	892	D	Poor				**Poor**
Lake Opuha at Recreation Reserve	VL	152	B	Very good				**Very Good**	152	B	Very Good				**Very Good**
Lake Ruataniwha at camping ground	VL	137	B	Very good				**Very Good**	130	A	Very Good				**Very Good**
Lake Tekapo / Takapō Beach	VL	191	B	Very good				**Very good**	174	B	Very Good				**Very Good**
Loch Cameron at South Bank	VL							**Insufficient data**	44	A	Very Good				**Very Good (Interim)**
Ōpihi River at SH79 (Fairlie)	M	1419	D	Poor	210	B	Good*	**Good***	1419	D	Poor	201	B	Good	**Good***
Twizel River / Whakatipu at picnic area	M	769	D	Poor	240	B	Good*	**Good***	545	C	Fair	180	B	Good	**Fair**
Waimate District															
Pareora River/Pureora at Evans Crossing	M	2420	D	Poor	586	D	Poor	**Poor**	1060	D	Poor	494	C	Fair	**Fair***
Pareora River/Pureora at Huts	M	2420	D	Poor	719	D	Poor	**Poor**	1326	D	Poor	655	D	Poor	**Poor**
Hakataramea River at SH82	M	323	C	Fair	112	A	Good	**Fair**	160	B	Good	102	A	Good	**Good**
Lake Aviemore at Te Akatarawa Camp	M	154	B	Good				**Fair**	146	B	Good				**Good**
Lake Aviemore at Waitangi	M	286	C	Fair				**Fair**	395	C	Fair				**Fair**
Otaio / Ōtaia River at Gorge	M	509	C	Fair	515	C	Fair	**Fair**	509	C	Fair	512	C		**Fair**
Waihao River at Black Hole	H	2420	D	Very poor	921	D	Very poor	**Very poor**	2420	D	Very Poor	1092	D		**Very Poor**
Waihao River at Bradshaws Bridge	H	585	D	Poor	186	B	Good*	**Good***	397	C	Fair	183	B	Good	**Fair**
Waihao River at Gum Tree Flat Rd (Don's Hole)	M	1625	D	Poor	282	C	Fair*	**Fair***	772	D	Poor	315	C	Fair	**Fair***
Waitaki District															
Lake Aviemore at Loch Laird	M	421	C	Fair				**Fair**	149	B	Good				**Good**
Lake Benmore at Pumpkin Bay	M	255	B	Good				**Good**	92	A	Good				**Good**
Lake Benmore at Sailors Cutting	M	81	A	Good				**Good**	65	A	Good				**Good**
Lake Middleton at north end of lake	M	425	C	Fair				**Fair**	365	C	Fair				**Fair**

Coastal

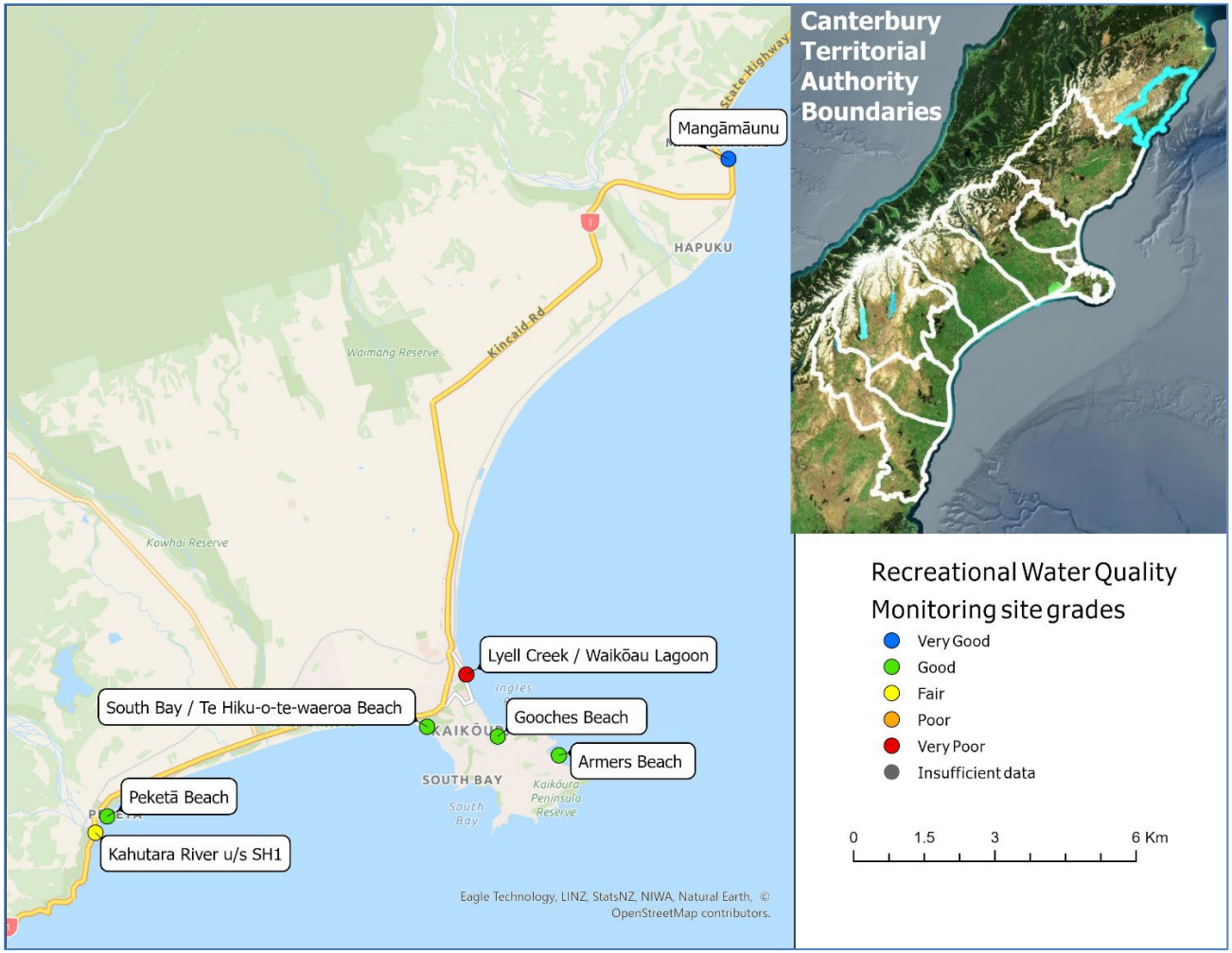
Site	SIC	End of 2022-23 season				End of 2023-24 season			
		All data			SFRG (* Grade is based on *E. coli* data)	All data			SFRG (* Grade is based on *E. coli* data)
		Enterococci 95th percentile	MAC	Provisional SFRG		Enterococci 95th percentile	MAC enterococci and *E. coli*	Provisional SFRG	
Kaikoura District									
Armers Beach	M	125	B	Good	Good	97	B	Good	**Good**
Gooches Beach	M	60	B	Good	Good	60	B	Good	**Good**
Mangāmāunu	VL	49	B	Very Good	Very Good	38	A	Very Good	**Very Good**
Peketa Beach	M	167	B	Good	Good	152	B	Good	**Good**
South Bay/Te Hiku-o-te-waeroa Beach	M	60	B	Good	Good	20	A	Follow up	**Good**
Hurunui District									
Gore Bay/Pariroa	L	28	A	Very Good	Very Good	28	A	Very Good	**Very Good**
Motunau Beach	L	78	B	Good	Good	95	B	Good	**Good**
Waimakariri District									
Ashley River/Rakahuri Estuary	M	1123	D - enterococci D - *E. coli*	Poor	Poor	1185	D - enterococci D - *E. coli*	Poor	**Poor**
Pegasus township	VL	45	B	Very Good	Very Good	27	A	Very Good	**Very Good**
Pines Beach	M	238	C	Fair	Fair	228	C	Fair	**Fair**
Waikuku Beach	VL	38	A	Very Good	Very Good	31	A	Very Good	**Very Good**
Woodend Beach	VL	60	B	Very Good	Very Good	47	B	Very Good	**Very Good**
Christchurch City									
Avon-Heathcote Estuary/Ihutai at Beachville Rd jetty	M	59	B - enterococci A - *E. coli*	Good	Good	28	A - enterococci A - *E. coli*	Follow up	**Good**
Avon-Heathcote Estuary/Ihutai at Humphreys Drive	M	3219	D - enterococci D - *E. coli*	Poor	Poor	1396	D - enterococci D - *E. coli*	Poor	**Poor**
Avon-Heathcote Estuary/Ihutai at Moncks Bay	M	29	A	Good	Good	20	A	Follow up	**Good**
Avon-Heathcote Estuary/Ihutai at Mt Pleasant Yacht Club	M	205	C - enterococci C - *E. coli*	Fair	Fair	177	B - enterococci C - *E. coli*	Good	**Fair***
Avon-Heathcote Estuary/Ihutai at Penguin Street	M	63	B - enterococci C - *E. coli*	Good	**Fair***	168	B - enterococci C - *E. coli*	Good	**Fair***
Avon-Heathcote Estuary/Ihutai at South New Brighton Park	M	84	B - enterococci C - *E. coli*	Good	**Fair***	41	B - enterococci C - *E. coli*	Good	**Fair***
Avon-Heathcote Estuary/Ihutai at South Spit	M	358	C	Fair	Fair	63	B	Good	**Good**
New Brighton Beach at surf club	M	52	B	Good	Good	49	B	Good	**Good**
Scarborough Beach	M	356	C	Fair	Fair	234	C	Fair	**Fair**
South Brighton Beach at Caspian St	M	31	A	Good	Good	31	A	Follow up	**Good**
South Brighton Beach at surf club	M	31	A	Good	Good	30	A	Follow up	**Good**
Spencerville Beach	VL	49	B	Very Good	Very Good	41	B	Very Good	**Very Good**
Sumner Beach	M	95	B	Good	Good	47	B	Good	**Good**
Taylors Mistake/Te Onepoto	M	48	B	Good	Good	36	A	Follow up	**Good**
Waimairi Beach	M	378	C	Fair	Fair	38	A	Follow up	**Good**
Lyttelton Harbour/Whakaraupō									
Cass Bay/Motu-kauati-rahi	M	361	C	Fair	Fair	361	C	Fair	**Fair**
Church Bay/Kaioruru	L	356	C	Fair	Fair	317	C	Fair	**Fair**
Corsair Bay/Motu-kauati-iti	M	1615	D	Poor	Poor	1615	D	Poor	**Poor**
Diamond Harbour/Te Waipapa Beach	L	859	D	Poor	Poor	850	D	Poor	**Poor**
Charteris Bay/Te Wharau at Paradise Beach	L	402	C	Fair	Fair	388	C	Fair	**Fair**
Purau Bay	L**	651	D	Poor	Poor	651	D	Follow up	**Poor**
Rāpaki Bay	M	639	D	Poor	Poor	639	D	Poor	**Poor**

Site	SIC	End of 2022-23 season				End of 2023-24 season			
		All data			SFRG (* Grade is based on *E. coli* data)	All data			SFRG (* Grade is based on *E. coli* data)
		Enterococci 95th percentile	MAC	Provisional SFRG		Enterococci 95th percentile	MAC enterococci and *E. coli*	Provisional SFRG	
Sandy Bay	M	2090	D	Poor	Poor	1746	D	Poor	**Poor**
Akaroa Harbour									
Akaroa main beach	M	646	D	Poor	Poor	489	C	Fair	**Fair**
Duvauchelle	M	280	C	Fair	Fair	188	B	Good	**Good**
French Farm	M	151	B	Good	Good	56	B	Good	**Good**
Glen Bay	M	205	C	Fair	Fair	138	B	Good	**Good**
Takamatua	M	344	C	Fair	Fair	191	B	Good	**Good**
Tikao Bay/Ōkoropeke	L**	666	D	Poor	Poor	424	C	Fair	**Fair**
Wainui Beach	M	438	C	Fair	Fair	238	C	Fair	**Fair**
Banks Peninsula/Te Pātaka-o-Rākaihautū									
Okains Bay Estuary	M	63	B - enterococci A - *E. coli*	Good	Fair	38	A - enterococci A - *E. coli*	Follow up	**Good**
Timaru District									
Caroline Bay mid beach	M	175	B	Good	Good	98	B	Good	**Good**
Timaru Coast Yacht Club	VL	63	B	Very Good	Very Good	41	B	Very Good	**Very Good**
West Caroline Bay	M	545	D	Poor	Poor	298	C	Fair	**Fair**

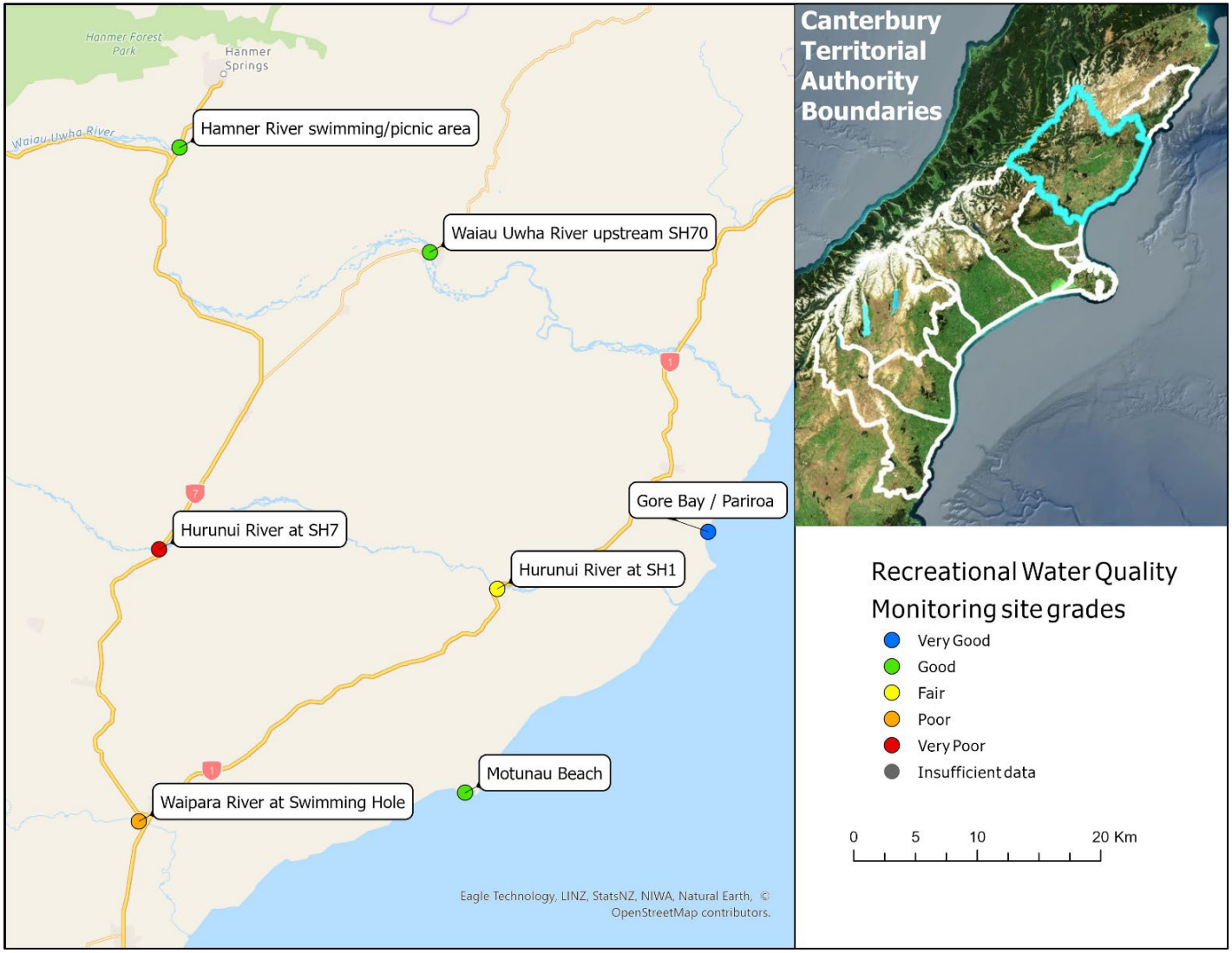
**SIC reviewed but not changed

Appendix 2: 2023-24 SFRG district summary maps

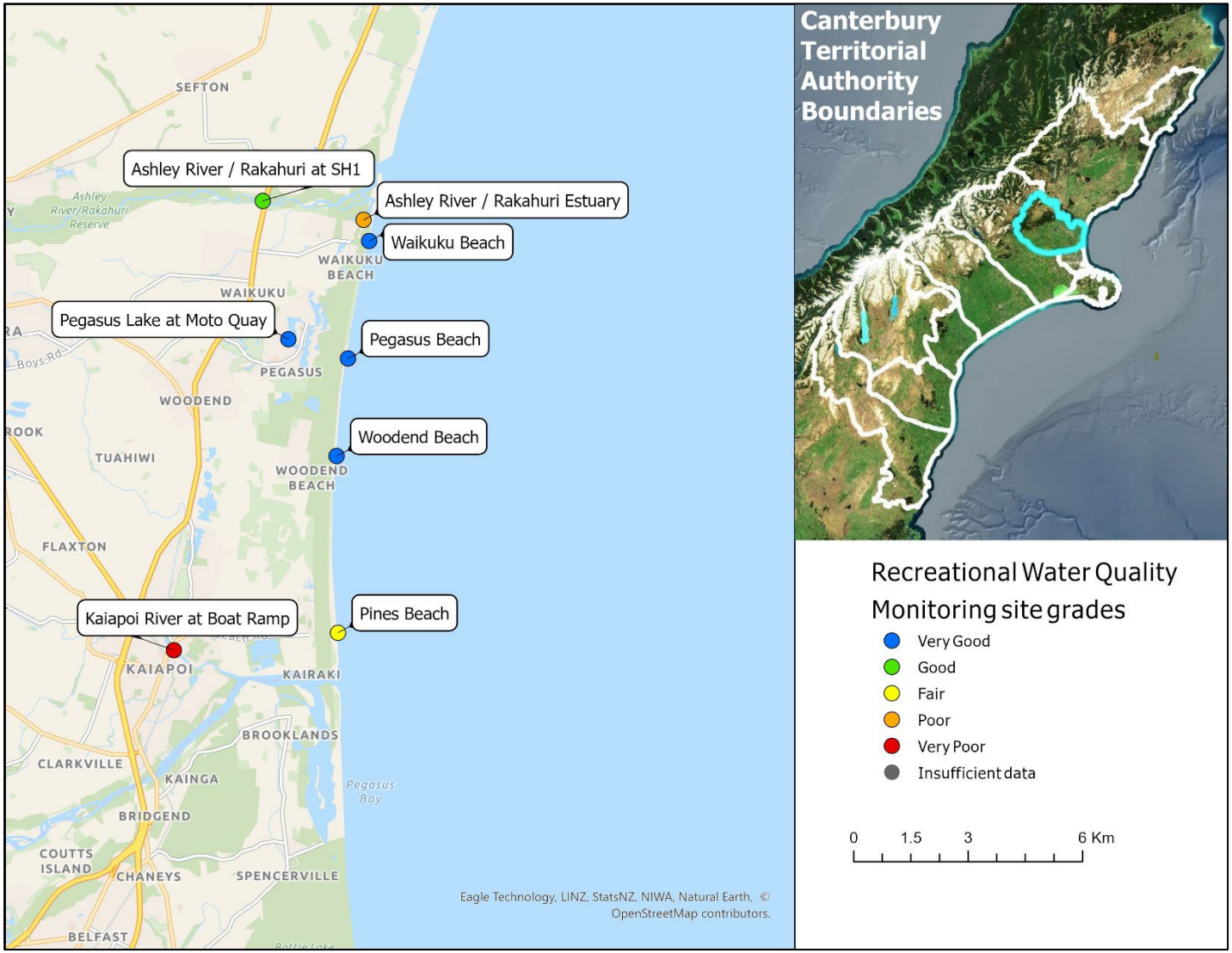
Kaikōura District



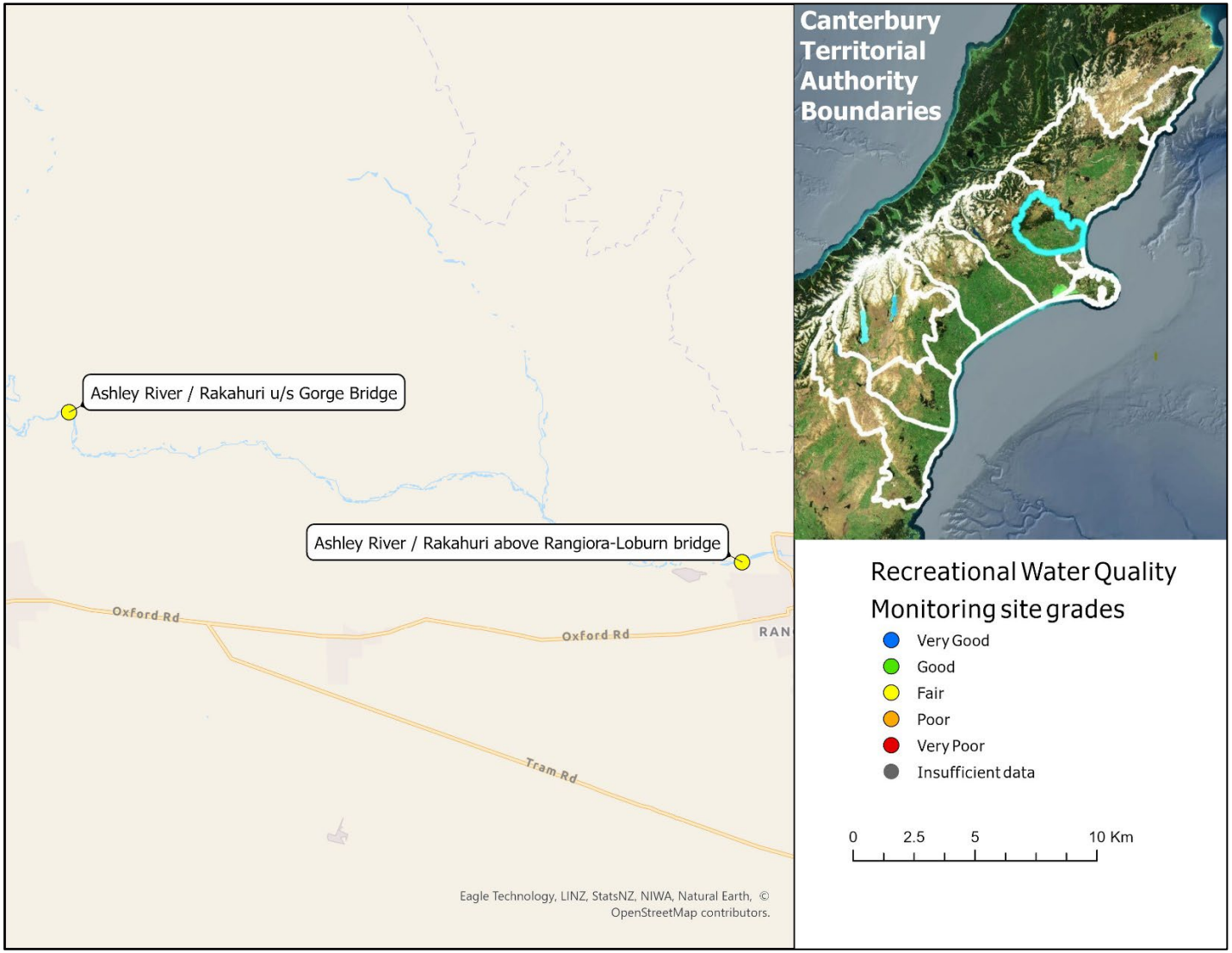
Hurunui District



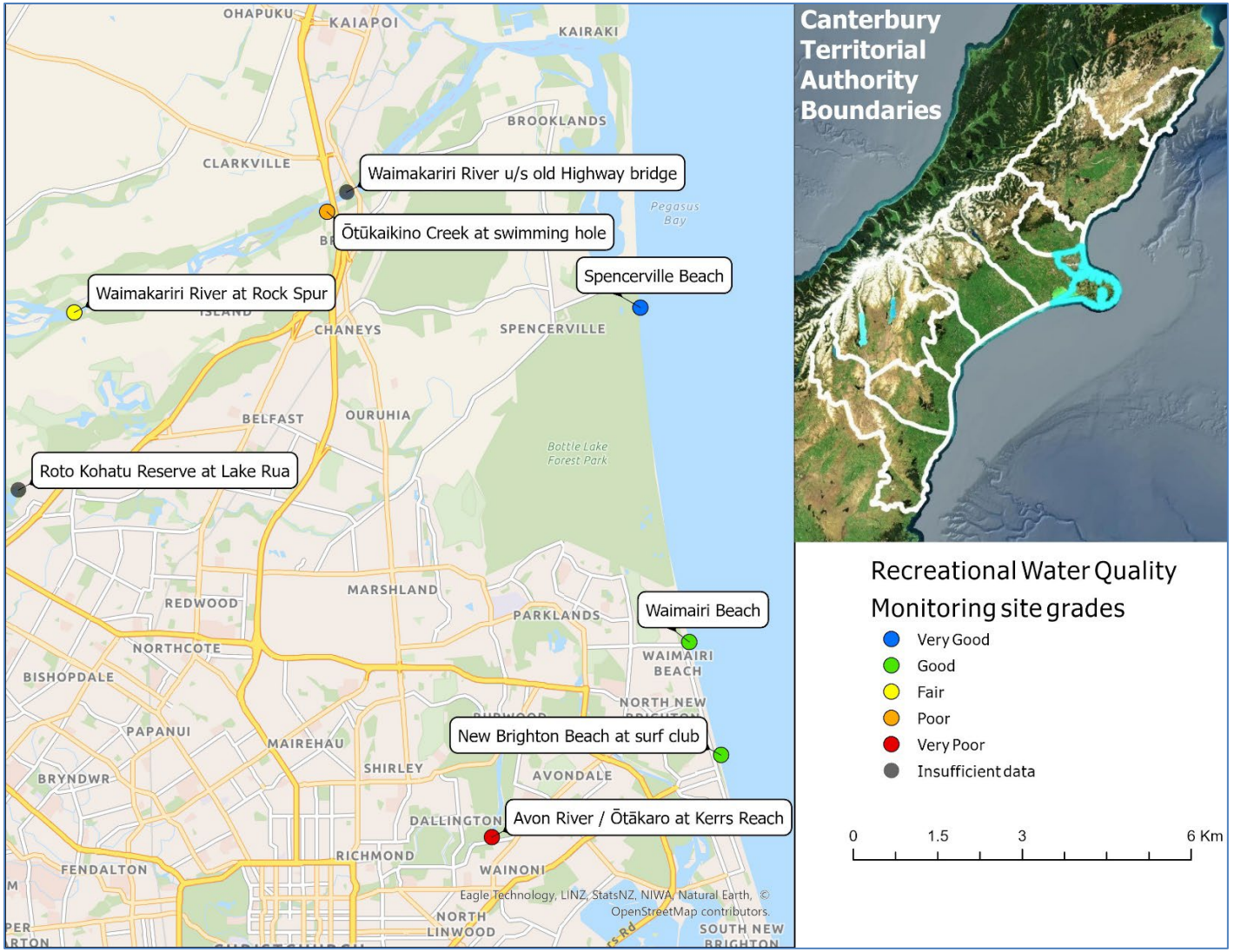
Waimakariri District - part 1



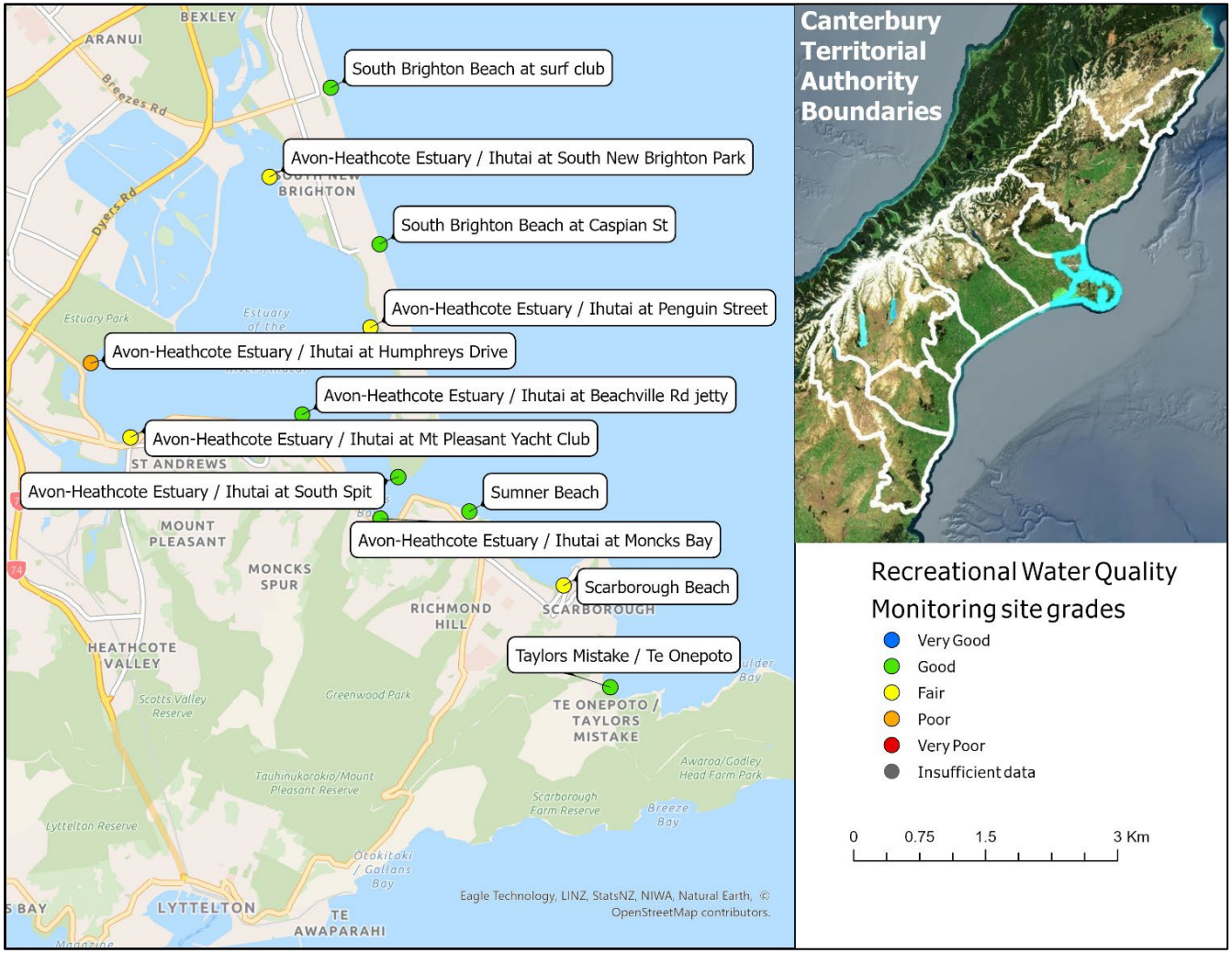
Waimakariri District - part 2



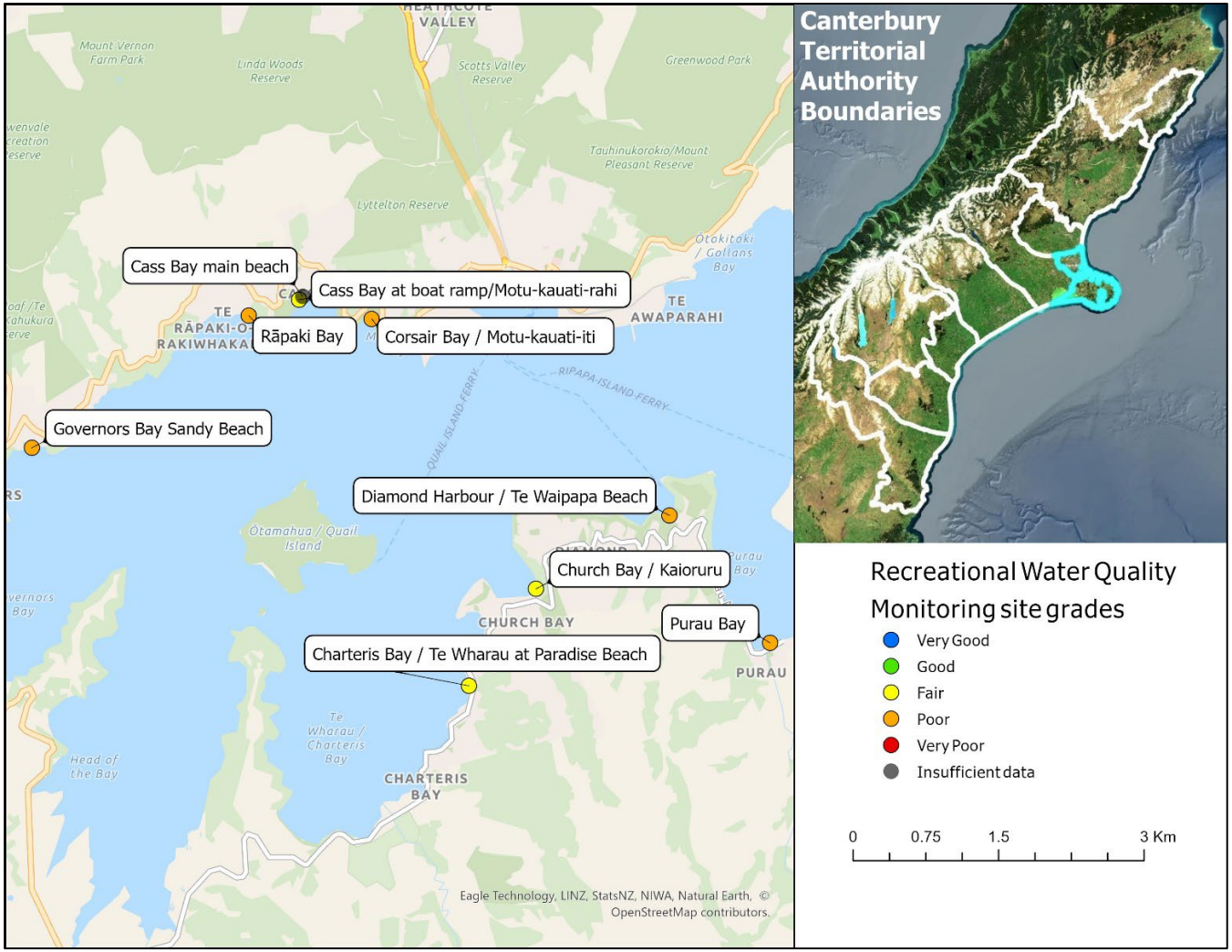
Christchurch City - North



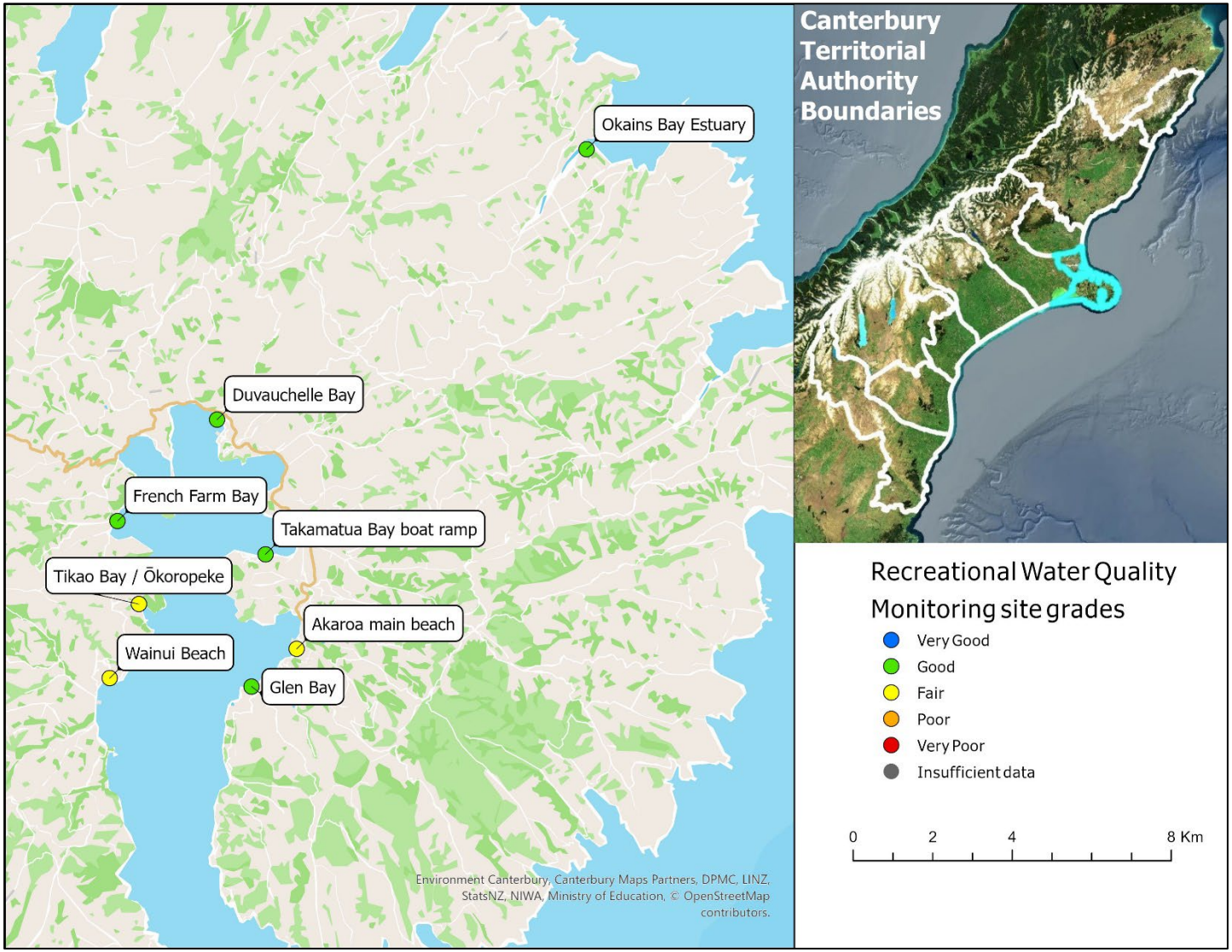
Christchurch - South



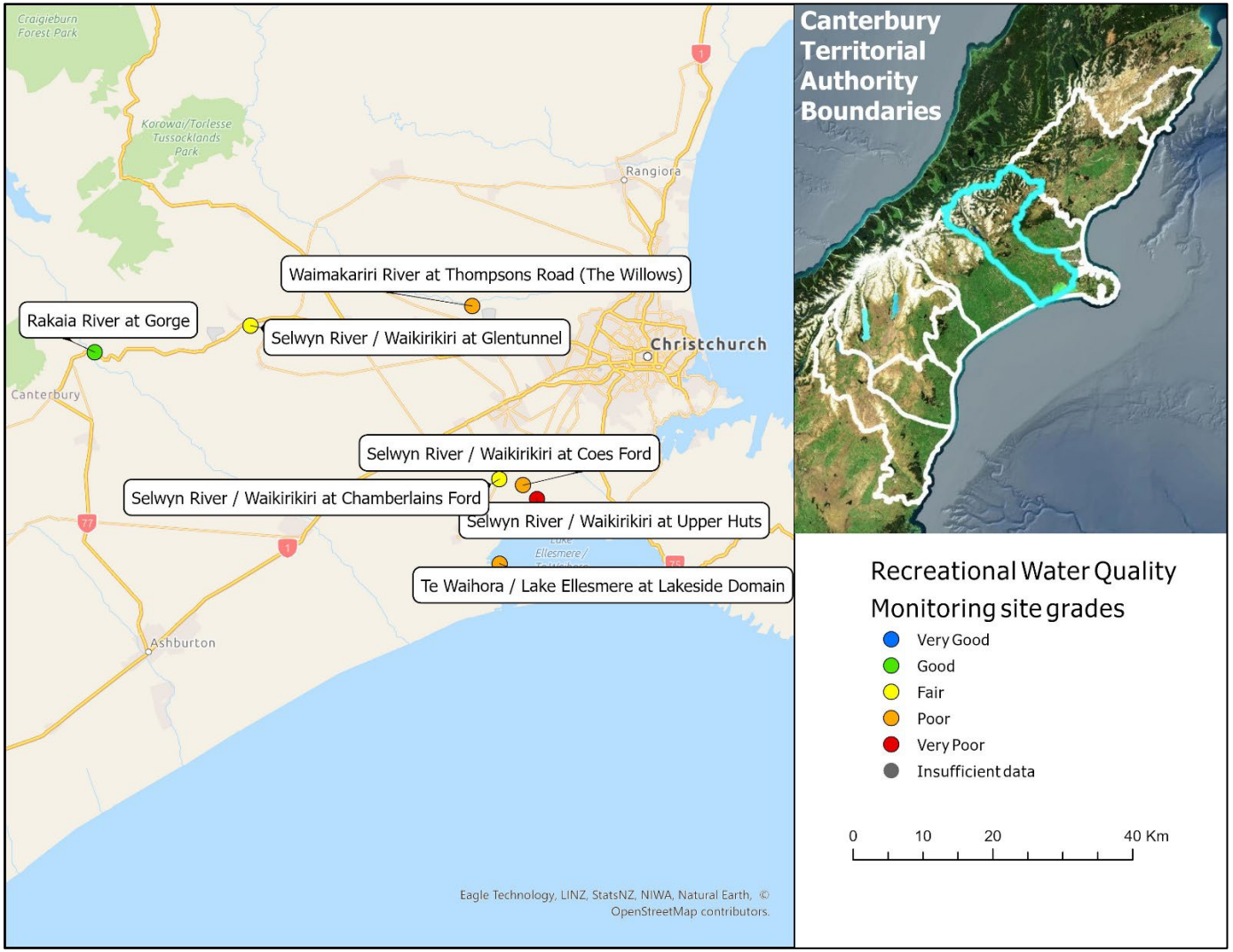
Lyttelton Harbour / Whakaraupō



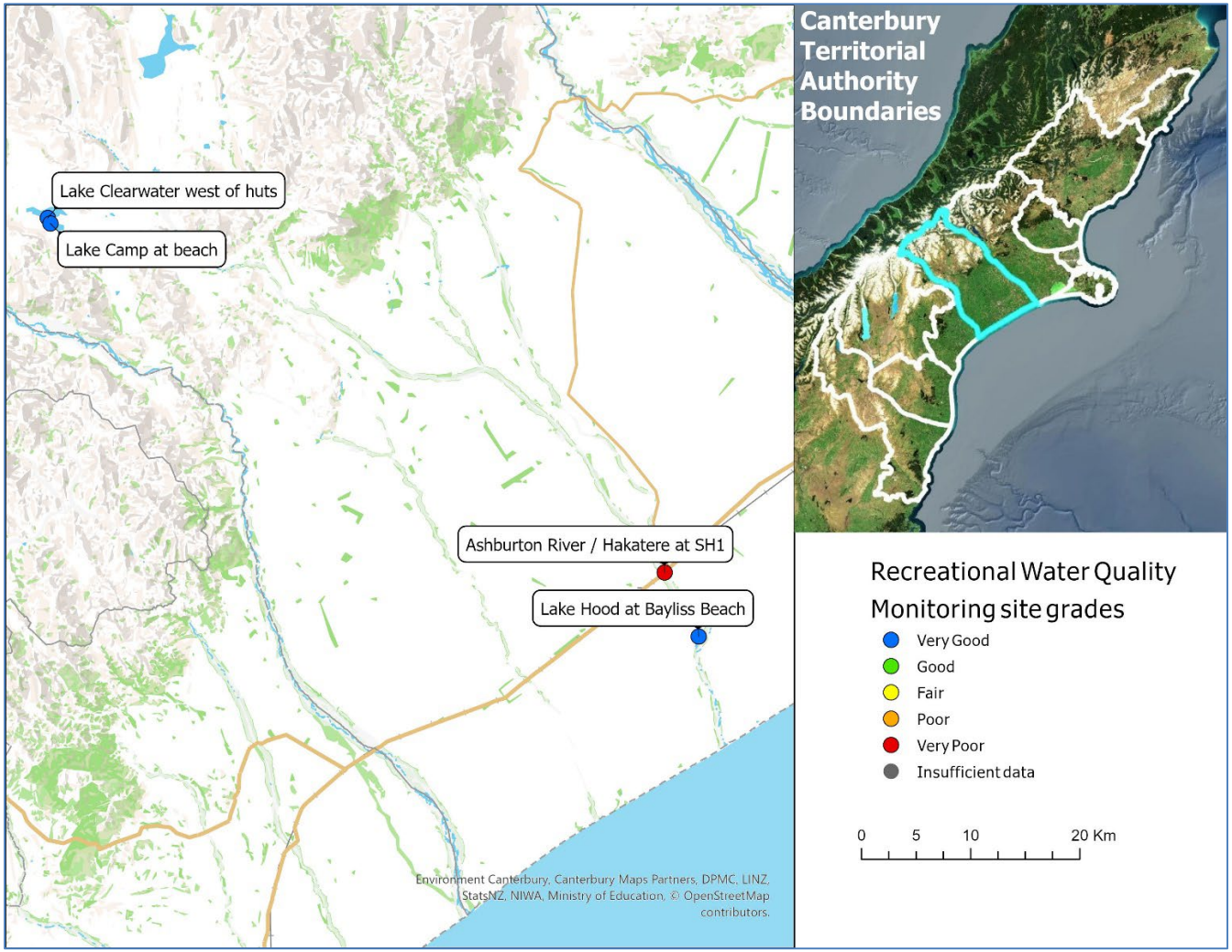
Banks Peninsula / Te Pātaka-o-Rākaihautū – Akaroa Harbour and Okains Bay Estuary



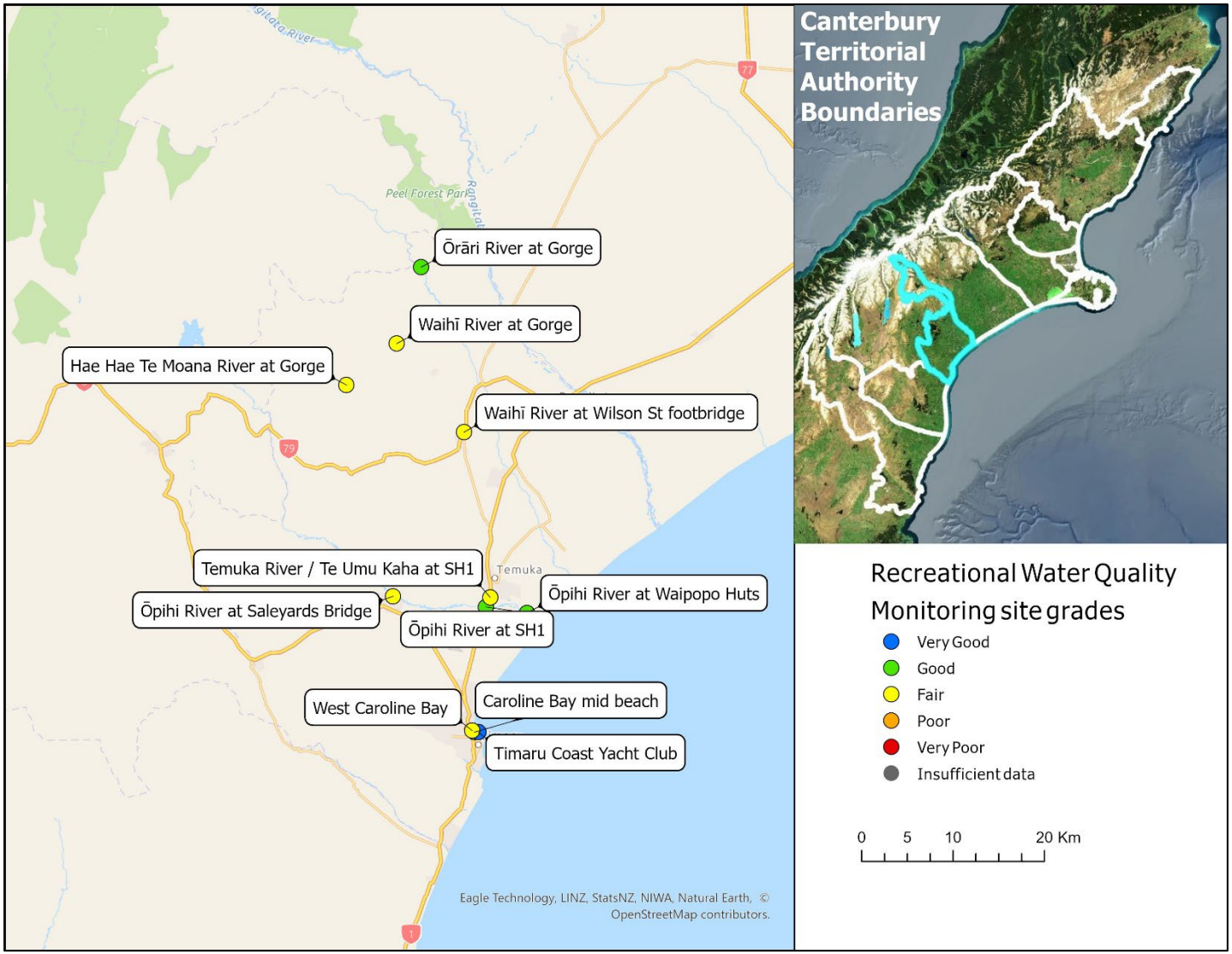
Selwyn District



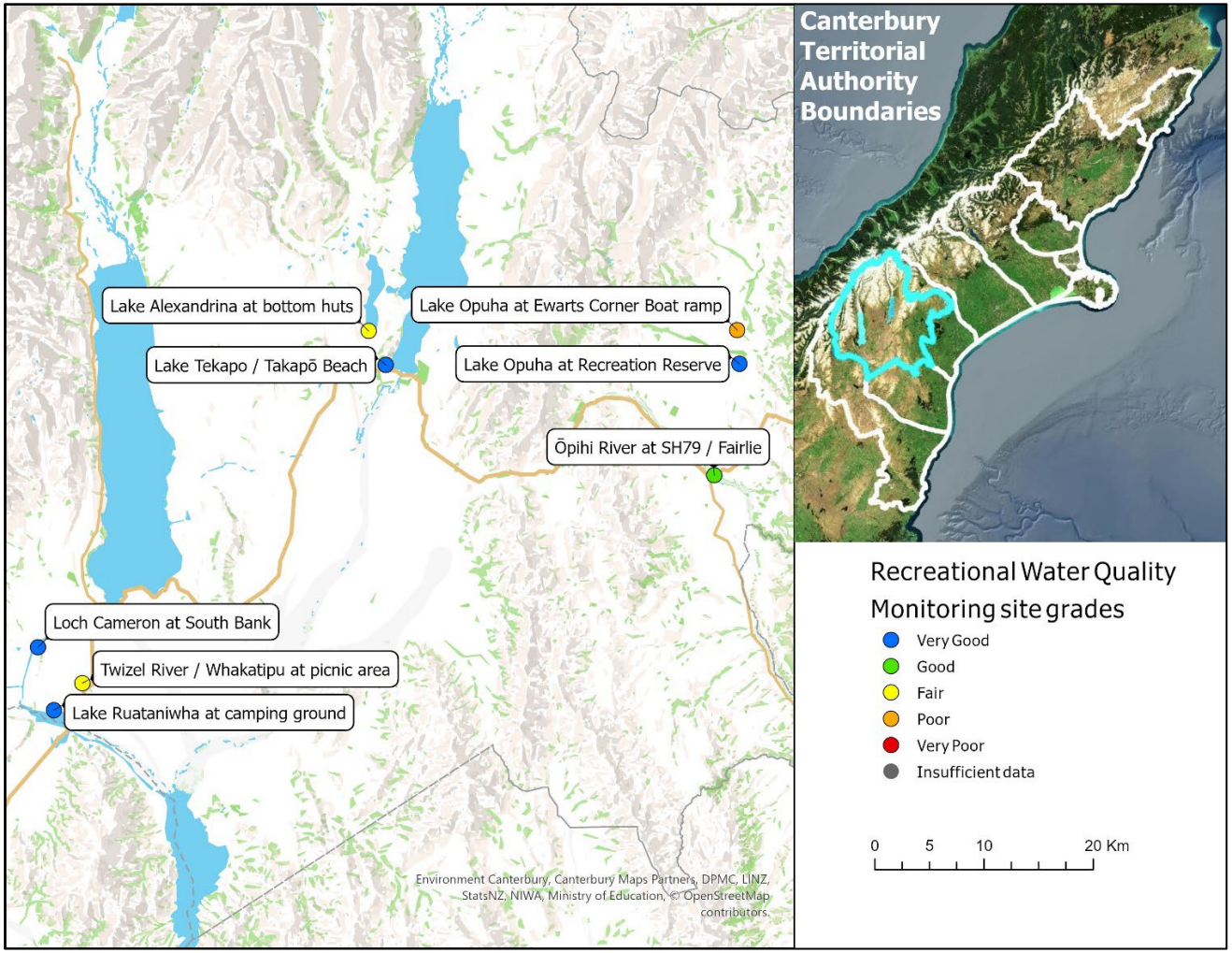
Ashburton District



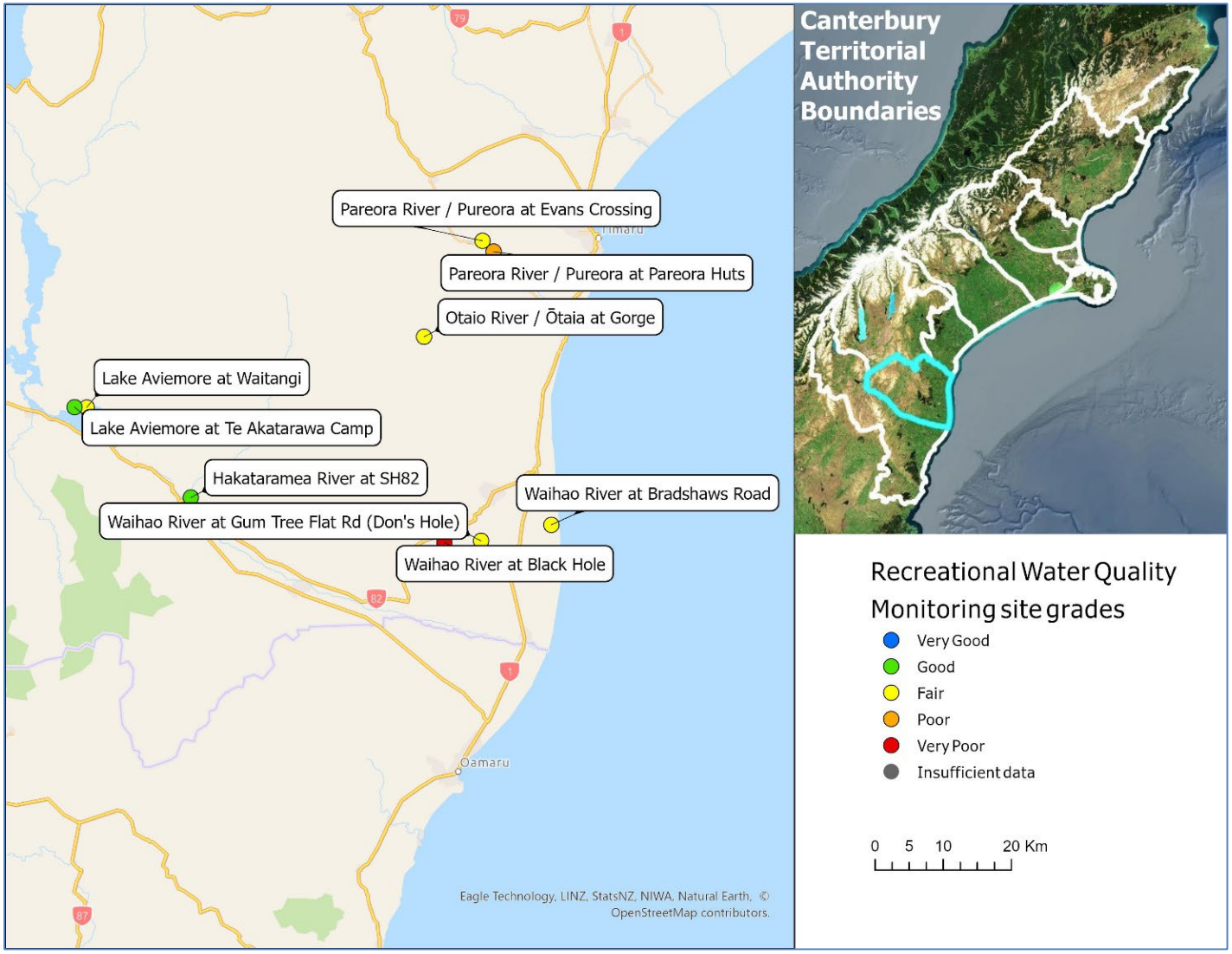
Timaru District



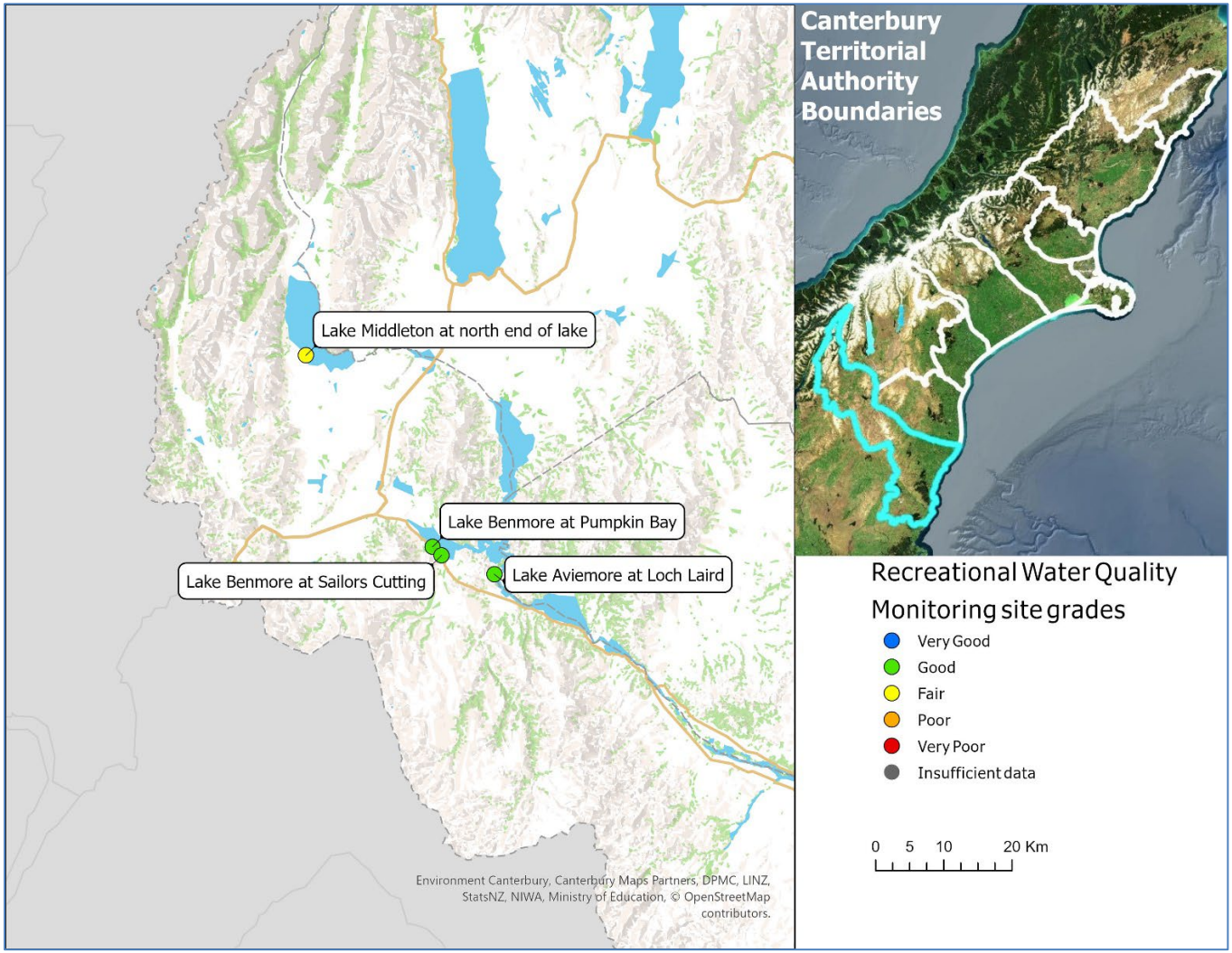
Mackenzie District



Waimate District



Waitaki District



Appendix 3: Waipara River swimming hole investigation

Sources of faecal contamination in the Waipara River swimming hole

A3.1 Background of investigation

Monitoring of the Waipara River Swimming Hole first began in 2002. For 2023-24 it was graded as unsuitable for swimming for the third consecutive summer.

The Waipara Adventure Centre (WAC), who manage the swimming hole and the river diversion into it, regularly use it as part of their outdoor education programme. WAC host school camps and has previously received enquiries from concerned school boards, principles, and parents about the water quality of swimming hole, resulting in some cancelations. Environment Canterbury agreed to investigate the cause and potential source of poor water quality within the swimming hole. This report represents the second and final year of investigations.

WAC expressed a desire to improve the grade for the swimming hole. Last summer, they identified ways to reduce the risk of exposure to high faecal contamination. This included assessment of *E. coli* data collected by Environment Canterbury (river and swimming hole) and their own samples (swimming hole only). They managed the swimming hole by replacing contaminated water with fresh river water. This process involved identifying the best time to empty the swimming hole and when to refill it. Care was taken to avoid refilling the pond with discoloured water and during periods of recent rainfall. The swimming hole was emptied and subsequently refilled on two occasions during the 2023-24 sample season.

A3.2 Purpose

To understand if the source of faecal contamination of the swimming hole was from the Waipara River inflows or activities and sources local to the swimming hole.

A3.3 Sampling sites

We included an additional site to be sampled on the same day as the Waipara River swimming hole. This site was in the Waipara River, immediately upstream of the diversion into the swimming hole (Figure A3-1). This site was also sampled in the previous season (Gray 2023).

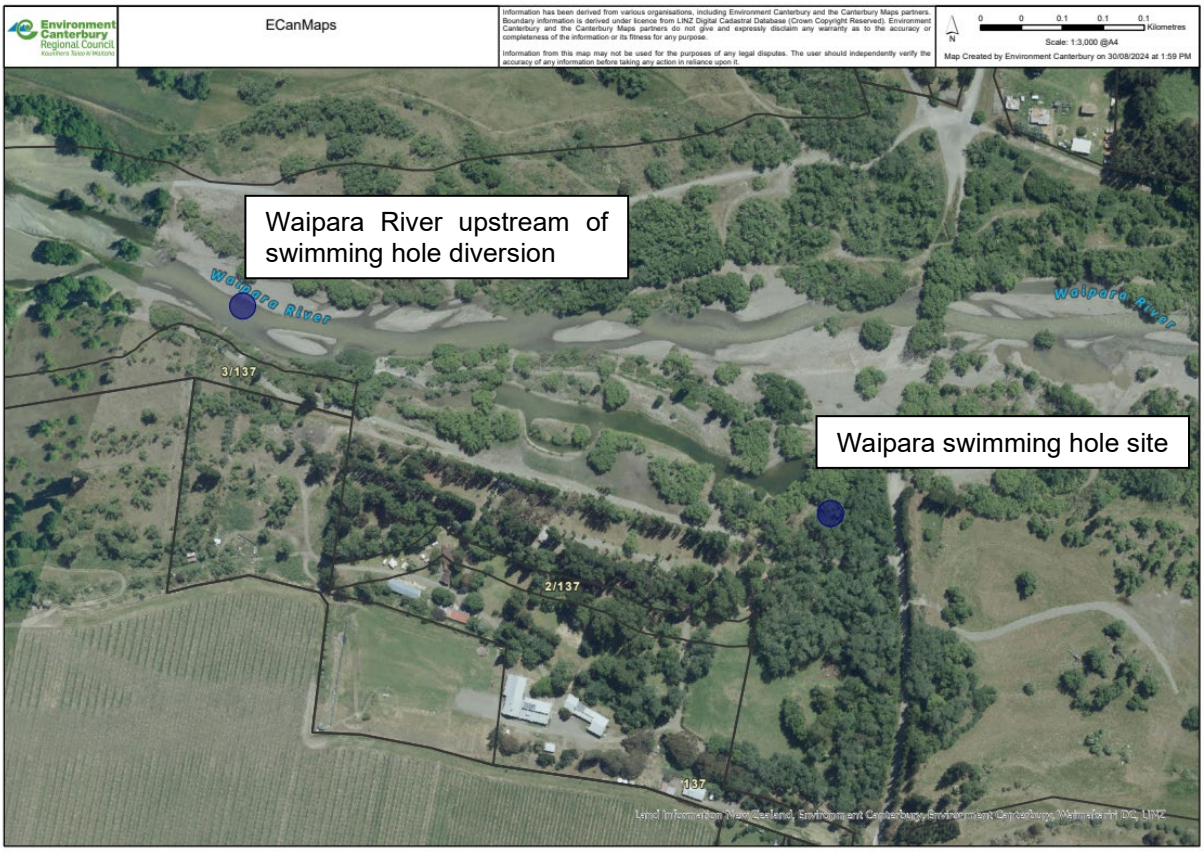


Figure A3-1: Location of water quality sampling sites

A3.4 Results

The current SFRG of poor for the swimming hole was strongly influenced by elevated concentrations of *E. coli* between November 2021 and April 2023. For the 2023-24 season, there was a single sample at or above the Alert level for *E. coli*, and none at Action level. This was likely to be related to the dry summer and a new approach to the management of the swimming hole, principally the drawing down and refilling with water from the Waipara River to reduce the risk of exposure to faecal contaminated water.

E. coli concentrations in the Waipara River immediately upstream of the swimming hole during the last two summers showed generally low concentrations, with most results below the Alert level, and only two results above the Action level. Rainfall and moderately high flows occurred on both sampling occasions where results exceeded the Action level. This indicates that if timed correctly the Waipara River can be a suitable source of water for the swimming hole. This aspect of the investigation into the influence of the Waipara River upon the swimming hole is now complete.

We collected samples for Faecal Source Tracking (FST) from the swimming hole as part of the weekly routine monitoring. However, no elevated faecal contamination events occurred that warranted processing of samples for FST. Environmental Canterbury will continue to collect samples for FST from the swimming hole as part of the 2024/25 sample season. This information may help to understand the relative influence of catchment scale pressures and sources of *E. coli* in and around the swimming hole itself.

There are unlikely to be significant changes in microbial water quality at the catchment scale so it is recommended that WAC continues to focus upon drawing-down and refilling the hole at appropriate times. Care should be continued to be taken not to refill the hole when the river water is discoloured or

recent rain has occurred. Additionally, WAC should consider that there may be sources of faecal contamination close to the pond margins from humans, dogs, and birds.

After the completion of the 2024-25 sample season, we will assess the data since November 2022 (three years of data), this will provide an indication of the influence of recent changes in the management of the swimming hole.

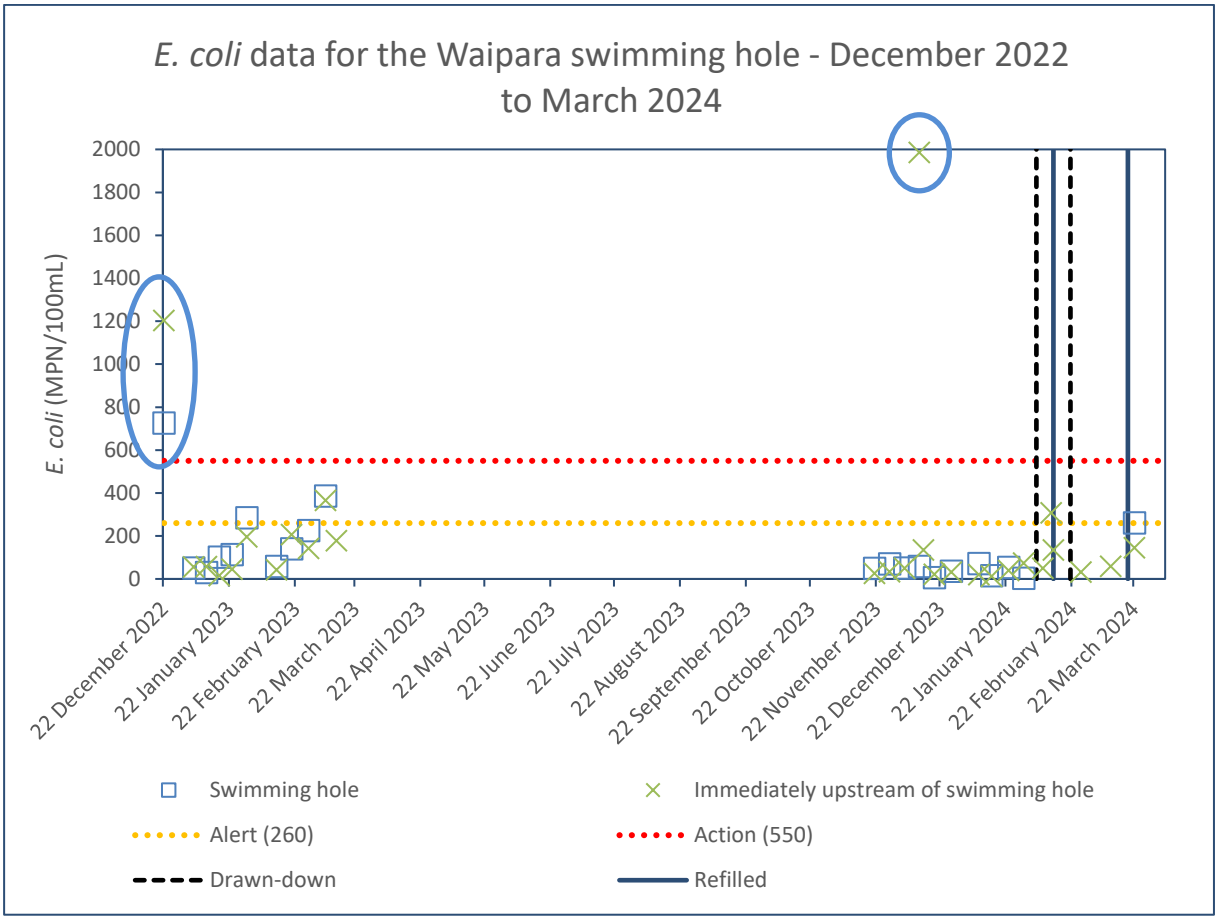


Figure A3-2: *E. coli* concentrations at the Swimming hole and in the Waipara River immediately upstream of the diversion. The blue circled high concentrations occurred during low to moderate rainfall events

Appendix 4: Memo on Lyttelton / Whakaraupō and Akaroa Faecal Source Tracking Investigation

Investigation of faecal contamination sources at sites in Lyttelton Harbour / Whakaraupō and Akaroa Harbour during the 2023-24 swimming season

A4.1 Background

There are several sites in Lyttelton Harbour / Whakaraupō and Akaroa Harbour that were graded poor and unsuitable for swimming at the end of the 2021-22 swimming season. These sites were Corsair Bay, Rāpaki Bay, Governors Bay Sandy Beach, Diamond Harbour Beach, Purau Bay, and Akaroa Main Beach.

Investigation into the sources of faecal contamination (faecal source tracking) at these sites was undertaken during the 2022-23 summer, as well as at Cass Bay and Glen Bay where unexplained exceedances in enterococci had occurred. The pathways of contamination (e.g., streams or stormwater pipes) were also investigated at sites in Lyttelton Harbour / Whakaraupō (Gray & Burns, 2023).

The results of the 2022-23 investigation identified faecal contamination from:

- Human sources in samples from Corsair Bay, Corsair Bay Stream, Cass Bay, Cass Bay Stream and stormwater outfall, Rāpaki outfall, Zephyr Stream (Governors Bay), Diamond Harbour Beach, Morgans Gully (Diamond Harbour), Glen Bay boat ramp, and Akaroa Main Beach.
- Ruminants and birds in samples from all sites except Diamond Harbour Beach (birds).
- Dogs in samples from Corsair Bay, Governors Bay, and Diamond Harbour.

Environment Canterbury communicated the results of this investigation with Te Mana Ora – National Public Health Service (Te Mana Ora), Christchurch City Council (CCC), Te Hapū o Ngāti Wheke, and the Banks Peninsula Zone Committee. Environment Canterbury have also been in regular communication with CCC on their plans to investigate the sources of human faecal contamination.

At the end of the 2022-23 swimming season another site in Akaroa Harbour (Tikao Bay) was downgraded from fair to poor, which means that it was no longer considered suitable for swimming. Tikao Bay was not included in the investigation sampling in 2022-23.

A4.2 Purpose

The purpose of the 2023-24 investigation was to understand the sources of faecal contamination at Tikao Bay, and the pathways for contamination at Akaroa Main Beach and Glen Bay which were not included in the 2022-23 investigation. At sites where faecal source tracking (FST) had previously been undertaken, additional samples were collected to understand faecal sources over different rain events. This helps to understand if there are variations in faecal sources and inform decision-making around the management strategies that are needed to resolve these faecal contamination issues.

A4.3 **Sampling**

Samples for microbial and FST analysis were collected following rain events (generally >10 mm of rain in the 24 hours prior) on five occasions between November 2023 and April 2024, and during dry weather on one occasion in September 2023. All FST samples were stored in the Environment Canterbury sample fridge. The separate microbial samples were analysed for enterococci (marine) or *E. coli* (streams/outfalls) at Hill Laboratories. If the concentration of faecal indicator bacteria in the microbial samples was >500 CFU/100 mL, which is considered sufficient for FST analysis (Hewitt et *al.*, 2018), the samples were taken to Environment Science Research (ESR) for filtering and storing. Some samples were taken directly to ESR for filtering and storing if they were a priority for analysis (i.e., we hadn't undertaken any previous FST).

At the end of the 2023-24 swimming season all filtered and stored samples at ESR were assessed and prioritised for FST analysis. In total 16 samples were selected for FST analysis from 13 sites.

A4.4 **Results**

For each of the sites the 2023-24 FST results have been compiled with FST results from previous seasons and presented in Tables A4-1 to A4-9 below.

Corsair Bay

FST results from February 2023 at Corsair Bay beach (SQ30684) and Corsair Bay Stream (SQ34899; Figure A4-1) showed that there was faecal contamination from humans, ruminants, dogs, and birds (Table A4-1). More recent FST results at Corsair Bay beach in November 2023 showed no positive detections for any of the faecal source markers analysed (Table A4-1). This result could be due to low concentrations of enterococci and general bacteria in the sample not providing sufficient faecal material for PCR marker analysis.

Figure A4-1: Sampling sites in Corsair Bay

Table A4-1: Faecal source tracking results at Corsair Bay beach and Corsair Bay Stream

Site ID	Site Name	Site Type	Date of sample	Enterococci/100mL	*E.coli* /100mL	ESR Lab No.	GenBac/100mL	Human	Ruminant	Dog	Avian
SQ30684	Corsair Bay Beach	Beach	15/02/2023	1,918	-	CMB230115	26,000	✓	⚠	✓	✓
SQ30684	Corsair Bay Beach	Beach	23/02/2023	4,880	3,080	CMB230156	26,000	✓	✓	✓	✓
SQ30684	Corsair Bay Beach	Beach	24/11/2023	556	3080	CMB230772	1,200	✗	✗	✗	✗
SQ34899	Corsair Bay Stream Beach	Stream	15/02/2023	>2,420	>2,420	CMB230136	440,000	✓	✓	✗	✓

⚠ - detected but below limit of quantification

Cass Bay

FST results from Cass Bay mid beach (SQ36763) and Cass Bay boat ramp (SQ30640; Figure A4-2) from previous investigations have shown faecal contamination from humans, birds (Cass Bay mid beach) and ruminants (Cass Bay boat ramp). The stream (SQ30638) and stormwater pipes (SQ36744 and SQ34707; Figure A4-2) entering the bay also had faecal contamination from humans and dogs (Table A4-2). The most recent FST results at Cass Bay mid beach only showed positive detection of dog faecal sources.

Figure A4-2: Sampling sites in Cass Bay

Table A4-2: Faecal source tracking results at sites around Cass Bay

Site ID	Site Name	Site Type	Date of sample	Enterococci/100mL	*E.coli* /100mL	ESR Lab No.	GenBac/100mL	Human	Ruminant	Dog	Avian
SQ30640	Cass Bay at boat ramp	Beach	9/12/2021	2610	-	CMB211121	290,000	✓	✓	✗	✗
SQ30640	Cass Bay at boat ramp	Beach	1/02/2022	583	-	CMB220032	1,800	✗	✗	✗	✗
SQ30640	Cass Bay at boat ramp	Beach	10/01/2023	404	-	CMB230005	4900	✗	✗	✗	✗
SQ30640	Cass Bay at boat ramp	Beach	5/02/2023	20	340	CMB230075	3200	✓	✗	✗	✗
SQ30640	Cass Bay at boat ramp	Beach	10/02/2023	404	-	CMB230091	2500	✗	✗	✗	✗
SQ36763	Cass Bay at mid beach	Beach	15/02/2023	495	458	CMB230134	5,600	⚠	✗	✗	✗
SQ36763	Cass Bay at mid beach	Beach	23/02/2023	691	744	CMB230157	26,000	✓	✗	✗	✓
SQ36763	Cass Bay at mid beach	Beach	11/02/2024	1,050	1,187	CMB240168	1,500	✗	✗	✓	✗
SQ34707	Unnamed Stream at Cass Bay West	Stream	15/02/2023	>2,420	>2,420	CMB230137	420,000	✓	✗	✓	✗
SQ36764	Cass Bay west stormwater outfall	Pipe/SW	15/02/2023	>2,420	>2,420	CMB230138	790,000	✓	✗	✗	✗
SQ30638	Cass Bay Stream at beach outlet	Stream	15/02/2023	1,986	>2,420	CMB230139	99,000	⚠	✗	✗	✗

⚠ - detected but below limit of quantification

Rāpaki Beach

Birds were a common source of faecal contamination at Rāpaki Bay beach (SQ30647), Omaru Stream (SQ35237), and Rāpaki outfall at Korara Tahi Road (SQ36765; Figure A4-3). Ruminant sources were present in samples from Omaru Stream and Rāpaki Bay Beach (Table A4-3). During the 2022-23 investigation a sample from Rāpaki outfall at Korara Tahi Road had a positive detection for human faecal contamination, this site wasn't resampled during the 2023-24 season.

Figure A4-3: Sampling sites in Rāpaki

Table A4-3: Faecal source tracking results for Rāpaki Bay beach, Rāpaki outfall and Omaru Stream

Site ID	Site Name	Site Type	Date of sample	Enterococci/100mL	*E.coli* /100mL	ESR Lab No.	GenBac/100mL	Human	Ruminant	Dog	Avian
SQ30647	Rapaki Bay Beach	Beach	9/12/2021	1,050	-	CMB211096	92,000	✗	✗	⚠	✓
SQ30647	Rapaki Bay Beach	Beach	16/12/2021	3,450	-	CMB211121	100,000	✗	✓	✗	✓
SQ30647	Rapaki Bay Beach	Beach	15/02/2023	650	-	CMB230129	10,000	✗	✗	✗	✗
SQ30647	Rapaki Bay Beach	Beach	11/02/2024	5,790	2480	CMB240169	12,000	✗	✗	✗	✓
SQ36765	Rapaki outfall at Korara Tahi Road	Pipe/SW	15/02/2023	>2,420	>2,420	CMB230118	340,000	✓	✗	✗	✓
SQ35237	Omaru Stream above Bottom Bridge	Stream	15/02/2023	>2,420	>2,420	CMB230140	1,300,000	✗	✓	✗	✓

⚠ - detected but below limit of quantification

Governors Bay

FST results from 2022-23 at Governors Bay Sandy Beach (SQ30649), Zephyr Stream (SQ35244), and Sandy Bay Stream (SQ34570; Figure A4-4) showed that ruminants and dogs were contributing to faecal contamination. Birds were also present in samples from Governors Bay Sandy Beach and Sandy Beach between the streams (SQ35245; Table A4-4). There was a positive detection for human faecal contamination in a sample from Zephyr Stream in February 2023. However, this site wasn't resampled during the 2023-24 season. FST results for 2023-24 at Governors Bay Sandy Beach further support that the main sources of faecal contamination in the bay were ruminants and dogs.

Figure A4-4: Governors Bay sampling sites

Table A4-4: Faecal source tracking results for Governors Bay Sandy Beach and streams around Sandy Beach

Site ID	Site Name	Site Type	Date of sample	Enterococci/100mL	*E.coli* /100mL	ESR Lab No.	GenBac/100mL	Human	Ruminant	Dog	Avian
SQ30649	Governors Bay Sandy Beach	Beach	21/11/2022	1,396	-	CMB220848	5,100	✗	✓	✓	✓
SQ30649	Governors Bay Sandy Beach	Beach	15/02/2023	1,789	-	CMB230130	7,600	✗	⚠	✗	✗
SQ30649	Governors Bay Sandy Beach	Beach	12/04/2024	4,880	776	CMB240307	6,900	✗	✓	✓	✗
SQ34570	Sandy Bay Stream Above Private Rd	Stream	15/02/2023	>2,420	>2,420	CMB230133	170,000	✗	✓	✓	✗
SQ35244	Zephyr Stream The beach	Stream	15/02/2023	>2,420	>2,420	CMB230119	200,000	✓	✓	✓	✗
SQ35245	Sandy Bay Beach between W & E streams	Beach	15/02/2023	2,360	677	CMB230135	7,500	✗	✗	✗	✓

⚠ - detected but below limit of quantification

Diamond Harbour

No additional samples were analysed for FST in Diamond Harbour this season. However, the FST results from February 2023 showed that the sources of faecal contamination at Diamond Harbour Beach (SQ30665) and Morgan's Gully Stream (SQ34118; Figure A4-5) were humans, ruminants, and dogs (Table A4-5). Morgan's Gully Stream is likely the pathway of contamination entering the beach.

Figure A4-5: Sampling sites in Diamond Harbour Beach

Table A4-5: Faecal source tracking results for Diamond Harbour Beach and Morgan's Gully Stream

Site ID	Site Name	Site Type	Date of sample	Enterococci/100mL	*E.coli* /100mL	ESR Lab No.	GenBac/100mL	Human	Ruminant	Dog	Avian
SQ30665	Diamond Harbour Beach	Beach	15/02/2023	5,170	-	CMB230131	13,000	✓	✓	✓	✗
SQ34118	Diamond Harbour Creek immediately above beach	Stream	15/02/2023	>2,420	>2,420	CMB230120	96,000	✓	✓	✓	✓

Purau Bay

The main sources of faecal contamination in Purau Bay beach (SQ35295) and Purau Stream were ruminants and birds (Table A4-6). However, human faecal contamination was detected at two different locations in Purau Stream (SQ30670 and SQ35236; Figure A4-6) during the 2023-24 season. There were insufficient enterococci concentrations in Purau Bay beach samples this season to analyse for FST.

Figure A4-6: Purau Bay sampling sites

Table A4-6: Faecal source tracking results for Purau Bay and Purau Stream

Site ID	Site Name	Site Type	Date of sample	Enterococci/100mL	*E.coli* /100mL	ESR Lab No.	GenBac/100mL	Human	Ruminant	Dog	Avian
SQ32595	Purau Bay Beach	Beach	15/02/2023	3,260	-	CMB230132	28,000	✗	✓	✗	✓
SQ35236	Purau stream 100 m U/S Purau Ave	Stream	24/11/2023	>2,420	2,420	CMB230777	260,000	✓	✓	✗	✓
SQ30670	Purau Stream above road bridge	Stream	15/02/2023	>2,420	>2,420	CMB230121	1,500,000	✗	✓	✗	✓
SQ30670	Purau Stream above road bridge	Stream	11/02/2024	8,660	8,160	CMB240170	370,000	✓	✓	✗	✓
SQ30670	Purau Stream above road bridge	Stream	12/04/2024	>2,420	1,300	CMB240306	250,000	✗	✓	✗	✓

Glen Bay

FST results at Glen Bay boat ramp (SQ35233) during the 2022-23 season showed that humans, ruminants, and birds were a source of faecal contamination (Table A4-7). However, no further investigation into how this contamination was entering the bay occurred until the current season (2023-24). FST results from the stormwater outfall pipes adjacent to the boat ramp (Figure A4-7) have shown that human and dogs were a source of contamination (Table A4-7). A sample was collected for FST analysis from Glen Bay boat ramp this season but couldn't be analysed due to insufficient concentrations of enterococci.

Figure A4-7: Glen Bay sampling sites

Table A4-7: Faecal source tracking results for Glen Bay boat ramp and stormwater pipes

Site ID	Site Name	Site Type	Date of sample	Enterococci/100mL	*E.coli* /100mL	ESR Lab No.	GenBac/100mL	Human	Ruminant	Dog	Avian
SQ35233	Glen Bay boat ramp	Beach	15/02/2023	2,360	-	CMB230123	95,000	✓	✓	✗	✓
SQ36779	Glen Bay SW Pipe 1	Pipe/SW	23/01/2024	16160	23600	CMB240072	310,000	✓	✗	✗	✗
SQ36780	Glen Bay SW Pipe 2	Pipe/SW	4/09/2023	-	>2,420	CMB230579	360,000,000	✓	✗	✓	✗
SQ36780	Glen Bay SW Pipe 2	Pipe/SW	23/01/2024	7,710	579	CMB240073	5,300	✗	✗	✗	✗

Akaroa Harbour

FST results at Akaroa main beach (SQ32610) during the 2022-23 summer identified that sources of faecal contamination at the beach were humans, ruminants, and birds (Table A4-8). However, no further investigation into how this contamination was entering the beach occurred until the current season (2023-24). The stormwater outfall pipe (SQ34647; Figure A4-8) was sampled during dry weather (4-9-2023) and wet weather (23-1-2024) this season (Table A4-8). Both samples from the stormwater outfall pipe were positive for human faecal contamination and the sample after rainfall was also positive for ruminants. A sample was collected for FST analysis from Akaroa Main beach this season but couldn't be analysed due to insufficient concentrations of enterococci.

Figure A4-8: Akaroa main beach sampling sites

Table A4-8: Faecal source tracking results for Akaroa main beach and stormwater outfall pipe

Site ID	Site Name	Site Type	Date of sample	Enterococci/100mL	*E.coli* /100mL	ESR Lab No.	GenBac/100mL	Human	Ruminant	Dog	Avian
SQ32610	Akaroa at main beach	Beach	15/02/2023	5,480	-	CMB230122	38,000	✓	✓	✗	✓
SQ34647	Akaroa Stormwater Outfall Pipe to beach	Pipe/SW	4/09/2023	-	>2,420	CMB230578	500,000	✓	✗	✗	✗
SQ34647	Akaroa Stormwater Outfall Pipe to beach	Pipe/SW	23/01/2024	19890	10500	CMB240071	320,000	✓	✓	✗	✗

Tikao Bay

FST results at Tikao Bay (SQ32632) during the 2023-24 summer identified that the sources of faecal contamination were ruminants and birds (Table A4-9). To identify the pathways of contamination, Tikao Bay Stream was sampled at three locations (Figure A4-9). Two of the sites were on separate branches of the stream before they merge (SQ36593 and SQ35646), and the third site was located just before the stream discharges onto the beach (SQ30740; Figure A4-9). The samples from all three stream sites were positive for faecal contamination from ruminants and birds. FST results from one of the tributaries (Tikao Stream South above confluence, SQ36593) and Tikao Bay Stream above beach (SQ30740) were also positive for human faecal contamination. However, there was no positive detection of human faecal contamination in the bay.

Figure A4-9: Tikao Bay sampling sites

Table A4-9: Faecal source tracking results for Tikao Bay and Tikao Stream

Site ID	Site Name	Site Type	Date of sample	Enterococci/100mL	*E.coli* /100mL	ESR Lab No.	GenBac/100mL	Human	Ruminant	Dog	Avian
SQ32632	Tikao Bay mid beach	Beach	24/11/2023	169	573	CMB230767	27,000	✗	✓	✗	✓
SQ30740	Tikao Bay Stream above beach	Stream	24/11/2023	>2,420	>2,420	CMB230769	3,800,000	✓	✓	✗	✓
SQ36593	Tikao Stream Sth above confluence	Stream	24/11/2023	>2,420	>2,420	CMB230770	3,000,000	✓	✓	✗	✓
SQ35646	Tikao Stream Nth above confluence	Stream	24/11/2023	>2,420	>2,420	CMB230771	200,000	✗	✓	✗	✓

Discussion and Recommendations

Environment Canterbury continue to work closely with CCC to assist with identifying sources of human faecal contamination entering the stormwater pipes or streams. CCC have completed inspections of the roadside channels and sampled stormwater sumps in Cass Bay and Corsair Bay. In Corsair Bay one private wastewater pipe was detected to have tree roots growing through it. This caused a discharge to the roadside channel and then the stormwater outfall that discharges into Corsair Bay. This was repaired in July 2023 and subsequent FST sampling in November 2023 by Environment Canterbury showed no positive detections of human faecal contamination.

I recommend that further FST sampling and analysis is undertaken after wet weather during the 2024-25 summer at Corsair Bay and Cass Bay. This is to confirm that there are no further sources of human faecal contamination entering these sites. I also recommend that further FST samples are collected and analysed from Zephyr Stream (Governors Bay), and the stormwater outfall in Rāpaki Bay to confirm whether human faecal contamination is still an issue in these locations.

FST results also indicated that dog faeces were a source of faecal contamination at Corsair Bay, Cass Bay, Governors Bay, and Diamond Harbour. It is recommended that a letter drop, or media campaign is undertaken to educate and remind the public to pick up dog faeces and dispose of it correctly.

FST results at two locations on Purau Stream indicate that sources of faecal contamination were humans and ruminants. In Purau Bay, although the concentrations of enterococci were above the guideline's values for swimming, there was insufficient concentrations for FST analysis. Nevertheless, it is reasonable to assume that the sources of faecal contamination from Purau Stream are contributing to high enterococci concentrations in Purau Bay.

Investigations into the sources of faecal contamination at Akaroa Main beach, Glen Bay and Tikao Bay were undertaken this season. FST results showed various sources of faecal contamination in Tikao Bay Stream, the stormwater outfall at Akaroa Main Beach, and stormwater pipes in Glen Bay. At Tikao Bay beach, Akaroa Main Beach and Glen Bay boat ramp, the concentrations of enterococci in the samples were above the guideline values for contact recreation but there were insufficient concentrations for FST analysis. Nevertheless, it is reasonable to assume that the sources of faecal contamination in Tikao Stream and the stormwater pipes in Akaroa Main Beach and Glen Bay are contributing to high enterococci concentrations in these receiving environments.

CCC have checked properties for leaks and cross connections in the Glen Bay area. They detected a significant water leak from a private property (used as a holiday home) and followed up with the landowner. I recommend that a further sample is collected from each of the stormwater pipes in Glen Bay during the 2024-25 season and analysed for FST. This is to determine the source of human faecal contamination has been fixed. Environment Canterbury staff have also been in contact with a landowner in Tikao Bay who contacted us for advice about retiring his land from sheep grazing and planting in native bush.

It is recognised that the mahi to remove or reduce sources of faecal contamination will take time. Rural land use activities within catchments and native bush will always provide sources of animal faecal contamination to our streams and stormwater systems that flow to our beaches, bays, and harbours. This work has allowed us to understand the sources of faecal contamination at each of the sites. This will help us to communicate with the relevant stakeholders and enable management actions to be taken.

Environment Canterbury are also working to develop a predictive model that can provide real time information to the public and advise them whether a beach is likely to be safe for contact recreation. This model will use rainfall information (measured and/or forecast) to determine the likelihood of faecal contamination at a site. This model may eventually replace the existing grading system, but it will take a few years to develop. Environment Canterbury are regularly collecting additional wet weather samples for microbial analysis at all sites within Lyttelton Harbour / Whakaraupō and Akaroa Harbour to support the development of the model.

References

Gray, E., & Burns, M. (2023). Investigation of faecal contamination sources at popular swimming sites in Lyttelton Harbour/Whakaraupō and Akaroa Harbour/Whakaroa during the 2022-23 swimming season.

Hewitt, J., Pantos, O., & Moriarty, E. (2018), Evaluation of faecal source tracking methods as an indicator for human faecal contamination in shellfish growing areas. Institute of Environmental Science and Research Limited Client Report No. FW1801.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

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.

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WAIMAKARIRI DISTRICT COUNCIL

REPORT FOR INFORMATION

FILE NO and TRIM NO:	DRA-07 / 240918159973
REPORT TO:	KAIAPOI – TUAHIWI COMMUNITY BOARD
DATE OF MEETING:	21 October 2024
AUTHOR(S):	Sophie Allen – Water Environment Advisor
SUBJECT:	Saline incursions in the Kaiapoi and Ruataniwha Cam Rivers
ENDORSED BY: (for Reports to Council, Committees or Boards)	General Manager / Chief Executive

1. SUMMARY

1.1. This report examines community observations this year (2024) regarding changes in the Kaiapoi and Ruataniwha Cam Rivers, including emergent and submerged macrophyte (weedbed) dieback and freshwater mussel (kākāhi) deaths.

1.2. This report raises possible options for management by Waimakariri District Council (WDC) and areas for WDC to work with Environment Canterbury to understand better and consider management options.

1.3. Increasing saline incursions during 2024, potentially combined with frost effects, rather than herbicide usage, is the likely cause of the ecological dieback in the Kaiapoi and lower part of the Ruataniwha Cam River. Low flows in the Waimakariri River are believed to increase the frequency of saline incursions into the Kaiapoi and Ruataniwha Cam Rivers.

1.4. The Kaiapoi Ruataniwha Cam Rivers area could be part of a Climate Adaptation Plan under the WDC Climate Resilience Programme. Additional ecological monitoring and modelling of these river systems is recommended for further understanding of the drivers of saline incursions. No replanting of intertidal plants that have experienced dieback in 2024 is proposed until there has been an assessment of future species suitability for saline, and confirmation of any regrowth of the existing plants in the summer growth period.

1.5. WDC could consider whether to request Environment Canterbury to gather further understanding of Waimakariri River flows including any impact of the minimum flow set in the Waimakariri River Regional Plan.

1.6. This report does not consider coastal erosion caused by coastal inundation by storms, saltwater intrusion and raised groundwater levels in the Kaiapoi area due to climate change and sea level rise. This work is part of the WDC Climate Resilience Programme.

2. RECOMMENDATION

THAT the Kaiapoi-Tuahiwi Community Board:

(a) **Receives** Report No. 240918159973.

AND

THAT the Kaiapoi-Tuahiwi Community Board recommends:

THAT the Council:

(a) **Receives** Report No. 240918159973.

(b) **Notes** that the cause of the Kaiapoi and Ruataniwha Cam Rivers ecological dieback observed in 2024 is primarily due to increased salinity, with potentially also some effect from frosts.

(c) **Requests** for modelling to be led by Environment Canterbury to establish the key drivers of saline incursions in the Kaiapoi and Ruataniwha Cam Rivers, which incorporates tides, river flows and salinity data.

(d) **Requests** that Environment Canterbury determine and employ methods to monitor water quality and aquatic ecology trends of the tidal section of the Kaiapoi River.

(e) **Circulates** this report to the Waimakariri Water Zone Committee, at a WDC-Ngāi Tūāhuriri Rūnanga meeting, and to the Ohoka Rural Drainage Advisory Group.

3. BACKGROUND

3.1. Community observations from the winter of 2024 regarding changes in the Kaiapoi and Ruataniwha Cam Rivers, include emergent and submerged macrophyte (weedbed) dieback and kākāhi (freshwater mussel) deaths in the Ruataniwha Cam River around the Revells Road bridge. From communications with Council members, and discussion on social media and in a local newspaper it has been highlighted there is high community concern. A public meeting was called at the Kaiapoi Library on 17 September 2024 that voiced a proposal to form a catchment group to look after local waterways, with a belief that herbicide could be the cause of the dieback.

3.2. Soft-stem bulrush (*Schoenoplectus tabernaemontani*) beds in the Kaiapoi River have died back (Figure 1). Some stems are still green at the base, indicating there is still a possibility of recovery. This species was planted by the Council as part of the Kaiapoi River Rehabilitation Working Party work programme, to compensate for instream habitat loss following effects from the Canterbury earthquakes.

Figure 1: Soft-stem bulrush (*Schoenoplectus tabernaemontani*) beds showing dieback in the Kaiapoi River as of September 2024

3.3. Following the Canterbury earthquake sequence in 2010-11, community members brought similar observations of a changing lower Kaiapoi River, such as the disappearance of weed beds, algal blooms, riverbank degradation, surface scums, and dying willows, to the attention of the Waimakariri District Council and Environment Canterbury. There were also unconfirmed reports of kākahi (freshwater mussel) mass death event(s) in the mouth of the Ruataniwha Cam River.

3.4. A report into the cause of these observations post-earthquakes by Adrian Meredith at Environment Canterbury, entitled 'Assessment of the state of a tidal waterway – the Lower Kaiapoi River' (March 2018), concluded that observed changes were most likely due to increasing episodes of saline water intrusion flowing into the lower Kaiapoi River. The saline intrusions were thought to be a result of bed level changes following the 2010-11 Canterbury earthquakes. This report and its implications were discussed in a WDC report to the Utilities and Roading Committee on 16 April 2019 (TRIM 190115003326).

3.5. Due to a lack of salinity and bathymetry information for the lower Kaiapoi River prior to the 2010-11 Canterbury earthquake sequence, it is difficult to attribute to what degree the increasing saline water intrusion periods might have been caused by changes in bed levels.

3.6. Saline intrusion episodes in the lower Kaiapoi River are hypothesised by Meredith (2018) to result from low flows in the Waimakariri River, generally in summer and autumn, allowing saltwater to penetrate further up the mouth of both rivers, with river flow and salinity data supporting this hypothesis. Cumulative inflow from the Kaiapoi River and its tributaries was noted by Meredith (2018) to exert little influence on the occurrence of saline intrusions.

3.7. Summer 2023 – winter 2024 experienced lower than average rainfall. On 21 March 2024, a "moderate adverse event" was declared in Canterbury, as El Niño conditions and a warming climate took effect. Conditions continued to be very dry into the winter of 2024, with Environment Canterbury monitoring showing record low water levels across the region. There were also relatively a high number of frost nights in 2024 compared to average, including an unseasonably cold -6.3ºC recorded at Christchurch Airport in May 2024.

3.8. In general, impacts of saline incursions are wide-ranging and predicted to include the following;

3.8.1. less flushing and build-up of contaminants (eutrophication),

3.8.2. scums and odour issues,

3.8.3. scour and decreased bank stability, because the crumb structure of soil affected by saltwater,

3.8.4. biota dieback or mobility such as inanga spawning habitats moving upstream,

3.8.5. saltwater intrusion into groundwater, tidal groundwater with potential effects on infrastructure, and

3.8.6. and loss of a freshwater port useful for naturally removing biofouling from boats.

3.9. Saline incursions are not thought by WDC staff to impact the Kaiapoi Wastewater Treatment Plant wetlands functioning or near-river water takes, as local water takes are for monitoring only, not abstraction.

4. ISSUES AND OPTIONS

Causes of the 2024 dieback

There have been alternate hypotheses presented for the observed 2024 ecological dieback in the Kaiapoi and Ruataniwha Cam Rivers. Environment Canterbury has presented salinity data that supports a high frequency of saline episodes as a key driver for dieback. Heavy frosts, when combined with expose mudflats at low tide, have also been raised as an additional potential contributor to dieback of submerged weedbeds. Various community members have raised that herbicide application instream of the Ruataniwha Cam River could have caused the dieback.

Salinity

4.1. In 2024 there were much longer periods with saline incursions of all the years since Environment Canterbury commenced monitoring in 2016 in the Kaiapoi River at the Mandeville Bridge. These saline incursions affected not just the summer, as has been observed in previous years, but also the autumn and winter (Figure 2), essentially transitioning the Kaiapoi River and lower parts of the Ruataniwha Cam River into an estuarine environment for much of 2024. Climate conditions (i.e. the El Niño conditions and a warming climate) were likely drivers of the increased saline incursions.

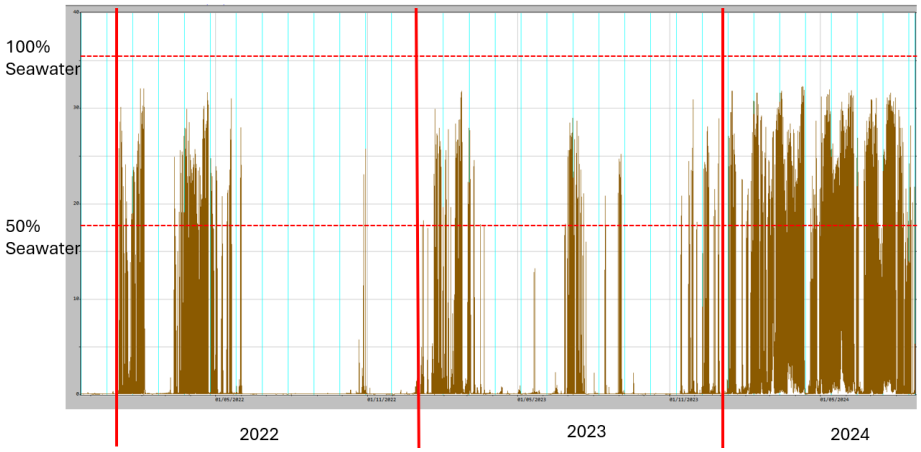

Figure 2: Salinity monitoring at the Mandeville footbridge, Kaiapoi River (source: Environment Canterbury, Adrian Meredith)

4.2. Modelling by Jacobs Ltd published in 2020, on behalf of the Council, has indicated that the bed of the Ruataniwha Cam River along lower Camside Road, and Kaiapoi River up to upstream of the railway line is currently below Mean Sea Level (see Figure 3). However the ability for saltwater to pass upstream during tidal cycles in these waterways is generally prevented by freshwater river flows, particularly from the Waimakariri River.

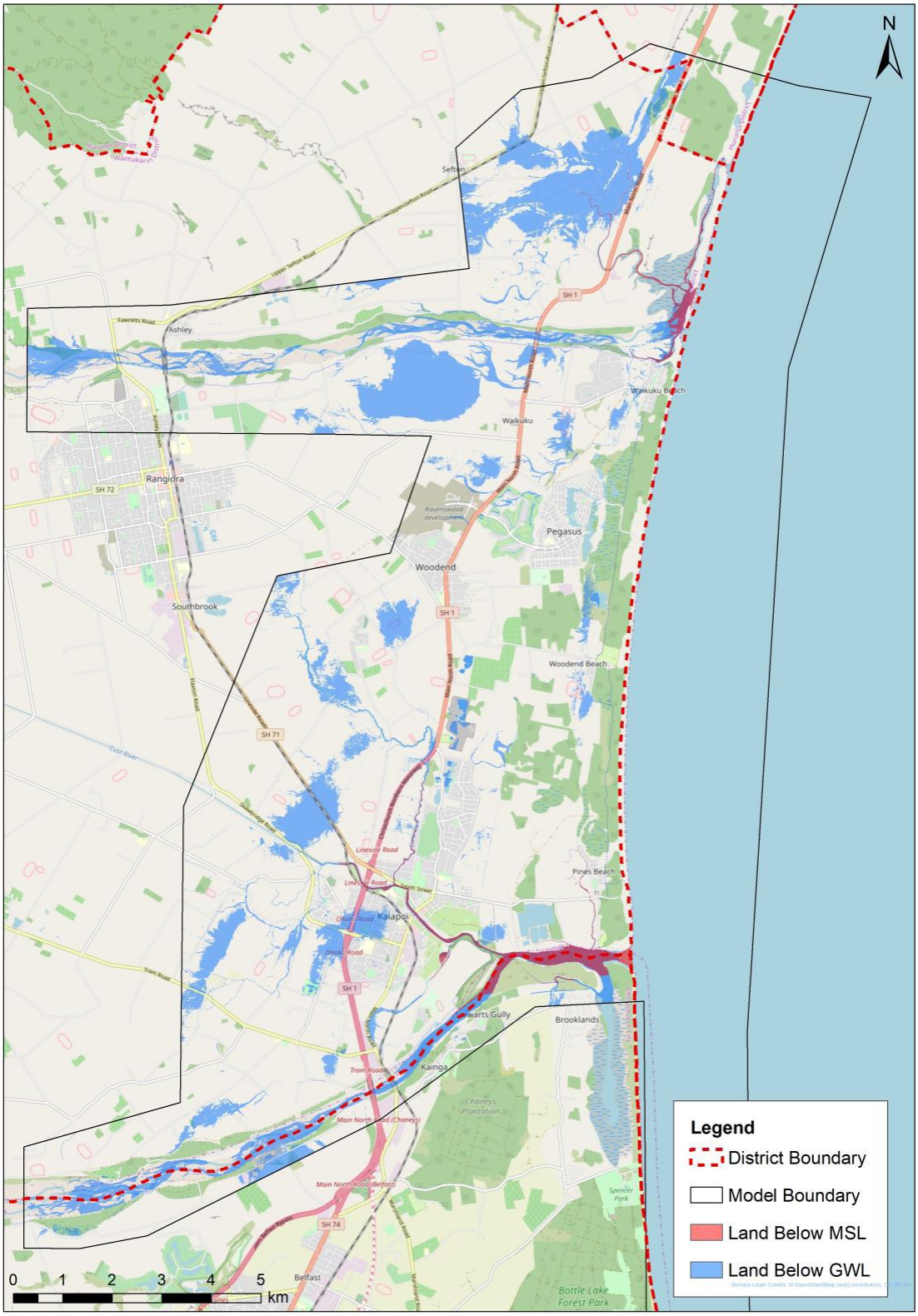

Figure 3 Areas of land below mean sea level (MSL), areas of land below the median groundwater level (GWL) and overlapping areas where initial ponding is specified (0m sea level rise). Source: Jacobs Ltd report, 12 March 2020 TRIM 200312034365.

Frosts

4.3. This year has experienced low temperatures below average (Figure 4) and seen a high number of frost nights to-date; 50 nights measured at Christchurch Airport. May 2024 was a particularly frosty month, with 15 frost nights (Christchurch Airport data). A particular frost

in May was unseasonably cold at -6.3ºC. When frosts coincide with low tides, plants such as aquatic macrophytes are exposed to colder temperature on frosty mud flats. An example of how frost is known to cause dieback is that this is a control method by hydropower generators to deliberately draw down water in dams to expose weedbeds during frosts. Although not the key driver of the observed dieback, it is possible that frosty mud flats, particularly in the Kaiapoi River could have also contributed to the dieback of the weedbeds (submerged macrophytes).

Figure 4: Temperature data for September 2023-August 2024 compared to previous years. (Source: Metservice)

Herbicide usage

4.4. Community members have raised that herbicide application instream of the Ruataniwha Cam River could have caused the dieback, with a river engineer from Environment Canterbury allegedly stating to a community member that herbicide had been applied in-stream in 2024. This was later clarified by Environment Canterbury to only relate to herbicide applied to the banks of the waterway, with no in-stream application.

4.5. Environment Canterbury has confirmed that after flooding in winter 2023, they removed several willow trees upstream and downstream of Bramleys Road Bridge on the Ruataniwha Cam River. Environment Canterbury sprayed the remaining stumps on the banks with an approved herbicide, to prevent regrowth.

4.6. The Environment Canterbury consent for herbicide use has recently been renewed. They strictly follow manufacturer's recommendations, Environmental Protection Agency (EPA) rules, and consent conditions when using herbicides. This includes advising landowners, publishing public notices, and restricting access when spraying occurs. Herbicides that have been used recently along the Ruataniwha Cam River banks are glyphosate and triclopyr.

4.7. WDC Drainage staff have also confirmed that there has been no instream herbicide usage in the Ruataniwha Cam River in the section managed by WDC, above Bramleys Road Bridge.

4.8. There is no evidence to suggest that an unknown third party may have applied herbicide directly instream, however a resource consent from Environment Canterbury would have been required to carry out such an application legally.

Modelling and monitoring

4.9. A model that links river flow for the Waimakariri River and tributaries, tides and salinity data from the Kaiapoi River at Mandeville Bridge could give strength to the hypothesis that low river flows in the Waimakariri River are a key driver of saline incursions in the Kaiapoi and Ruataniwha Cam Rivers, and what effect tidal range has on these incursions.

4.10. WDC staff are in discussion with Environment Canterbury about a proposal to commission this modelling work. WDC staff recommend that Environment Canterbury commission and support this modelling work with provision of river flows and salinity data. WDC could provide partial funding assistance for this work of $10,000 from existing Zone Implementation Programme Addendum (ZIPA) budget.

4.11. WDC staff recommend Council to request that Environment Canterbury continue salinity monitoring, to further information on the extent of saline intrusions. This investigation should also investigate, to consider the relative effects of abstraction from the Waimakariri River and predict the effect of sea level rise on increasing saline intrusions in the lower Kaiapoi River due to climate change.

4.12. WDC is recommended by 3 Waters staff to request for Environment Canterbury to monitor of the extent of submerged weedbeds and kākāhi (freshwater mussels) in the Kaiapoi and Ruataniwha Cam Rivers over time.

4.13. It is recommended for WDC staff to monitor whether there is recovery of the emergent soft-stem bulrush *Schoenoplectus tabernaemontani* and *Typha australis* (Raupō) beds in the Kaiapoi River. These beds were planted by WDC, under the Kaiapoi River Rehabilitation Working Party work programme and were spreading successfully until the spring of 2024. This monitoring would inform whether replanting of these species should be considered, whether salt-tolerant (i.e. saltmarsh) species should be encourage due to salinity constraints, or whether there is likely to be a natural recovery with replanting not required.

Community Engagement and Governance

4.14. WDC staff propose to engage with agencies such as Fish and Game, community groups such as fishermen associations and the nascent ‘Save our Rivers’ community group, and the wider community with an interest in this issue. An Environment Canterbury councillor has raised the idea of the re-establishment of the Kaiapoi River Rehabilitation Working Party to work collaboratively with the local community and other management agencies to discuss the 2024 dieback issues. The need for a specific governance group could be considered if an inter-agency work programme was created that required oversight.

4.15. The Kaiapoi Ruataniwha Cam Rivers area could be part of a Climate Adaptation Plan under the WDC Climate Resilience Programme. This work is scheduled to take place from 2026 onwards. A plan would allow for community involvement and discussion of appropriate responses to climate change impacts, which are projected to increase saline incursions due to sea level rise and decreased summer flows in the Waimakariri River. The Kaiapoi Ruataniwha Cam Rivers area is also well-suited for implementation of blue-green infrastructure concepts, which is an objective 1.2.2 in the recently-adopted Waimakariri Natural Environment Strategy.

Waimakariri River flows

4.16. The flow of the Waimakariri River which the Kaiapoi River empties into, is also thought to play a role in whether a saline intrusion occurs. As noted by Meredith (2018) ‘more detailed monitoring and modelling of the river system is necessary to explain the complicated interactions of earthquake mediated bed level changes, river flow regimes, and tidal height

interactions.' This would allow for better prediction and management of the saline episodes in the Waimakariri and Kaiapoi rivers. Meredith has noted a rule of thumb whereby saline incursions appear to occur in the Kaiapoi River at the Mandeville Bridge when Waimakariri River flows are <50 m^3/s (cumecs).

4.17. The Waimakariri has been in low flow (<50 m^3/s and often less than 30 m^3/s) at State Highway 1 for almost all of the summer/autumn and winter 2024 with very few freshes and only four floods. Small freshes (i.e. 31 July and 10 August 2024) did not maintain the flow above 50 m3/s. The recent rainfall and snow generating the flood of 20 August 2024 was significant event to maintain and stabilise river flows well above the thresholds allowing desalination of the Kaiapoi River (50 m^3/s). A further flood on 24 August 2024 of 600+ m^3/s likely ended the long continuous salinity period. Salinity incursion periods can still re-establish, leading to 'flip-flopping' between freshwater and estuarine conditions.

4.18. Environment Canterbury sets the minimum flow levels for Canterbury's rivers, balancing the needs of mana whenua, extraction (such as drinking water and irrigation), community values, and government policy. The current minimum water flow level for the Waimakariri River is 46 m^3/s measured at Otarama, which is effectively equivalent to a minimum flow of 41 m^3/s at the Old Highway Bridge site, due to 5 m3/s lost to groundwater over that distance. A further 5 m^3/s is able to be extracted below this minimum flow for 'AA permits' giving a flow of 36 m3/s at the Old Highway Bridge before full restrictions on extraction. This level was set in the Waimakariri River Regional Plan, which came into effect in 2004.

4.19. Minimum flow levels for the Kaiapoi and Ruataniwha Cam Rivers are set in the Canterbury Land and Water Regional Plan. In 2017, the Waimakariri Water Zone Committee requested a review of these levels – the resulting changes were publicly notified in 2019 and Plan change 7 (PC7) came into effect in 2023.

4.20. Although, in theory, low minimum flows in the Waimakariri River could potentially contribute to increased salinity, with 2024 as a very dry year, that have often been full restrictions with no take for large periods (i.e. people were not irrigating), so water takes cannot be considered due to be a contributing factor to saline incursions this year.

4.21. The Waimakariri River Regional Plan is expected to be next reviewed in 2028 by Environment Canterbury. WDC staff recommend that Environment Canterbury carries out investigations and research into what impact, if any, minimum flows may have in the salinity in the Kaiapoi River. Any findings from this research should be considered in the review of this plan, and to set a minimum flow which includes consideration of saline incursion effects in Kaiapoi and more extreme weather events including drought conditions as our climate changes.

Implications for Community Wellbeing

4.22. There are implications on community wellbeing of Kaiapoi residents and river users for the issues that are the subject matter of this report.

4.23. The Management Team has reviewed this report and support the recommendations.

5. COMMUNITY VIEWS

5.1. Mana whenua

Te Ngāi Tūāhuriri hapū are likely to be affected by, or have an interest in the subject matter of this report. This report is proposed to be circulated to at a WDC-Ngāi Tūāhuriri Rūnanga meeting.

5.2. Groups and Organisations

There are groups and organisations likely to be affected by, or to have an interest in the subject matter of this report.

Local waterway users, such as fishers, independently contacted the Council in winter 2024 regarding observations of declining species in the Kaiapoi and Ruataniwha Cam Rivers.

A community meeting was held on 17 September 2024 regarding the recent changes in the Kaiapoi and Ruataniwha Cam Rivers. A nascent group called 'Save our Rivers' has been established from this public meeting from community volunteers with the aim of improving the health of local waterways.

5.3. **Wider Community**

The wider Kaiapoi community is likely to be affected by, or to have an interest in the subject matter of this report. Kaiapoi is viewed by locals, and marketed by WDC, as a 'historic river town'. This is due to the town's connection with the lower Kaiapoi River, and the historically bustling freshwater port area. It is recommended that WDC works with the community and other agencies to communicate that this 'historic river town' area is in flux, with challenges however some opportunities to support the transition to an estuarine environment.

6. OTHER IMPLICATIONS AND RISK MANAGEMENT

6.1. **Financial Implications**

There are no financial implications of the decisions sought by this report. The Climate Adaptation Plan proposed by this report is included in existing budget for the WDC Climate Resilience Programme.

A budget of $10K from the existing pool for the Canterbury Water Management Strategy Zone Implementation Programme Addendum (ZIPA) is proposed to support Environment Canterbury with the development of a model to combine river flow, tides and salinity data already. This budget is already included in the Annual Plan/Long Term Plan.

6.2. **Sustainability and Climate Change Impacts**

The recommendations in this report do have sustainability and/or climate change impacts about how to adapt to climate change. Although the current state of the rivers is primarily considered by this report, climate change will further affect river flows and sea level, with effects on the Kaiapoi and Ruataniwha Cam Rivers, infrastructure and community into the future. Therefore this area is potentially identified for a Climate Adaptation Plan, developed in conjunction with the community under the WDC Climate Resilience Programme.

6.3 **Risk Management**

There are no risks arising from the adoption/implementation of the recommendations in this report.

6.3 **Health and Safety**

There are no health and safety risks arising from the adoption/implementation of the recommendations in this report.

7. CONTEXT

7.1. **Consistency with Policy**

This matter is not a matter of significance in terms of the Council's Significance and Engagement Policy.

7.2. **Authorising Legislation**

7.2.1. Resource Management Act (1991)

Section 6(h); management of significant risks from natural hazards must be recognised and provided for.

Section 7(i); decisions must have regard to the effects of climate change**.**

7.3. **Consistency with Community Outcomes**

The Council's community outcomes are relevant to the actions arising from recommendations in this report, particularly environmental outcomes:

7.3.1. People are supported to participate in improving the health and sustainability of our environment.

7.3.2. Land use is sustainable; biodiversity is protected and restored.

7.3.3. Our communities are able to access and enjoy natural areas and public spaces.

7.4. **Authorising Delegations**

7.4.1. This report is for information only.

MINUTES OF THE MEETING OF THE CANTERBURY WATER MANAGEMENT STRATEGY WAIMAKARIRI ZONE COMMITTEE HELD IN THE COUNCIL CHAMBER, 215 HIGH STREET, RANGIORA ON MONDAY 2 SEPTEMBER 2024 COMMENCING AT 4PM.

PRESENT

C Latham (Chairperson), J Cooke and A Reuben (Te Ngāi Tūāhuriri Rūnanga representatives), E Harvie, C Aldhamland, M Jolly, R Gill-Clifford (Youth Representative), WDC Councillor T Fulton, ECan Councillor C McKay

IN ATTENDANCE

Mayor D Gordon, S Allen (WDC Water Environment Advisor), M Griffin (ECan CWMS Facilitator), G Cleary (WDC General Manager Utilities and Roading), A Smith (WDC Governance Coordinator), D McCormack (WDC Land Drainage Engineer), K Simpson (WDC 3 Waters Manager), C Armour (Senior Biodiversity Officer – Regional Programmes, ECan), G Stanley (ECan Regional Lead – Braided River Revival), S Stewart (Deputy Chair Kaiapoi-Tuahiwi Community Board), M Bate (Kaiapoi resident), J Ensor (Chair Mandeville Residents Association), WDC Councillor P Redmond,

A significant number of residents were also present in the public gallery, concerned about the impact of chlorine since it was introduced to the district council drinking water supply.

KARAKIA

Ruby Gill-Clifford opened the meeting with a karakia.

1. BUSINESS

1.1 Apologies

Moved C McKay Seconded J Cooke

THAT an apology for absence be received and sustained from E Harvie

CARRIED

1.2 Welcome and Introductions

Members of the committee introduced themselves to all those present.

At this time the Chairperson, for the information of those members of the public present, provided a background summary of the history of the Zone Committee, from when they were formed in 2010.

1.3 Register of Interests

There were no updates advised for the Register of Interest.

2. OPPORTUNITY FOR THE PUBLIC TO SPEAK

Michael Bate

M Bate referred to the oxidation ponds and wetlands in Kaiapoi and expressed concern on the number of dead birds due to avian botulism. He believed the build up of sludge had been a cause of this problem. There was 27 hectares of this and M Bate said this issue wasn't being addressed by the Council as it should.

M Bate also had concerns with the current state of the district's drinking water and acknowledged the large number of residents in the public gallery. He believed having chlorine

added to the drinking water supply was harmful for human consumption and for the environment.

G Cleary responded regarding the botulism issue, referring to the report that was included in the agenda for this meeting, that had been referred from the recent Utilities and Roading Committee meeting. It was advised that the Council did have compliant resource consents for its wastewater treatment plants. The pond based system was a standard approach to wastewater treatment and the Council believed it was using best practice methods to manage the issues of botulism, bringing in specialists to deal with it. This was an issue with wastewater treatment plants throughout the world and was not a unique situation in Waimakariri or in New Zealand. Regarding the sludge management, there was a scheduled programme in place as part of the maintenance activities at the wastewater treatment plants and the Council was conscious of minimising the risk of botulism.

James Ensor

J Ensor introduced himself as Independent Chairperson of the Mandeville Residents Association. There had been monitoring undertaken on the nitrate levels in domestic (privately operated) wells used for drinking water supplies over the last three years. Confirmed this was not water from Council drinking water supplies. With the use of a map, information on the variations in nitrate levels in the water supplies was shown in the Mandeville, Swannanoa, Eyreton and Clarkville areas. There were quite high levels in some areas. There were some concerns in the area near the forest with high levels recorded.

By way of background information and to provide clarification for all those present, C Latham advised that these results were from tests undertaken on private well water supplies. The drinking water from private wells was not monitored by the District Council and though it was not the council's responsibility under legislation, it would be good to make residents more aware that they may have high nitrate levels in the private drinking water supplies. The figures that had been referred to today were well below the New Zealand limits. The Council had stepped up and undertaken some testing of water in wells volunteered by the property owners.

Sophie Allen, WDC Water Advisor, responded providing some context on these results and the testing that the Council had been undertaking.

J Ensor extended thanks to the Council and to the Zone Committee members who had assisted on the water testing day. There were some concerns with some of the nitrate levels recorded in these private drinking water supplies.

Chair Latham invited anyone in the public galley who wished to speak on their concerns with the chlorine in the Council drinking water supplies.

Tania Britton

T Britton, had been a resident of Rangiora since 2003, expressed her concern with the introduction of chlorine to the Council public drinking water supplies. Many residents had now needed to purchase filters. It was acknowledged that the government had ruled that the Council's had to introduce chlorine to the water, which has had a detrimental impact on a lot of residents in the district. There were additional costs being imposed on residents having to purchase water filters or purchase bottled water and some people were experiencing skin irritations.

T Britton believed the chlorine in public drinking water supplies was harmful to residents.

G Cleary clarified that the Council delivered the water supply, and it was required to meet the Drinking Water Standards, as set by the government. It was pointed out that the matter of drinking water was not part of the business of the Waimakariri Water Zone Committee.

G Cleary provided some background information on the water supply for Rangiora, noting that currently the water for Rangiora came from a well supply in Kaiapoi. He noted that the WDC community had strongly voiced its wishes to not have chlorine in its drinking water supplies but pointed out that all water supplies across entire country needed to be chlorinated

to meet the Drinking Water Standards. The Council was conscious of the wishes of the residents, and that they were using the smallest level of chlorine in its water supply that was allowed – which was one teaspoon per 10,000 litres of water.

Mayor Gordon added his comments that the Council had taken its concerns and that of the community to Parliament in Wellington at the time but there were no further options for the Council to pursue. The Council cares about the community and keeping it safe and will continue to keep the public informed of any updates.

The Chairperson thanked the members of the public for attending.

3. REPORTS

3.1 Taranaki Creek 'letterbox' survey – update – Murray Griffin (CWMS Facilitator- Waimakariri)

This report provided the committee with an update on the survey results of the Taranaki Creek fish passage "letterbox". This was an experimental solution jointly developed by ECan engineering, science and biodiversity staff as the former top-hung flood gate that was in place at the creek almost totally blocked fish passage at some points of the tide cycle. This 'letterbox', which was a vertical slot in the new flood gate, would only allow a small amount of water through, but allowed fish species to travel up and down the river to complete their life cycles.

Chloe Armour (Senior Biodiversity Officer – Regional Programmes, Environment Canterbury), (attending remotely), provided background information on the history of Taranaki Floodgate and the impact on fish passage. There had been recent surveying undertaken which had indicated that the 'letterbox' was a popular upstream pathway for a number of fish species. To conduct the survey a net was place on the upstream side of the floodgate to catch migrating fish heading upstream, and left out for 24 hours, or two tide cycles. This had showed that it was definitely being used, either the fish were swimming through or being carried through by the flow of water. There were ideas for future design improvements, and it was hopeful that this system could be used on other flood gates.

Thanks were extended to a number of Environment Canterbury staff who had worked on this project over many years.

R Gill-Clifford believed this was a great innovation, but was surprised that there was no design for a flood gate that had a fish passage incorporated in it. C Armour advised that this was specifically designed for this floodgate, and was not aware of any other design.

The Chair commented that it was encouraging to see the letterbox working so well. Suggested that it would be good to share this information out to other councils.

Following a question from M Griffin, C Armour said as this floodgate on Taranaki Stream had needed to be replaced, it was an opportune time to test this "letterbox" system in a new flood gate, but there would need to be further work undertaken to install such a system in a floodgate that was insitu.

Moved M Jolly Seconded J Cooke

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** this update with consideration to the Committee's 2021-2024 CWMS Acton Plan Priorities.

CARRIED

3.2 **Ashley Rakahuri Work Programme – Update – Murray Griffin (CWMS Facilitator- Waimakariri)**

G Stanley, Regional Lead – Braided River Revival, Environment Canterbury provided an update on the recent work programme priorities led by Ecan on the Braided River Revival programme of work including the Rangiora Reach Masterplan implementation and the Rakahuri Berm Transition (central Government co-funded works).

A PowerPoint presentation of photos showed the before and after of work undertaken on the Ashley river clearance. Exotics such as willows and poplar were being cleared and staff would keep monitoring the changes in the riverbeds. The programme of work was undertaken in two separate sections – from the Gorge reach to the Garry River confluence, and from there down. Work was undertaken as budget would allow.

The next steps include engaging a maintenance operator, with active mapping of targets to building information. So far there had been observed some positive impacts of the bird habitat.

Goals of the Berm Transition project were to improve flood protection, Biodiversity, kaitiakitanga and have community involvement. Targeted weeds were highlighted in the Waimakariri River bed, noting that removing one plant makes room for another plant. The next steps of the Berm Transition were then highlighted.

Strategy and Masterplan updates were also highlighted, with G Stanley noting the co-drafting of the Strategy was awaiting response from Ngāi Tūāhuriri.

There had been discussions held with Grant Davey from the Rakahuri Rivercare Group and their expectations which was to apply for funding for the bird islands. Consent has been produced and they can be implemented this season.

Development of upper catchment willow control strategy and associated wetland weeds. Lees Valley wetland enhancement collaboration, there will be extensive mapping of the willow infestations in the Lees Valley catchment by two summer students. This will provide information for a headwater control strategy.

In response to a question, G Stanley advised that there would always be willow trees. For flood protection it would be too risky to use all native planting, as this may fail and private property could be put at risk

A Reuben expressed concern that willow trees were being removed and then there was a lapse in time before replacement planting was undertaken. G Stanley responded that the willows were removed when the south branch was being cleared. On the berm, willows were not controlled or targeted, but targeted Old Mans Beard, Hawthorne, and vines. When doing the sub-canopy planting, willows were not being treated at all.

Councillor Fulton enquired regarding the Lees Valley wetland, had there been any discussions with the landowners up there and what was planned. It was confirmed that the ECan Ecologist had been in discussion with landowners there.

Further question from Councillor Fulton, what value would there be in prohibiting vehicle access to the river bed to protect the plants and birdlife. Vehicles and birds were both choosing to operate in the same open areas in riverbeds but G Stanley believed vehicles were predominantly driving on the tracks available.

Moved Councillor Fulton Seconded R Gill-Clifford

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** this update with consideration to the Committee's 2021-2024 CWMS Acton Plan Priorities.

CARRIED

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

4.1 Waimakariri Water Zone Committee Working Groups.

Martha spoke on the Environmental Awards for 2024, which would once again be held in conjunction with the WDC Community Service Awards on 10 October

Lifestyle Block Working Group

This update was taken as read, with no further comments or questions from members.

Monitoring Working Group

Erin was not present at the meeting.

4.2 Environment Canterbury Reports.

Councillor McKay provided an update on the recent changes to the Council's Committee Structure. This would align with the LTP 2024-34 and council's impact framework and three core services. In July the Council discharge five standing committees and established two new standing committees, being the Strategy and Policy Committee and a Regional Delivery committee.

Plan Change 8 went to the Environment Canterbury council meeting of 28 August and was passed to go out for consultation to the selected organisations, as required by statute. Staff would also be including some others into this consultation group. This Plan Change covered some consenting issues as a result of the AWA decision on water take use. This involved Christchurch City Council and Waimakariri District Council having issues getting consents for non-consumptive use of water in fully allocated, or over-allocated sites. There would also be consulting on a consent pathway for constructed wetlands, making this more straightforward for people and also seeking feedback on intensification rules, options around dairy conversions or dairy support.

The Mayoral Forum were still considering the future of Water Zone Committees, and a decision was to be made and advised in November. The committee would be kept updated on any progress prior to this.

4.3 Waimakariri District Council Updates – from Councillor Tim Fulton

Kaiapoi River / Cam River – Weed Die-back

- There has been recent concern from the community regarding weed die-back in the Cam and Kaiapoi rivers, including a letter to the North Canterbury News.
- Ecan have confirmed that no chemical instream spraying of the weed has been undertaken in the Cam River (or other local rivers) in recent years.
- It is suspected that the die-back is related to the increased salinity this year due to low flows in the Waimakariri River.

Woodend & Kaiapoi WWTP

- Council has recently initiated its midge management plan for at the Woodend WWTP following a report from neighbouring properties of the first midges emerging.

WDC have updated its website with additional information on chlorine levels in our water supplies.

https://www.waimakariri.govt.nz/services/3-waters/water-supply/drinking-water-standards

Youth Week – Clean Up Week (flyer screenshot was attached to the agenda)

Other updates:

- Councillors recently attended a site visit relating to the Mandeville resurgence upgrade, along with staff involved. This was beneficial for all who attended.

- The Council had recently hosted a meeting of residents of Threlkelds Road to address flooding concerns.

Report for information from the Utilities and Roading Cttee August meeting on Avian Botulism Management 2023/24 – S Allen (Water Environment Advisor)

The information in this report was received, with no questions or comments from committee members.

Memo – Proposed Closure of Stockwater Race R3A and R3A-7, 949 and 1049 South Eyre Road – Declan McCormack (WDC Land Drainage Engineer)

D McCormack and K Simpson were present to speak to this application to close the Stockwater Races and 949 and 1049 South Eyre Road. These races had not been active for the last several years and were no longer needed. The neighbour at 1049 South Eyre Road was also in favour of the race closure.

It was pointed out that there had been four closures of stockwater races in the last ten years.

C Latham commented that the closure of water races at a larger scale than was currently occurring, could make the nitrate levels worse. The Zip Addendum highlighted that the stockwater races were keeping nitrate levels diluted. She hoped that those who were wanting stockwater races closed were aware of that, and thanked staff for keeping the Zone Committee updated as it was acknowledged that the purpose of the stock race network was not for nitrates dilution.

4.4 **Kaiapoi Wetlands – Press Article.**

The information in this Press article was received and there were no comments or questions from members.

4.5 **Action points from the previous Zone Committee meetings.**

A presentation was provided by Dr Adrian Meredith (Environment Canterbury Principal Scientist - Water Quality and Ecology) on the salinity levels in the Kaiapoi River. The salinity in Kaiapoi River was last reported to the community in mid-2021. Dr Meredith provided information on salinity levels of each year since then. He noted 2024 has had high salinity levels, especially on the high tide. There had been 25 weeks of high salinity

river incursions in 2024. This was mostly because the Waimakariri River was flowing very low with very few floods. The fresh water had been largely assaulted by the salt water in the last few months. This was primarily the consequence of a climate driven process. In the last two weeks there had been some flood water in the Waimakariri River which was keeping the salinity at bay. Showed evidence of low flows in the Waimakariri River.

Following a question from M Jolly, if the saline conditions remain, Dr Meredith suggested that this would have dire effects of plant and fish life. If fresh water returned, over time, so would the plant and fish life in the river.

Moved Councillor McKay Seconded J Cooke

THAT the CWMS Waimakariri Zone Committee:

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

CARRIED

5. COMMITTEE SCHEDULE AND PRIORITIES FOR 2024

5.1 Zone Committee Schedule and Priorities – Review Discussion – Murray Griffin (CWMS Facilitator- Waimakariri)

M Griffin spoke to this matter, noting the addition of the 27 January 2025 meeting

The Action Plan Fund for Waimakariri was to be open to the 24 October of funding applications, with an update to be presented to the November 11 meeting. Murray to follow up with possible applications for the Action Plan Funding and provide an update on these.

Moved M Jolly Seconded Councillor T Fulton

THAT the CWMS Waimakariri Zone Committee:

(a) **Review** its schedule for the remainder of 2024.

CARRIED

6. CONFIRMATION OF MINUTES

6.1 Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee Meeting – 1 July 2024

There were no updates for these minutes.

Moved J Cooke seconded C Aldhamland

THAT the CWMS Waimakariri Zone Committee:

(a) **Confirms** the Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee meeting, held on 1 July 2024, as a true and accurate record.

CARRIED

There were no matters arising from the minutes.

7. GENERAL BUSINESS

J Cooke requested an update from either Councils on the state of the stop banks on the Cam River, after the flooding in 2023. Councillor Fulton agreed to source an update from WDC. Councillor McKay advised that ECan communications had provided feedback on the 2023 flooding, which advised that the stop bank had been rebuilt downstream from Bramleys Road using carefully controlled methods to protect regrowth and establish protective vegetation.

It was agreed that both the WDC and ECan Councillors would follow up on this matter and see if there had been a formal report that could be shared with the committee.

KARAKIA

R Gill-Clifford provided the karakia.

NEXT MEETING

The next meeting of the CWMS Waimakariri Water Zone Committee is scheduled for Monday 11 November 2024 at 4pm, with a workshop on the 7 October 2024.

There being no further business, the meeting concluded at 6.05pm.

CONFIRMED

_____
Chairperson
Carolyne Latham

_____
Date