Canterbury Water Management Strategy
Waimakariri Zone Committee

Agenda

Monday 4 July 2022

3:30pm

Council Chamber
215 High Street
Rangiora

Members:
Michael Blackwell
Martha Jolly
Erin Harvie
Carolyne Latham
Judith Roper-Lindsay
Wendy Main
Arapata Reuben (Te Ngai Tūāhuriri Rūnanga)
John Cooke (Te Ngai Tūāhuriri Rūnanga)
Sandra Stewart (WDC Councillor)
Megan Hands (ECan Councillor)

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 4 JULY 2022 COMMENCING AT 3:30PM.

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

BUSINESS

PAGES

KARAKIA

1. BUSINESS

1.1 **Apologies**

1.2 **Welcome and Introductions**

1.3 **Register of Interests**
Advice of any changes or updates. *5-6*

2. OPPORTUNITY FOR THE PUBLIC TO SPEAK

3. REPORTS

3.1 **Waitaha Action to Impact Fund – Update (for information) – Ali Bower, (ECan, Community Partnerships Co-ordinator))**
7-8

RECOMMENDATION

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** these updates for its information, and with consideration to the committee's 2021-2024 Action Plan priorities.

3.2 **Communications – Update (for information) – Kim Whitwell (Northern Zones Communications Principal. ECan) and Anna Veltman (Northern Zone land Management Advisor, ECan)**
9-13

RECOMMENDATION

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** this update for its information and with consideration to the committee's 2021-2024 Acton Plan priorities.

3.3 **Ashley/Rakahuri Braided River Revival Draft Strategy – update (for information) – Sarah Worthington (Braided River Revival Advisor, ECan) and Andrew Arps (Northern Zone Manager, ECan)**

14-15

RECOMMENDATION

THAT the CWMS Waimakariri Zone Committee:

(a) **Receive** – this update for its information and with consideration to the committee's 2021-2024 Acton Plan priorities in the Rakahuri/Ashley River catchment.

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

4.1 **Zone Committee Working Groups.**

4.2 **WDC Land and Water Committee.**

ECan Long term Trends – Groundwater and Surface Water

4.3 **PC7 and PC2**

4.4 **Further Information Links.**

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

RECOMMENDATION *16-20*

THAT the CWMS Waimakariri Zone Committee:

a) **Receives** these updates for its information, and with reference to the Committees working groups, action plan, and engagement priorities in 2022.

5. REPORTS FOR INFORMATION

5.1 **Zone Implementation Programme Addendum Capital Works Programme 2022/23 – Sophie Allen (WDC, Water Environment Advisor)**

21-40

RECOMMENDATION

THAT the CWMS Waimakariri Zone Committee:

a) **Receives** the report for information from the WDC Land and Water Committee.

5.2 **Long Term Trends – Groundwater and Surface Water – Carl Hanson (ECan, Groundwater Science Manager)**

41-52

RECOMMENDATION

THAT the CWMS Waimakariri Zone Committee:

a) **Receives** the staff report on long term trends in groundwater quality.

5.3 **Long Term Trends Surface Water Natural Environment Committee Report – Helen Shaw (ECan, Surface Water Science Manager)**

RECOMMENDATION *53-75*

THAT the CWMS Waimakariri Zone Committee:

a) **Receives** this report on long term trends in surface water in the Canterbury Region.

6. CONFIRMATION OF MINUTES

6.1 **Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee Meeting – 4 April 2022**

76-82

RECOMMENDATION

THAT the CWMS Waimakariri Zone Committee:

a) **Confirms** the Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee meeting, held on 4 April 2022, as a true and accurate record.

7. GENERAL BUSINESS

KARAKIA

NEXT MEETING

The next meeting of the CWMS Waimakariri Water Zone Committee is scheduled for 5 September 2022 at 3:30pm

WAIMAKARIRI WATER ZONE COMMITTEE

Register of Interests – at 1 April 2022

Name	Committee Member Interests
Michael Blackwell	- Director/ Shareholder – Blackwells Limited, Kaiapoi - 4Ha property, Tuahiwi
John Cooke	- Director/Shareholder – Executive Limousines 2015 Limited - Director/Shareholder – Express Hire Limited - Director/Shareholder – Secure Property Management 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
Megan Hands	- Director/Shareholder – Landsavvy Limited - Member – NZ Institute of Primary Industry Management - Member – NZ Young Farmers - Member – Institute of Directors NZ - ECan Councillor
Erin Harvie	- Shareholder – Bowden Consultancy Limited, trading as Bowden Environmental - Trustee – Waimakariri Landcare Trust - 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) - Student of Masters in Water Resource Management (2nd year) - Volunteer assistant the Styx Living Laboratory Trust - Volunteer educator Vets for Compassion - Volunteer clinician SPCA NZ - Member – Forest and Bird NZ
Carolyne Latham	- Farmer – Sheep, beef - Director – Latham Ag Ltd Consulting - Shareholder – Silver Fern Farms, Farmlands - Registered Member – New Zealand Institute of Primary Industry Management
Wendy Main	- Dairy Farmer – Trinity Holdings (2001) Ltd - Registered Nurse - Member Federated Farmers - Consent to Farm and related consents for water and effluent with ECan - Shareholder – Silver Fern Farms, Farmlands, LIC

Arapata Reuben	- Trustee – Tuhono Trust - Trustee – Mana Waitaha Charitable Trust - Member – National Kiwi Recovery Group - Rūnanga Rep – Christchurch/West Melton Water Zone Committee - Rūnanga Rep – Ashburton Water Zone Committee
Judith Roper-Lindsay	- Landowner/small-scale sheep farmer, Ashley downs - Fellow – Environment Institute of Australia and New Zealand (EIANZ) - Chair – Waimakariri Biodiversity Trust
Sandra Stewart	- Self-employed journalist - Landowner, 4Ha Springbank – sheep & dogs - WDC Councillor

AGENDA ITEM NO: 3-1	SUBJECT: Waitaha Action to Impact Fund – update (for information)
REPORT TO: Waimakariri Water Zone Committee	MEETING DATE: 4 July 2022
REPORT BY: Murray Griffin, CWMS Facilitator – Waimakariri, ECan	

PURPOSE

To provide the Water Zone Committee with an update on Waitaha Action to Impact Fund as confirmed through Environment Canterbury's 2022-23 Annual Plan.

RECOMMENDATION

That the Zone Committee:

> **Receives** these updates for its information, and with consideration to the committee's 2021-2024 Action Plan priorities.

BACKGROUND

The Waitaha Action to Impact Fund

The Waitaha Action to Impact Fund is a contestable fund for community organisations in Canterbury. The fund aims to build community engagement and action for a better environment in the region.

The 2021 funding round was a pilot and the timing and processes for next year are currently being reviewed. The pilot was open for applications from 30 August until 11 October 2021. There were 46 applications, totalling over $810,000, far exceeding the funding available.

All applications were assessed against the criteria and twenty applicants were selected to receive funding for 2021/22. In total, $215,190 was allocated.

All successful recipients must provide a minimum of 30% of the total project budget; this may come from funding or equivalent in-kind contributions, such as volunteer hours.

- **WAI Fund recipient in the Waimakariri 2021/22 – Te Kōhaka o Tūhaitara Trust**

Tūhaitara Coastal Park rehabilitation – enhancing the native biodiversity in this corridor linking the Waimakariri to the Ashley Rakahuri. Awarded $5,000

ECan 2022/23 Annual Plan – Two Funding Changes from the 2021-24 Long Term Plan

The final plan was adopted by Council on 16 June 2022. There are two significant changes of relevance to the Zone Committee, as set out below.

1. **Waitaha Action to Impact Fund to increase to $600,000 in 2022/23**

"In the Engagement and Influence programme, we are increasing the amount of funding available for community-led initiatives through our Waitaha Action to Impact Fund. There will be a total of $600,000 to be allocated in 2022/23." (Page 88 of the Environment Canterbury 2022/23 Annual Plan)

2. **CWMS Action Plan Budget for Implementation to stay at $500,000 in 2022/23**

“Removing the increase in investment planned for the Working together for healthy water and land programme. This means that the funding for each zone committee to implement their Action Plans will stay at the same level as 2022/23 rather than increase, as set out in the Long-Term Plan.” (Page 32 of the Environment Canterbury 2022/23 Annual Plan)

Link – for more information, and to view, the Environment Canterbury 2022/23 Annual Plan:

Annual Plan | Mahere ā Tau 2022/23 | Have Your Say (ecan.govt.nz)

WHO

This update will be provided by:

- Alison Bower – Community Partnerships Coordinator, ECan

AGENDA ITEM NO: 3-2	SUBJECT MATTER: Communications – update (for information)
REPORT TO: Waimakariri Water Zone Committee	MEETING DATE: 4 July 2022
REPORT BY: Murray Griffin, CWMS Facilitator, ECan & Kim Whitwell, Northern Communications Principal, ECan	

PURPOSE

This agenda item provides the Zone Committee with an update on the communications developed by Environment Canterbury relevant to the Waimakariri Zone Committee over the last two months.

RECOMMENDATION

That the Zone Committee

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

BY WHO

This update will be provided by:

- Kim Whitwell, Northern Zones Communications Principal, ECan
- Anna Veltman, Northern Zone Land Management Advisor, ECan

BACKGROUND

April – July 2022 Communications Report for Waimakariri Water Zone Committee

- **Prepared by:** Kim Whitwell, Principal Communications and Engagement Advisor (Northern), Environment Canterbury
- **Prepared for:** Waimakariri Water Zone Committee meeting, Monday 4 July 2022

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

- Environment Canterbury website and Facebook
- Waimakariri District Council channels
- Local Water Zone email newsletter (through Environment Canterbury)
- North Canterbury News

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

Date	Content	Overview
April	The Pines Wetland committee field trip and project funding story: www.ecan.govt.nz/the-pines-wetland-project-progressing-well/	• Story about the Pines Wetland and wider Tūhaitara Coastal Park; the committee field trip to the site and funding support for the project

May	Regional campaign - water zone committee refresh: www.ecan.govt.nz/why-you-should-join-a-water-zone-committee/	• Web stories, newspaper advertisements and digital adverts for the water zone committee membership refresh across the region
June	Regional snapshot campaign – paid advertisements in local newspapers	• Two projects supported by the water zone committee were shared in the North Canterbury News

	Intensive winter grazing campaign: • www.ecan.govt.nz/flyovers • www.ecan.govt.co.nz • Email newsletter	• Phase one for intensive winter grazing campaign focusing on the trial flyover • First flyover for winter grazing ever in Waimakariri this year • Flyer sent to mailboxes, paid advertisements in the North Canterbury News and Oxford Observer, digital targeted adverts, news stories, email newsletter and information page on the ECan website • Worked with industry to refine approach and develop content • Phase two to focus on IWG messages for the upcoming rule changes from November
	Zone delivery projects funded 2021/2022: www.ecan.govt.nz/north-canterbury-collaboration-increases-environmental-outcomes/	• Zone delivery projects • Includes WDC planting project • Funding from Zone Delivery Priority Project Fund and Me Uru Rakau

To note - central zone campaign: stormwater key messages. Opportunity for other committees to utilize content. For discussion: /www.ecan.govt.nz/stormwater/

Planned communication activity: Water zone committee action plan progress reports (August/September), Ashley Rakahuri catchment update (looking back to look forward), Waimakariri Water Zone website page updates (including the WZC page), email newsletter, ZC comms support, North Canterbury comms planning

Intensive winter grazing campaign
In July 2022, we're conducting our first trial flyover to get a better look at intensive winter grazing in our region.
Other regional councils have found flyovers a valuable tool to observe current land management practices and provide better support to landowners who need it most. Our trial flyover will take place in the Waimakariri district.

The decision to do this trial in the Waimakariri was based upon the proximity to Christchurch Airport (where the plane will depart), Environment Canterbury staff availability for follow-up, industry partner network availability and the diverse geographies in the Waimakariri district.
We will not be recording video or taking photographs during the flyover. Our staff will be viewing the land from above and noting examples of good management practice, as well as potential areas where support is needed.

We've been working with industry partners and stakeholder groups in the Waimakariri district and as part of this collaborative approach, will invite an industry representative to join the flight as an observer. Several representatives will be available to attend follow-up visits if landowners would like additional support.

Communications included in this campaign:

1. Website information at www.ecan.govt.nz/flyovers
2. Advert in North Canterbury News (30 June)
3. Advert in Oxford Observer (early July)
4. Email to Waimakariri water zone list (early July)
5. Industry/stakeholder channels
6. Digital advertising
7. Target mailout to landowners from end June/early July.

Following the trial flyover, we'll work with our industry partners to share the findings and provide opportunities for feedback.

Example comms – next page:

Environment Canterbury Regional Council

Intensive winter grazing

SUPPORTING YOU WITH GOOD MANAGEMENT

This July, we're conducting a trial flyover in Canterbury – the first one ever for intensive winter grazing in our region. The trial will give us an understanding of current intensive winter grazing practices and any areas where help, support or advice might be needed.

The trial will take place in the Waimakariri district only, in early to mid-July, weather dependent. We will not be filming or taking photos.

What we are looking for

During the flyovers, Environment Canterbury staff will look at current intensive winter grazing and good management practices. They will note any areas where improvements are needed, such as where waterways are being impacted by stock or dirt.

If these or other issues are identified, we will get in touch to offer help, support and education to help meet good management practice. We've partnered with industry groups to define our approach for the flyover. They will also be available to support you throughout this process.

We will only be observing current intensive winter grazing practices, and new legislation coming into effect in November this year is not part of this trial.

For more information visit **ecan.govt.nz/flyovers** or contact Environment Canterbury on **0800 324 636**.

Example comms:

Intensive winter grazing: It's all about planning

Here are some ways to protect your soil structure and waterways on your farm.

- **Select the right paddocks**
  It's best to choose paddocks away from waterways and wet areas prone to pugging to reduce the risk of sediment and nutrient run-off. Have fodder crops spread across wetter and drier paddocks to give options during winter.
- **Leave a buffer and protect waterways**
  When planting the crop, leave ungrazed buffer strips around waterways, drains and critical source areas, such as gullies and swales, where the run-off collects and flows out of the paddock. This can really help reduce sediment and nutrient loss into waterways.
- **Plan for bad weather**
  Having practical bad weather mitigations should be part of planning to minimise your environmental losses and make sure your stock remains healthy. Make sure your access ways are hard surfaces, you have alternative feed sources or drier locations for grazing, and you have the ability to practice on/off grazing to minimise pugging damage in wet conditions.
- **Graze strategically**
  Strategic grazing and careful management of critical source areas can reduce losses of sediment and phosphorous by 80–90%. Identify and protect any critical source areas. Leave them in pasture or graze them last, when it is dry, if they need to be grazed at all. Back-fence stock from land that has already been grazed and place water troughs and supplementary feed in areas away from waterways. Graze down towards a critical source area – this leaves vegetation between bare ground and the critical source area, reducing run-off. On/off grazing can minimise pugging damage and distribute nutrients from dung and urine more widely.
- **Plant a catch crop**
  As soon as possible after grazing, plant a cool-weather tolerant follow-up crop, such as oats or rye. This can soak up nutrients from the soil, preventing the leaching that can occur if the paddock is left fallow.

For more information visit ecan.govt.nz/winter-grazing

Taking action together to shape a thriving and resilient Canterbury, now and for future generations.
Toitū te marae o Tāne, toitū te marae o Tangaroa, toitū te iwi.
www.ecan.govt.nz

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

AGENDA ITEM NO: 3-3	**SUBJECT MATTER:** Ashley/Rakahuri Braided River Revival Draft Strategy – update (for information)
REPORT TO: Waimakariri Water Zone Committee	**MEETING DATE:** 4 July 2022
REPORT BY: Murray Griffin, CWMS Facilitator, ECan	

PURPOSE

This agenda item provides the Zone Committee with an update on the Ashley/Rakahuri Braided River Revival draft strategy being developed by Environment Canterbury.

RECOMMENDATION

That the Zone Committee

Receive – this update for its information and with consideration to the committee's 2021-2024 Acton Plan priorities in the Rakahuri/Ashley River catchment.

BY WHO

This update will be provided by:

- Sarah Worthington, Braided River Revival Advisor, ECan
- Andrew Arps, Northern Zone Manager, ECan

BACKGROUND

The Braided River Revival programme established by Environment Canterbury has two overarching purposes:

1. To achieve improvements in the health of Canterbury's braided rivers by supporting the development and promotion to external partners, of a proposal for a landscape scale alignment of the agencies involved in braided river management.

2. Environment Canterbury, as a Council, has called for a step change in effort in the regeneration of freshwater, marine and terrestrial biodiversity and has recognised Braided Rivers as one of two priority ecosystems. Council's efforts to achieve the desired change are focused on strategic and work programme alignment, both internally and with external agencies and partners.

Alignment with the Waimakariri Water Zone Committee Action Plan 2021-2024

Action Plan Priority – Promoting the natural braided character and increased flow of the Ashley River/Rakahuri.

To protect the braided river values associated with the Ashley River/Rakahuri, ki uta ki tai, by:

- *Promoting an improved community understanding of land and water use impacts on braided river character and the lower catchment ecosystems,*
- *Working to make the Ashley River/Rakahuri safe for contact recreation, with improved river habitat, fish passage and customary use, and flows that support natural coastal processes.*

We will measure this by:

- *Encouraging the improved understanding of landowners and wider community of climate change impacts on the Ashley River/Rakahuri',*
- *Encouraging landowners and agencies to protect the landscape and indigenous biodiversity values in the upper catchment,*
- *Supporting weed control in the upper and middle sections of the catchment,*
- *Supporting an investigation into existing consents and water use in the Ashley River/Rakahuri catchment,*
- *Encouraging landowner and agency efforts to improve the habitat health of lowland spring-fed tributaries,*
- *Supporting investigations focused on understanding and improving the ecosystem health of Te Aka Aka/Ashley estuary.*

Alignment with the Waimakariri ZIP Addendum (2018)
The Braided River Revival programme aligns with the following ZIP Addendum recommendations focused on the Ashley/Rakahuri

Rec 1.22	That Environment Canterbury and the Waimakariri District Council recognise the Ashley River/Rakahuri for its important natural landscape values, braided river characteristics, and braided river bird (nesting and feeding) habitat.
Rec 1.23	That Environment Canterbury investigate funding for projects to address key environmental issues in consultation with LINZ and Department of Conservation for the Ashley River/Rakahuri, particularly the removal of woody weeds above the confluence with the Okuku River.
Rec 1.24	That Environment Canterbury and the Waimakariri District Council recognise the Upper Ashley River/Rakahuri catchment, including Lees Valley, for its high natural landscape and ecosystem values, and protect its waterways from degradation by: • Avoiding increased contaminant losses to waterways. • Preventing the removal or degradation of any existing wetlands. • Preventing the expansion of wilding pines.
Rec 2.1	The zone committee recommends that Environment Canterbury and the Waimakariri District Council work with Ngāi Tūāhuriri, landowners, agencies and stakeholders to integrate indigenous biodiversity in a whole of waterway, Ki Uta Ki Tai, approach to managing catchments in the Waimakariri Water Zone.

Alignment with other work programmes

- Work programmes developed under the Braided River Revival umbrella will mesh with other programmes particularly in relation to tree planting.
- Work on braided rivers may also deliver river protection functions outside of existing rating districts. For example, the current choked status of the Ashley Rakahuri between Ashley Gorge and the Okuku River may be addressed through Braided River Revival which will also have very beneficial effects for adjacent landowners concerned about lateral erosion.
- **Link** – For more information on the vegetation clearance being undertaken in the catchment:
  - Ashley River/Rakahuri vegetation clearance | Environment Canterbury (ecan.govt.nz)

AGENDA ITEM NO: 4	SUBJECT: Committee Updates (for information)
REPORT TO: Waimakariri Water Zone Committee	MEETING DATE: 4 July 2022
REPORT BY: Murray Griffin, CWMS Facilitator – Waimakariri, ECan	

PURPOSE

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

RECOMMENDATION

That the Zone Committee:

Receives these updates for its information.

COMMITTEE UPDATES

The following updates will be addressed with the committee:

1. Zone Committee Working Groups

Landcare Working Group

Erin Harvie provided the following update:

- Members evening will be held on the 6th of July as a social gathering for members and to provide an update on what the trust has been up to and to ask members for their feedback on what they would like to see going forward.
- Waimakariri Landcare Trust is supporting local groups undertake projects by acting as a umbrella organisation, for receiving and accounting for funds. The trust looks forward to seeing these groups thrive.

The Next Generation Farming Project work continues.

- The third on-farm practice change case study has been released, and the second part of all the case studies are either released, or will be released over June/July, . A copy of the media releases can be found here:

  ○ On Farm Practice Change Case Study – J. Bradshaw - Episode One
  https://waimaklandcaretrust.co.nz/science-and-genetics-boost-fernside-farm/

  ○ On Farm Practice Change Case Study – R. Taggart - Episode Two
  https://waimaklandcaretrust.co.nz/precision-technology-delivers-diverse-benefits/

  ○ The Trust's website is also now up and running:
  https://waimaklandcaretrust.co.nz/

Biodiversity Working Group

Martha Jolly has provided the following update for May/June:

- The Biodiversity Working Group has met on April 11th and May 23rd, 2022. Judith Roper-Lindsay updated the Group on the Waimakariri Biodiversity Trust formation. The Trust deeds have been finalised and they are currently advertising for a part-time coordinator.
- The Group received updates from WDC Biodiversity team regarding ongoing assessment of SNAs within the Zone. It was suggested that a full committee workshop on this topic be floated.
- The team at WDC and the Trust are working on a winter lecture series on biodiversity within the Zone. These are due to start mid-July.
- Criteria for Action Plan funding has also been discussed following the Zone workshop on May 2nd resulting in a provisional outline that maybe applied to any potential project going forward.

Lifestyle Block Working Group

Carolyne Latham had provided the following update on the Sefton Saltwater Creek Catchment Group:

- The LBWG convened a workshop with other interested parties to brainstorm the concept of coming up with Ten Top Tips for Lifestylers in terms of what actions could potentially make the biggest improvements to the environment if undertaken on lifestyle blocks. We ran out of time at five top tips, with plenty of scope for more, and need to reconvene to finish this off.

Monitoring Working Group

Erin Harvie provided the following update:

- A Zone Committee workshop was held on 20 June with Environment Canterbury scientist, Ms. H Shaw who provided an update on the monitoring programme underway and future work and compared this against a list of the ZIPA recommendations. The review included an outline of the scope of works to contribute to the integrated planning framework programme. It was outlined that no additional monitoring data or modelling will be undertaken for the Waimakariri Zone to contribute towards the setting of limits or reductions in the integrated planning framework programme. This was raised as a concern for the Zone Committee, given the uncertainties of the model outlined in the PC7 hearing, and not wishing to see the same unresolved issues raised at the next plan hearing. The zone committee has requested that this stance be reconsidered and at the very least some work undertaken on verification or sense checking the model against current data. Ms Shaw is to come back to the zone committee following internal discussions.

2. WDC Land & Water Committee

The previous WDC Land & Water Committee meeting will be held on **Tuesday 22 May 2022** and the agenda for this meeting is provided as **agenda item 5-1**.

This meeting includes reports on

- An application to the Biodiversity Fund
- ZIPA capital works programme report
- Portfolio updates – Biodiversity and Land based Indigenous Reserves

3. Regional Groundwater Long-Term Trends update for the ECan Natural Environment Committee – 6 April 2022

At their 6 April 2022 meeting, the Natural Environment Committee (NEC) of Environment Canterbury received a report on the Long-Term Trends for Groundwater which focussed on nitrate-nitrogen concentrations in groundwater. Environment Canterbury is currently developing surface water analysis tools and statistics and building data viewers to share long-term surface water state and trend.

Key points from the paper:

- Environment Canterbury's long term monitoring network enables staff to assess changes in water resource state and trends over time.

- Nitrate-nitrogen concentrations in Canterbury groundwater have been increasing since farming began in the region. Even by the 1970s/1980s, concentrations were well above natural levels.

- Analysis of 30 years of data shows that the rate of change is slow and nonlinear, but the overall direction of change is generally an increase in nitrate-nitrogen concentrations.

- It can take time for changes to land management to result in changes in water quality, although lag times in some locations in Canterbury are likely to be sufficiently short to see responses. For the most part, the time lag between land use change and the start of resulting effects on groundwater nitrate concentrations is on the order of five to ten years. Shorter lags exist where receiving environments are close to land sources. The full effects of changes may still take decades to come through, particularly for large catchments.

- It can be difficult to tease out the reasons for changes in groundwater quality; factors such as climate, natural events, permitted activities, and on-the-ground actions as part of plan implementation will be affecting water quality and it may be difficult to isolate the effects of specific interventions.

- Data analysis is currently being undertaken to prepare information to contribute to the development of the new regional planning framework.

- The focus of the paper is on the long-term water quality trends that are being identified through our groundwater monitoring programmes. Understanding why these trends are occurring, and what role the regional planning framework and on-farm changes have played in any change, is the focus of work being developed to inform the integrated regional planning framework.

- The paper (Item 8.3 of the NEC Agenda Papers for the 6 April 2022 meeting, pgs. 109-120) is include as **Agenda Item 5.2**.

4. Regional Surface Water Long-Term Trends update for the Natural Environment Committee – 19 May 2022

At their 19 May 2022 meeting, the Natural Environment Committee (NEC) of Environment Canterbury received an update focussing on surface water ecology, quality and
quantity in our rivers and lakes. The state and trend data and statistics presented in the paper are from data viewers currently in development to support the ki uta ki tai integrated planning framework. As such, they are an initial look at the data; further refinement of these tools will be undertaken over the coming years.

Key points from the paper:

- Regional trends in surface water indicators are useful for overall patterns of change, but detailed site analysis is required to identify specific drivers of change. Changes in our indicators can be driven by a range of factors including anthropogenic activities, climate variability, and change in species. There are often complex interactions between these drivers that complicate understanding of trends.

- The ecological health of our streams has been in decline over the last 20 years at 54% of sites. In contrast, there are 22% of sites that are relatively stable and 24% are improving. It is notable that many sites with improving trends are those in a poorer state close to the coast on the Canterbury Plains, while inland areas previously in good health have a relatively high number of deteriorating sites.

- Surface water quality trends for nitrate-nitrite nitrogen are similar to those for groundwater quality trends. This is due to groundwater being the dominant source of nitrate-nitrite nitrogen in our rivers, with 63% of sites demonstrating an increasing trend over the 22-year data period.

- Conversely, long term dissolved reactive phosphorus (DRP) trends indicate that concentrations have improved at 55% of sites over the 22-year period examined. Turbidity (essentially the cloudiness of water and a surrogate for suspended sediment) has shown a shift and has improved over the last 9 years at 71% of our river sites. These parameters are the ones we would expect to use as early indicators of improvements in water quality due to actions such as fencing and stock exclusion.

- Trend analysis of high-country lakes data 2007-2022 (24 lakes) showed that chlorophyll a is increasing in most lakes (>80%). This has mostly resulted in a shift from National Policy Statement for Freshwater Management (NPS-FM) attribute band A to band B for these lakes, which is a significant shift for these sensitive lakes.

- River flow data is showing decreasing low flows in 10-year trend analysis, but no clear changes over 30 years - many of our lower catchment sites have only been installed in the past two decades. Other indicators and additional data from newer sites will be needed to further understand long term effects.

- Long term monitoring programmes were not originally designed to monitor the efficacy of localised catchment/land management interventions but will ultimately reflect largescale changes in land use and land management. Environment Canterbury has modified our monitoring networks over time to enable assessment of plan efficacy at a regional scale, but many of the datasets are not yet sufficient to determine long-term trends or changes resulting from interventions.

- The paper (Item 8.4 of the NEC Agenda Papers for the 18 May 2022 meeting, pgs. 67-89) is provided as **Agenda Item 5.3**.

5. Proposed Plan Change 7 – Canterbury Land & Water Regional Plan

The Council has made its decisions on Plan Change 7 (PC7) to the Canterbury Land & Water Regional Plan and Plan Change 2 (PC2) to the Waimakariri River Regional Plan. The Council's decisions adopt the independent hearing commissioners' recommendations on PC7 and PC2 in their entirety. The decisions were publicly notified on 20 November 2021 and the appeal period has now closed. There are four appeals on PC7, made by the following submitters:

- Synlait Milk Limited
- Rangitata South Irrigation Limited
- Rayonier New Zealand Limited and Port Blakely Limited
- Te Rūnanga o Ngāi Tahu and Te Rūnanga o Arowhenua

Council staff are working through the content of the appeals on PC7 at the present time. At the moment if people want to see any appeal documents they must request them from the High Court.

For more information, go to:

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

6. Further Information Links

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

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

7. Action points from the previous zone committee meetings

Action points from the previous meetings:

- M Blackwell (Dec 2020) & E Harvie (May 2021) requested that the CWMS Waimakariri Zone Committee be provided with updated water quality and ecological data for the Waimakariri district on a quarterly basis.
- Cr S Stewart requested if a report on the Infiltration Trench Trial project in South Eyre could be submitted to the Committee.
- Cr S Stewart requested information on the definition of private drinking water supply well by Environment Canterbury.
- Cr S Stewart requested information on the realignment of the North Brook tributary and water quality sampling at Tutaepatu Lagoon.

Action points from the 31 January 2022 meeting:

- The Committee recorded its interest in the "Discussion Document" on the Ashley Rakahuri currently being prepared by ECan under the Braided River Revival programme umbrella. Its interest in developing a "Vision" for the whole river in collaboration with the community; and to invite Sarah Worthington (co-ordinator/author of the Discussion Document) to meet the Committee as soon as practicable, to discuss its interests and concerns. *Please refer to the Braided River Revival update above (item 4)*.

Action points from the 4 April 2022 meeting:

- An update on ECan management of the PC7 requirement for properties 20-hactares plus to have a Freshwater Farm Plan.
- An update on the Kaiapoi River salinity logger data.
- Follow up on WDC drainage maintenance programme procedures for protecting aquatic life.
- Follow up on testing for pesticides in the Kaiapoi River.

Fin.

WAIMAKARIRI DISTRICT COUNCIL

REPORT FOR DECISION

FILE NO and TRIM NO:	WAT-10-14 / 220328045801
REPORT TO:	LAND AND WATER COMMITTEE
DATE OF MEETING:	17 May 2022
AUTHOR(S):	Sophie Allen – Water Environment Advisor
SUBJECT:	Zone Implementation Programme Addendum Capital Works Programme – 2022-23

ENDORSED BY: (for Reports to Council, Committees or Boards)	Department Manager	Chief Executive

1. SUMMARY

1.1 This report details the proposed Waimakariri District Council (WDC) capital works programme for 2022-23 as developed from the Zone Implementation Programme Addendum (ZIPA), including;

a. Fish passage improvements on the North Brook tributary at Cotter Lane in Rangiora;

b. Creation of a low flow channel on Jeffs Drain in Ohoka with biodegradable textile bags, as recommended as a trial technique in the WDC Drainage Maintenance Management Plan project;

c. Biodiversity and amenity improvements for the South Brook at Townsend Fields;

d. Terrestrial planting along the Kaiapoi River, and support the second phase of an Environment Canterbury watercress Mahinga Kai project, and

e. Improvements to inanga (whitebait) spawning areas located on land owned by Waimakariri District Council on the McIntosh Drain.

1.2 There is a capital expenditure allocation of $50,000 per annum from 2021-31 in the draft Long Term Plan, from the Zone Implementation Programme Addendum (ZIPA) budget from the general rate.

1.3 Capital expenditure ZIPA projects will be scoped and presented to the Land and Water Committee prior to the commencement of each financial year.

Attachments:

i. Waimakariri ZIPA WDC Role and funding review Long Term Plan– March 2021 (210401054372)

2. RECOMMENDATION

THAT the Land and Water Committee:

(a) **Receives** report No. 220328045801.

(b) **Approves** the proposed 2022-23 Waimakariri District Council capital expenditure work programme, based on the Zone Implementation Programme Addendum (ZIPA) recommendations.

(c) **Receives** an update on the progress of the Environment Canterbury watercress mahinga kai project on the Cam River before the $5,000 of WDC ZIPA budget is allocated to this specific project for 2022-23.

(d) **Circulates** this report to Council, Community Boards, WDC-Rūnanga liaison meeting and the Waimakariri Water Zone Committee for their information.

3. BACKGROUND

3.1 A report was presented on 29 January 2019 to Council, seeking a decision on the role of WDC in ZIPA implementation, staff resourcing, and funding of projects (refer to TRIM 181217148924).

3.2 A total of $305,000 per annum was approved by Council for 2019-21 on 28 May 2019 (refer to TRIM 190501061992), of which $100,000 was capital expenditure. Due to COVID-19 pandemic budget revisions, the capital expenditure was reduced to $50,000 from 2020-21 onwards.

3.3 A ZIPA role and budget allocation review was carried out in 2021 for the Long Term Plan 2021-31, which was present to the Land and Water Committee at the 20 July 2021 meeting (Attachment 1).

4. ISSUES AND OPTIONS

4.1. Of the $255 per annum total allocation for ZIPA implementation in the 2021-31 Long Term Plan, $50K is allocated to capital expenditure (CAPEX) projects (see Table 1), and $205K to operational expenditure.

Table 1: Summary of capital expenditure proposed for 2022-23 for WDC ZIPA works

CAPEX project	**ZIPA recommendation**	**Budgeted amount**
Fish passage improvements – Rock ramp on the North Brook tributary at Cotter Lane in Rangiora	1.8	$10,000
Projects for improvement of contaminant losses and aquatic life: Creation of a low flow channel using biodegradable textile bags on Jeffs Drain, as recommended by the WDC Drainage Maintenance Management Plan (201203164171)	1.14	$10,000

Biodiversity and amenity values in Waimakariri River tributaries – South Brook Townsend Fields project	1.26	$5,000
Terrestrial plantings on the Kaiapoi River, and support for the Environment Canterbury-led mahinga kai watercress enhancement project on the Cam River (pending an updated on the progress of this project).	1.27	$15,000
McIntosh Drain spawning habitat improvements – bank rebattering and planting to the north of the proposed pump station	2.11	$10,000
TOTAL		**$50,000**

Fish Passage

4.2. A concrete apron structure on a tributary of the North Brook (corner of Cotter Lane and Northbrook Road) is proposed to have a rock ramp installed below it (placement of loose cobbles and boulders) which will create a pooled area over the concrete apron where there is currently a shallow, fast-flowing drop (see Figure 1). This concrete apron is believed to prevent some migratory species such as īnanga from being able to move upstream, based on survey data from Aquatic Ecology Ltd and spotlighting data from WDC staff. An example of a constructed rock ramp is shown in Figure 2.

Figure 1: Likely partial fish passage barrier on a North Brook tributary – Corner of Cotter Lane and Northbrook Road

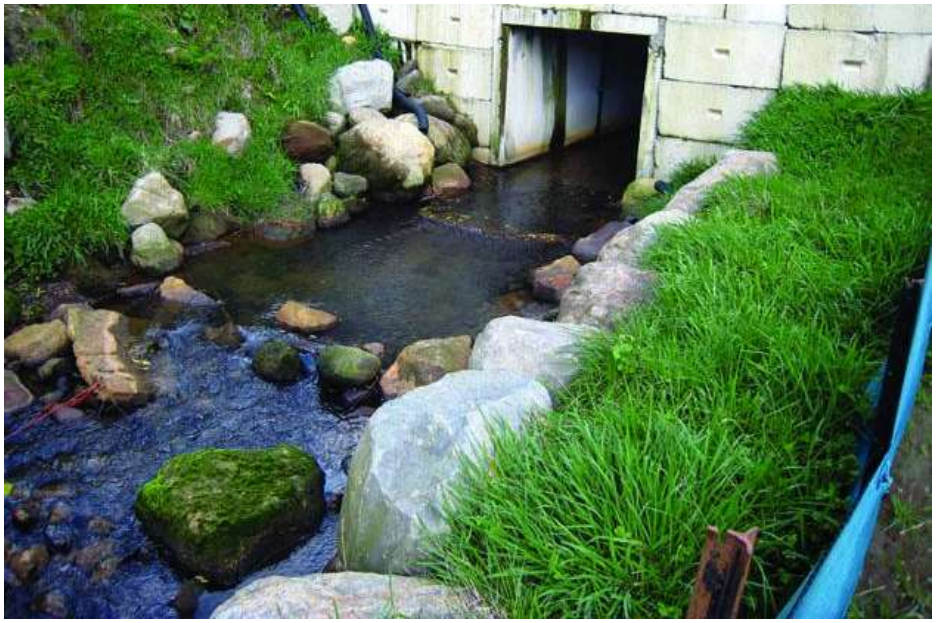

Figure 2: A rock ramp constructed to enable fish passage through a culvert by creating a pool downstream. (Photo credit: NIWA)

Low flow channel creation - Jeffs Drain

4.3. Creation of a low flow channel (i.e. a deliberately narrowed flow path with higher flow velocity that remains free of water weeds such as watercress) has been proposed in the WDC Drainage Maintenance and Management Plan as a technique to trial for the potential benefit of a long-term reduction in weed clearing requirements. Narrowing of the drain with plantings was trialled in 2020-21, however was not successful due to pukekos removing the plants (TRIM 210316044295).

4.4. Installation of biodegradable bags, such as hessian sacks, are proposed along the drain edges at the same trial site on Jeffs Drain Road. An assessment of the reduction in hydraulic capacity of the drain, and potential to exacerbate any flooding issues is recommended before confirming this trial site.

Biodiversity and amenity - South Brook Townsend Fields

4.5. WDC staff have been working in this area since 2019 on improving a WDC-owned esplanade reserve on the South Brook beside the Townsend Fields Stormwater Management Area (see Figure 3). It is recommended to continue planting with eco-sourced indigenous plants directly upstream of current plantings, and to install signage that informs users that the area is WDC esplanade reserve with public access. This work will continue to be led by the WDC Greenspace Team and Jobs for Nature rangers in 2022-23.

4.6. The surrounding area is undergoing development of urban housing, including the placement of a nearby retirement village. The area on the south side was cleared of willows in August 2019, with some of the areas planted with native plants in 2019-21. The planting areas are suitable terrain for community planting events to be held, however has not been possible to-date due to COVID restrictions, but may be possible in 2022-23.

4.7. Budget for plant maintenance, such as weeding around plants and weed control (e.g. blackberry) is available under the ZIPA operational budget for 2022-23.

Figure 3: Existing native planting along the South Brook beside the Townsend Fields Stormwater Management Area (April 2022)

Terrestrial plantings on the Kaiapoi River, and Environment Canterbury mahinga kai watercress project support

4.8. The Greenspace team has produced a Kaiapoi River spatial planting plan, which incorporates both terrestrial and aquatic tidal plantings. This plan takes into consideration

Kaiapoi town planning, Kaiapoi Regeneration Zone planning, and Environment Canterbury priorities.

4.9. $10,000 is proposed be allocated in the 2022-23 year to Kaiapoi River riparian planting, and $5,000 allocated to the Environment Canterbury watercress mahinga kai project for the Cam River.

4.10. WDC staff and Environment Canterbury (as landowner) have been progressively planting native species along the riparian margins and also intertidal flats of the Kaiapoi River since the Canterbury earthquake sequence as part of earthquake recovery, as well as for biodiversity and amenity improvements. The intertidal planting been completed by WDC staff, with existing plantings predicted to spread in size and distribution over time. Therefore there is only requirement for further terrestrial plantings, with no further intertidal plantings.

4.11. Environment Canterbury Tuia staff commenced a mahinga kai watercress enhancement project for the Cam River above Bramleys Road Bridge in 2021-22, in consultation with Ngāi Tūāhuriri members. The first phase of this project, which involved weeding out of competing water plants has received positive feedback from a kai gatherer that there has an increase in watercress available.

4.12. WDC staff understand that the works proposed in 2022-23 include improving bank access for harvesting with steps or re-battering of slope, installation of sediment traps, and continued weeding out of the monkey musk and water speedwell species, as competing water plants. WDC staff propose to allocate a budget a $5,000 budget from ZIPA Recommendation 1.27 to this project as it meets the aim to 'improve habitat for mahinga kai' in the Cam River, pending receipt and discussion of an update on the progress of this project to the Land and Water Committee. Further discussion with Environment Canterbury staff is also needed to establish how this WDC funding would be best utilised in conjunction with a continued allocation of Environment Canterbury budget for 2022-23.

4.13. If suitable allocation of the $5,000 WDC ZIPA budget is not found with the watercress mahinga kai project, a potential re-allocation could be to the North Brook Trail project, for partial funding of deer fencing to create a riparian buffer or other capex costs.

McIntosh Drain - Inanga spawning habitat improvements

4.14. There are significant īnanga spawning sites located on WDC land, such as at Taranaki Stream, Courtenay Stream and McIntosh Drain. These sites have received ZIPA in previous years for īnanga habitat improvements to increase spawning success, as recommended by Aquatic Ecology Ltd.

4.15. Aquatic Ecology Ltd (AEL) reviewed inanga spawning sites and quality of habitat in the Waimakariri District in reports from 2017, 2019 and 2021. Habitat improvements carried out by WDC are thought to have improved spawning in the Courtenay Stream, but it is too soon to see if the Taranaki improvements have been successful. Additional works, following recommendations from AEL are proposed to be carried out by WDC staff at McIntosh Drain (Figure 4) directly upstream of a proposed new pump station.

Figure 4: The location of the proposed bank re-grading, followed by native planting on the McIntosh Drain, north of a proposed pump station.

4.16. Co-funding for this project has been secured from the Environment Canterbury Regional Fish Habitat Fund for $5,575 (excluding GST) towards the cost of bank regrading to at least a 1:3 ratio, and planting of native inanga spawning grasses (such as *Carex virgata* and *Cyperus ustulatus*).

4.17. Initially bank regrading and planting was proposed from ZIPA budget in 2019-20, however was paused due to unconfirmed plans for the area as part of the Kaiapoi flood improvements project i.e. 'Shovel Ready' project for the McIntosh Drain. With finalised Shovel Ready plans excluding re-battering and planting of the bank to the north of the pump station, this is now proposed again to be provided from ZIPA budget in 2022-23. The Shovel Ready project will re-batter and plant natives along the inlet to the pump station, as required by resource consent conditions.

Alignment with the Waimakariri Water Zone Committee Action Plan 2021-24

4.18. The Capex projects proposed in this report align with the WWZC Action Plan goals of:

4.18.1. Increased indigenous biodiversity in the zone.

4.18.2. Protection and enhancement of recreation in the zone.

4.18.3. Improved mahinga kai within the Waimakariri Water Zone.

Implications for Community Wellbeing

4.19. There are implications on community wellbeing by the issues and options that are the subject matter of this report. The ZIPA recommendations and budget allocations are to meet targets in the Canterbury Water Management Strategy for recreation and amenity, biodiversity and mahinga kai provision for example.

4.20. 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. The projects in this report will be presented to the next WDC- Ngāi Tūāhuriri liaison meeting for discussion.

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.

5.2.1. Waimakariri Water Zone Committee – An update on the progress of ZIPA projects is presented quarterly to the Waimakariri Water Zone Committee for comment and discussion.

5.3. Wider Community

The wider community is not likely to be affected by, or to have an interest in the subject matter of this report. The wider community was consulted on the role of WDC and budget allocation for the ZIPA in the draft Annual Plan public consultation in March-April 2019.

6. OTHER IMPLICATIONS AND RISK MANAGEMENT

6.1. Financial Implications

There are no financial implications of the decisions sought by this report. Budget has been already been approved in the Long Term Plan for 2021-31. This report is for more detailed specificsof the proposed projects for 2022-23.

6.2. Sustainability and Climate Change Impacts

The recommendations in this report do have sustainability and/or climate change impacts. The projects for planting of trees will help to sequester carbon. Fish passage remediation will aid the sustainable future of local fish populations that are migratory species.

6.3 Risk Management

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

ZIPA capex spend is be reported on quarterly in a summary capital expenditure report to the Audit and Risk Committee. This provides governance with information of any risk of an under or overspend.

Health and Safety

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

ZIPA capital expenditure project implementation will follow established health and safety processes. There are no new health and safety risks or hazards that have been identified.

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

Resource Management Act (1991). All capital expenditure works requiring consent are anticipated to be covered by the 'Maintenance and Minor Works in Waterways' global

consent (CRC195065, CRC195066, CRC195067) that WDC has been granted from Environment Canterbury, and the Waimakariri District Council consent RC19143 for works beside waterways.

7.3. Consistency with Community Outcomes

The Council's community outcomes are relevant to the actions arising from recommendations in this report.

7.4. Authorising Delegations

The Land and Water Committee hold the delegation for the allocation of the ZIPA budget.

Waimakariri ZIPA - Final version (26 November 2018)

		WDC and ECan roles (MOU)		WDC Funding							
Recommendation	**Text**	**Project Lead**	**Project Contributor**	**Current funding per annum (K) 19/20, 20/21**	**Option A Low WDC funding (K) CAPEX**	**Option A Low WDC funding (K) OPEX**	**Option B Medium WDC funding (K) CAPEX**	**Option B Medium WDC funding (K) OPEX**	**Option C High WDC funding (K) CAPEX**	**Option C High WDC funding (K) OPEX**	**Notes**
1.1	That Environment Canterbury and the Waimakariri District Council support the Waimakariri Water Zone Committee to prioritise catchments and develop at least two Catchment Management Plans per year. These plans will provide specific catchment management goals and actions, priorities and monitoring programmes to support the implementation of ZIP Addendum recommendations.	Waimakariri Water Zone Committee	ECan Zone Delivery	0	0	0	0	0	0	20	Would be for Taranaki Coastal Streams, maybe Saltwater Creek Catchment (Still need to scope cost and scope of Catchment Management Plans first before funding. High level funding could be for funding for Catchment Groups to lead catchment planning work.
1.2	That Environment Canterbury and the Waimakariri Water Zone Committee support industry groups to provide sector, and catchment-specific support to landowners implementing Good Management Practice (GMP), including: a. sub-catchment groups working to reduce contaminant losses. b. increasing education and awareness of the Farm Environment Plan audit and accreditation process amongst wider community. c. educating and supporting landowners to protect catchment-specific ecological, biodiversity and Ngāi Tūāhuriri values by: – Preparing catchment management plans to implement on-the-ground waterway remediation projects at sites identified as priorities. – Providing workshops in vulnerable hotspots (i.e. high value or high contaminant loss) areas.	ECan Zone Delivery	ECan Regional Support, Waimakariri Water Zone CommitteeWDC 3 Waters, Ngāi Tūāhuriri Rūnanga,	0	0	0	0	0	0	0	
1.4	That Environment Canterbury implement a comprehensive waterway monitoring plan for the Waimakariri Water Zone, including: a. Monitoring water quality and ecological health of waterways. b. State of the Takiwā monitoring, including the health and wellbeing of mahinga kai species. c. Measuring diversity and distributions of freshwater fish, invertebrates and aquatic vegetation throughout the zone. d. Identifying critical sources areas and measuring deposited sediment extent and character, particularly in spring-fed plains streams. e. Including important bathing sites in Schedule 6 of the Land and Water Regional Plan and assessing primary recreational water quality at: – Ashley River/Rakahuri at Gorge – Ashley River/Rakahuri at Rangiora-Loburn Bridge – Ashley River/Rakahuri at State Highway 1 – Kaiapoi River at Kaiapoi township – Pegasus Lake at Motu Quay – Cam River at Bramleys Rd f. Continuing to share information and integrating monitoring programmes between organisations, and promoting community-based monitoring of waterways (citizen science) and education initiatives g. Investigating the ecosystem health of hill country waterways to identify issues and catchment-specific management options as required. h. Supporting ongoing research into emerging contaminants, including endocrine disruptors, in the Waimakariri Water Zone. i. Investigating tidal waterbodies related to: I. Sediment deposition and salt water intrusion in: – Ashley River/Rakahuri – Saltwater Creek Estuary – Tidal reaches of Kaiapoi River, Saltwater Creek and Taranaki Creek II. Aquatic habitat shifts associated with climate change and sea level rise, including changes in īnanga spawning areas. j. Monitoring water quality and ecological health in urban streams and rivers in conjunction with Waimakariri District Council	WDC 3 Waters (j. only)	ECan Science (j.only)	0	0	0	0	0	0	0	(J) only - Urban stream monitoring together with ECan. Covered under existing budgets for stormwater improvements.
1.5	That Environment Canterbury and Waimakariri District Council investigate the impact of commercial forestry practices and wilding pines on downstream freshwater ecosystems.	ECan Science	WDC 3 Waters	0	0	0	0	0	0	0	National Environmental Standard for Plantation Forestry. Could start with the Saltwater Creek Catchment, due to catchment management group and Ashley Forest
1.6	That Environment Canterbury and the Waimakariri District Council support further research into factors that influence and/or control toxic cyanobacteria growth in the Ashley River/Rakahuri.	ECan Science	WDC 3 Waters	0	0	0	0	0	0	0	Research would require substantial funding of a third party e.g. Cawthron Institute. It would be better to advocate for central government research funding support. Proposed

Recommendation	Text	Project Lead	Project Contributor	Current funding per annum (K) 19/20, 20/21	Option A Low WDC funding (K) CAPEX	Option A Low WDC funding (K) OPEX	Option B Medium WDC funding (K) CAPEX	Option B Medium WDC funding (K) OPEX	Option C High WDC funding (K) CAPEX	Option C High WDC funding (K) OPEX	Notes
1.7	That Environment Canterbury, Waimakariri District Council, and Ngāi Tūāhuriri review the waterway management and maintenance methods used in the Zone. The review which should be publicly reported, would include: a. Preparation of an inventory of the main methods, including chemicals and mechanical methods, used by public and private land and water managers in the Zone; b. The findings of recent work by EPA, MfE or other relevant New Zealand organisations reviewing the potential effects of the listed chemicals on waterway ecosystem health and of other methods; c. An assessment of the risk to soil biodiversity and waterway ecosystem health in the Zone from use of chemicals or other methods.	WDC 3 Waters	Ngāi Tūāhuriri Rūnanga, ECan Science	10	0	0	0	0	0	10	Review completed in 2020 for WDC Drainage Maintenance Management Plan (200728095074). Could fund hours by WDC Water Environment Advisor, or WDC contractor for private drainage management practices and education. ECan will promote existing resources as BAU.
1.8	That Environment Canterbury, Waimakariri District Council, Department of Conservation, Fish and Game, and Ngāi Tūāhuriri review the presence and effects of barriers to indigenous and introduced fish migration on waterways in the Zone in consultation with stakeholders and land owners. The review should: a. Identify locations where there are barriers to migrating indigenous fish and salmonids b. Consider the purpose of specific barriers (e.g. tidal control, flood management, drainage) c. Determine and prioritise options for removing or retrofitting barriers appropriate to different species at specific sites.	ECan Zone Delivery	WDC 3 Waters, Ngāi Tūāhuriri Rūnanga, DOC, Fish & Game	20	5	5	10	5	30	10	Fish passage projects or survey work. Fish passage guidelines now required by the National Policy Statement for Freshwater Management (2020)
1.14	That Environment Canterbury and Waimakariri District Council ensure waterway management and maintenance activities minimise contaminant losses to downstream waterbodies and loss of aquatic life, while maintaining flood carrying capacity.	WDC 3 Waters, ECan Zone Delivery		20	15	5	10	15	60	20	Funding to start implementation of initiatives under the Drainage Maintenance Management Plan (200728095074). Funding for drain shading, channel
1.18	That Environment Canterbury and the Waimakariri District Council support landowners with education and guidance on appropriate riparian set back distances and plantings for different situations.	ECan Zone Delivery	WDC 3 Waters, WDC	0	0	0	0	0	0	0	Resource provided by ECan/National guidance? BAU with 70 hours Water Environment Advisor. Setback details from Section 360 Stock Regulations
1.19	That Environment Canterbury and Waimakariri District Council work with the forestry sector and MPI to: a. Identify high risk periods over the next 5 years when earthworks and harvesting will take place within the Waimakariri Water Zone, so resources can be targeted to ensure potential environmental effects are mitigated or avoided. b. ensure that implementation of the NES is effective within the zone.	ECan Strategy & Planning	WDC Policy & Strategy	0	0	0	0	0	0	0	BAU with ECan, and working with forestry industry
1.20	That Ngāi Tūāhuriri, Te Rūnanga o Ngāi Tahu, Environment Canterbury, and Waimakariri District Council work together to identify areas and waterways of high cultural value and options for protecting those values including providing for mahinga kai and the protection of wāhi tapu and wāhi taonga within the Waimakariri Water Zone.	ECan Planning	Ngāi Tūāhuriri Rūnanga,	0	0	0	0	0	0	0	0
1.21	That Environment Canterbury prioritise on the ground projects for Taranaki Creek, given its significant value to Ngāi Tūāhuriri and proximity to Kaiapoi Pā, particularly those related to: • reducing and removing sources and legacies of deposited fine sediment • improving the quality of habitat for mahinga kai species • removing barriers to native fish passage • removal of invasive fish species	ECan Science	Ngāi Tūāhuriri Rūnanga, WDC 3 Waters, WDC Greenspace, ECan Zone Delivery	0	0	0	0	0	0	0	
1.22	That Environment Canterbury and the Waimakariri District Council recognise the Ashley River/Rakahuri for its important natural landscape values, braided river characteristics, and braided river bird (nesting and feeding) habitat.	WDC Planning, ECan Planning		0	0	0	0	0	0	0	Recognised as Outstanding Natural Landscape and Special Amenity Area in draft District Plan. Ecologist-Biodiversity role with 30 hours/year to implement? Braided river work
1.24	That Environment Canterbury and the Waimakariri District Council recognise the Upper Ashley River/Rakahuri catchment, including Lees Valley, for its high natural landscape and ecosystem values, and protect its waterways from degradation by: • avoiding increased contaminant losses to waterways. • preventing the removal or degradation of any existing wetlands. • preventing the expansion of wilding pines.	ECan Planning	WDC Planning	0	0	0	0	0	0	0	On track to protect Lees Valley wetlands as SNAs in District Plan, and designate area as Outstanding Natural Landscape . BAU with 70 hours Water Environment Advisor / Ecologist - Biodiversity for compliance
1.25	That Environment Canterbury and the Waimakariri District Council initiate public education and awareness campaigns aimed at improving the water quality and health of urban waterways.	WDC 3 Waters	ECan Zone Delivery	20	0	10	0	10	0	20	Urban waterway education (funding for Enviroschools Canterbury- decision from S17a review report)

Recommendation	Text	Project Lead	Project Contributor	Current funding per annum (K) 19/20, 20/21	Option A Low WDC funding (K) CAPEX	Option A Low WDC funding (K) OPEX	Option B Medium WDC funding (K) CAPEX	Option B Medium WDC funding (K) OPEX	Option C High WDC funding (K) CAPEX	Option C High WDC funding (K) OPEX	Notes
1.26	That Environment Canterbury and the Waimakariri District Council support projects that have enduring benefits for improved stream health, Ngāi Tūāhuriri values, and improved recreational amenity in the North Waimakariri River tributaries.	ECan Zone Delivery	WDC 3 Waters, WDC Greenspace, Ngāi Tūāhuriri Rūnanga	70	10	5	5	15	40	20	Fencing, walkways on WDC land, as well as biodiversity and stream health projects. Continue with South Brook Townsend Fields Reserve and possibly start work on a new esplanade reserve.
1.27	That Environment Canterbury and the Waimakariri District Council prioritise on-the-ground projects in the Cam River/Ruataniwha and Kaiapoi/Silverstream, including but not limited to: • Reducing and removing sources and legacies of deposited fine sediment. • Improving the quality of habitat for mahinga kai. • Removing barriers to native fish passage.	ECan Zone Delivery	WDC 3 Waters, Ngāi Tūāhuriri Rūnanga	10	15	5	20	10	45	15	Kaiapoi river projects e.g. plantings ($10k for 3 years), transitions to funding for Cam River, post the Cam River Enhancement Fund (projects and emptying of sediment traps). Watercress mahinga kai enhancement (access,signage,shade management)
1.28	That Environment Canterbury and Waimakariri District Council investigate options to fund plants for riparian or wetland planting on land managed in accordance with an FEP or a Management Plan. (see also Rec 2.9)	ECan Regional Support	WDC 3 Waters	0	0	0	0	0	10	10	Contribute to Environment Canterbury to find funding and providing guidance to landowners- could fund a community organisation, with WDC Biodiversity Contestable Fund focussing on SNAs
2.1	The zone committee recommends that Environment Canterbury and the Waimakariri District Council work with Ngāi Tūāhuriri, landowners, agencies and stakeholders to integrate indigenous biodiversity in a whole of waterway, Ki Uta Ki Tai, approach to managing catchments in the Waimakariri Water Zone.	ECan Zone Delivery	WDC 3 Waters, WDC Planning,	0	0	0	0	0	0	0	Capture in District Plan (Natural Character of waterbodies chapter etc.) and Catchment Management Plans
2.2	The Waimakariri Water Zone Committee endorses and supports the implementation of the Canterbury Regional Biodiversity Strategy as it applies in the Waimakariri Water Zone. In particular: a. The zone committee endorses the vision, goals, targets, and actions of Canterbury Regional Biodiversity Strategy: b. The zone committee recommends that Environment Canterbury support the appointment of a regional co-ordinator for the Canterbury Regional Biodiversity Strategy c. The zone committee recommends that Waimakariri District Council increase its biodiversity capability and capacity	Waimakariri Water Zone Committee	ECan Strategy & Planning	110	0	110	0	110	0	110	1 X Ecologist-Biodiversity at 90k/yr plus 20K overheads
2.3	The zone committee recommends implementing the Canterbury Biodiversity Strategy, at the water zone level, with a Waimakariri Biodiversity Action Plan to enable the following actions: • Developing and illustrating a vision for indigenous biodiversity (and related values) across the zone • Mapping indigenous habitats, vegetation and, as appropriate, threatened plant and animal species in the zone • Identifying actions for protection and enhancement of indigenous habitats, vegetation types and plant and animal species • Identifying priority sites, waterways, springheads, wetlands, reaches or locations for protection • Identifying priority habitats and vegetation for management actions • Setting targets for biodiversity protection and enhancement in the zone • Working with willing landowners to action indigenous biodiversity protection and enhancement projects • Developing strategies and actions that incentivise indigenous biodiversity protection and enhancement on private land.	ECan Regional Support	Waimakariri Water Zone Committee, WDC Policy & Strategy, WDC Greenspace, WDC 3 Waters, ECan Zone Delivery, Ngāi Tūāhuriri Rūnanga, DOC	0	0	0	0	0	0	0	No support for Waimakariri Biodiversity Action Plan until scoped further? Environmental and Biodiversity Strategy will be supported by BAU for Policy and Strategy Team in-house
2.4	That Environment Canterbury and the Waimakariri District Council consider climate change and sea level rise impacts on indigenous biodiversity in the Waimakariri Water Zone.	ECan Science	WDC Policy & Strategy, WDC 3	10	0	0	0	0	0	0	Was allocated to PhD 2019-21. BAU with Water Environment Advisor Ecologist-Bioidversity

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2.5	That Environment Canterbury and the Waimakariri District Council integrate indigenous biodiversity and instream ecological values into councils' planning and operational activities, including in work carried out by consultants or contractors.	Ecan Planning	WDC Policy & Strategy, WDC 3 Waters, ECan Zone Delivery, ECan Science	10	0	10	0	10	0	20	Ecology surveys to assist planning and operational. Relates to rec. 1.7
2.6	That Environment Canterbury and Waimakariri District Council investigate further ways to protect braided river-bed breeding bird habitat and bird populations from the impacts of vehicles.	ECan Regional Support	WDC 3 Waters, Ashley Rakahuri	0	0	0	0	0	0	10	BAU Planning tools e.g. a Bylaw, signage education monitoring? Funding would be to support Ashley Rakahuri Rivercare Group
2.7	That Environment Canterbury, Waimakariri District Council and the Department of Conservation work with, and support, Ngāi Tūāhuriri Fenton Reserve Trustees in the Land and Water Solutions Programme project to reconnect coastal ecosystems between the Lower Ashley River/Rakahuri, the estuary and Te Aka Aka Fenton Reserve to provide for mahinga kai benefits for Ngāi Tūāhuriri Rūnanga.	ECan Strategy & Planning	ECan Science, ECan Zone Delivery, WDC Policy & Strategy	0	0	0	0	0	0	0	Support with scoping as BAU, for potential funding later
2.8	That Environment Canterbury and the Waimakariri District Council work with community groups to address indigenous biodiversity protection and enhancement by means such as: • Provision of administrative support; • Provision of financial assistance; • Identification of funding sources; • Provision of technical advice; and • Endorsement of projects.	ECan Zone Delivery	WDC 3 Waters, ECan Regional Support, ECan Science	0	0	0	0	20	20	30	Baseline support for community organisations for the Arohatia te Awa riparian planting, and could stretch to District-wide support for catchment groups and community groups
2.9	That Environment Canterbury and the Waimakariri District Council work with Ngāi Tūāhuriri, Department of Conservation and other agencies to assist landowners/land managers by: • Establishing a biodiversity advisory service (e.g. advice on appropriate plant sources or riparian planting) • Advising on indigenous biodiversity management as part of farm management planning within catchment plans • Publicising positive biodiversity actions, events and news • Promoting and raising awareness of biodiversity values and protection or enhancement opportunities • Investigating the development of a system to ensure appropriate sources of plant material for revegetation and enhancement projects • Promoting and advising on appropriate wetland habitat and waterway protection	ECan Zone Delivery	ECan Regional Support, WDC Greenspace, Ngāi Tūāhuriri Rūnanga, DOC, ECan Science	0	0	0	0	0	0	0	Provided through Rec 2.8, or BAU for Water Environment Advisor and Ecologist - Biodiversity. Service delivery model though baseline funding for a community organisation (e.g. Te Ara Kakariri) for ATA sites in ATA budget, but that is Cam River specific (need for whole of District.)
2.10	That Environment Canterbury and the Waimakariri District Council explore consenting options to enable landowners to undertake indigenous biodiversity initiatives including, but not restricted, to: • habitat protection and enhancement • wetland creation or restoration • predator control of high values sites • revegetation projects	ECan Planning	ECan Consents Planning, WDC Planning	0	0	0	0	0	0	0	BAU Planning tools (green consenting, bonus development lots) e.g. permitted actitivities, and/or WDC provides access to global consent in partnership
2.11	The zone committee recognises the importance of the tidal reaches of waterways as īnanga habitat and recommends that Environment Canterbury and the Waimakariri District Council support the development of habitat at īnanga spawning sites and riparian planting.	WDC 3 Waters, ECan Science	ECan Regional Support	10	0	0	5	5	5	5	Started with the McIntosh, Courtenay - potential further CAPEX work at Taranaki, Benzies Creek, Saltwater Creek - as well as follow-up survey work and sea level rise preparation (OPEX)
2.12	The Waimakariri Water Zone Committee acknowledges the Ashley Estuary (Te Aka Aka) as a taonga within the Waimakariri Water Zone; and acknowledges the current project in relation to the Fenton Reserves (see Rec 2.7); and recommends the establishment of a working group comprising representatives of Ngāi Tūāhuriri, Environment Canterbury, Waimakariri District Council, Department of Conservation, Fish and Game and other agencies to develop a strategy and programme to protect and enhance Ngāi Tūāhuriri, biodiversity and recreational values in the face of current pressures, climate change and rising sea levels.	ECan Strategy & Planning	ECan Science, ECan Zone Delivery, WDC 3 Waters, WDC Policy & Strategy	0	0	0	0	0	0	0	BAU Water Environment Advisor support of 30 hours/year. Could overlap with the existing Northern Pegasus Bay Bylaw Advisory Group - but this group does not have a strong biodiversity focus currently.

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3.16	That Environment Canterbury, Waimakariri District Council and Canterbury District Health Board work together to: a. develop a programme for testing and reporting of water quality in private drinking water supply wells, and b. raise awareness of health impacts from high nitrates in drinking water	ECan Science, WDC 3 Waters	ECan Comms, CDHB	10	0	5	0	10	0	50	Cost of water sampling if full chemical suite analysis. Programme delivered by WDC, with technical support from ECan Groundwater Team, Option A is to continue with only 20 wells, Option B is 40 wells, Option C is 180 wells. Would also need considerable support from Water Environment Advisor as BAU. Alternative to just sample nitrate-nitrogen
3.17	Environment Canterbury and Waimakariri District Council should consider provision of guidance and information regarding a minimum depth for new drinking water supply wells and well head security, to provide better water quality protection.	ECan Science	WDC 3 Waters	5	0	0	0	0	0	0	To be completed 2020-21. BAU distribution of leaflet
3.20	That Environment Canterbury commences a review of the Waimakariri section of the Land and Water Regional Plan in 2030 to incorporate new information and understanding of: how social, cultural, economic and environmental systems have responded; and whether we are on track to meet the plan nitrate limits.	ECan Planning	ECan Science, ECan Strategy & Planning, WDC Policy & Strategy	0	0	0	0	0	0	0	
3.22	That Environment Canterbury works with the Waimakariri community and Ngāi Tūāhuriri Rūnanga, to respond accordingly to new information, emerging opportunities and technology, and review the Waimakariri section of the Land and Water Regional Plan at least once every 10 years.	ECan Strategy & Planning	ECan Regional Support, WDC 3	0	0	0	0	0	0	0	
3.25	The Environment Canterbury and Waimakariri District Council explore a funding stream and management structure to deliver the significant improvements in stream health and biodiversity, and mahinga kai diversity and abundance for the Waimakariri Water Zone over the next 5-10 years. The option of Targeted Rating Districts should be explored by Environment Canterbury. Industry and government funding partners should also be sought.	ECan Zone Delivery	ECan Strategy & Planning, WDC Policy & Strategy	0	0	0	0	0	0	0	Continue discussion with ECan over targeted rating districts
4.12	That any changes to the water race network (e.g. race closure or piping) in the Waimakariri Water Zone be subject to wider consideration by Environment Canterbury and Waimakariri District Council, given the existing benefits of race losses in diluting nitrate concentrations, and supporting groundwater levels and stream flows.	ECan Planning, WDC 3 Waters		0	0	0	0	0	0	0	Assessment of Environmental Effects (AEE) for closures. Annual report to U&R / WWZC about overview of changes to the Stockwater Race system potentially
4.19	In all zone committee proceedings and documentation, the local naming convention is to be adopted: a. The term 'Silverstream' will be used to define the section of watercourse from the springheads to the three streams confluence. b. The term 'Kaiapoi River' will be used to define the section of watercourse from the three streams confluence to the Waimakariri River confluence.	ECan Planning	ECan Comms, WDC 3 Waters, ECan Science, ECan Zone Delivery	0	0	0	0	0	0	0	
4.20	Environment Canterbury investigate further actions necessary to reverse the degraded features of the water quality and habitat of the 'Kaiapoi River' that detract from its vision of being 'New Zealand's best Rivertown'.	ECan Science	ECan Strategy & Planning, WDC 3 Waters	0	0	0	0	0	0	0	
1.3	That Environment Canterbury engages with small block owners to increase awareness and uptake of good management practices.	ECan Zone Delivery	ECan Regional Support	0	0	0	0	0	0	0	
1.9	That Environment Canterbury work with Ngāi Tūāhuriri and Department of Conservation to identify the types of activities and controls needed to protect the aquatic habitat of the threatened Canterbury mudfish and amend plan provisions to ensure protection at key sites in waterbodies including the following: • Tutaepatu Lagoon • Taranaki Creek • Eyre River tributaries • Coopers Creek tributaries • Mounseys Stream tributaries	ECan Planning	ECan Science Ngāi Tūāhuriri Rūnanga DOC	0	0	0	0	0	0	0	

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1.10	That Environment Canterbury work with Ngāi Tūāhuriri and Department of Conservation to identify the locations and types of activities and controls needed to protect the habitat of important indigenous species including but not limited to: • Freshwater crayfish/kōura • Freshwater mussels/kākahi • Lamprey/kanakana	ECan Planning	ECan Science Ngāi Tūāhuriri Rūnanga DOC	0	0	0	0	0	0	0	
1.11	That Environment Canterbury support catchment management plans that implement on the ground projects targeted at rehabilitating the wetland, freshwater or estuarine habitats of threatened species or species of high value to Ngāi Tūāhuriri.	ECan Science	ECan Zone Delivery	0	0	0	0	0	0	0	
1.12	That Environment Canterbury support further assessment of the issue of lost ecological and cultural values resulting from waterway realignments for consented and permitted activities.	ECan Science	Ngāi Tūāhuriri Rūnanga	0	0	0	0	0	0	0	
1.13	That Environment Canterbury promotes actions that improve bank stabilisation and reduce sediment inputs to spring-fed plains waterways.	ECan Zone Delivery	ECan Science	0	0	0	0	0	0	0	
1.15	That Environment Canterbury strengthen the LWRP rules on stock exclusion to exclude intensively farmed stock from: • All springheads that permanently or intermittently contain water; and • All open drains and other artificial watercourses, (including but not restricted to irrigation canals and water races) with surface water in them that discharge into a stream, river or lake.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
1.16	That Environment Canterbury strengthen the LWRP rules on stock exclusion to exclude non-intensively farmed cattle and deer on the plains from: • All waterways and their tributaries, • All springheads that permanently or intermittently contain water; and • All open drains and other artificial watercourses, (including but not restricted to irrigation canals and water races) with surface water in them that discharge into a stream, river or lake.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
1.17	That Environment Canterbury educate horse owners to exclude grazing horses from access to waterways.	ECan Zone Delivery	ECan Comms	0	0	0	0	0	0	0	
1.23	That Environment Canterbury investigate funding for projects to address key environmental issues in consultation with LINZ and Department of Conservation for the Ashley River/Rakahuri, particularly the removal of woody weeds above the confluence with the Okuku River.	ECan Zone Delivery	ECan Strategy & Planning	0	0	0	0	0	0	0	
2.13	That Environment Canterbury undertake a programme of investigations and monitoring in the Ashley Estuary (Te Aka Aka) to provide information for the deliberations of the working group identified in Rec 2.12 and the group implementing Rec 2.7. The programme should include: • Determination of eutrophication susceptibility. This requires determining the flushing potential, the dilution potential, nutrient inputs and nutrient load susceptibility • Development and implementation of a programme to assess current trophic state and to monitor trophic state over time (important considerations are location of sites, parameters to be measured, frequency of sampling, seasonality of sampling) • Annual mid-summer broad-scale monitoring to assess the occurrence of macro-algae. • Monthly water quality monitoring for ecosystem health at the site near the estuary mouth. • Five-yearly monitoring of sediment quality at two sites – present site adjacent to Saltwater Creek and downstream from SH1 and a site in proximity to where Taranaki Creek flows into the Ashley Estuary (Te Aka Aka). • Monitoring of cockles and pipis from sites in the estuary to assess contaminant levels in shellfish flesh. • Establish stations at various locations in the estuary and begin to monitor sedimentation. • Annual monitoring of the sediments and macrobiota at one site within the estuary. • Baseline surveys of the fish and bird populations of this estuary.	ECan Science	ECan Science	0	0	0	0	0	0	0	
3.1	That Environment Canterbury reflect in the Waimakariri section of the Land and Water Regional Plan a staged approach to reduce nitrate losses over time in the Waimakariri Water Zone.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
3.2	Two water quality management areas are proposed; a Nitrate Priority Management Area and a Runoff Priority Management Area.	ECan Planning	ECan Science	0	0	0	0	0	0	0	

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3.3	The zone committee recommend that farmers in the Runoff Priority Management Area are not required to achieve beyond Baseline GMP reductions. The expectation is that landowners in this area will focus on minimizing overland flow of contaminants such as sediment, phosphate, nitrate and pathogens.	ECan Planning	ECan Science, ECan Zone Delivery, ECan Regional Support	0	0	0	0	0	0	0	
3.4	The Waimakariri Water Zone Committee proposes Baseline GMP as the starting point for nitrate reductions from 1 July 2020 (at the onset of expiry of land use consents). Baseline GMP is the average nitrogen loss rate, estimated by the Farm Portal, for the farming activity carried out during the baseline period of 2009-2013, if operated at good management practice.	ECan Planning	ECan Science, ECan Zone Delivery, ECan	0	0	0	0	0	0	0	
3.5	Dairy in the Nitrate Priority Management Area should achieve a 15% beyond Baseline GMP reduction by 2030.	ECan Planning	ECan Science, ECan Zone	0	0	0	0	0	0	0	
3.6	All other consented farming activities in the Nutrient Priority Management Area should achieve a 5% beyond Baseline GMP reduction by 2030.	ECan Planning	ECan Science, ECan Zone	0	0	0	0	0	0	0	
3.7	The zone committee encourage industry and local authorities to provide incentives to achieve nutrient reductions greater than the recommended reductions in this ZIP Addendum.	ECan Regional Support	ECan Science, ECan Zone Delivery	0	0	0	0	0	0	0	
3.8	Unless amended in a Waimakariri plan review process, the nitrate loss reductions in recs 3.5 and 3.6 above should be repeated until: a. the nitrate reductions necessary to achieve the plan limits have been met, or b. the science information available shows the plan limit is likely to be met in the future without the need for further reductions.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
3.9	The zone committee recommends the plan change includes policy criteria that allow for and guides consideration of extensions to the 2030 target date for beyond baseline GMP reductions in exceptional circumstances.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
3.10	Investigate and implement a nitrate "floor" to exclude low nitrogen emitters from having to make further reductions in nitrogen loss beyond Baseline GMP within the Nitrate Priority Management Area.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
3.11	The Waimakariri Water Zone Permitted Activity winter grazing allowances should be reduced across the whole Waimakariri Water Zone to minimise the potential for further nitrate increases in streams and groundwater. The following winter grazing PA property size thresholds should be implemented: Property sizes: • less than 5 ha do not require consent for winter grazing; • Between 5 ha and 100ha can use up to 5ha of property for winter grazing without triggering a consent requirement; and • Between 101ha and 1,000 ha can use up to 5% of property size for winter grazing without triggering a consent requirement; and • greater than 1,000 ha can use up to 50 ha for winter grazing without triggering a consent requirement.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
3.12	That Environment Canterbury runs an education campaign (including workshops) promoting good management practice, and proactively checks progress.	ECan Regional Support	ECan Zone Delivery	0	0	0	0	0	0	0	
3.13	The zone committee recommends that the Waimakariri sub-region plan boundary in Section 8 of Land and Water Regional Plan is amended to incorporate land bordering the Waimakariri River.	ECan Planning		0	0	0	0	0	0	0	
3.14	That Plan Change 5 nutrient allocation zone rules for "red zones" are used as a foundation for managing nutrients across the whole Waimakariri Water Zone, combined with amendments to the permitted activity winter grazing consent thresholds, and additional nitrate loss reductions in the Nitrate Priority Management Area described in other recommendations.	ECan Planning		0	0	0	0	0	0	0	
3.15	That Environment Canterbury reflect in the Waimakariri section of the Land and Water Regional Plan the nitrate limits in the drinking water supply wells of Waimakariri Water Zone as set out in the table below 1. Private water supply well areas are shown in Map X5, appended.	ECan Planning		0	0	0	0	0	0	0	
3.18	That Environment Canterbury reflect in the Waimakariri section of the Land and Water Regional Plan the nitrate limits in the streams and rivers of the Waimakariri Water Zone as set out in the tables below.	ECan Planning		0	0	0	0	0	0	0	

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3.19	That Environment Canterbury makes sufficient resources available to enable significant improvements to continue to be made in the understanding of the Waimakariri Water Zone groundwater system and its connection with the Christchurch aquifer and spring-fed streams. The outcome of this work should be an updated assessment of the direction of travel and likely future nitrate concentrations provided to the committee, partners and stakeholders in 2025. The key areas for improvement of understanding include: a. Lag times between land use change and nitrate concentration changes in wells and spring-fed streams b. Past and present rates of nitrate discharge to ground within the zone and trends in nitrate concentrations c. Transport pathways between land and key receptors such as spring-fed streams, community water supply wells and the Christchurch aquifer system, so that recharge zones can be defined with more certainty d. Nitrate attenuation e. The effectiveness of actions (regulatory and non-regulatory) being taken. f. Nitrate discharges to Ashley Estuary (Te Aka Aka) g. Nitrate concentrations in private water supply wells	ECan Science		0	0	0	0	0	0	0	
3.21	That farming land use consents are granted to have common expiry dates to align with plan review stages.	ECan Consents Planning	ECan Planning	0	0	0	0	0	0	0	
3.23	That Environment Canterbury continues to work with sector and research groups to encourage the further development and implementation of tools and techniques to reduce nitrate leaching.	ECan Science	ECan Regional Support, ECan Zone Delivery	0	0	0	0	0	0	0	
3.24	That the Zone Committee support the investigation and assessment of on-the-ground actions to address nitrate issues (for example, Managed Aquifer Recharge, targeted stream augmentation, woodchip bioreactors, wetland creation, and water storage), including: a. That Environment Canterbury undertake a zone-wide study to assess the feasibility, costs and measures required to implement appropriate actions (to be completed by the end of 2019) to inform the development of sub-catchment management plans. b. That the Waimakariri section of the Land and Water Regional Plan should be assessed to ensure that these activities are enabled where appropriate in the Waimakariri Zone.	ECan Science, ECan Strategy and Planning	ECan Regional Support, ECan Zone Delivery	0	0	0	0	0	0	0	
4.1	In over-allocated Surface Water Allocation Zones, that Environment Canterbury uses the methods set out in Rec 4.2 to reduce and where possible eliminate the over-allocation by 2032.	ECan Planning	ECan Planning	0	0	0	0	0	0	0	

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4.2	That Environment Canterbury use the following suite of options to recover over-allocation, prioritising those options which reduce paper allocation. a. Prohibit any abstraction, other than for community drinking water supplies, where a limit has, or would be, exceeded. b. Enable the substitution of existing surface water or stream depleting groundwater takes with deep groundwater in over-allocated catchments provided there is no increase in the rate of take or annual volume. c. In the case of site to site water transfers i. Prohibit the transfer of any unexercised water permit, and/or of any unused water from the previous 5 years, based on actual usage records. ii. For transfers of water within over-allocated catchments 50% of the transferred water (rate of take and/or annual volume) is to be surrendered unless the water is to be used for a community water supply. iii. Retain Land and Water Regional Plan Section 8 policy that there are no transfers of river water takes within the Ashley River/Rakahuri catchment above State Highway 1 d. That Environment Canterbury identifies water permits that have not been exercised in the past five years and works with consent holders to seek their surrender. e. Lapsed consents i. For any water permit that lapses, is surrendered, or expires and is not renewed, the rate of take and/or annual volume is not reallocated ii. Lapse dates on unexercised consents are prevented from being extended except where exceptional extenuating circumstances are demonstrated. f. Past water use i. The Plan Change includes policy direction that records of past water use are assessed and considered when determining an efficient allocation for replacement consents in accordance with Schedule 10 ii. That Environment Canterbury reports annually on how metered usage compares to consented allocation within the Waimakariri Water Zone. g. Region-wide policy in the Land and Water Regional Plan for reducing over allocation by adjusting the allocation on replacement consents applies throughout the whole of the Waimakariri Water Zone, not only within the Ashley River/Rakahuri catchment.	ECan Planning, ECan Consents Planning	ECan Planning, ECan Consents Planning	0	0	0	0	0	0	0	
4.3	That Environment Canterbury applies LWRP requirements for partial restrictions and requires that pro-rata restrictions be applied to all surface water takes, and stream-depleting groundwater takes which require a minimum flow in the zone.	ECan Planning	ECan Consents Planning	0	0	0	0	0	0	0	
4.4	That Environment Canterbury adopt the methodology for classifying stream-depleting groundwater takes laid out in Schedule 9 of the Land and Water Regional Plan.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
4.5	That Environment Canterbury remove B allocation blocks from all spring-fed rivers unless further investigations indicate that sustainable B blocks can be supported.	ECan Planning	ECan Consents Planning	0	0	0	0	0	0	0	
4.6	That Environment Canterbury extend existing SWAZ and/ or introduce new SWAZ to ensure that there are no gaps in the environmental flow regime framework which manages the Waimakariri Water Zone.	ECan Planning	ECan Consents Planning	0	0	0	0	0	0	0	
4.7	In currently under-allocated catchments, that Environment Canterbury cap the allocation at the currently allocated amount, so no further surface water can be allocated.	ECan Planning	ECan Consents	0	0	0	0	0	0	0	
4.8	That Environment Canterbury support water users to set up water user groups such that the available water resource can be best managed, particularly in times of restriction	ECan Zone Delivery	ECan Strategy & Planning,	0	0	0	0	0	0	0	
4.9	Environment Canterbury investigate how takes for community supplies (and, back-up supplies) are incorporated into the allocation block system, such that they do not unnecessarily impact on the reliability of takes by other users.	ECan Strategy & Planning	ECan Science	0	0	0	0	0	0	0	
4.10	The zone committee will prioritise over-allocated catchments in its catchment management plan programme and actively promote the use of non-statutory mitigations to offset the effects of over-allocation.	Waimakariri Water Zone Committee	ECan Strategy & Planning, ECan Zone	0	0	0	0	0	0	0	
4.11	That Environment Canterbury ensure: a. The Plan Change to section 8 of the Land and Water Regional Plan (Waimakariri) includes policies and rules that adequately provide for augmentation of water bodies, including the Cust River, for environmental benefit. b. Ngāi Tūāhuriri Rūnanga are actively involved in any decision-making with other relevant stakeholders regarding water used in the zone for augmentation purposes.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
4.13	The zone committee recommends that Environment Canterbury allocates resources to improve monitoring of permitted surface water irrigation takes for compliance with limits in the Land and Water Regional Plan.	ECan Compliance	ECan Consents Planning	0	0	0	0	0	0	0	

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4.14	That in any year it chooses within the date range below, Environment Canterbury considers, prioritises and may undertake a review of water permits to align with any revised environmental flow and allocation regime following the Waimakariri plan change becoming operative: a. Ashley River/Rakahuri Catchment – between 2026 and 2027 b. Northern Waimakariri Tributaries – between 2028 and 2029	ECan Consents Planning	ECan Planning, ECan Science	0	0	0	0	0	0	0	
4.15	For the Ashley River/Rakahuri B and C blocks, that Environment Canterbury designate an allocation for mahinga kai enhancement purposes equal to 50% of the water available within the existing block system at plan notification. This allocation would be included in, and subject to, the prevailing management rules for that block (minimum flow and restriction regime).	ECan Planning	ECan Consents Planning, ECan Science	0	0	0	0	0	0	0	
4.16	That Environment Canterbury adopt the minimum flow and allocation recommendations in Table 4.5	ECan Planning	ECan Consents Planning, ECan Science	0	0	0	0	0	0	0	
4.17	For the Cam River/Ruataniwha A block, that Environment Canterbury designate an allocation for mahinga kai enhancement purposes equal to 50% of the water available within the existing block system at plan notification. This allocation would be included in, and subject to, the prevailing management rules for that block (minimum flow and restriction regime).	ECan Planning	ECan Consents Planning, ECan Science	0	0	0	0	0	0	0	
4.18	That Environment Canterbury adopt the minimum flow and allocation recommendations in Table 4.6.	ECan Planning	ECan Consents Planning, ECan Science	0	0	0	0	0	0	0	
4.21	That Environment Canterbury, along with Ngāi Tūāhuriri, Waimakariri Irrigation Limited and other stakeholders, investigate the potential to create an enduring flow regime for the Cust River. This is to be given effect in the upcoming Waimakariri sub-regional plan change, as part of the minimum flow and allocation recommendations, detailed in Table 4.6, under Rec 4.18. The regime would provide for improved stream health and habitat availability, noting that: a. 230 L/s of allocation from the Waimakariri River is already reserved for such purposes in the Waimakariri River Regional Plan and b. Such a flow regime may result in an increased minimum flow.	ECan Planning	ECan Science, ECan Strategy & Planning, Ngāi Tūāhuriri Rūnanga, Waimakariri Irrigation Limited	0	0	0	0	0	0	0	
4.22	That Environment Canterbury investigate a sustainable B allocation limit for the Cust River prior to plan notification.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
5.1	That the Waimakariri Water Zone Committee proposes within the Kowai Groundwater Allocation Zone to: a. cap the current allocation volume, b. allow an extra 10% (based on current allocation volume) for additional groundwater takes that are not stream-depleting and c. provide an allocation for the substitution of existing surface water and stream depleting groundwater takes for non-stream depleting groundwater, provided i. the existing take is surrendered and ii. the new groundwater take is abstracted from the same property as the surrendered surface water or stream depleting groundwater take, and there is no increase in the proposed rate of take or annual volume.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
5.2	That the Waimakariri Water Zone Committee proposes within the Ashley Groundwater Allocation Zone to: a. cap the current allocation volume, b. allow an extra 10% (based on current allocation volume) for additional groundwater takes that are not stream-depleting and c. provide an allocation for the substitution of existing surface water or stream depleting groundwater takes for non-stream depleting groundwater, provided i. the existing take is surrendered and ii. the new groundwater take is abstracted from the same property as the surrendered surface water or stream depleting groundwater take, and there is no increase in the proposed rate of take or annual volume.	ECan Planning	ECan Science	0	0	0	0	0	0	0	

Recommendation	Text	Project Lead	Project Contributor	Current funding per annum (K) 19/20, 20/21	Option A Low WDC funding (K) CAPEX	Option A Low WDC funding (K) OPEX	Option B Medium WDC funding (K) CAPEX	Option B Medium WDC funding (K) OPEX	Option C High WDC funding (K) CAPEX	Option C High WDC funding (K) OPEX	Notes
5.3	That the Waimakariri Water Zone Committee proposes within the Loburn Groundwater Allocation Zone to: a. cap the current allocation volume, b. allow an extra 10% (based on current allocation volume) for additional groundwater takes that are not stream-depleting and c. provide an allocation for the substitution of existing surface water or stream depleting groundwater takes for non-stream depleting groundwater takes, provided i. the existing take is surrendered and ii. the new groundwater take is abstracted from the same property as the surrendered surface water or stream depleting groundwater take, and there is no increase in the proposed rate of take or annual volume.	ECan Planning	ECan Consents Planning	0	0	0	0	0	0	0	
5.4	That the Waimakariri Water Zone Committee proposes within the Cust Groundwater Allocation Zone to: a. cap the current allocation volume, b. allow an extra 10% (based on current allocation volume) for additional groundwater takes that are not stream-depleting and c. provide an allocation for the substitution of existing surface water or stream depleting groundwater takes for non-stream depleting groundwater, provided i. the existing take is surrendered and ii. the new groundwater take is abstracted from the same property as the surrendered surface water or stream depleting groundwater take, and there is no increase in the proposed rate of take or annual volume.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
5.5	That the Waimakariri Water Zone Committee proposes within the Eyre Groundwater Allocation Zone to: a. cap the current allocation volume, and b. provide an allocation for the substitution of existing surface water or stream depleting groundwater takes for non-stream depleting groundwater, provided i. the existing take is surrendered and ii. the new groundwater take is abstracted from the same property as the surrendered surface water or stream depleting groundwater take, and there is no increase in the proposed rate of take or annual volume.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
5.6	That the Waimakariri Water Zone Committee propose to create a Lees Valley Groundwater Allocation Zone. Within the proposed Lees Valley Groundwater Allocation Zone: cap the current allocation volume, allow an extra 10% (based on current allocation volume) for additional groundwater takes that are not stream-depleting.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
5.7	That Environment Canterbury extend the Groundwater Allocation Zone boundaries further inland, to the edge of surface water catchment boundary.	ECan Planning	ECan Science	0	0	0	0	0	0	0	
5.8	That Environment Canterbury allocates resources to improve monitoring of permitted groundwater irrigation takes for compliance with limits in the LWRP. The proposed GAZ boundaries are shown on Map X4.	ECan Science	ECan Science	0	0	0	0		0		
				305	**45**	**155**	**50**	**210**	**210**	**350**	**TOTAL ($K per year)**
					450	1,550	500	2,100	2,100	3,500	**Accumulative TOTAL (10 years)**
					Option A	**$ 8.84**	**Option B**	**$ 11.49**	**Option C**	**$ 24.75**	**Rating impact per average rateable property- assuming CAPEX funded from rates, not loan**
						0.32%		**0.44%**		**0.73%**	**% of rates increase (based on 2021 Financial Year)**

8.3. Long Term Trends - groundwater and surface water

Natural Environment Committee report

Date of meeting	6 April 2022
Author	Carl Hanson, Groundwater Science Manager
Responsible Director	Dr Tim Davie, Director Science

Purpose

1. This paper responds to the request from the Natural Environment Committee at its 2 December 2021 meeting for staff to "report back with long term trends on water quality and flows as soon as possible in 2022".

2. Environment Canterbury has an extensive monitoring programme, which enables the Council to identify changes occurring, evaluate interventions, and develop appropriate management responses.

3. This paper focusses on nitrate-nitrogen concentrations in groundwater. Environment Canterbury is currently developing surface water analysis tools and statistics and building data viewers to share long-term surface water state and trend. The development of this surface water information is nearly complete and will be presented to the Committee at its next meeting on 18 May 2022.

Recommendations

That the Natural Environment Committee:

1. Receives the staff report on long term trends in groundwater quality.

Key points

4. The key points include:

- Environment Canterbury's long term monitoring network enables staff to assess changes in water resource state and trends over time.
- Nitrate-nitrogen concentrations in Canterbury groundwater have been increasing since farming began in the region. Even by the 1970s/1980s, concentrations were well above natural levels.
- Analysis of 30 years of data shows that the rate of change is slow and non-linear, but the overall direction of change is generally an increase in nitrate-nitrogen concentrations.
- It can take time for changes to land management to result in changes in water quality, although lag times in some locations in Canterbury are likely to be sufficiently short to see responses. For the most part, the time lag between land use change and the start of resulting effects on groundwater nitrate

concentrations is on the order of five to ten years. Shorter lags exist where receiving environments are close to land sources. The full effects of changes may still take decades to come through, particularly for large catchments.

- It can be difficult to tease out the reasons for changes in groundwater quality; factors such as climate, natural events, permitted activities, and on-the-ground actions as part of plan implementation will be affecting water quality and it may be difficult to isolate the effects of specific interventions.
- Data analysis is currently being undertaken to prepare information to contribute to the development of the new regional planning framework.
- The focus of this paper is on the long-term water quality trends that are being identified through our groundwater monitoring programmes. Understanding why these trends are occurring, and what role the regional planning framework and on-farm changes have played in any change, is the focus of work being developed to inform the integrated regional planning framework.

Background

5. At its 2 December 2021 meeting, the Natural Environment Committee was presented with a report ‘Water Monitoring - Recent Results and New Programmes’. At the meeting, the Committee requested staff report back with long term trends on water quality and flows as soon as possible in 2022.

6. Environment Canterbury currently has approximately 337 groundwater monitoring wells; 112 of these have more than 30 years’ water quality data.

7. Over time our long-term monitoring programmes have evolved and expanded to respond to various statutory requirements, science, regulatory and planning needs.

8. The Science Group is currently checking data, developing statistics, and building data viewers to share state and trend information as part of the regional planning programme. This work is in progress - today’s paper provides some of the data and information already prepared, focussing on nitrate-nitrogen concentrations in groundwater. Other work is still in development.

Groundwater State

9. The earliest picture we have of nitrate-nitrogen concentrations in Canterbury groundwater comes from work by the North Canterbury Catchment Board in the 1970s and early 1980s (Figure 1). Many of the concentrations found were low, but samples from several wells (12) had concentrations above 11.3 mg/L, the Maximum Acceptable Value (MAV) set in the New Zealand drinking-water standards, and there were many wells where concentrations were above half the MAV. Natural (pre-human settlement) nitrate-nitrogen concentrations were probably less than 1 mg/L, so the state of groundwater in the 1970s/1980s already reflected significant change. It is likely that concentrations have been increasing since significant farming with cultivation first began in the region in the 1800s.

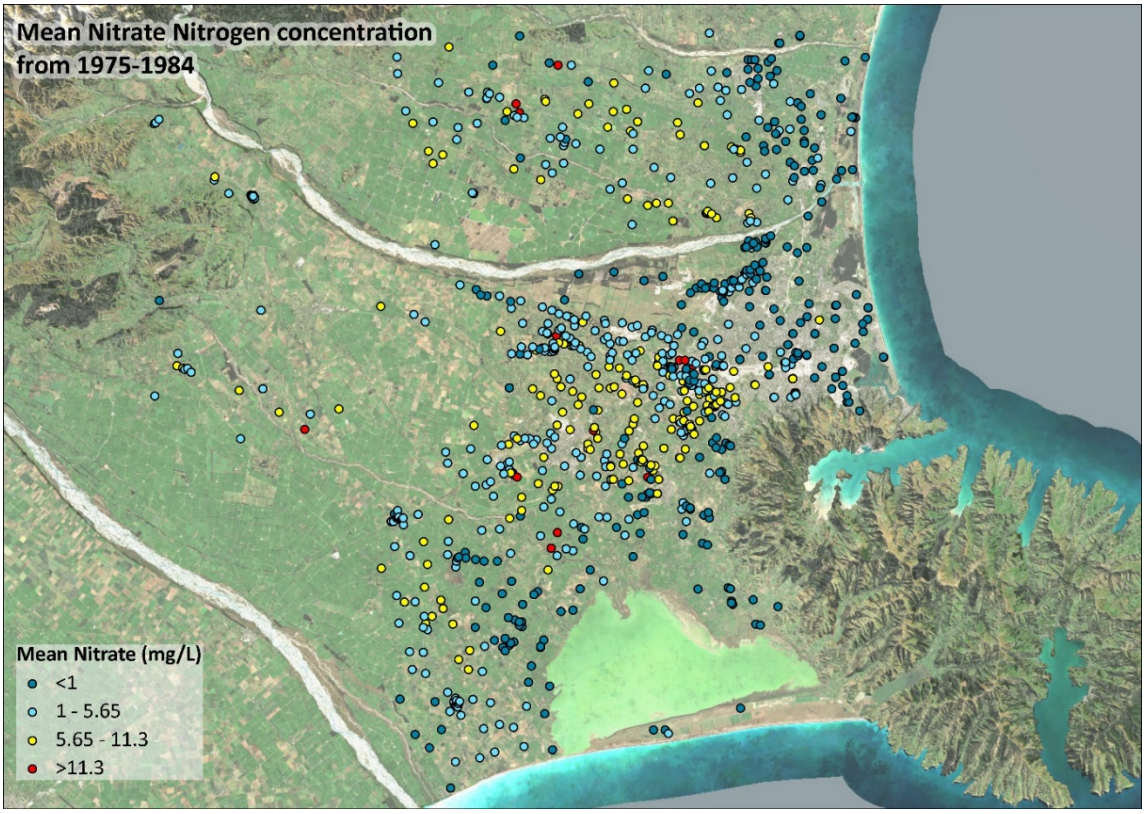
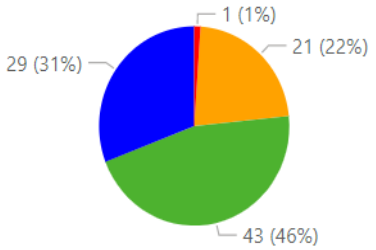
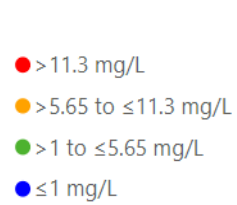


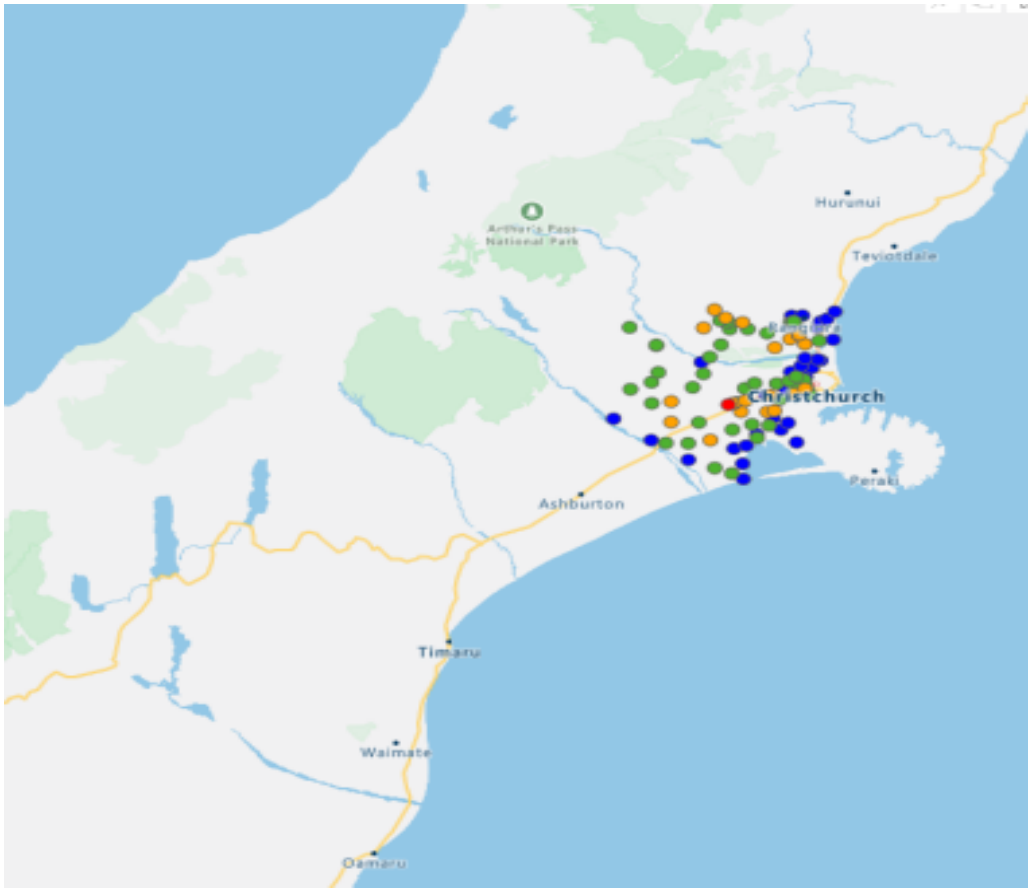
Figure 1: Groundwater nitrate-nitrogen concentrations measured by the North Canterbury Catchment Board from 1975 to 1984.

10. Long-term monitoring of groundwater in Canterbury began in 1986. Using data from this monitoring, we have undertaken some analysis of nitrate-nitrogen concentrations in Canterbury's groundwater. All statistics use a five-year median value for nitrate-nitrogen.

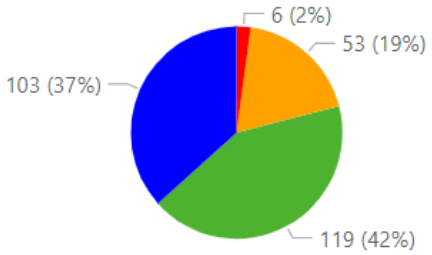
11. Figure 2 (over the next three pages) provides a summary of nitrate-nitrogen state for 1992, 2002 and 2021.

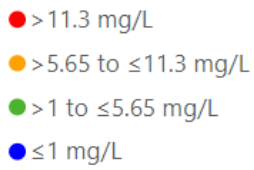

1 (1%)
21 (22%)
29 (31%)
43 (46%)

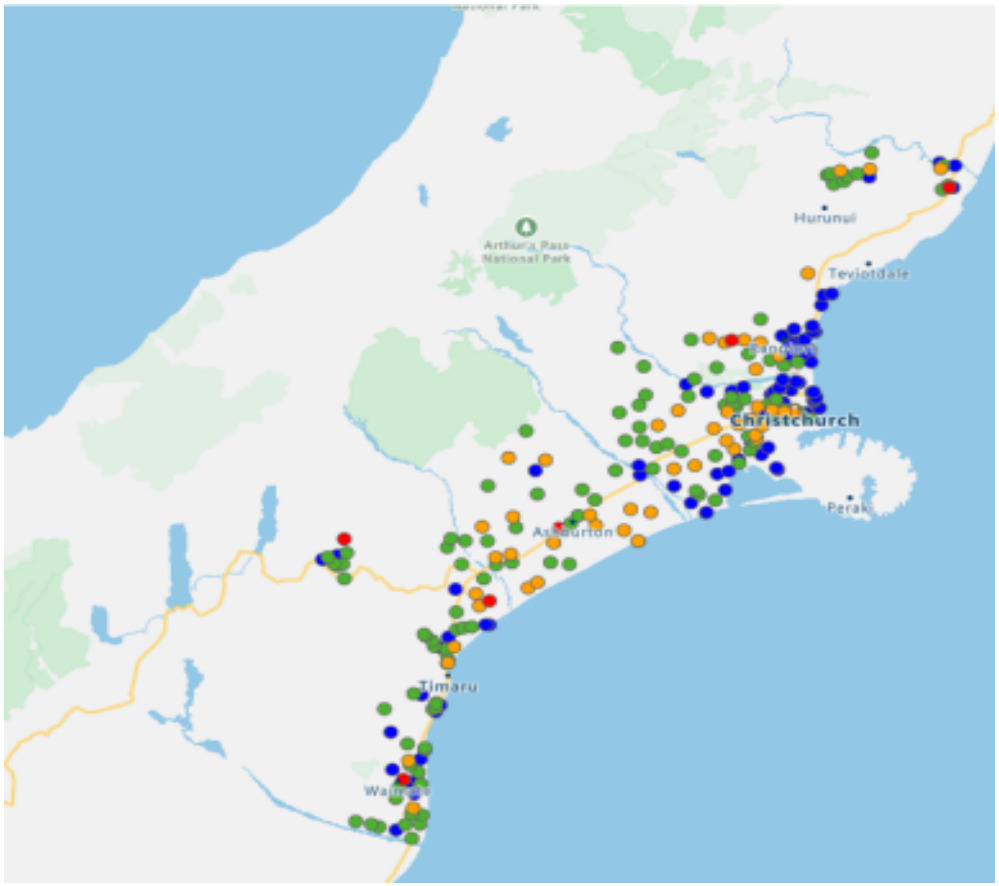

>11.3 mg/L
>5.65 to ≤11.3 mg/L
>1 to ≤5.65 mg/L
≤1 mg/L


Hurunui
Arthurs Pass National Park
Teviotdale
Christchurch
Ashburton
Timaru
Waimate
Oamaru

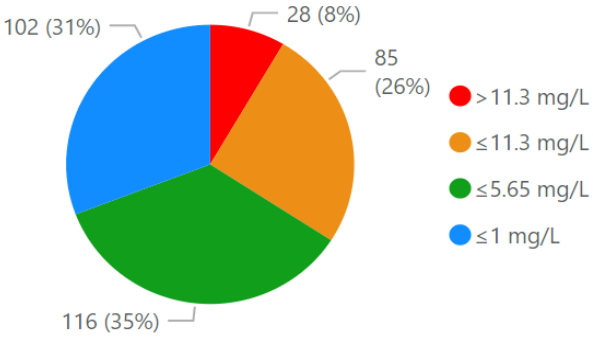
A) 1992

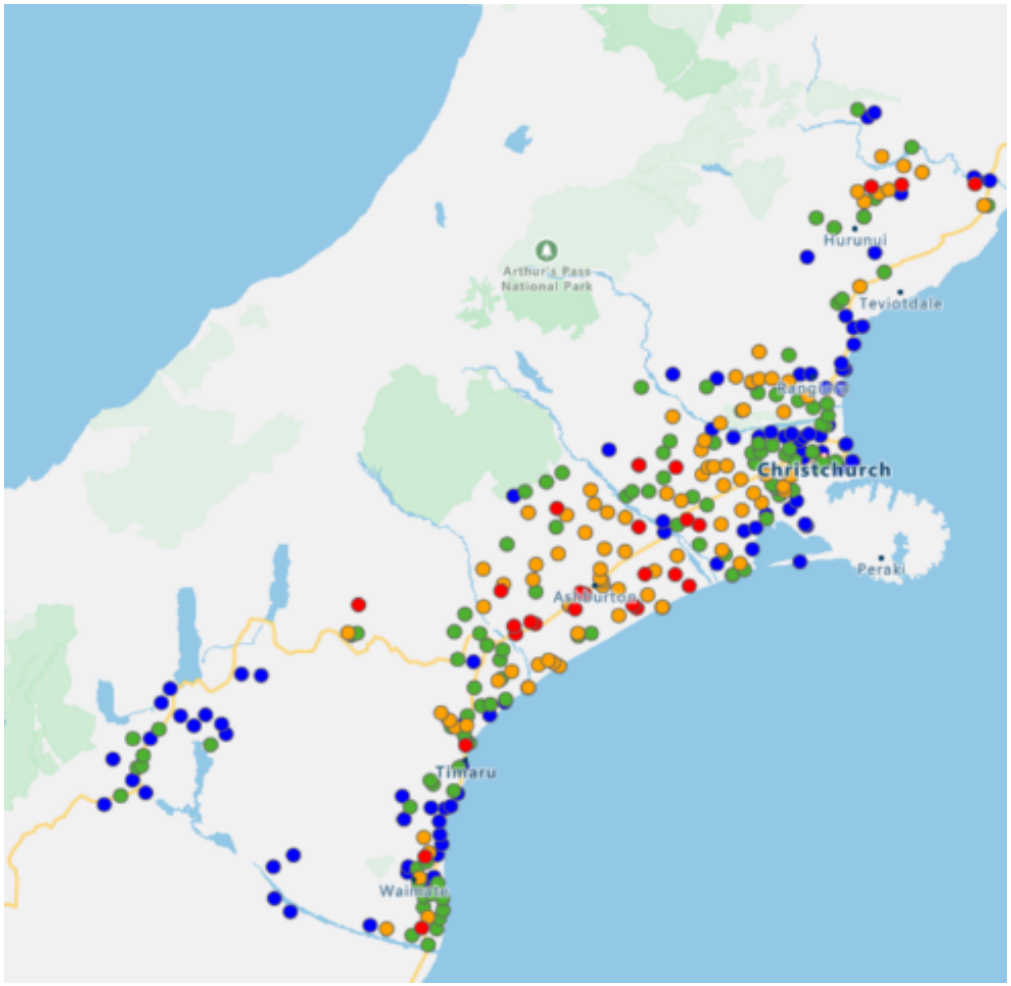

6 (2%)
53 (19%)
103 (37%)
119 (42%)


>11.3 mg/L
>5.65 to ≤11.3 mg/L
>1 to ≤5.65 mg/L
≤1 mg/L


Hurunui
Arthur's Pass National Park
Teviotdale
Christchurch
Timaru

B) **2002**





C) 2021

Figure 2: Groundwater nitrate-nitrogen State A) 1992, B) 2002, C) 2021. Number and percentage of groundwater sites at 4 nitrate concentration ranges.

12. Analysis of data from 1992, based on 94 groundwater sites on the Northern Canterbury plains, shows 99% of the wells' water quality met the current drinking water guideline for nitrate-nitrogen in drinking water (<11.3 mg/l).

13. Analysis of data from 2002, based on a wider number of 281 groundwater wells across a wider spread of Canterbury, shows a similar profile to the data from 1992; 98% met the current drinking water guidelines.

14. In 2021, 72% of the 331 groundwater sites across Canterbury met the guidelines.

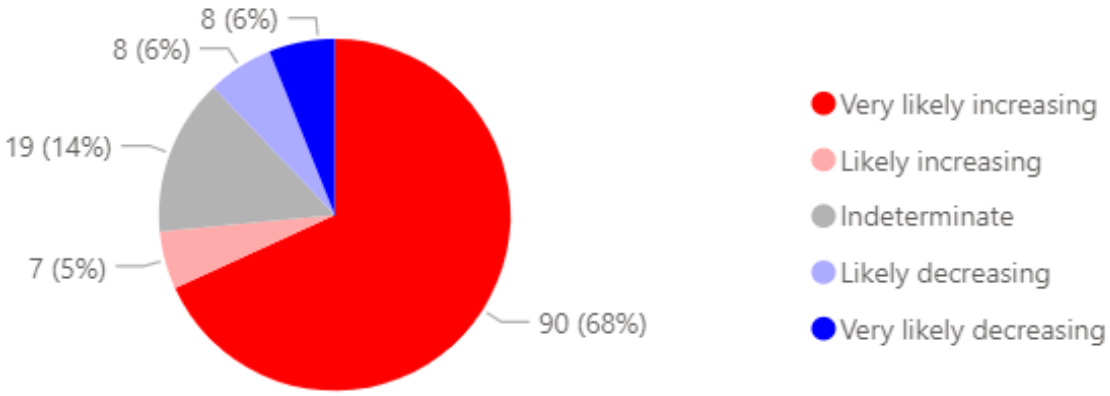
15. These figures show that while nitrate-nitrogen concentrations in groundwater have generally been increasing over time, the increase is relatively slow, and that while concentrations are clearly higher in 2021, there were a small number of elevated levels in 1992, and even 1984.

Groundwater Trend

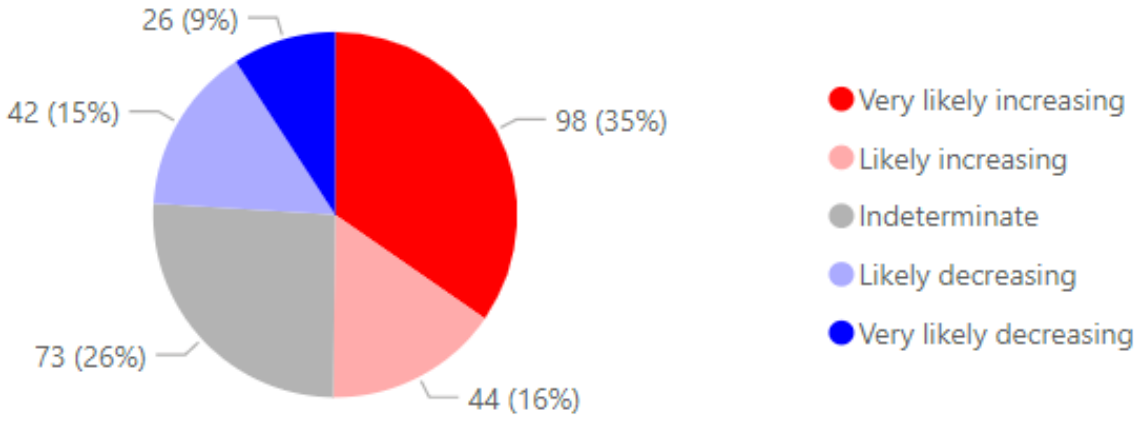
16. Figure 3 below provides an analysis of trends in nitrate-nitrogen concentrations in Canterbury's groundwater for a 30-year (1991-2021) and a 10-year (2011-2021) period.

17. The analysis in Figure 3 involves doing a trend analysis on every well record over the specified period and classifying the trend according to the likelihood of an increasing or decreasing trend. This approach is built on the same method used by the Intergovernmental Panel on Climate Change and is the same as used by the Ministry for the Environment (MFE) and Statistics New Zealand for their environmental reporting and the LAWA (Land, Air Water Aotearoa) website.

18. While response times to change on the land may be faster than 10 years in Groundwater (see below), staff recommend that 10 years be used as the minimum 'time step' for trend analysis, to ensure that factors such as weather events (floods, droughts) are not skewing results.



A) 30 years



B) 10 years

Figure 3: Trends in nitrate-nitrogen in Canterbury Groundwater (A - 30-year, B-10 year)

19. Over the past ten years, we've seen increasing trends (likely and very likely) in 51% of the wells analysed and decreasing trends in 24% of the wells. In comparison, 73% of the wells in the 30-year analysis show increasing trends, and only 12% show decreasing trends. This may seem to show an improvement in recent years, but you cannot draw that conclusion from this analysis alone. We also need to consider the non-linear character of groundwater change (Figure 4) and how the trends have changed with time (Figure 5).

20. When we consider the three wells shown in Figure 4, with data plotted over the 30-year period 1991 to 2021, it is clear they do not increase in the same way.

21. Concentrations in the first well, J38/0242 increased over the first ten years, then more or less levelled off. At the second well, K37/0468, the bulk of the increase occurred in the middle period. At the third well, K37/0243, most of the increase occurred in the final ten years. For any ten-year period, only one of these three wells show an increasing trend, but over the full thirty years, all three of them show increasing trends, but in a non-linear fashion.

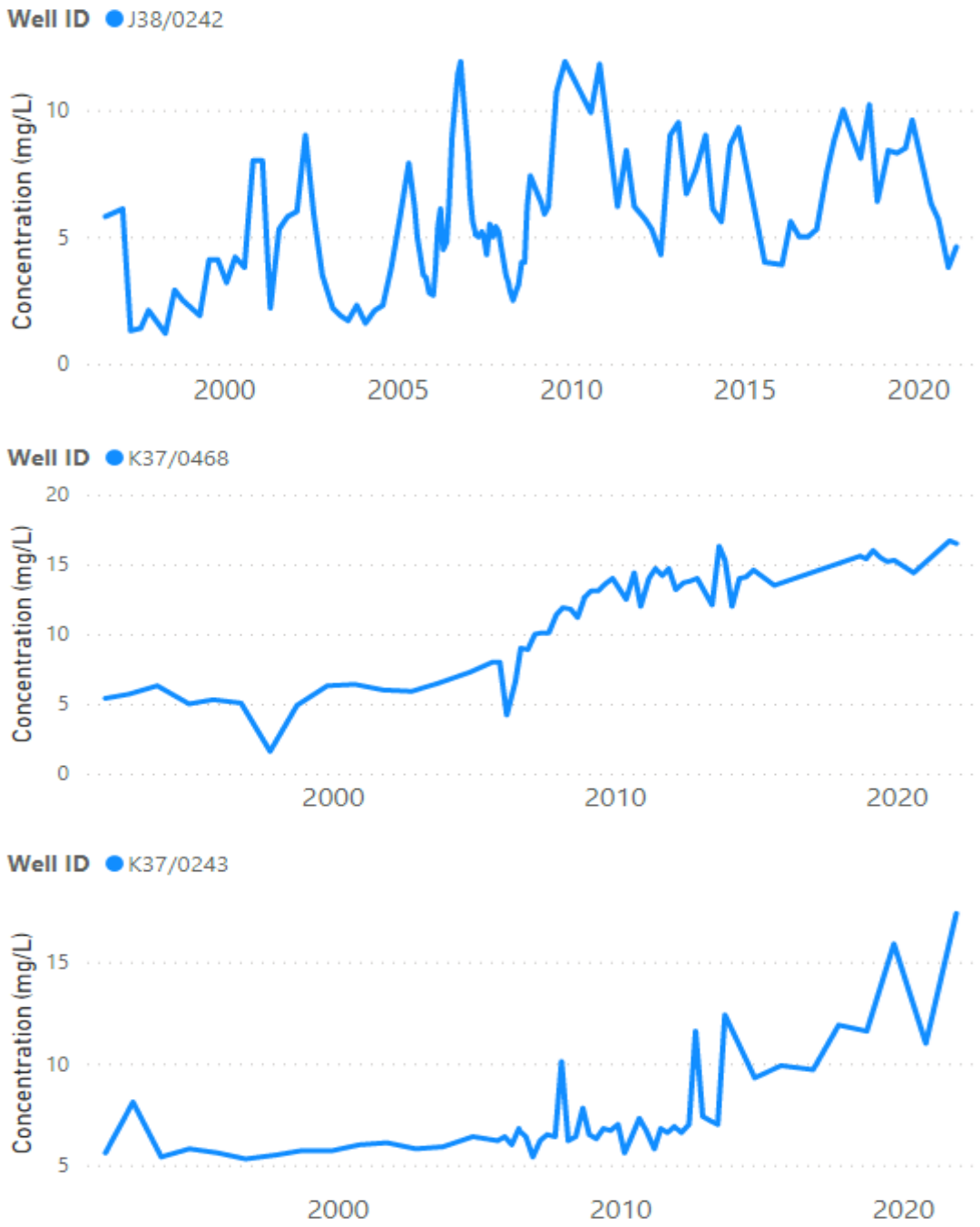


Figure 4: Examples of non-linear changes in nitrate-nitrogen concentrations in three wells

22. Environment Canterbury publishes an analysis of ten-year trends in nitrate concentrations every year in Annual Groundwater Quality Survey reports (available in the Document Library on the Environment Canterbury website). This analysis was first done in 2002 and has been consistently done since 2007. In every year that analysis has been completed, the results have been similar. Increasing trends in 16% to 37% of the wells have been observed, versus decreasing trends in 2% to 10% of the wells, with no clear trend in the results over the years (Figure 5).

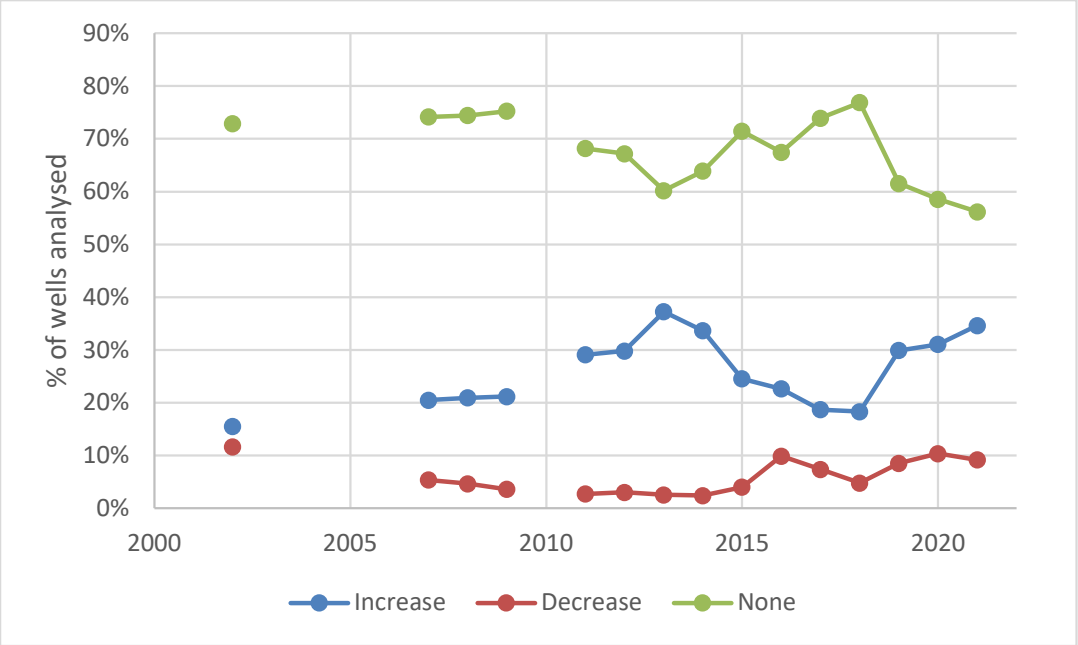


Figure 5: Rolling 10-year trends in nitrate-nitrogen in Canterbury Groundwater, reported in Annual Groundwater Quality Survey reports.

23. To be confident that we were seeing improvements in groundwater quality, we would expect our rolling 10-year analyses to show more decreasing trends over time and fewer increasing trends. Figure 5 does show more decreasing trends in recent years, but also more increasing trends, especially after heavy winter recharge in 2017.

24. In summary, it is likely that nitrate concentrations in groundwater have been increasing for many decades, probably since farming first began in the region, and our data from the past 30 years indicates that concentrations are still increasing.

Impact of lag times on changes in water quality

25. Environment Canterbury has been working with the community for many years to find ways to reverse the increasing trends in nitrate nitrogen concentrations in groundwater.

26. Since we have not yet seen any clear reversal of the trends, the question is being asked, how long will it take before we see the benefit of this work. There are two things to consider here. First, there is a time lag between when land use change occurs and when we see the effects of that change in water quality.

27. For groundwater quality, in most cases we would expect to see the first signs of change within a few years, though it will take much longer for the full effects of the change to come through. We would see these effects soonest in groundwater at the water table immediately beneath the land use change.

28. We know that nitrate can be flushed from the soil into the groundwater in a single heavy rain or snowfall event. Events such as the heavy snow in 2012 resulted in observed flushing of nitrate. This has been validated with field trial sites at Templeton, Burnham and Rolleston.

29. We have several examples of where we have seen nitrate concentrations in groundwater increase within a few years of land use change. These include:

    - the Hinds area, after land use changes in the mid-2000s
    - conversion from forestry to beef, then dairy, near Culverden
    - change from border-dyke to spray irrigation in the lower Waitaki area.

30. Where the water table is deeper, it can take longer for the effects of land use change to reach the groundwater. An example of this is in the Te Pirita area, where the water table is 50 to 100m below the ground surface, nitrate concentrations in the groundwater have been increasing slowly since agricultural intensification (irrigation and dairy conversions) began in the 2000s.

31. Groundwater age tracer data suggests that it can take decades for the effects of land use change in the upper Canterbury Plains to reach coastal areas. This has been the method used to inform lag times within sub-regional planning processes such as the Waimakariri Plan Change 7 process.

32. Surface water quality often shows signs of improving water quality prior to groundwater. For example, recent work done under the Our Land and Water Science Challenge (McDowell et al., 2021) has estimated that catchment lag times across New Zealand vary from about 1 to 12 years, with a median of 4.5 years. Therefore, monitoring of small streams near where the on-the-ground action occurs within a catchment, will show the impact faster than in groundwater. The study did not include the Canterbury Plains. Lag times are likely to be much longer between land use in the upper plains and effects on groundwater and streams near the coast.

33. The second factor to consider is that there is often a delay between plan implementation and on-farm changes, creating another ‘lag’ of sorts. Environment Canterbury has delivered a regional and sub-regional planning framework over the past 12 years that requires on-farm reductions in nutrient losses to improve freshwater quality. However, on-farm changes due to this planning framework are still occurring.

34. Understanding what on-farm mitigations and interventions have been implemented over the past ten years, and in particular as part of the Good Management Practice and Auditing framework, will provide information and data to help understand and quantify changes to nitrate losses. This work will also be important to inform tools used in the future planning framework.

35. In summary, the analysis of time lags suggests that if widespread changes to land use management have been happening around the region over the past five to ten years, we would expect to be seeing some improvements in groundwater quality, even if the full effects of the changes might take decades to come through. The fact that we haven’t seen these improvements suggests that either the changes have not been enough to bring about widespread changes in groundwater quality, or they have not yet been fully implemented.

Next steps

36. The groundwater monitoring programme is well established with over 30 years' worth of data. The analysis of the surface water data is still under development and will be presented at the next Committee meeting on 18 May 2022. These data will play a critical role in supporting the mana whenua partnership and community engagement in the development of the new integrated regional plan.

Attachments

Nil

File reference	
Legal review	
Peer reviewers	Carl Hanson, Groundwater science Manager, Cameron Smith, Senior Strategy Manager

8.4. Long Term Trends Surface Water Natural Environment Committee report

Date of meeting	Thursday, 19 May 2022
Author	Helen Shaw, Surface Water Science Manager
Responsible Director	Dr Tim Davie, Director of Science

Purpose

1. This paper responds to the request from the Natural Environment Committee at its 2 December 2021 meeting for staff to 'report back with long term trends on water quality and flows as soon as possible in 2022'.

2. This paper follows a paper on long term trends in groundwater, presented to the Committee on 6 April 2022, and focusses on surface water ecology, quality and quantity in our rivers and lakes.

3. The state and trend data and statistics presented in this paper are from data viewers currently in development to support the *ki uta ki tai* integrated planning framework. As such, they are an initial look at our data; further refinement of these tools will be undertaken over the coming years.

Recommendations

That the Natural Environment Committee:

1. Receives this report on long term trends in surface water in the Canterbury Region.

Key points

4. Regional trends in surface water indicators are useful for overall patterns of change, but detailed site analysis is required to identify specific drivers of change. Changes in our indicators can be driven by a range of factors including anthropogenic activities, climate variability, and change in species. There are often complex interactions between these drivers that complicate understanding of trends.

5. The ecological health of our streams has been in decline over the last 20 years at 54% of sites. In contrast, there are 22% of sites that are relatively stable and 24% are improving. It is notable that many sites with improving trends are those in a poorer state close to the coast on the Canterbury Plains, while inland areas previously in good health have a relatively high number of deteriorating sites.

6. Surface water quality trends for nitrate-nitrite nitrogen are similar to those for groundwater quality trends. This is due to groundwater being the dominant source of nitrate-nitrite nitrogen in our rivers, with 63% of sites demonstrating an increasing trend over the 22-year data period.

7. Conversely, long term dissolved reactive phosphorus (DRP) trends indicate that concentrations have improved at 55% of sites over the 22-year period examined. Turbidity (essentially the cloudiness of water and a surrogate for suspended sediment) has shown a shift and has improved over the last 9 years at 71% of our river sites. These parameters are the ones we would expect to use as early indicators of improvements in water quality due to actions such as fencing and stock exclusion.

8. Trend analysis of high-country lakes data 2007-2022 (24 lakes) showed that chlorophyll *a* is increasing in most lakes (>80%). This has mostly resulted in a shift from National Policy Statement for Freshwater Management (NPS-FM) attribute band A to band B for these lakes, which is a significant shift for these sensitive lakes.

9. River flow data is showing decreasing low flows in 10-year trend analysis, but no clear changes over 30 years - many of our lower catchment sites have only been installed in the past two decades. Other indicators and additional data from newer sites will be needed to further understand long term effects.

10. Long term monitoring programmes were not originally designed to monitor the efficacy of localised catchment/land management interventions, but will ultimately reflect large-scale changes in land use and land management. Environment Canterbury has modified our monitoring networks over time to enable assessment of plan efficacy at a regional scale, but many of the datasets are not yet sufficient to determine long-term trends or changes resulting from interventions.

Approach

11. Data and information presented in this report are preliminary analysis of our long-term monitoring datasets for Surface Water. Datasets include monitoring undertaken by Environment Canterbury and NIWA.

12. Environment Canterbury currently monitors surface water quality at 149 long-term river and stream sites and 38 lakes. We also monitor river and lake levels at 160 sites. Summer monitoring includes annual monitoring of ecological health at 187 stream sites and swimmability at 57 freshwater sites (both rivers and lakes) over the summer period.

13. Median values are often used for water quality data; generally, a 5-year median has been calculated to represent the water quality state of a water body and assessed against relevant NPS-FM attribute bands. The NPS-FM provides attribute state bands that range from A being largely unimpacted state through to D being a highly impacted state with adverse effects on values expected. The NPS-FM also includes national bottom lines that are generally between band C and D, and can be considered a threshold where unacceptable effects occur.

14. Trends have been calculated for individual measurements over whole years (hydro years). Flow data for this paper have been presented as annual low flows (ALF); ALF has been chosen as it is a measure of the seven lowest consecutive days flow in each year and reflects a river's low flow state.

15. Tools used to analyse data have incorporated the latest national guidance and have been developed by the Surface Water Science Section for the Integrated Planning project. Further exploration of data and modification of methods is likely over the next few years as we work to understand drivers and test management and intervention options.

16. Datasets for surface water are not as long as groundwater. A major review of the river water quality monitoring programme in 2013 resulted in changes to sites and sampling frequency. We therefore have a few sites with regularly collected data dating back to the late 1990s (22 years) and a larger number of sites with monthly data collected since mid 2013 (9 years).

17. For our lakes, we have regularly collected data dating back to the mid 1990s for the two coastal lakes: Te Waihora and Te Roto O Wairewa. The high-country lakes monitoring programme provides regularly collected data for 27 inland lakes since 2007 (15 years).

18. We have aimed to provide trends that combine the longest time periods with maximum number of sites available to us for each parameter explored; because of this, some of the trend analysis is presented for varying time periods.

19. While the groundwater trends presented focussed on nitrate nitrogen, this surface water analysis looks at a number of other parameters because of the multiple drivers of ecosystem health; we can expect different parameters to respond to different management approaches and interventions on different timescales. For example, we expect phosphorus, turbidity and E. coli to respond quickly to changes in farm practices, while nitrogen and deposited sediment responses will be slower. Noting also that the many drivers of ecological health mean that improvements in some parameters will not necessarily result in improved overall ecological health.

Rivers and Streams

Macroinvertebrates

20. Macroinvertebrate communities are a very useful indicator of overall stream health because they integrate the effects of multiple stressors over time. They respond to changes in habitat condition, flow and water quality. Macroinvertebrate communities are sampled annually each summer at 183 stream sites around the region. Monitoring began in 1999 (20 years of data).

21. In this paper the current state of stream health, as indicated by the Quantitative Macroinvertebrate Community Index (QMCI), is the median of the previous five years.

22. Figure 1, below, shows that over half of monitored streams are in the NPS-FM C and D bands and can be described as moderately to severely impacted respectively. The streams with poorer ecosystem health are typically in areas of more intensive urban and agricultural land use but also on Banks Peninsula. The proportion of streams in the A and B NPS-FM attribute bands (low to mildly impacted) has declined over the extent of the entire data record (Figure 2).

23. Figure 3 shows that 54% of sites have a deteriorating QMCI trend over 20 years. In contrast, there are 22% of sites that are relatively stable and 24% are improving. It is notable that many sites with improving trends are close to the coast on the Canterbury Plains, while inland areas have a relatively high number of deteriorating sites.

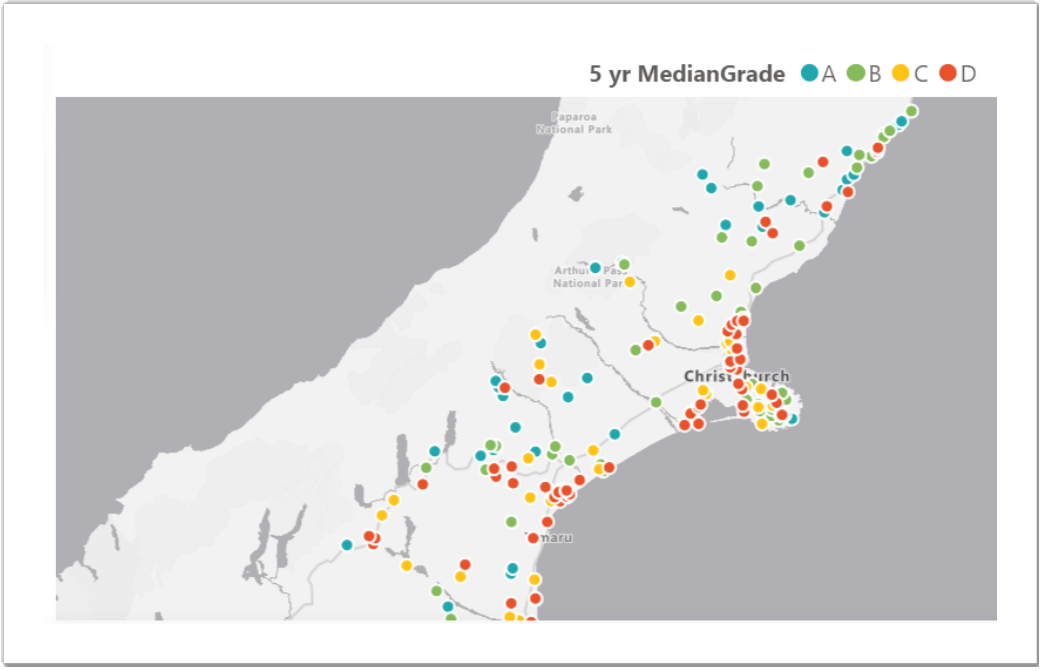


Figure 1: State of macroinvertebrate communities 2017-2021 (5-year median QMCI). Sites are coloured and summarised according to NPS-FM attribute bands).

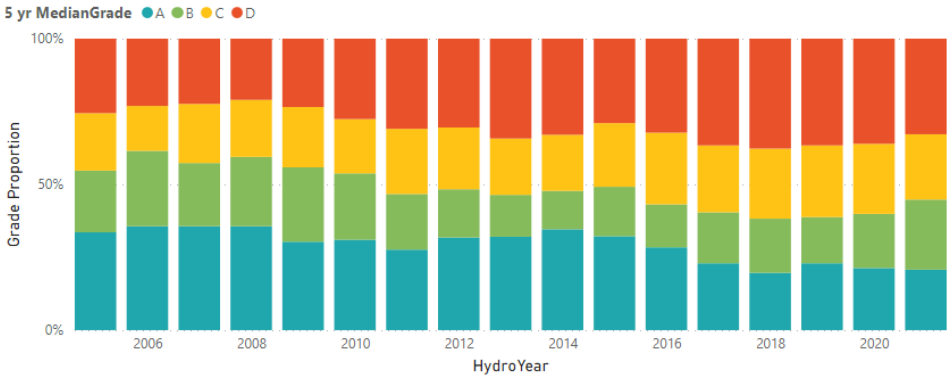


Figure 2: State of macroinvertebrate communities over time (5-year median QMCI). Sites are coloured and summarised according to NPS-FM attribute bands.

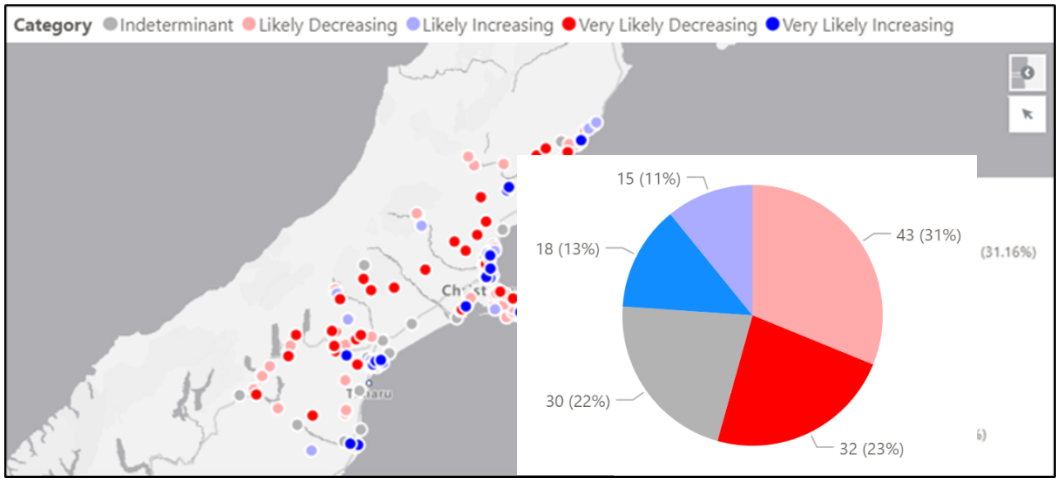


Figure 3: Twenty-year trend for QMCI based on a Mann-Kendall test.

Nitrate+Nitrite Nitrogen

24. Nitrate+nitrite nitrogen (NNN)1* in our rivers, lakes and streams is predominantly sourced via groundwater inflows, and to a lesser extent by land run-off and the decay of organic material in the stream. High concentrations of NNN in our streams contribute to excess plant and algal growth and a decline in water quality and ecological health. Very high NNN concentrations can have direct toxicological impacts on aquatic fauna (fish and invertebrates).

25. Groundwater data presented to the Committee on 6 April 2022 showed that nitrate-nitrogen concentrations in groundwater have increased over the past 30 years. Surface water data over the 22-year period analysed (Figure 4) shows a similar trend with >60% of sites showing increasing concentrations of NNN, and 29% of river sites with decreasing nitrate-nitrite nitrogen.

26. Trends over a shorter, more recent time period (last 9 years) show over half the sites with decreasing NNN concentrations, although 34% of sites continue to show increasing trends. As with groundwater trends, these trends need to be confirmed over a longer timeframe.

[1] In surface waters we routinely measure oxidised nitrogen as the combined form nitrate+nitrite nitrogen (NNN). Nitrite is a form of oxidised nitrogen that is readily further oxidised to nitrate in aerated waters, such as our surface waters. Concentrations of nitrite are generally below laboratory detection limits in surface waters. Therefore, NNN measurements in surface waters can be used as a proxy for comparing to nitrate-nitrogen guidelines.

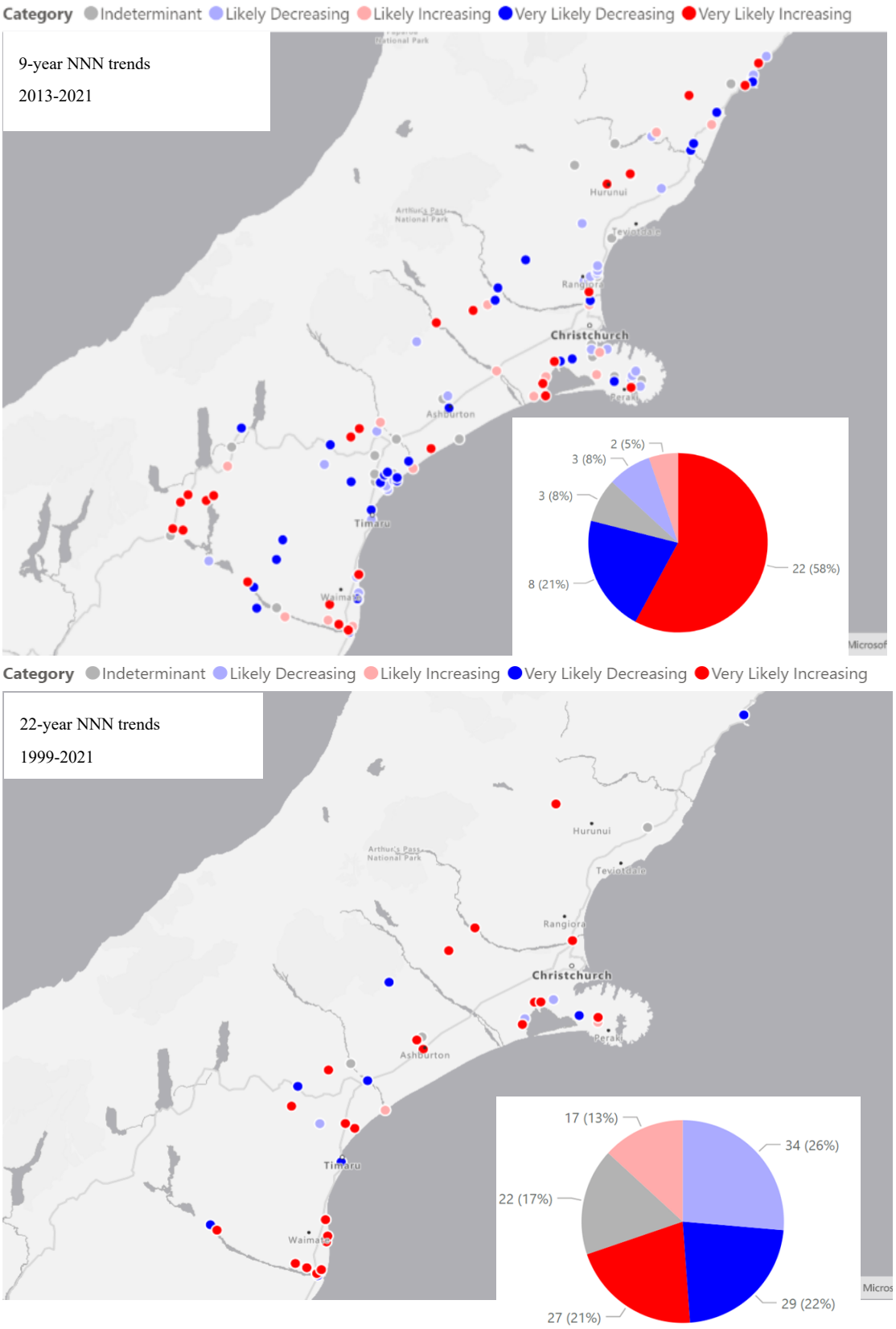


Figure 4: Trends in nitrate+nitrite nitrogen concentrations with varying time periods and number of sites

Dissolved Reactive Phosphorus

27. Dissolved reactive phosphorous (DRP) is a measure of the dissolved (soluble) phosphorus compounds that are readily available for use by plants and algae. DRP concentrations are an indication of a waterbody's ability to support nuisance algal or plant growths (algal blooms).

28. Over the past 22 years we have seen a trend of decreasing DRP concentrations in 55% of long-term river sites and increasing concentrations in 23% of sites (figure 5). Shorter term recent trends show a higher proportion of sites with increasing concentrations (47%), while 33% show decreasing concentrations. Our next steps will involve correlating these trends with land use and management changes.

29. Many of the sites with recent trends of increasing dissolved phosphorus concentrations occur on the lowland and Banks Peninsula areas which have high naturally occurring sources, although some sites are found in inland areas (e.g., Mackenzie Basin) where concentrations are extremely low.

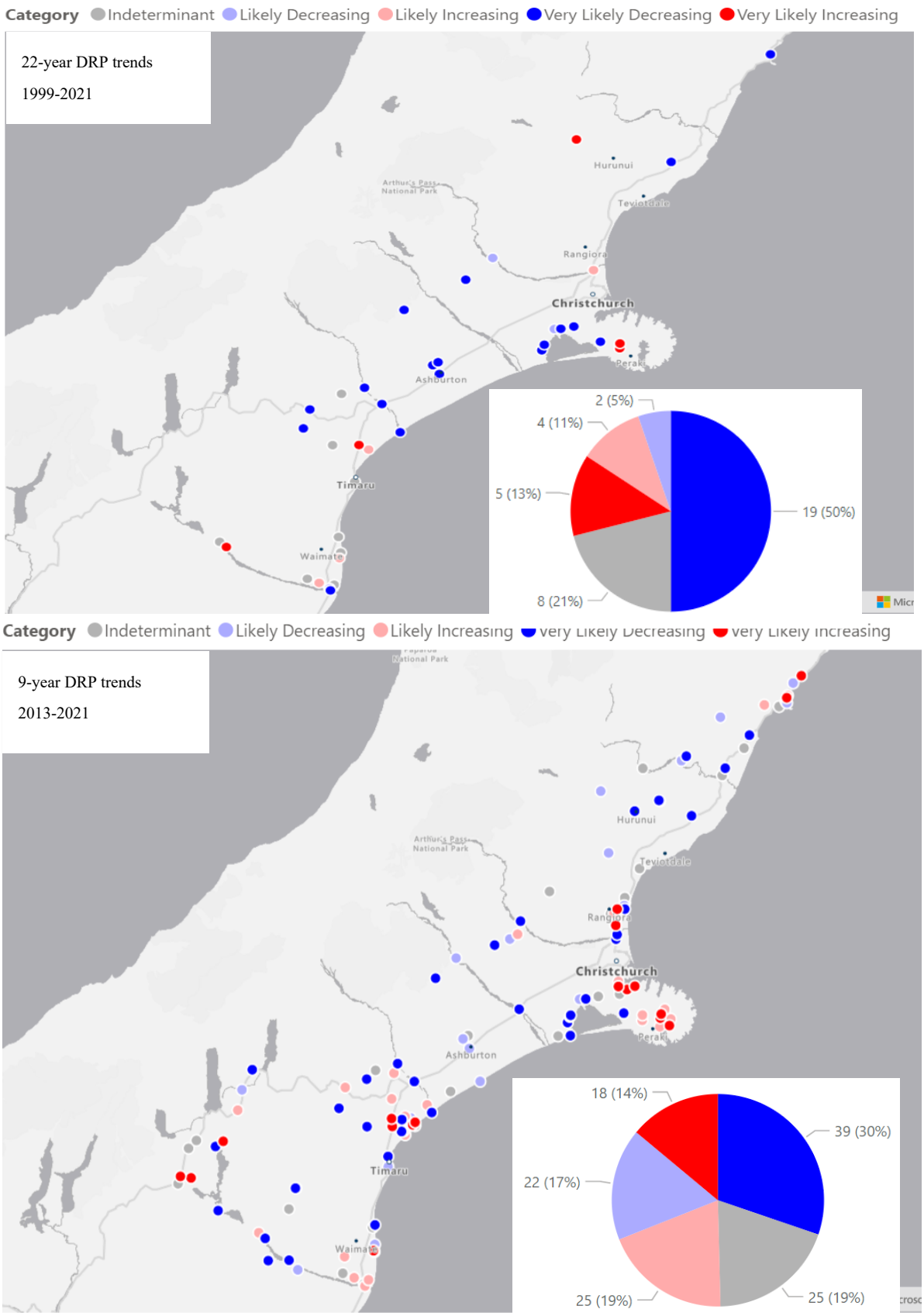


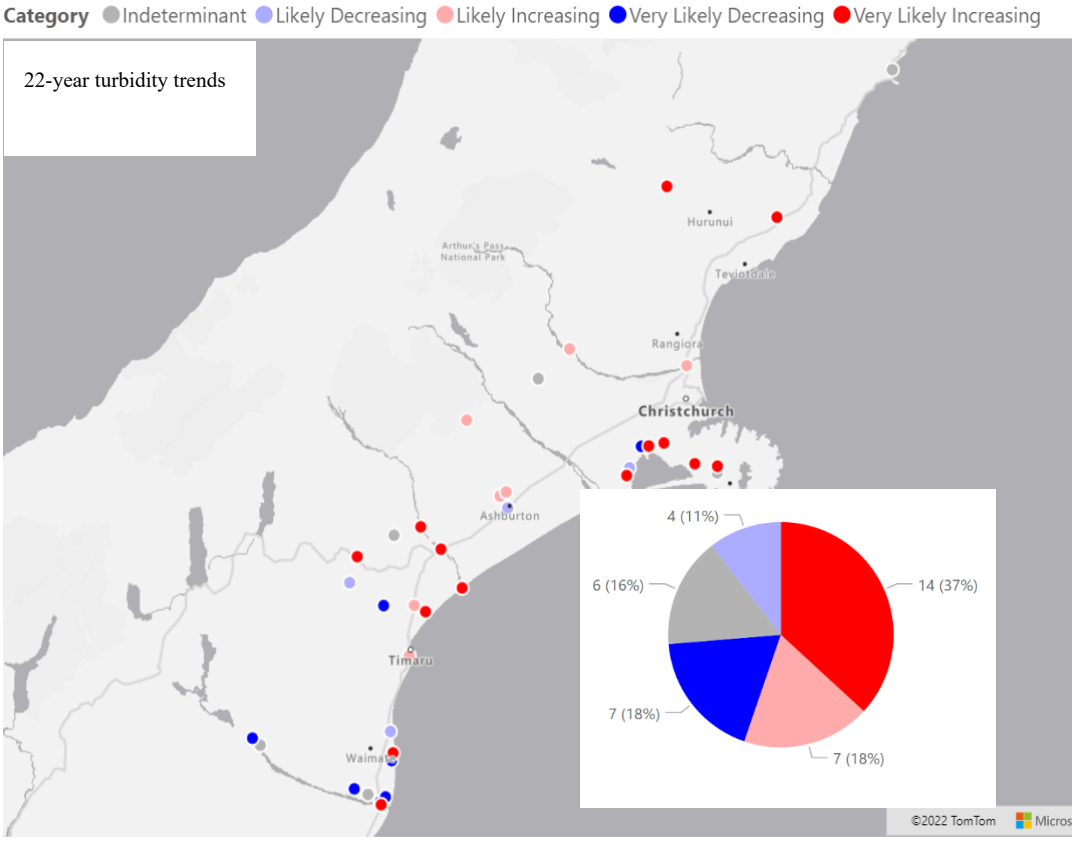
Figure 5: Trends in DRP concentrations with varying time periods and number of sites

Turbidity

30. Turbidity is a measure of the cloudiness of water. Turbid water can be caused by heavy rainfall resulting in erosion, disturbance of the riverbed or bank by stock or machinery, or through direct discharges. Soil type in the catchment can affect the amount of suspended sediment.

31. High sediment in water can affect aquatic life directly and indirectly via habitat changes. Poor water clarity will also affect the amount of light reaching the river or lake bottom, potentially limiting plant growth.

32. Figure 6 shows that the long-term trend in turbidity at our sites is varied, but shorter-term trends indicate that the majority of sites (71%) have improving turbidity. This could be an early indication of improving water quality, however, as with phosphorus trends, further data and analysis is required to confirm the direction of change and explore the drivers. This will be part of the ki uta ki tai integrated planning project.



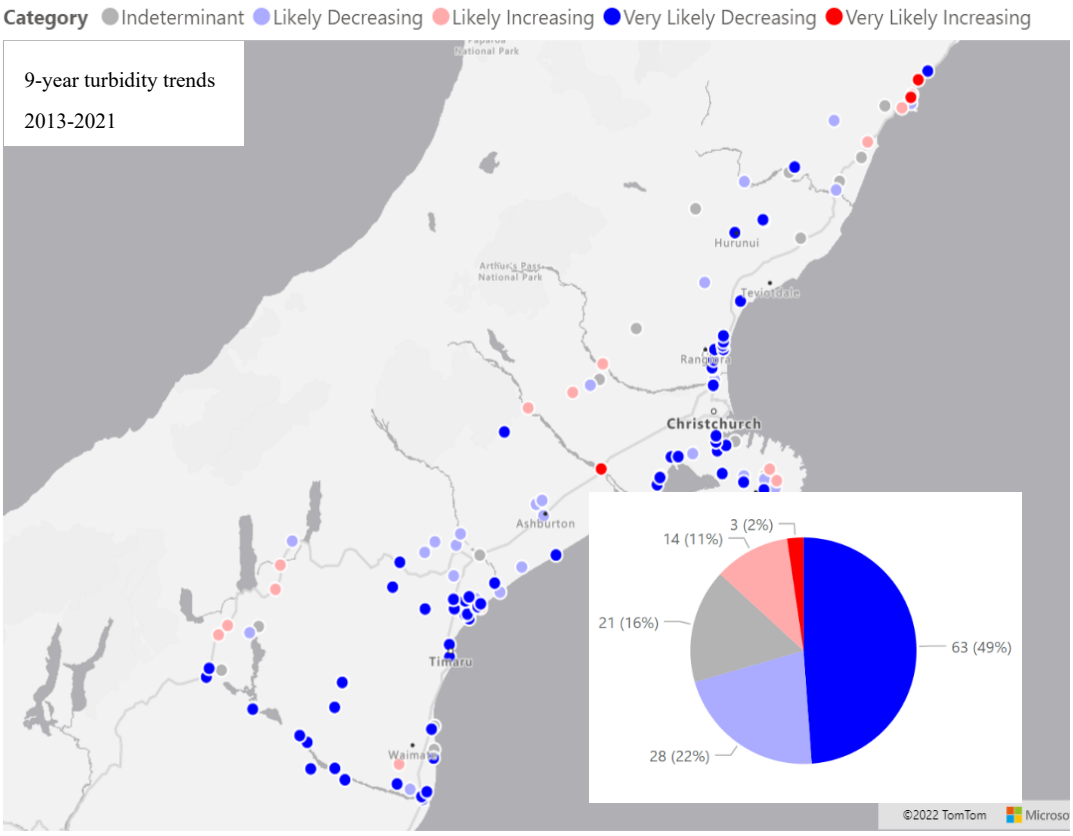


Figure 6: Trends in turbidity with varying time periods and number of sites

Lakes

33. The high-country lakes monitoring programme provides regularly collected data for 27 inland lakes since 2007 (15 years). Chlorophyll *a* (Chla) is used as an indicator of lake water quality because it measures algal biomass; the ecological response to changes in nutrients, climate and ecosystem interactions. Increasing Chla is a reflection of poorer water quality resulting from changes in these drivers - at attribute bands C and D, ecosystems are considered to be moderately to severely impacted due to reduced clarity, excess algal growth, and can cause low oxygen conditions affecting fish.

34. Figure 7 below provides a comparison of the current state of high-country lakes (5-year median to 2021), with a 2012 state. A number of lakes (8) have shifted from Attribute band A to B over the monitoring period, indicating a shift from healthy, resilient ecological communities to those slightly impacted by algal growth.

35. Trend analysis of high-country lakes data 2007-2021 (24 lakes) showed that chlorophyll *a* is increasing in most high-country lakes (>90%) (Figure 8). No trends of decreasing chlorophyll *a* were found. Increases in chlorophyll *a* concentrations can be driven by nutrients and/or climate, as well as changes in the types of grazing animals and algal species in the lakes.

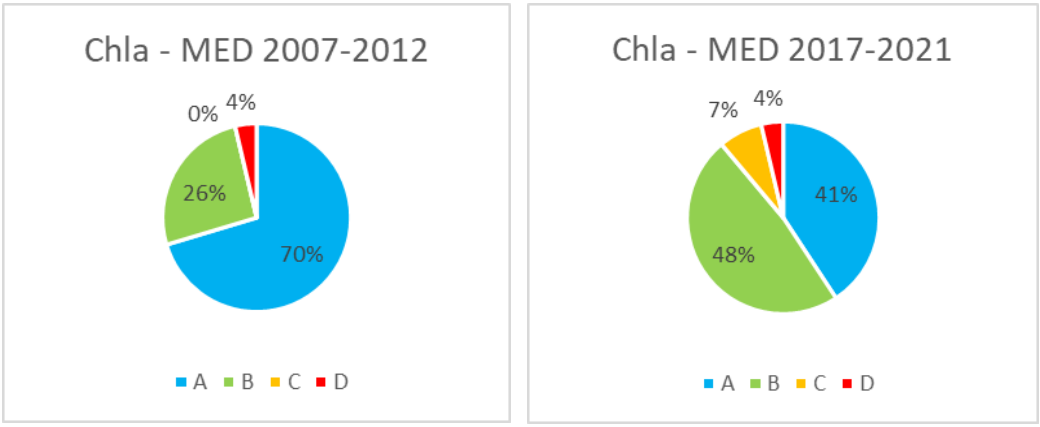


Figure 7: NPS-FM attribute band states for chlorophyll a 5-year median concentrations in 27 high country lakes

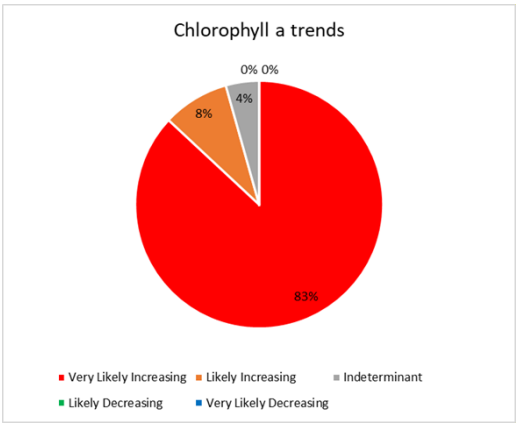


Figure 8: 14 year trends for chlorophyll a concentrations in 24 high country lakes

River Flows

36. As with water quality, a number of drivers affect river flows. These include climate, groundwater levels, diversions, storage, abstractions, and irrigation type (e.g., border dyke, spray irrigation).

37. Environment Canterbury currently operates approximately 160 continuous water level/flow sites across the region. The purpose of flow monitoring has changed over time with the focus in early years being on flood warning, therefore many of the sites with the longest records are at sites in the upper gorges of the large rivers. Over time our monitoring network has been expanded to include a wider range of sites, added to increase our knowledge of the state of the environment and to monitor the effects of plan rules, including cumulative effects of abstraction.

38. There are many distinct parts of the flow regime which can exhibit trends, e.g., high flows, low flows, or average flows. There are no national bottom lines or pre-defined thresholds against which flow is assessed, therefore we have chosen to carry out trend analysis on low flows for this paper. Low flows are most affected by abstraction and likely reflect the consequences of climate and water management; higher flows are more significantly driven by climatic conditions/weather.

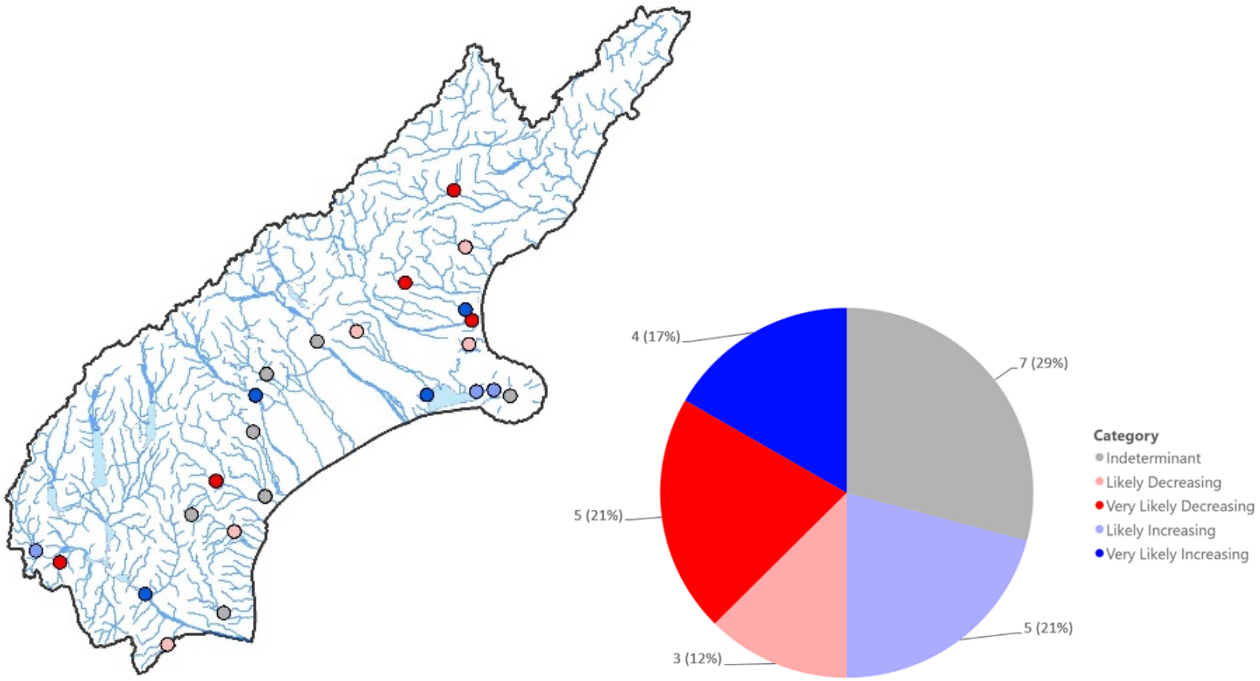
39. Trends in Annual Low Flow (ALF) have been assessed for each of our continuous flow sites. ALF has been chosen as it is a measure of the seven lowest consecutive days flow in each year and reflects a river's low flow state.

40. Trends can vary depending on the period being analysed and varying short term trends can occur within an overlying long-term trend. While we are assessing a range of periods in our analysis for the regional planning programme, in this paper we present trends over the 30 and 10 year period to 2021 (Figure 9). As sites in our network have varying timespans, and some periods of missing data, there are fewer sites on which we can carry out 30 year trend analysis than for 10 year trend analysis.

41. Figure 9 shows that the 30-year trends in ALF are variable across the region with both increasing and decreasing trends being detected. There are no consistent spatial patterns.

42. The analysis of trends in ALF over the last 10 years (Figure 9) is based on more sites than the 30-year trends. It shows that 47% of sites have a trend of decreasing low flows, meaning that it is more likely that reaches will become dry or be dry for more extended periods, water will be less available for abstraction, and environmental minimum flows may be breached more often or for longer. The additional data are useful, because they include considerably more sites in the lower catchments. This is where we would expect the effects of abstraction (but also climate change or other changes in the catchment) to be evident in low flows.

30 Year ALF Trends (1992-2021)



10 Year ALF Trends (2012-2021)

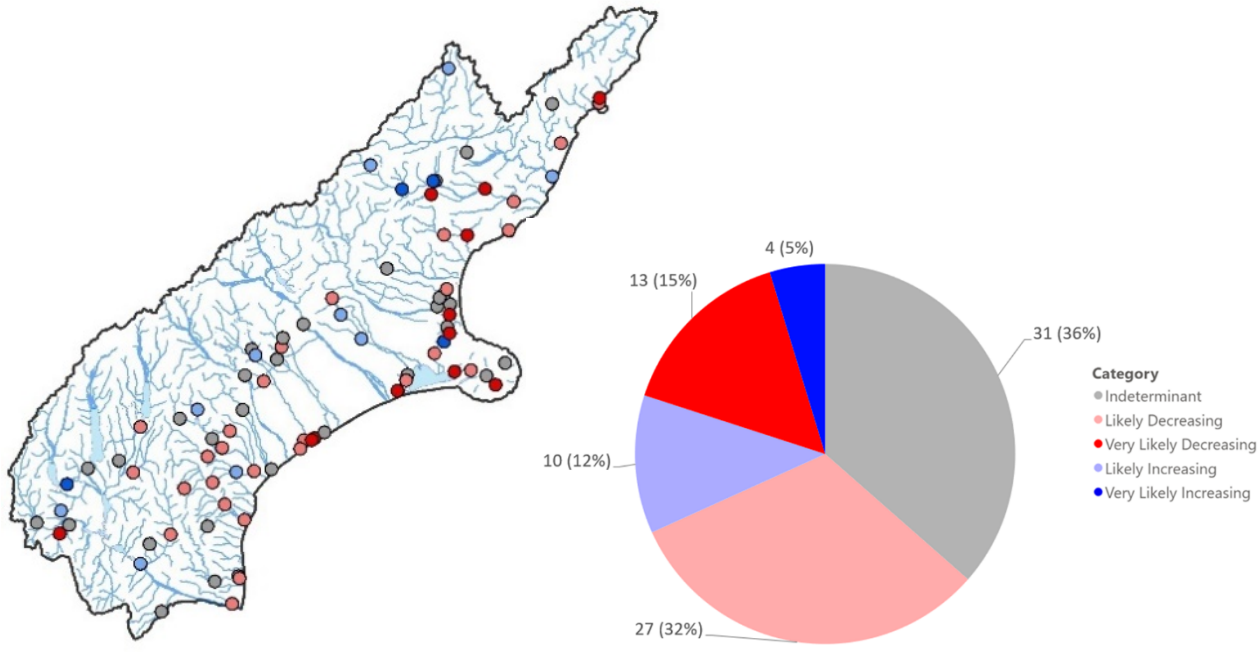


Figure 9: Trends in Annual Low Flows with varying time periods and number of sites

43. Because of the many drivers of flow change, the effects of abstraction on river flows are best examined on a site-by-site basis. Figures 10 and 11 below provide a clear relationship between increasing abstraction from the Selwyn River and the resulting change in flows at the lower water level monitoring site at Coes Ford.

44. In Figure 10, both the upper site (Whitecliffs) and lower site (Coes Ford) show similar patterns in wet and dry years, but Coes Ford shows a continual declining trend. This indicates that the cumulative effects of abstraction (Figure 11) have contributed to reduced flows in the lower catchment.

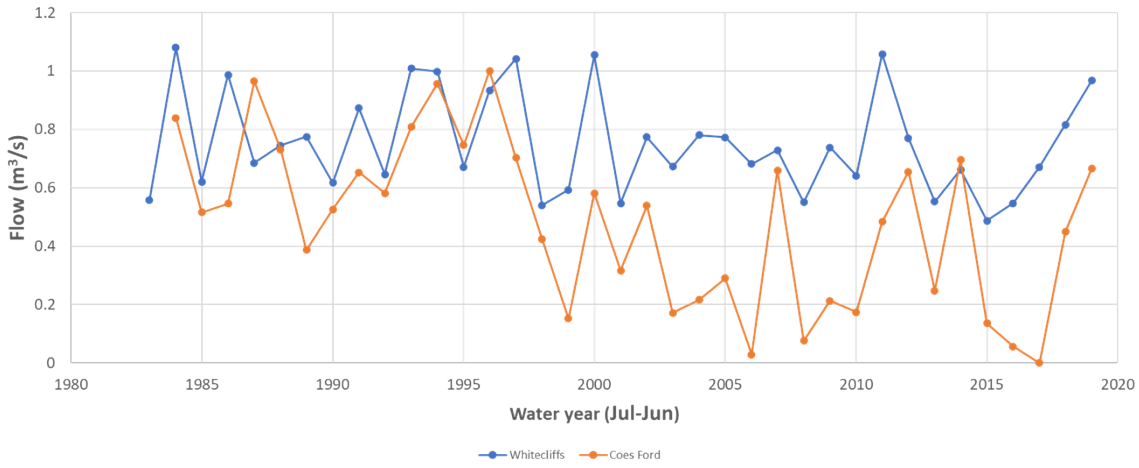


Figure 10: Selwyn River Annual Low Flows (7 day) above and below abstraction and losses to groundwater (Whitecliffs vs Coes Ford)

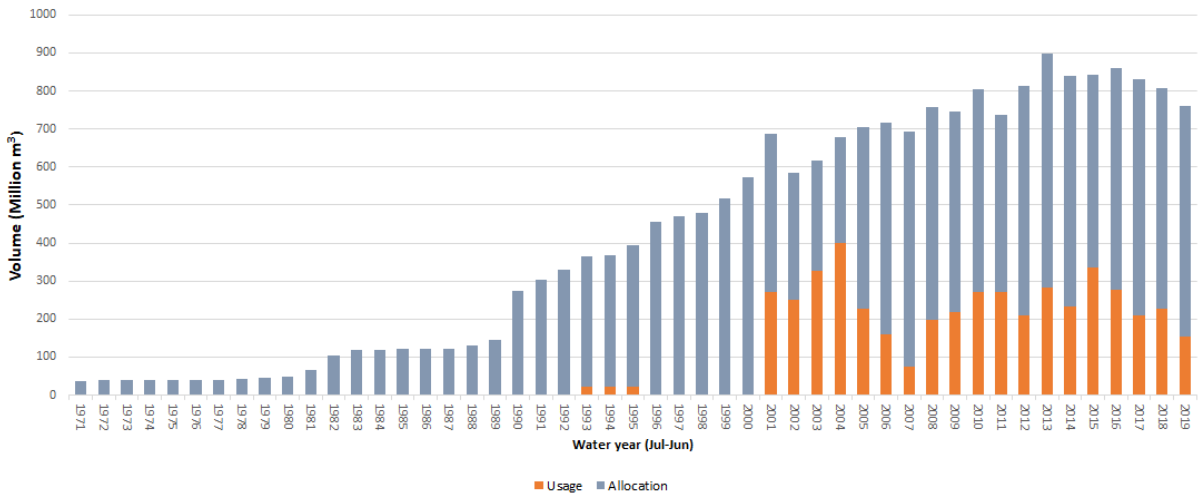


Figure 11: Water allocation and usage - Selwyn River

Effect of management interventions

45. While some of the trends indicate that parameters likely impacted by catchment interventions such as stock exclusion and riparian planting are improving, we usually need to look at site specifics to be sure. Often, specific monitoring sites need to be identified, and catchment characteristics and changes well documented.

46. We have seen improvements at the Waihi River at Gorge (DOC campsite) recreational swimming monitoring site. Concerns were raised about stock access to the river upstream of the campsite in 2015, and our data indicated a deterioration in water quality. Environment Canterbury worked with the landowner to address this issue. A reassessment the catchment in 2017 found that landowners had permanently fenced one kilometre of the Waihi River upstream of the gorge bathing site in March 2016. As a result, *E. coli* concentrations improved the following summer (Figure 12) and the site's swimmability grading shifted from Fair to Good.

47. The site and actions are an excellent example of the improvements which can be seen in freshwater environments in a short timeframe. For attributes like *E. coli* that have short travel times (i.e., that run-off or enter streams via direct deposition), improvement in freshwater can be seen in short-term data (e.g., 5 yrs.).

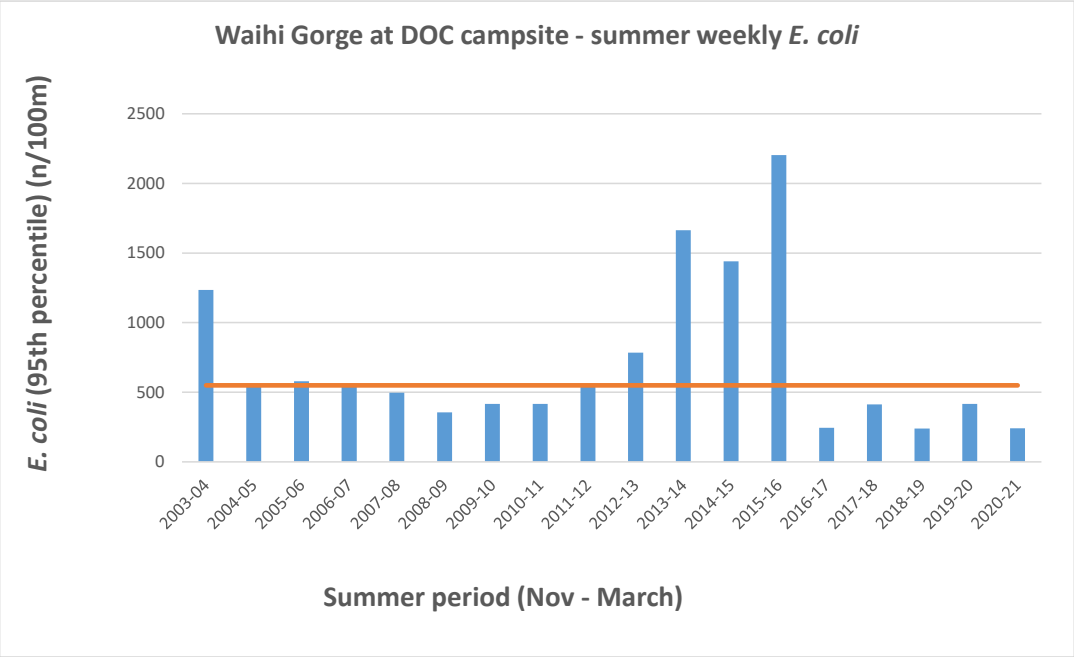


Figure 12: Improvement in E. coli summertime concentrations following fencing and stock exclusion improvements upstream of the site in 2016.

48. On the ground intervention projects need to be clear about what can be achieved through specific mitigations. The Waikākahi catchment was part of the Best Practice Dairy Catchment (BPDC) programme through the mid 2000s. This long running programme focussed on working with landowners to identify key issues and improvements that could be achieved. The Waikākahi Stream had been a valuable trout spawning and rearing tributary of the Waitaki River but with agricultural intensification in the catchment in the 1990s and early 2000s, water quality had deteriorated. Particularly noticeable was poor water clarity and increased fine sediment accumulation on the stream bed. Through the BPDC programme, stock exclusion and border dyke wipe-off discharges were identified as priority issues that needed addressing.

49. Extensive improvements in stock exclusion occurred throughout the catchment in the mid 2000s with focus on hotspot areas. Improvements in management of border-dyke irrigation wipe-off water were achieved but ultimately many irrigations systems were converted to spray-irrigation. Through improved stock exclusion and riparian management, concentration of total suspended solids improved at our long-term monitoring site (Figure 13). Other attributes affected by run-off and discharges such as dissolved phosphorus also improved over the 25-year monitoring record.

50. However, improved irrigation efficiency (conversion of border dyke to spray irrigation) along with increased production have meant that nitrate+nitrite nitrogen concentrations increased over the 20 year period from the mid 1990s to mid 2010s. More recently, nitrate+nitrite nitrogen concentrations have started to decrease but we will need a greater length of record to be confident in this recent trend.

51. Ecological health as indicated by QMCI values has varied (Figure 14), with individual values varying across attribute states B to D. Overall, the QMCI values indicate the stream remains in a moderately to severely impacted state. An array of drivers and legacy effects (such as embedded fine sediment) continue to impact on stream health.

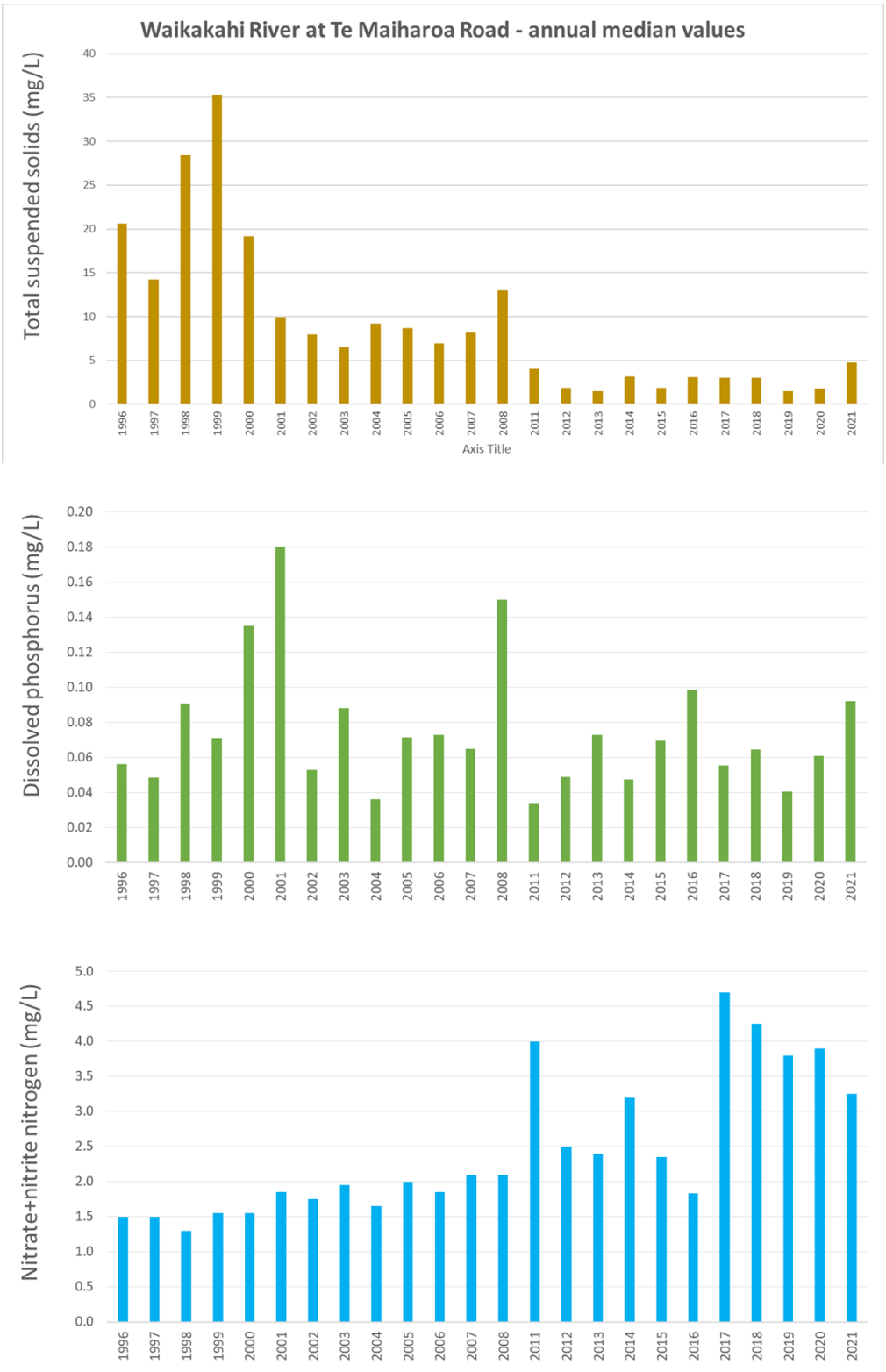


Figure 13: Annual median concentrations of three key parameters in the long-term monitoring site on the Waikākahi River at Te Maiharoa Road.

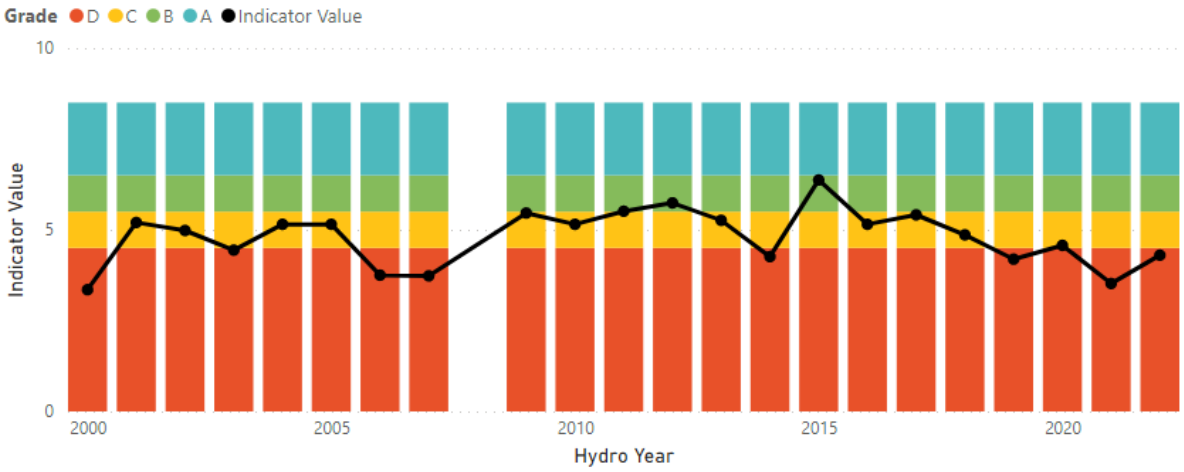


Figure 14. Annual QMCI values for Waikākahi Stream at Te Maiharoa Road.

Engagement, Significance and Māori Participation

52. This work is part of initial science work scoped to inform the ki uta ki tai integrated planning framework. We expect that the scope of work will be adjusted to reflect the Partnership approach agreed for the planning project with Papatipu Rūnanga.

53. Mātauranga Māori knowledge sets will provide insights to long term changes in state and trend beyond the timeframes of Environment Canterbury's freshwater monitoring programme.

54. Water quality, flow and ecological monitoring data will complement Mātauranga Māori for our region. We look forward to discussing the development of new monitoring frameworks and exploring the connections between knowledge sets.

Climate Change Impacts

55. Our long-term monitoring data set provides essential information regarding changes to our water resource as a result of climate change. Long-term trends and flow analysis will play a vital role in understanding the effects of climate change on our rivers and lakes.

56. Climate is a key driver of the ecological health of our rivers and lakes. Changes in climate will play an important part in the future of the water resource and the way it is managed.

Next steps

57. Further tools will be developed, and analysis will be undertaken to inform the ki uta ki tai integrated planning framework. A review of Environment Canterbury's monitoring networks will be done once the new regional plan has been developed; this will involve identifying sites to meet a variety of purposes, including long term state of the environment monitoring, climate change monitoring, flood warning, mātauranga Māori monitoring alignment, and plan efficacy.

Attachments

Nil

Legal review	
Peer reviewers	[Names of two peer reviewers who have reviewed this paper]

MINUTES OF THE MEETING OF THE CANTERBURY WATER MANAGEMENT STRATEGY WAIMAKARIRI ZONE COMMITTEE HELD VIRTUALLY VIA ZOOM ON MONDAY 4 APRIL 2022 AT 3.30PM.

PRESENT

M Blackwell (Chairperson), A Reuben (Te Ngāi Tūāhuriri Rūnanga representative and Deputy Chairperson), E Harvie (until 5.48pm), M Jolly, C Latham, W Main, J Roper-Lindsay, John Cooke (Te Ngāi Tūāhuriri Rūnanga representative) and Councillor S Stewart (WDC Councillor).

ABSENT

Councillor M Hands (ECan Councillor)

IN ATTENDANCE

A Wilson (Fernside resident) and J Benn (Department of Conservation).

S Allen (WDC Water Environment Advisor), A Arps (ECan Zone Manager), S Symns (ECan Communications Engagement Advisor), Emily O'Connell (ECan Communications Engagement Advisor), L Jenkins (ECan Fresh Water Planning Team Leader), K Butterfield (ECan Resource Management Officer Regional Implementation), L McKellar (ECan Senior Planner), M Griffin (ECan CWMS Facilitation Team Leader) and T Kunkel (WDC Governance Team Leader).

KARAKIA

A Reuben provided the karakia to open the meeting.

1 BUSINESS

1.1 Apologies

Nil

1.2 Welcome and Introductions

The Chairperson welcomed all the members present and requested all the members present to introduce themselves.

1.3 Register of Interests

Nil

2. OPPORTUNITY FOR THE PUBLIC TO SPEAK

2.1 A Wilson (Fernside resident)

A Wilson advised that there was several freshwater springs located on her property in Fernside. The water from the springs on her property ultimately flowed into the Cust and Eyre Rivers and she has endeavoured to keep the waterways on her property clean by fencing the wetlands and waterways and planting native plants on her property. She has found freshwater mussels in the waterways that need shade to survive, so she would have to shade the waterways. A Wilson noted that protecting the wetlands and waterways on her property had been a struggle and she needed knowledgeable assistance to ensure that she was going about this the right way.

M Blackwell expressed his appreciation that A Wilson for realising that she had a duty of care as a land owner and thanked her for the work she had done.

J Roper-Lindsay noted that the Waimakariri Biodiversity Trust would be able to assist A Wilson with the protection of the wetlands and waterways on her property. She also suggested that the ECan would be able to assist with the protection of the wetlands and waterways. A Arps agreed and suggested that Waimakariri Biodiversity Trust and ECan could discuss the possible levels of assistance with A Wilson.

Councillor Stewart explained that the Council's Arohatia te Awa Project aimed to create off-road ecological corridors along the streams and rivers across the Waimakariri District while simultaneously helping to improve water quality for our streams and rivers. A Wilson property may in future be liked with the Arohatia te Awa Project. She congratulated A Wilson on the work that she had done so far.

A Wilson advised that the adjacent property owner claimed that his property was flooding because her waterways had not been cleaned. He was, therefore, demanding that she clean her waterways as soon as possible. The last time she had the waterways cleaned had been very upsetting as it had resulted in the death of a large amount of aquatic life. She had however agreed to remove the watercress in one of the waterways with a water-rake. She needed advice on how to deal with the matter with the least possible damage to the natural environment. A Reuben and J Cooke volunteered to assist A Wilson with the removal of the watercress. J Roper-Lindsay offered that the Waimakariri Biodiversity Trust would co-ordinate the assistance provided to A Wilson.

3. REPORTS

3.1 Plan Change 7 and Plan Change 2 Update - L McKellar – Senior Planner, ECan, and M Griffin, CWMS Facilitator – Waimakariri, ECan)

L McKellar and K Butterfield provided an update on Plan Change 7, by highlighting the following:

- Applicability of the operative Waimakariri River Regional Plan versus Waimakariri River Regional Plan Change 2.
- The process of developing Plan Change 7 since 2019.
- Five appeals had been lodged to the High Court of New Zealand against Plan Change 7 and non against Plan Change 2. Provision not under appeal were treated as operative. Copies of the notices of appeal were available on ECan's website, along with documents identifying provisions that ECan considered to be under appeal.
- The provisions for the Nitrate Priority Areas were not under appeal and were, therefore, now operative.
- Regional Planning Framework
- Implementation of Plan Change 7 alongside the implementation of the essential freshwater regulations.

J Roper-Lindsay questioned how ECan would be dealing with the additional pressure that the Essential Freshwater Regulations will place on the implementation of Plan Change 7. K Butterfield noted that ECan was currently working on the matter.

Councillor S Stewart enquired how the main stem of the Waimakariri River and the areas to the south, not covered by Plan Change 7, would be included in ECan's 2024 review. L McKellar confirmed that these areas would from part of the 2024 region wide Integrated Plan review.

Councillor S Stewart noted there were people waiting to provide feedback on the scheduled review of the Alpine River Section of the Land and Water Regional Plan. She asked how the public would be advised that this review would now form part of the 2024 regional review. She also expressed concern this would reduce consultation on this

section of the plan which had particular importance to Waimakariri River flows and saltwater intrusion. L Jenkins explained that ECan would firstly be establishing its co-governance environmental partnership with Ngāi Tahu, once this had been done they would proceed with engagement for the wider region, which would be catchment based. She acknowledged that the public engagement may not be as detailed as in previous Plan Change processes.

In response to further questions from Councillor S Stewart, L Jenkins advised that the Communications Plan for broader community consultation could not be established until ECan and Ngāi Tahu's co-governance environmental partnership had been established. It was currently unclear when this would be finalised, however, the CWMS Waimakariri Zone Committee (the Committee) would be kept updated on the process.

E Harvie sought clarity on how the Committee and other environmental groups could contribute the monitoring of the implantation of Plan Change 7, thereby assisting ECan. L McKellar advised that ECan would focus on the monitoring once it had established its co-governance environmental partnership with Ngāi Tahu.

C Latham asked how ECan was going to deal with the potential requirement for all properties 20-hactares plus to have a Freshwater Farm Plan. L McKellar undertook to report back to the Committee on this matter.

Moved: J Roper-Lindsay Seconded: E Harvie

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** this update for its information, and with reference to the Committee's Working Groups, Action Plan, and Engagement Priorities in 2022.

CARRIED

3.2 **CWMS Action Plan Budget Initiatives – for decision - M Griffin (CWMS Facilitator)**

M Griffin highlighted the initiatives that the Committee could consider supporting using the Committee's Action Plan Budget established in the Environment Canterbury Long Term Plan 2021/31. These initiatives included:

- Taranaki Stream Inanga Spawning improvement,
- Sefton/Saltwater Creek Monitoring Programme,
- Northbrook Trail Project,
- Waimakariri Biodiversity Trust Visioning Workshop,

M Griffin explained that the proposed allocation to the Sefton/Saltwater Creek Monitoring Programme had been increased to $6,640 to ensure the largest impact on the motoring of the ground water and to cater for years one and two of the Programme. Subsequent to the previous Committee meeting, it was also recommended to support the following additional projects:

- Ashley Rakahuri Estuary Shorebird Monitoring project that would monitor the breeding of shorebirds around the Ashley-Rakahuri /Saltwater Creek estuary
- Pines Beach wetland willow control project that would support the control the willows regrowth occurring and enhance the establishment of indigenous wetland habitat in this area.

Moved: J Cooke Seconded: M Jolly

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** information on the proposed CWMS Action Plan Budget projects

to support for the 2021/22 financial year.

(b) **Approves** its support for the following projects based on the $50,000 CWMS Action Plan Budget allocated for each CWMS Water Zone in the 2021/22 financial year:

(i) Taranaki Stream Inanga Spawning improvement,
(ii) Sefton/Saltwater Creek Monitoring Programme,
(iii) Northbrook Trail Project,
(iv) Waimakariri Biodiversity Trust Visioning Workshop,
(v) Ashley Rakahuri Estuary Shorebird Monitoring,
(vi) Pines Beach Wetland Willow Control Project.

CARRIED

3.3 **ZIPA Implementation – Second and Third Quarterly Update 2021/22 – S Allen WDC, Water Environment Advisor) and M Griffin (CWMS Facilitator, ECan)**

S Allen and M Griffin took the report as read.

Councillor S Stewart questioned if the comprehensive monitoring equipment had been installed in the Kaiapoi River at the Mandeville Bridge. Also had the data downloaded from the current salinity logger been analysed. M Griffin advised that, to his knowledge, the results would be available at the next Committee meeting

Councillor S Stewart sought clarity on who would be receiving the data on the monitoring of the water quality in Tutaepatu Lagoon. She requested if the Committee could be kept updated on the data as well. M Griffin undertook to investigate the matter and report back to the Committee.

E Harvie requested an update on the investigation into nitrate lag times in the Canterbury region. M Griffin noted he would follow up on this and that the review of the available scientific and technical resources would be dealt with as part of the Plan Change 7 review. M Blackwell commented that resources for monitoring needed to be prioritised.

Councillor S Stewart advised that the Council would be requesting ECan and the District Health Board to assist with the cost of the Private Well Study, which had been a ZIPA recommendation. Currently only the Council contributed towards the study and the lack of resources was limiting the scope of the study. A Arps undertook to follow-up on this matter.

J Roper-Lindsay noted that the ECan staff were advising and supporting Rūnanga on Mahinga kai gathering areas. She questioned what the staff would be advising on. M Griffin acknowledged that the statement was vague, and more information would be provided on this in the next report.

M Blackwell enquired when the data from the Council's Stormwater Network Discharge Consent monitoring programme for the district would be accessible. S Allen advised that the annual Monitoring Report for Rangiora would be compiled after the end of the 2021/ 22 financial year, and it was anticipated that the date would be available in either September or October 2022.

Moved: J Roper-Lindsay Seconded: M Jolly

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** this update for its information, and with reference to the Committee's Working Groups, Action Plan, and Engagement Priorities in 2022.

CARRIED

4. COMMITTEE UPDATES – M GRIFFIN (ECAN)

4.1 Zone Committee Working Groups

- Landcare Working Group

  No discussion emanated from this point.

- Biodiversity Working Group

  No discussion emanated from this point.

- Coastal Catchments Working Group

  No discussion emanated from this point.

- Monitoring Working Group

  E Harvie stressed the importance of actually starting with the monitoring process to have the data to feed in the plans.

  Councillor S Stewart noted that in March 2021, the CWMS Waimakariri Zone Committee was advised that ECan was working on the Water Data Project to 'clean-up' its data sets. As part of the project, a Water Quality Data Viewer was being developed, which would enable the public to access the latest water quality data. She requested that the Committee be updated via memo on the progress of the project and when this information would be available

4.2 WDC Land and Water Committee – 22 March 2022

A Reuben questioned if the recycler truck currently used to suck and centrifuge out sediment from the Greens Road sediment trap on the Tuahiwi Stream would have a screen to ensure that it did no remove tuna heke. He expressed a concern that autumn was the time of year that the tuna heke headed out to sea and they would be easily sucked up by the recycler truck. Councillor S Stewart noted that the emptying of the sediment traps would be done as part of the drainage maintenance programme, and she assumed that they would be very careful to protect any aquatic live. However, she would question the procedures and protocol to be used and report back to A Reuben.

In response to question, Councillor S Stewart explained that the Cam River Enhancement Fund would only be used for fencing, when all other regulatory mechanisms had proven unsuccessful, and the Council could get a better environmental outcome by working with the landowner. However, they consulted with Anna Veltman from ECan to speak to the landowners, any fencing had to be permanent and there had to be a Memorandum of Understanding with the landowners.

4.3 Waimakariri Zone Communications Report (February 2022 and March 2022)

No discussion emanated from this point.

4.4 Ashley/Rakahuri River – Braided River Revival

M Griffin noted that the public consultation for the 'Rangiora Reach' was scheduled for 7 April 2022. However, Ngāi Tūāhuriri Rūnanga was currently busy with legal action against ECan about the commercial water bottling consent, which may delay in public consultation process for the Braided River Revival Project.

A Arps reported that the draft stage one of the project was being presented to the Rūnanga via Mahaanui Kurataiao Ltd. It was hoped that the project would be presented at the next Kaitaiki Hui. There was still quite a bit of work to be done, particularly in the river reach section of the project. ECan would be requesting feedback not only from the Rūnanga but also from the CWMS Waimakariri Zone Committee on this part of the Braided Rivers Revival during the next stage of engagement for the project.

In response to questions raised by J Roper-Lindsay, A Arps explained that there had been an Advisory Committee set up for the 'Rangiora Reach' which was a joint committee with members from the Council and ECan. The Advisory Committee had compiled the Engagement Plan, however, due to various factors there had been some delays and gaps in the consultation process. However, CWMS Waimakariri Zone Committee would be part of that next phase, where the feedback from public consultation would be used to create the Master Plan for the 'Rangiora Reach'. ECan could not speculate how the court action brought by Ngāi Tūāhuriri would impact on its public consultation process. However, it was hoped that the Braided River Revival Project could continue with the work already agreed to, such as the woody weed removal, boom transitions, fish passages etc. A Arps undertook to provide committee members with information about the ongoing Braided Rivers projects.

A Reuben noted that the Rūnanga participation in water processes and the work being done by water entities had been stopped. The opposition to the Tree Waters Reform by a number of councils had placed a strain on the relationships between Rūnanga and these entities.

4.5 CWMS Zone Committee Refresh 2022

J Roper-Lindsay reported that she would not be putting her name forward for the CWMS Zone Committee Refresh. She wished to concentrate of getting the Waimakariri Biodiversity Trust up and running.

4.6 Further Information Links

No discussion emanated from this point.

4.7 Action Points from previous Zone Committee Meetings.

M Griffin provided and overview of the actions points from previous meetings.

Moved: J Roper-Lindsay Seconded: J Cooke

THAT the CWMS Waimakariri Zone Committee:

(a) **Receives** these updates for its information, and with reference to the Committee's 2021 Work Programme and Community Engagement priorities.

CARRIED

5. CONFIRMATION OF MINUTES

5.1 Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee meeting – 31 January 2022

Moved: W Main Seconded: A Reuben

THAT the CWMS Waimakariri Zone Committee:

(a) **Confirms** the Minutes of the Canterbury Water Management Strategy Waimakariri Zone Committee meeting, held on 31 January 2022, as a true and accurate record.

CARRIED

6.2 Matters Arising

A Reuben noted that the pesticide levels in the Kaiapoi River had not been tested in five years and the information was, therefore, outdated. He therefore suggested that a new test be conducted. Councillor S Stewart agreed that new tests should be done, noting that due to the chemistry in the Kaiapoi River if was difficult to test for pesticides levels in the river sediment. M Griffin undertook to follow-up on the matter.

7. GENERAL BUSINESS

Nil

KARAKIA

A Reuben provided the karakia to close the meeting.

NEXT MEETING

The next meeting of the CWMS Waimakariri Water Zone Committee was scheduled for the 4 July 2022 at 3:30pm.

THERE BEING NO FURTHER BUSINESS, THE MEETING CLOSED AT 5.58 PM.

CONFIRMED

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Chairperson Date