Comprehensive Stormwater Network Discharge Consent Two-Year Report for 2024-2025

Prepared to meet the requirements of CRC252424

Christchurch City Council

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Christchurch City Council

Internal Document Review and Approval

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Acronyms and Abbreviations

ATL	Attribute Target Level
ASPM	Average Score Per Metric
CBA	Cost-Benefit Analysis
Council	Christchurch City Council
CHA	Cultural Health Assessment
CHI	Cultural Health Index
CSNDC	Comprehensive Stormwater Network Discharge Consent
C-CLM	Christchurch Contaminant Load Model
ECan	Environment Canterbury Regional Council
EMP	Environmental Monitoring Programme
ESCP	Erosion Sediment Control Plan
ICCM	Instream Contaminant Concentration Model
IDS	Infrastructure Design Standards
IGSC	Interim Global Stormwater Consent
ISDL	Industrial Stormwater Discharge Licence
IBI	Index of Biological Integrity
LWRP	Land and Water Regional Plan
NZFFD	New Zealand Freshwater Fish Database
MEDUSA	Modelled Estimates of Discharges for Urban Stormwater
MUSIC	Model for Urban Stormwater Improvement Conceptualisation
MCI	Macroinvertebrate Community Index
OARC	Otakaro–Avon River Corridor Regeneration
PAH	Polycyclic aromatic hydrocarbons
QMCI	Quantitative Macroinvertebrate Index
RHA	Rapid Habitat Assessment
SDMP	Sediment Discharge Management Plan
SMP	Stormwater Management Plan
SOT	State of Takiwā
TPRP	Technical Peer Review Panel
TSS	Total Suspended Solids
TOC	Total Organic Carbon
TWWM	Targeted Wet Weather Monitoring
WWDG	Waterways Wetlands Design Guide
WQI	Water Quality Index

1. Introduction

This report outlines the Christchurch City Council's 2024-25 stormwater consent activities, as required by our Comprehensive Stormwater Network Discharge Consent. This is the Councils first two-year report and details our ongoing stormwater and surface water monitoring results against consented attribute target levels, as well as our adaptive management approach to improving stormwater and waterway health.

The following table is a snapshot of the Councils consent activity areas and performance levels covered in detail in this report.

Our focus areas	Summary / status
Stormwater Management Plans (SMPs)	**Planning flood protection, ecology, water quality, and groundwater approaches for our catchments** We are making good progress with our completing our SMPs, with five out of seven certified, and the remaining two awaiting imminent completion.
Stormwater infrastructure	**Optimising our capital improvements** We continue to build stormwater infrastructure to reduce flooding and improve water quality. This includes mandating private industrial/commercial sites to build their own as required.
Modelling	**Understanding where containments/flooding is coming from, and how we can best mitigate these risks** Our stormwater modelling is showing that we are on track to meet our short- and medium-term water quality and quantity goals.
Environmental Monitoring	**Monitoring the health of our waterbodies and ecology** The city's rivers water quality and ecology health continues to be mixed, with some waterways achieving well, while others continue to suffer from a range of stormwater contaminants.
Proactive improvement and engagement	**Enhancing our stormwater performance** We continue to adapt surface water management to improve waterbody health through community and iwi engagement, industry compliance and research and development.

2. Purpose of the Annual Report

In December 2019, Environment Canterbury Regional Council (ECan), granted the Comprehensive Stormwater Network Discharge Consent (CSNDC) CRC252424, to the Christchurch City Council (Council). As per Condition 61, the Council must produce a Two-Year Report on 30 June, reporting on the previous two calendar years of consent activities undertaken. The Two-Year Report is provided to ECan, Papatipu Rūnanga (via Mahaanui Kurataiao Limited and Whitiora Centre Limited and is published on the Council's website.

This is the first CSNDC Two-Year Report and covers the period of 1 January 2024 to 31 December 2025, prior to this CSNDC reports were produced annually.

3. Summary of Developments Authorised under this Consent

General stormwater authorisation

The Council has authorised stormwater discharges under consent CRC252424, since 20 December 2019, when the consent order was issued. This occurs when an applicant (e.g. developer or customer building a new residential dwelling) applies for a resource consent, building consent, or subdivision consent; and is required to ensure that the discharge of stormwater from the building or site is legally authorised.

An applicant may then choose to request authorisation from the Council to discharge stormwater under consent CRC252424 or to obtain their own resource consent from ECan.

Authorised sites

The authorisations given by the Council to applicants have been for sites including subdivisions, redevelopment of commercial and industrial sites, residential housing units, schools, and individual house lots. Appendix A provides the list of sites that were authorised in 2024 and 2025 to discharge under the CSNDC, as required by Condition 61(h).

Condition 3 of the CSNDC required the Council to accept a wider range of discharges (including some which had been previously excluded) into its network from 1 January 2025. The process for managing these sites and their risks, are detailed in the Councils Transition Plan (Appendix B).

High risk dischargers

The Council still holds the ability under the Transition Plan to exclude unacceptably high risk dischargers into its network; these sites are then required to gain their own resource consent with ECan.

Excluding sites

A change of conditions application for the CSNDC was approved by ECan in January 2025, resulting in several minor amendments to the CSNDC conditions. One change that affects the Council's ability to manage discharges into its network is the revision to Condition 42(a), which now allows the Council to exclude sites from using the CSNDC if they do not comply with their Erosion and Sediment Control Plan (ESCP), these processes are detailed in the updated Sediment Discharge Management Plan (SDMP) (Appendix C).

4. Changes to Regulatory Framework Affecting Stormwater Management Plans (SMPs)

Plan change 7 of the Land and Water Regional Plan (LWRP) became fully operative on 10 March 2025, this plan changes dealt with several stormwater related issues such as river classifications, surface water quality limits, salmon spawning and bathing sites within the Christchurch district, particularly relating to the Waimakariri sub-chapter. These changes were visible in the 2023 draft version of Plan Change 7 and so were included in all relevant Council SMPs drafted post 2023.

The *Resource Management (Consenting and Other System Changes) Amendment Act 2025* brought in changes to pause councils' work on review and change of their RMA plans. This plan stop prevented ECan from undertaking any further plan and policy development and so little has occurred in this space since then.

5. Alignment with Christchurch-West Melton Sub-Regional Section of the Canterbury Land and Water Regional Plan

As stated above, Plan Change 7 - Christchurch-West Melton sub-regional section of the LWRP came into effect in 2023 and operative in 2025, no significant amendments were made to this document post 2023 and so no significant impact on the CSNDC implementation is expected in their current form.

6. Complaints or Observations regarding Spring Flow

There have been no specific complaints received by the Council regarding spring flow and/or quality. It is noted that spring flow is now included in the CSNDC Environmental Monitoring Plan.

7. Consent Compliance Reviews for 2024

ECan provided a CSNDC compliance monitoring report for the 2024 year to Council in January 2025. This report scored the Council as "Non-compliance - action required" for its implementation of the consent's conditions and requested the following actions be taken (*italics*) and Councils actions:

- *Condition 3c - Please submit the final Transition Plan, incorporating the changes requested in the email…, dated 5 November 2024.* The Transition Plan was provided to ECan and granted in 2025.
- *Condition 5, 6 and 15 - Please submit the revised Puharakekenui/Styx SMP and TPRP review by the 30 March 2025.* This SMP and TPRP review was submitted in June 2025 and again in December 2025.
- *Condition 40 - Please submit the Schedule 4 (s) – Pūharakekenui/Styx River Weed Management final report by end of June 2025.* This report was submitted in July 2025.
- *Condition 43, 44, 45 and 46 - Please provide an updated Sediment Discharge Management Plan, so that the document sets out reasonably practicable processes*

and practices to be implemented to manage the discharges of stormwater from development sites post Jan 2025. This report was submitted and approved in 2025.

No CSNDC compliance monitoring report was provided by ECan for the 2025 Calander year.

8. Engagement with Papatipu Rūnanga

The Council is committed to working in partnership and collaboration with Papatipu Rūnanga of the Christchurch District. The Papatipu Rūnanga include, in no particular order:

- Te Ngāi Tūāhuriri Rūnanga
- Te Hapū o Ngāti Wheke (Rāpaki)
- Te Rūnanga o Koukourārata
- Wairewa Rūnanga
- Ōnuku Rūnanga
- Te Taumutu Rūnanga

During the 2024–2025 calendar years, the Council engaged with Papatipu Rūnanga through Mahaanui Kurataiao Ltd, and from late 2025 also through Whitiora Centre Limited, on a range of stormwater matters. This engagement included four-monthly reporting and an annual meeting in relation to the CSNDC, as well as work on several SMPs, namely Te Pātaka o Rākaihautū-Banks Peninsula Settlements, the Ōtākaro-Avon River Area, and the Pūharakekenui-Styx River Area. In addition, cultural values monitoring was undertaken by Mahaanui Kurataiao Ltd across a number of catchments, including the Ōtākaro-Avon catchment, Whakaraupō (Lyttelton Harbour), and Te Roto o Wairewa (Lake Forsyth).

9. Stormwater Management Plans

9.1. Background and Purpose

SMPs are required to be developed and updated for each river catchment, as per CSNDC Conditions 4 and 5. Condition 6 and Schedule 2 provide the purpose and requirements of SMPs. These SMPs provide commentary on the future approach of the Council for these catchments in relation to flood protection, ecology, water quality, and groundwater. At the end of 2025, four SMPs had been certified by ECan and the remaining three SMPs were undergoing their final reviews, further details on the SMPs progress can be found in Table 1 below:

Table 1: Status of the SMPs including key submission dates (as of 30/12/2025).

SMP Area	Status	Key Dates	Action
Te Pātaka o Rākaihautū-Banks Peninsula Settlements	Processing	15 Dec 2025	Re-submitted to ECan
Ōtākaro-Avon River Area	Processing	20 May 2025	Further information requested
Pūharakekenui-Styx River Area	Processing	15 Dec 2025	Re-submitted to ECan
Huritini-Halswell River Area	Certified	10 April 2025	
Ōpāwaho-Heathcote River Area	Certified	28 March 2025	
Ihutai-Estuary and Coastal Area	Certified	17 Feb 2023	
Ōtukaikino-Outer Area	Certified	13 March 2025	

9.2. Progress to-date on SMP Programme

A key component of SMPs is the construction of new or retrofitted stormwater treatment and detention facilities. These facilities are designed to improve surface water quality and reduce flood risk within their respective catchments. Details of proposed future facilities at both private-site and sub-catchment scales are provided in the *Mitigation Plan* section of each SMP.

Table 2 below lists all stormwater treatment and detention facilities constructed during the 2024–2025 calendar years. This table focuses on sub-catchment-scale facilities serving more than one site.

Table 2: Stormwater Facilities Constructed between 2024-2025

Facility ID	Name	Type	Area (m^2)
Ōtākaro-Avon			
1241	1R Waianiwa Basin	Basin	362
1242	155R Mairehau Basin	Basin	970

1509	Forebay Drainage Forebay 01	Basin	129
1535	Hagley Park Drainage Swale 1	Basin	316
1536	Hagley Park Drainage Swale 2	Basin	196
1566	Snellings Drain Realignment	Swale	312
1568	Avon Park Swale1	Basin	996
1652	76 Banks Ave Rain Garden	Rain Garden	8
Te Pātaka o Rākaihautū-Banks Peninsula			
1543	Onuku-Swale 1	Basin	440
1544	Onuku-Swale 2	Basin	69
1545	Onuku-Swale 3	Basin	144
1546	Onuku-Swale 4	Basin	123
1567	888 Feltham Basin	Swale	28
Estuary and Coast-Ihutai			
1651	Kakatai Basin	Basin	999
Huritini-Halswell			
1497	Sabys Retaining Structure-Basin3	Basin	3347
1498	Sabys Retaining Structure-Basin4	Basin	16,076
1499	Sabys Retaining Structure-Basin5	Basin	6,921
1569	Sabys Stg3 Drain1	Swale	2,045
1570	Sabys Stg3 Drain2	Swale	869
1655	Rossendale Basin 1	Basin	20,815
1656	Rossendale Basin 2	Basin	25,047
1657	Rossendale Basin 3	Basin	8,246
1658	Rossendale Basin 4	Basin	7,973
1667	Wigram Rd Swale 1	Swale	888
Ōpāwaho-Heathcote			
1560	Cashmere Estate Van Swale	Swale	879
1561	Cashmere Estate Mac Swale	Swale	1,432
1562	Cashmere Estate Wim Swale	Swale	703
1563	Cashmere Estate Nix Swale	Swale	156
1653	Awatea Development Swale	Swale	855
1659	785 Main North Swale	Swale	244
1660	Blencathra Basin	Basin	10,125
1665	Te Kaha Turf Farm Basin	Basin	4,803
1666	Te Kaha Turf Farm Basin	Basin	2,941
Ōtūkaikino			

1649	"Arterial" subcatchment temporary Basin	Basin	6,076
1650	"Arterial" subcatchment temporary FF Basin	Basin	4,500
Pūharakekenui-Styx			
971	Highsted Highams FF	Basin	27,367
1243	Waitikiri Swale	Basin	2,854
1244	Waitikiri Basin	Basin	210
1468	Highfield Oakbridge North FF	Basin	8,812
1469	Highfield Oakbridge North	Basin	16,196
1470	Highfield Oakbridge North Wetland	Wetland	13,733
1474	Blakes Road-Attenuation Basin	Basin	5,827
1475	Blakes Road-First Flush Basin	Basin	7,082
1476	Blakes Road-Wetland Basin	Basin	10,108
1489	Cunliffe Subdivision-Attenuation Basin	Basin	1,608
1490	Cunliffe Subdivision-First Flush Basin	Basin	1,018
1491	Cunliffe Subdivision-Swale 1	Basin	131
1492	Cunliffe Subdivision-Swale 2	Basin	88
1493	Cunliffe Subdivision-Swale 3	Basin	44
1494	Cunliffe Subdivision - Wetland Basin	Basin	2,219
1500	Millstead Pond-Overland Swale	Basin	611
1531	Oaklands Drainage-Pond 1	Basin	3,349
1532	Oaklands Drainage-Pond 2	Basin	574
1533	Oaklands Drainage-Rapid Soakage	Basin	54
1534	Oakbridge Drainage-FFB	Basin	1,666
1654	CCC Swale	Swale	229
1668	Highsted Bypass Channel	Swale	4,062
1669	Highsted CELL 1A	Basin	2,552
1670	Highsted CELL 1B	Basin	5,512
1671	Highsted CELL 1C	Basin	3,341
1672	Highsted CELL 2A	Basin	2,523
1673	Highsted CELL 2B	Basin	2,690
1674	Highsted CELL 2C	Basin	2,032

9.3. Summary of Contaminant Load Reduction Targets in SMPs

Condition 19 requires the Council to specify target contaminant load reductions, which will largely be achieved through the proposed treatment facilities and devices.

To support this, a contaminant load model was adapted to Christchurch conditions by Golder Limited and applied across the four major catchments, forming the Christchurch Contaminant Load Model (C-CLM). Additional, separate models were developed for the Ihutai-Estuary and Coastal catchment, and for Ōtukaikino.

This two-year report also expands coverage to include Banks Peninsula.

Table 3 and Table 4 summarises the numerical reduction targets proposed in the respective SMPs over a 10-year period. These targets are derived from the outputs of the contaminant load models described above

Table 3: Respective SMP contaminant load target reductions (tonnes/year) associated with proposed treatment facilities compared to the consent application base year 2018

Contaminants	Ōtākaro - Avon	Pūharakekenui -Styx	Huritini - Halswell	Ōpāwaho - Heathcote	Ihutai Estuary and Coastal Area	Ōtukaikino / Outer Area
TSS	11.2%	22.3%	14.4%	18.5%	3.40%	In proportion to development up to 69% reduction on present day
Total Zinc	9.3%	29.0%	13.7%	12.7%	5%	In proportion to development up to 53% increase on present day
Total Copper	10.6%	34.5%	15.5%	17.9%	5.30%	In proportion to development up to 14% reduction on present day

Table 4: :SMP contaminant load target reductions for Te Pātaka o Rākaihautū / Banks Peninsula Settlements

Contaminant	Modelled Settlement contaminant loads in 2025 without treatment (kg)	Modelled Settlement contaminant loads in 2035 without treatment (kg)	Reduction target through treatment by 9-12 devices (kg/yr)
Total suspended solids	626,000	623,000	450
Total zinc	378	389	4.1
Total copper	20	20	0.18

9.4. Table 2 contaminant load reductions – 5 year report

Council is required to report at five yearly intervals on whether the contaminant load reduction standards under Condition (19) and targets developed through the SMPs are being met. In order to do this, Council commissioned WSP to update the stormwater facilities and their respective catchments in the C-CLM.

The report on this work is attached as Appendix D. The review shows that Council remains on target to meet the 5 and 10-year scenarios for Table 2 (CSNDC), but is tracking slightly down for the 25-year scenario (2043), as shown in the Table 5 below.

Table 4-1: Reduction in stormwater contaminant load comparison with Table 2 results from CSNDC

		Contaminant load compared to no treatment (as at 2018)	**5 years from 2018 compared to no treatment (as at 2023)**	10 years from 2018 compared to no treatment (as at 2028)	25 years from 2018 compared to no treatment (as at 2043)
TSS	CSNDC C-CLM	12%	**21%**	25%	29%
	2024 v1 C-CLM	15%	***26%***	*28%*	***26%***
Total Zinc	CSNDC C-CLM	10%	**15%**	18%	21%
	2024 v1 C-CLM	9%	***16%***	*19%*	***16%***
Total Copper	CSNDC C-CLM	15%	**23%**	28%	31%
	2024 v1 C-CLM	16%	***26%***	*29%*	***26%***

Table 5: Contaminant load reductions comparison with Table 2 of CSNDC by WSP

The report provides a catchment-by-catchment breakdown of where Council is experiencing gains or losses in contaminant removal as against the C-CLM. While the catchment level breakdown is not a standard that Council needs to comply with, it does provide a helpful insight into where Council needs to focus more attention.

This analysis shows that the Huritini–Halswell, Ōpāwaho-Heathcote catchments are generally ahead of the targets, whereas the Ōtākaro- Avon and Pūharakekenui-Styx are behind, although this does vary by contaminant. This analysis will guide Council's investment to remain on target to comply with Table 2 (CSNDC).

10. Environmental Monitoring Programme (EMP)

The EMP, as per Condition 49, has been developed and implemented to determine whether receiving environment objectives and Attribute Target Levels (ATLs) are being met.

The monitoring carried out under this programme includes monitoring of soil quality at infiltration facilities; groundwater; surface water levels and flows; sea level, and rainfall levels; surface water quality; instream sediment quality; aquatic ecology; and mana whenua values. The latest EMP Version 11 included a new detailed groundwater monitoring programme which is currently being implemented by Council.

The current EMP Version 11 was submitted to ECan in December 2025 (Appendix E) and approved in January 2026.

10.1. Soil Quality Monitoring at Infiltration Facilities

Chapter 2 of the EMP requires the sampling of soil from six different infiltration facilities located across the district, on a five-yearly basis.

Previous monitoring was undertaken in 2010, 2015, and 2020, in February 2025 Council undertook soil sampling (Appendix F) at the same six infiltration facilities to assess if stormwater contaminants are accumulating at levels of concern within the soil profile at these facilities.

Of note from the 2025 monitoring:

- There is no significant accumulation of contaminated sediments on the ground surface of the basin/swale areas from the stormwater network discharges.
- The potential risk to human health via contact from the continued use of these areas as par/recreation land is considered to be acceptably low.
- The low-level total concentrations reported in the soils indicate a low likelihood of potential impacts to the underlying shallow groundwater via infiltrating stormwater within the basin/swale areas.

Trend analysis of the 2025 results and past sampling events found:

- Overall, zinc levels are recorded at higher concentrations across all sampling sites, compared to other contaminants (lead and copper).
- There appears to be an increasing trend of zinc concentration at Tumara Park, Richmond Housing and Grove Road
- All other parameters generally fall within the historic range of concentrations measured.

To date, all contaminant concentrations (heavy metals and polycyclic aromatic hydrocarbon (PAHs)) across the six facilities are well below the applicable soil quality guideline value.

10.2. Groundwater

A groundwater quality and quantity study covering the lower Otakaro - Avon catchment was undertaken in 2025 by WSP (Appendix G) as part of the Councils Otakaro–Avon River Corridor Regeneration (OARC) Project.

This groundwater study undertook two rounds of groundwater sampling in October and December 2025 across 20 shallow bores (1.8-3.8m in depth) shown in Figure 1 below, for a wide range of parameters which were compared against LWRP Schedule 5 (freshwater spring feed) and ANZG Freshwater Toxicant GVGs LOSP, 2023 (90% level protection).

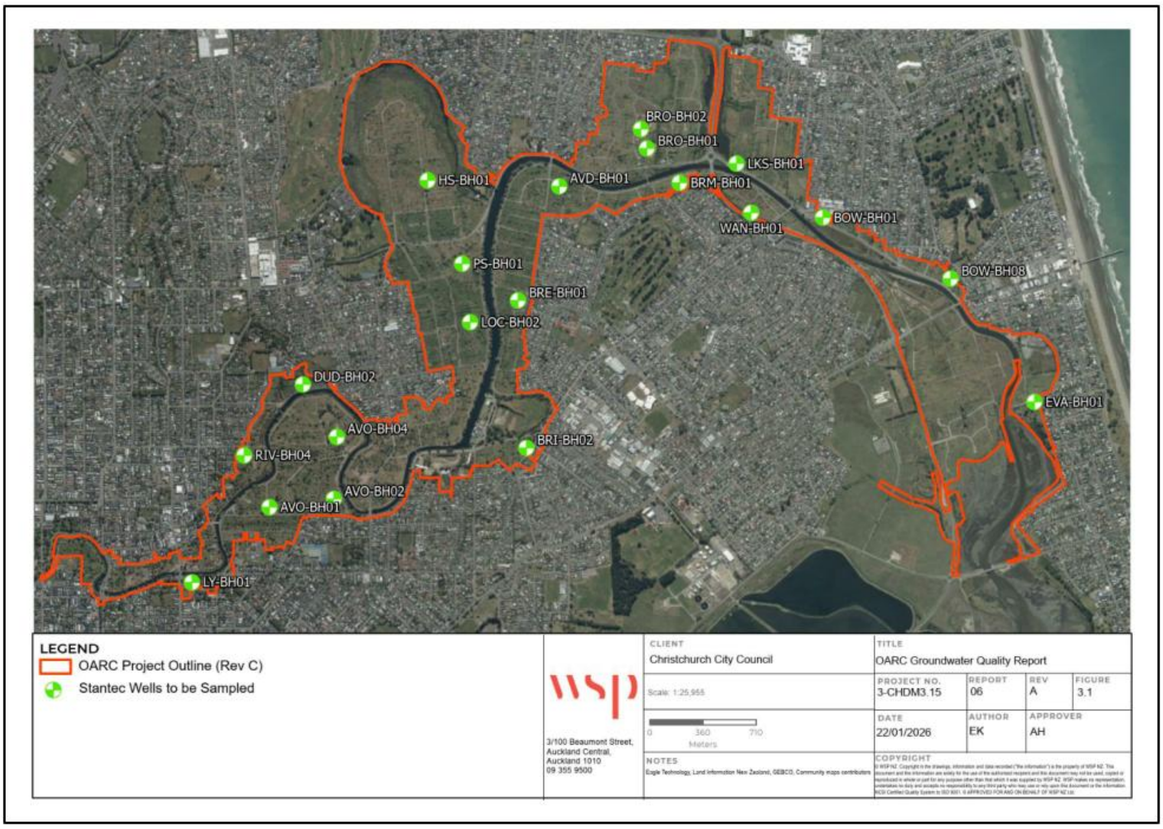

Figure 1: Groundwater quality monitoring wells sampled in 2025 by WSP

Groundwater quality data from the October and December 2025 monitoring rounds were consistent with results from previous investigations across the OARC, including Wainoni. The primary contaminants of interest were dissolved metals (copper, lead, nickel, zinc), nitrogen, and occasional low-level pesticides (OCPs). Organic contaminants (e.g. TPH, BTEX, PAHs, VOCs) were not widely detected, and any detections were low and limited to few wells.

Low concentrations of OCPs reported in earlier studies (e.g. Wainoni and Bexley) were near historical reporting limits, indicating low risk. In 2025, dissolved metals remained the main COI, with widespread copper and zinc exceedances and localised lead and nickel exceedances, similar in magnitude to past results and likely related to land use. Nitrogen concentrations were broadly similar to earlier data, with slightly higher nitrate in some wells, while zinc concentrations were generally higher than previously reported.

In 2026 WSP produced “Groundwater Quantity – Impact Assessment” (Appendix G) as part of the OARC Regeneration Project, this report took a detail look at the aquifer systems below the OARC and how they are impacted by both human and natural processes. In regard to groundwater levels, the report concluded:

- Key groundwater level extremes occurred between 2020 and 2025, with median levels recorded on 28 January 2022, minimum on 1 February 2020, and maximum winter levels in July 2022–2025. Groundwater flow modelling from the first fully saturated layer (Layer 4) shows consistent drainage toward surface water features and the coast, although localised shallow mounding is not represented.
- Groundwater levels fluctuate by up to 1.5 m, with the greatest variation in elevated areas away from drainage features and the least variation near major drains such as the Ōtākaro-Avon River, Travis Wetland, and areas influenced by leakage from the Riccarton Gravels. Surface expression of groundwater is expected during peak levels. Groundwater pressures range from 1.5–6.75 mRL, with higher pressures in deeper layers driven by upward leakage from the Riccarton Gravels, strongest beneath the city centre.

The Council has been recording groundwater levels across the district since the 1960s. Currently this monitoring network consists of 27 groundwater level sites, which are displayed in Figure 2.

This network of groundwater level monitoring bores helps to identify patterns of water level change, some of which may be affected by stormwater management systems. Continued monitoring of the groundwater levels within this network is a requirement of CSNDC and is currently undertaken by National Institute of Water and Atmospheric Research (NIWA), reports for the 2024-2025 calendar years are provided in Appendix (G).

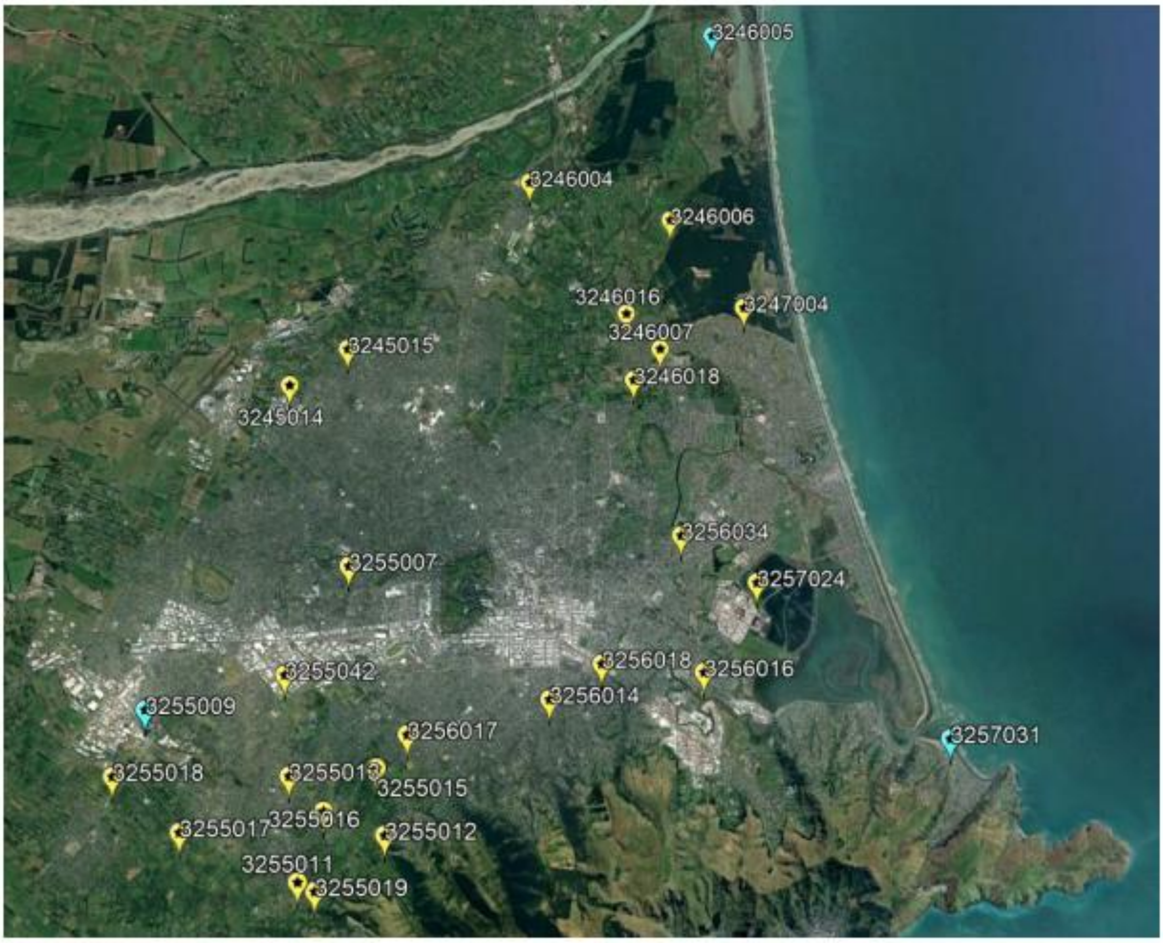

Figure 2: Councils groundwater level sites 2024 (NIWA)

The EMP v11 groundwater section details the Council's new groundwater quality, springs and levels monitoring programme, which is focused around six stormwater basins. As this new monitoring programme was only finalised at the end of 2025, no monitoring occurred within the timeframe of this report. Council aims to start monitoring in March 2026 and provide a detailed groundwater report to ECan in 2028 as part of the next CSNDC reporting cycle.

10.3. Stormwater Quantity Models (Condition 55)

Condition 55 requires water quantity/flood models for the Pūharakekenui-Styx, Ōtākaro-Avon, Ōpāwaho-Heathcote and Huritini-Halswell Rivers to be updated at least every 5 years to reflect changes in development patterns or modelling parameters. Once updated, the catchment flood models are then required to be compared to modelling for the consent baseline years in Schedule 10, with a description of compliance with the consent attributes targets included in two year reports.

All catchment flood models have been updated at the time of writing. The Ōtākaro-Avon flood model update was completed within the period of this 2 yearly reporting (2024-2025).

Table 6: Catchment flood model reporting status

Catchment	Status	Compliance reporting
Avon	Model update and compliance reporting completed	Included in reporting for 2025 (this report)
Heathcote	Model update and compliance reporting completed	Included in reporting for 2023 https://ccc.govt.nz/assets/Documents/Environment/Water/CSNDC-Annual-Reports/2024/CSNDC-ANNUAL-REPORT-2024-FINAL2.pdf
Halswell	Model update completed	To be included in annual reporting for 2026
Styx	Model update completed	To be included in annual reporting for 2026

The latest update to the Avon flood model was completed in 2025. Updates to modelled infrastructure and development patterns produced a model which is considered generally representative of 2023 conditions. For compliance reporting, the results of this model are compared to modelling of baseline 2014 conditions. The methodology of this comparative modelling has been peer reviewed as part of the compliance demonstration process.

Schedule 10 requires an increase in modelled water levels at Gloucester Street of no more than 50 mm (0.05 m) between the latest modelled water levels and the 2014 modelled baseline, for the 2% AEP event.

Table 7: Avon model Schedule 10 comparison

	Water levels (m CDD)		**Difference**
Location	2% AEP 2023	2% AEP 2014	2% AEP modelled increase
Avon River at Gloucester Street Bridge	13.673	13.651	22 mm

The modelled water level difference is 22 mm, therefore the assessment is within the Maximum Increase target of 50 mm.

CSNDC Schedule 2 requires that SMPs also include identification of key locations for modelling assessment, in addition to the Gloucester Street location specified in Schedule 10.

Results are reported below (Table 8) for locations proposed in the SMP, as submitted to ECan.

Table 8: Avon model SMP location comparison

	Modelled Water Levels (RL CDD)				Difference	
Location	10% AEP 2023	10% AEP 2014	2% AEP 2023	2% AEP 2014	10% AEP modelled increase	2% AEP modelled increase
Avon River at Gloucester Street Bridge	13.242	13.230	13.673 (as above)	13.651 (as above)	12 mm	22 m (as above)
Wairarapa Stream at railway bridge	18.769	18.736	19.224	19.171	33 mm	53 mm
Avon River at railway bridge	17.866	17.764	18.084	18.081	2 mm	3 mm
St Albans Stream at Stapletons Road bridge	12.107	12.811	12.246	13.142	-704 mm	-896 mm

Minimal difference in water levels is noted in the Ōtākaro-Avon, upstream of Gloucester Street, when compared at railway bridge. An increase is predicted within the tributary of Wairarapa Stream due to changes in this sub-catchment. A large decrease in water levels from 2014 to 2023 is observed within St Albans Stream at Stapleton Rd. This decrease in water levels can be attributed to the construction of the Lower Dudley Diversion, which provides significant drainage improvements.

10.4. Waterway and Coastal Waters Monitoring

10.4.1. Surface Water Quality

Surface water quality monitoring was carried out for the 2024 and 2025 monitoring years, in accordance with Chapter 5 of the EMP. Full reports can be found in Appendix H.

In 2024, water samples were collected from 47 sites in Banks Peninsula (Stream Reserve Drain/Zephyr Stream, Balguerie Stream, and Aylmers Stream), Ōtākaro-Avon River, Ōpāwaho-Heathcote River, Huritini-Halswell River, Pūharakekenui-Styx River, Ōtūkaikino River, and Linwood Canal. Samples from four coastal sites included Ihutai-Avon-Heathcote Estuary, Lyttelton Port, Cass Bay, and Akaroa Harbour.

In 2025, water samples were collected from 51 within freshwater and coastal areas of Christchurch and Banks Peninsula. These sites predominately include waterways within the five main river catchments of Christchurch (Ōtākaro-Avon River, Ōpāwaho-Heathcote River, Pūharakekenui-Styx River, Huritini-Halswell River and Ōtūkaikino River), waterways within Banks Peninsula settlement areas and coastal areas within Christchurch and Banks Peninsula.

Relevant guideline levels and consent ATLs are used to assess the potential effects of stormwater contaminants on aquatic life. The key contaminants assessed under the consent framework are total suspended solids, dissolved copper, dissolved zinc and dissolved lead. Other water quality parameters that are not specifically included in the consent schedules are assessed against the most appropriate guideline values set out in the Environmental Monitoring Programme (EMP).

Guideline values for copper and zinc have been updated since the original consent schedules were prepared. For the 2024/25 reporting period, copper and zinc were assessed using the updated Gadd et al. (2023) guidance, consistent with EMP and agreed by Council. Compliance was assessed using annual median concentrations for bioavailable copper and lead, and monthly exceedances for dissolved zinc.

Long-term analyses, including state and trend assessments, were undertaken using methods consistent with the EMP and previous annual reports to maintain comparability over time. Where relevant, comparisons between historic and updated assessment methods are also provided, with supporting rationale, guideline details and data limitations set out in the appendices.

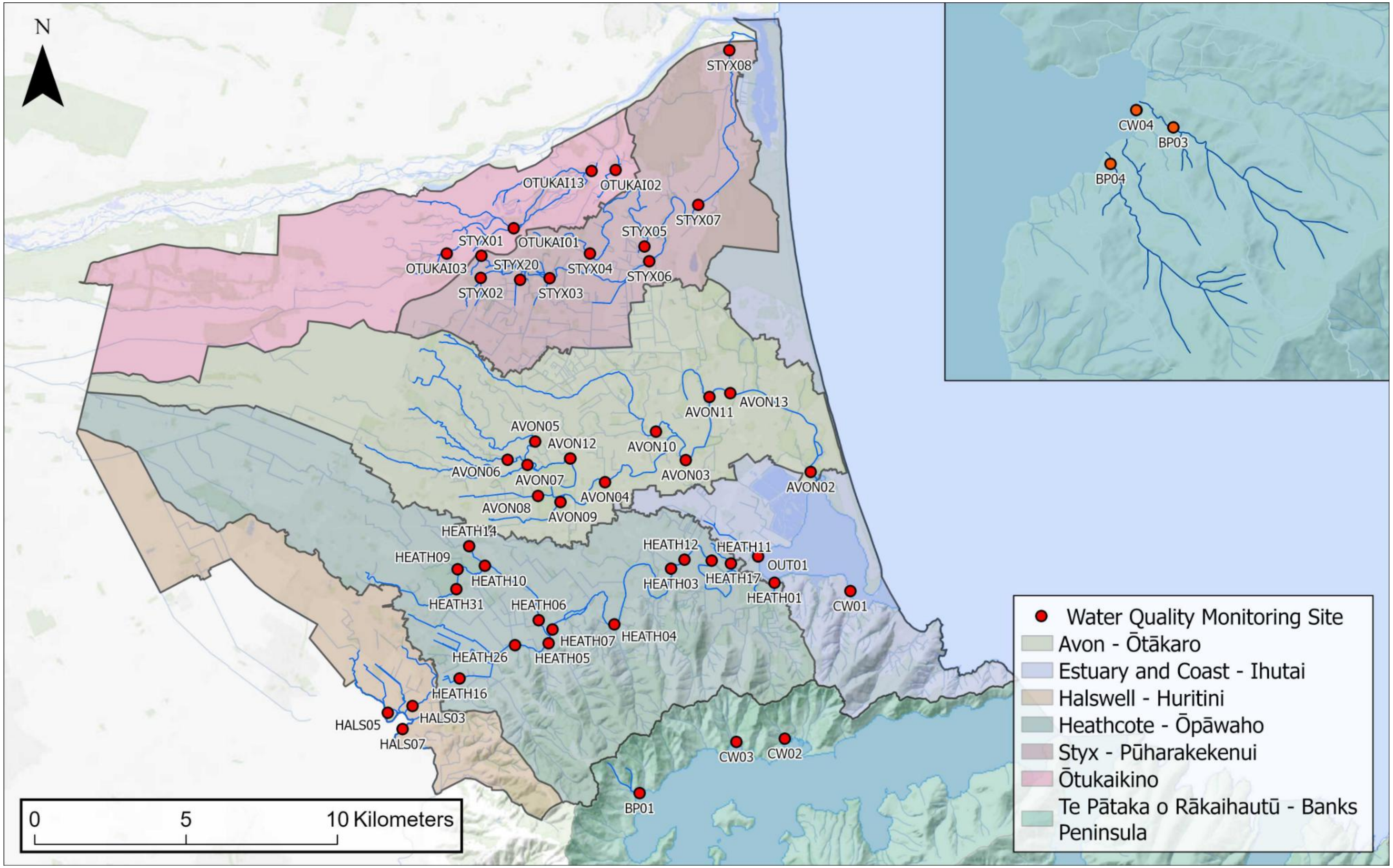

Figure 3: Surface water quality monitoring sites. Credit: Instream Consulting Limited

2024 Results

For the 2024 monitoring year, 27% of samples were influenced by rainfall. Trends were identified using a combination of newly emerging patterns, noteworthy changes from the previous year, and site-specific knowledge, noting that many sites have relatively short datasets of approximately 4 to 5 years.

Notable declining water quality trends included increases in dissolved inorganic nitrogen at Aylmers Stream (21% annually), total suspended solids at Akaroa Harbour (25% annually), turbidity at Curlett Stream at Motorway (25% annually) and Steamwharf Stream (17% annually), and salinity at Linwood Canal (20% annually). These changes indicate potential nutrient enrichment, sedimentation inputs, and elevated salinity effects, with some sites warranting closer monitoring due to ecological sensitivity, including inanga spawning habitat.

Positive trends were observed for dissolved copper at Ōtākaro-Avon River in Avondale and Ka Putahi Creek at Belfast Road, and dissolved lead at both Curlett Road Stream sites and the Heathcote River at Opawa.

Based on the Water Quality Index (WQI), three sites were rated Very Good (Heathcote at Bowenvale Ave, Ōtūkaikino at Scout Camp & Ōtūkaikino at Groynes), nineteen Good, fifteen Fair, nine Poor and one very poor (Stream Reserve Drain). Two sites (Haytons Stream & Halswell at Wroots Road) demonstrated improving WQI trends, while Dudley Creek declined. No catchments recorded significant long-term WQI change overall. The best performing catchment was Ōtūkaikino, while the poorest performing was Linwood Canal.

Twenty-five sites did not meet the Attribute Target Level (ATL), with priority investigative sites at Nottingham Stream at Candys Rd, Heathcote at Ferrymead Bridge and Stream Reserve Drain identified. Investigation proceeded at Nottingham Stream whereas time constraints and site logistics prohibited progress at the other sites.

2025 Results

The 2025 monitoring results show mixed performance, with only around 30% of sites fully meeting consent ATLs (Figure 4). Compliance was generally better in less urbanised catchments such as Pūharakekenui-Styx River and Ōtūkaikino, while a small number of sites-particularly in the Heathcote catchment continue to show persistent exceedances and remain priorities for investigation.

Dissolved zinc remains the primary contaminant of concern, with the highest proportion of ATL exceedances and declining trends, although the magnitude of change is relatively minor. In contrast, most sites exhibited improving trends for dissolved copper and lead. Broader water quality indicators (including turbidity, nutrients, conductivity, and E coli) are largely consistent with previous years. Water Quality Index scores have improved at some sites, notably Addington Brook and Dudley Creek, transitioning from poor to fair condition.

Changes to copper and zinc assessment methods in 2025, incorporating toxicity-modifying factors, have influenced compliance outcomes and provide a more accurate representation of ecological risk. As a result, some apparent changes in compliance reflect methodological updates rather than true shifts in water quality.

Overall, while there are signs of improvement at some locations, urban waterways continue to experience contaminant pressures. Priority sites have been recommended for further investigation, particularly where multiple exceedances, declining zinc trends, and sensitive receiving environments coincide.

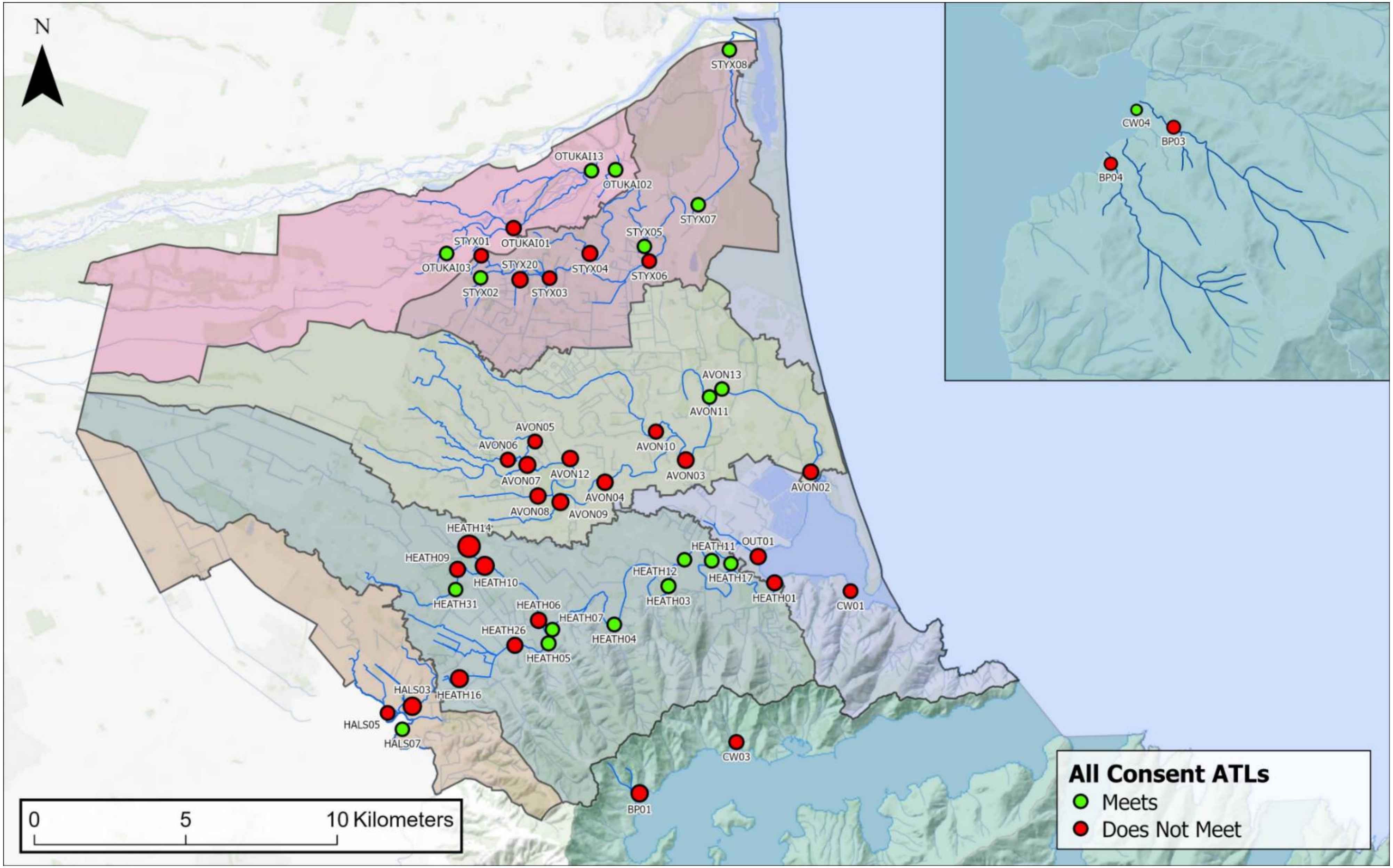

Figure 4: Map of sites meeting or failing All Consent ATLs. Credit: Instream Consulting Limited.

10.4.2. Instream Sediment Quality and Aquatic Ecology

Instream sediment quality and aquatic ecology monitoring has been included in the two-year report and provides context on overall waterway health. For the 2024 & 2025 monitoring years, the following was carried out in accordance with Chapters 6 and 7 of the EMP;

2024 Monitoring Sites: Instream Consulting Limited sampled a range of ecology and sediment sites in February and March 2024. This included five-yearly ecology sites in the Ōtākaro-Avon River catchment, annual ecology sites in Wilsons Drain and Cashmere Stream, and instream sediment quality sites within the Ōtākaro-Avon. Existing annual macroinvertebrate data from selected Ōtākaro-Avon and Banks Peninsula sites were also reviewed to provide wider context and support the Environmental Monitoring Programme.

Table 9: Five-yearly monitoring sites in the Ōtākaro-Avon catchment sampled in 2024.

Site Code[1]	Waterway	Site Name/Location	Easting (NZTM)	Northing (NZTM)
AVON25	Okeover Stream	University of Canterbury Glasshouses	1566687	5180996
AVON22	Waimairi Stream	Fendalton Park	1567011	5181168
AVON06**	Waimairi Stream	Downstream of Railway Bridge	1568233	5181172
AVON23	Wairarapa Stream	Upstream of Glandovey Road	1567225	5181608
AVON05**	Wairarapa Stream	Downstream of Fendalton Road	1568250	5181303
AVON08**	Riccarton Main Drain	Downstream of Deans Avenue	1568683	5180019
AVON09**	Addington Brook	Upstream of Riccarton Avenue	1569427	5179826
AVON10**	Dudley Creek	North Parade	1572574	5182150
AVON26**	Avon River	Clyde Road	1566766	5180682
AVON07*	Avon River	At Mona Vale	1568334	5181046
AVON21	Avon River	Downstream of Mona Vale Loop	1568634	5180880
AVON12*	Avon River	Carlton Mill Corner	1569737	5181259
AVON19	Avon River	Botanic Garden North Car Park/in Hagley Park	1569390	5180398
AVON18	Avon River	Upstream of Montreal Street/near Durham Street	1570089	5179759
AVON17**	Avon River	Victoria Square Near Armagh Street	1570498	5180473

AVON04*	Avon River	Manchester Street	1570890	5180481
AVON16	Avon River	Downstream of Kilmore Street (Ōtautahi)	1571260	5180717
AVON03**	Avon River	Dallington Terrace/Gayhurst Road	1573560	5181210
AVON13**	Avon River	Avondale Road	1574752	5183557
AVON01**	Avon River	Pages/Seaview Bridge	1577484	5182589
AVON02*	Avon River	Bridge Street	1577691	5180813

Note: 1 * indicates sediment quality site only; ** indicates sediment and ecology site; no symbol means ecology site only. The EMP site code prefix "AVON" has been omitted for ease of tabulation and plotting.

Table 10: Annual ecology monitoring sites. The Cashmere Stream and Wilsons Drain sites were sampled by Instream for CCC in February/March 2024, the other sites were sampled by ECan in November 2023.

Site Code[1]	Waterway	Site Name / Location	Easting (NZTM)	Northing (NZTM)
HEATH28	Cashmere Stream	Behind 420–426 Cashmere Road (upstream of stormwater discharge)	1567362	5174782
HEATH27	Cashmere Stream	Behind 406 Cashmere Road (downstream of stormwater discharge)	1567453	5174866
OTUKAI02	Wilsons Drain	At Main North Road (Ōtūkaikino Reserve)	1571246	5190823
OTUKAI06	Wilsons Drain	At Tyrone Street	1570719	5189928
SQ00684	Balguerie Stream	At Stony Bay Road	1598639	5148931
BP03 / SQ00170	Balguerie Stream	Downstream of Settlers Hill Road	1597746	5149579
SQ00130	Waimairi Stream	Kotare Street	1567032	5181168
SQ00063	Dudley Creek	Corner of Banks Avenue and North Parade Road	1572819	5182466
SQ00129	Avon River	UCSA	1566173	5180855
SQ00128	Avon River	Victoria Square	1570508	5180466

Note: [1] Site codes with an "SQ" prefix are from ECan's monitoring network.

2025 Monitoring Sites: Between February and March 2025, Instream Consulting Limited sampled instream sediment quality sites across the district including sites in the Ōtākaro-Avon, Ōpāwaho-Heathcote, Pūharakekenui-Styx, Huritini-Halswell, Ōtukaikino, Estuary and Coast-Ihutai, and Banks Peninsula.

The sites are classified under the Canterbury Land and Water Regional Plan, mainly as Spring-fed plains or Spring-fed plains urban, with Banks Peninsula sites having their own classification. These classifications help inform relevant water quality standards, management approaches and consent ATLs used to assess ecology and sediment quality monitoring results.

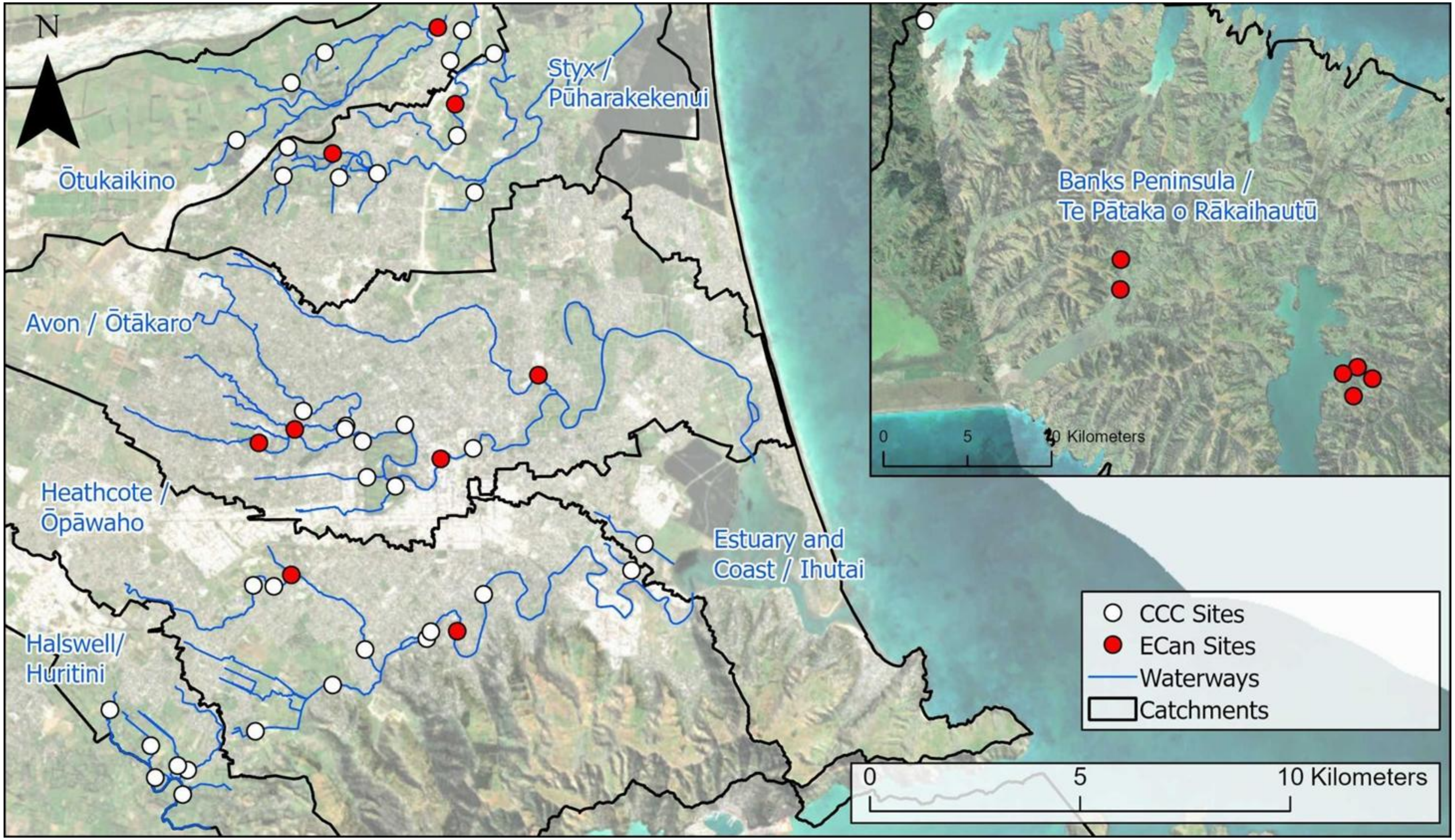

Figure 5: Annual ecology monitoring sites. Credit: Instream Consulting Limited

Habitat & Water Quality

2024: Habitat quality in the Ōtākaro-Avon catchment is in a poorer state, compared to less urbanised waterways in the district. The identified issues include lack of sufficient native riparian vegetation to shade and buffer waterways and high bed cover with deposited fine sediment and high macrophyte cover. This observation remains consistent with previous monitoring. However, there are indications of slowly improving habitat quality at some locations, based on long term annual monitoring data from ECan.

Riverbed sediments at wadable sites contained a slightly higher proportion of silt and sand compared with previous years, when gravel and pebble substrates were more dominant. Although substrate composition differed between significantly between sites, differences between years were weak and not statistically significant.

Sediment depth remained low across the monitoring period, ranging from around 2 cm to 4 cm across all sites. While some statistical differences were recorded between sites and years, the overall change in sediment depth was small and unlikely to be ecologically meaningful.

Fine sediment cover was generally complaint with consent target, with 14 monitored sites meeting the 30% fine sediment cover threshold in 2024 (Figure 6) This represents an improvement compared with previous monitoring years. Although fine sediment cover varied between sites and years, there was no observed evidence of an increasing trend over time.

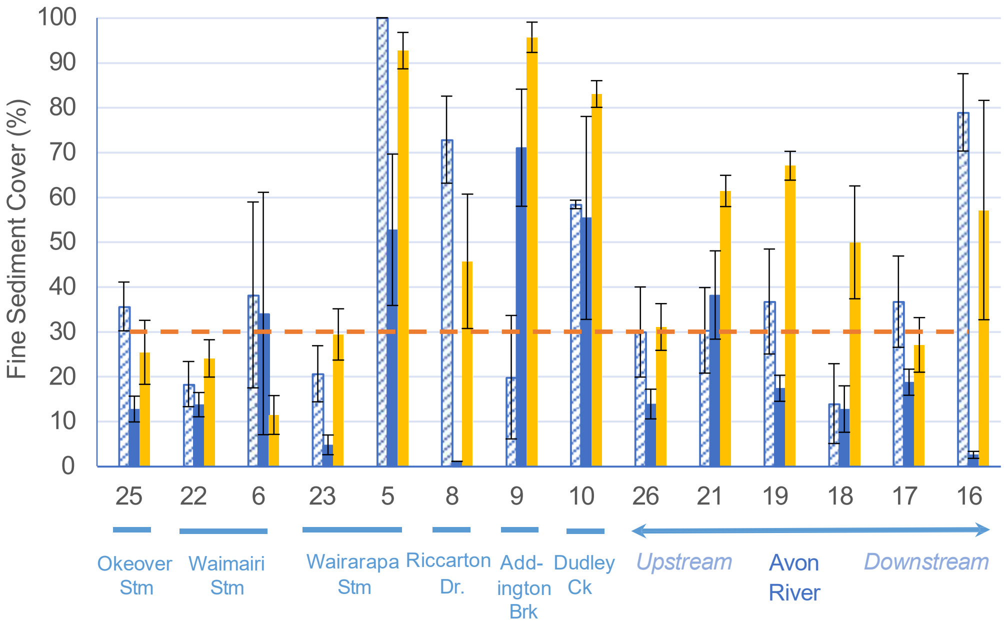

Figure 6: Mean (± 1 SE) fine sediment cover at the 14 wadable sites. No data was collected in 2009 for fine sediment cover. Credit: Instream Consulting Limited.

Macrophyte cover at monitored wadable sites has generally been dominated by submerged species, while emergent macrophyte cover has remained low across all monitoring years. Total macrophyte cover was often high and exceeded at 60% consent Attribute Target Level at most sites sampled in 2009, 2019 and 2024. However, this is likely influenced by the timing of monitoring in relation to routine macrophyte clearance works undertaken by council contractors.

Long filamentous algae cover was low at most wadable sites, with 12 out of 14 sampled sites meeting the consent target of less than 30% cover. There was no significant difference in filamentous cover between sites or years, and no evidence of increasing or decreasing trend over time.

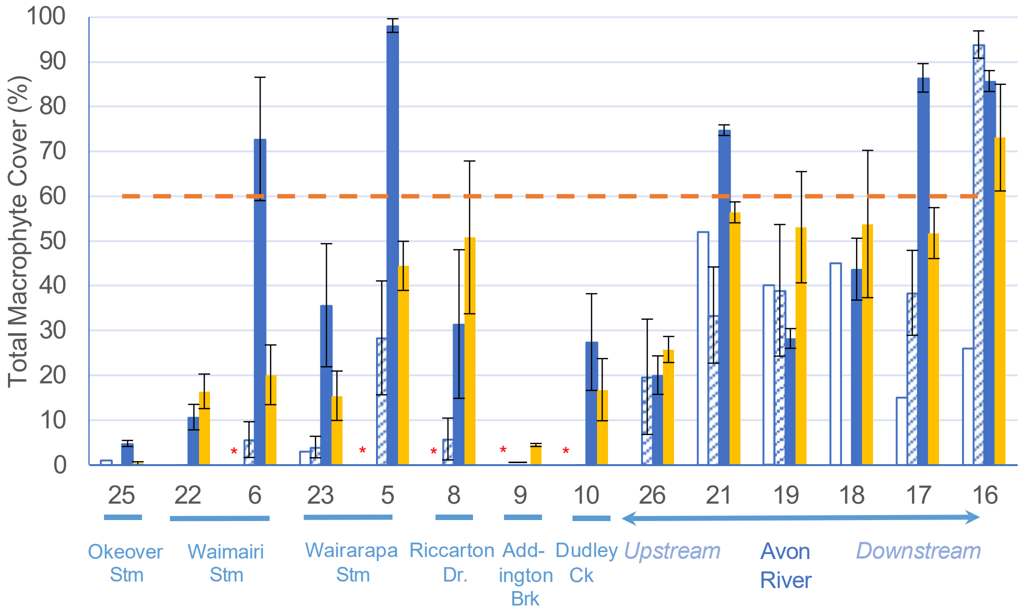

Figure 7: Bed cover with total macrophytes at the 14 wadeable sites. Asterisks indicate no data was collected for that year. Credit: Instream Consulting Limited.

Trends at Annual Monitoring Sites

Cashmere & Otukaikino Sites

Macrophyte cover is generally high at the two Cashmere Stream monitoring sites and often exceeds the 30% consent trigger level. Results at the Otukaikino sites have been more variable. However, these changes are likely influenced by the timing of the macrophyte removal works, therefore it is difficult to draw firm conclusions about long-term trends.

Fine sediment cover has also remained consistently high across all four monitoring sites, generally exceeding the 20% consent trigger level. However, because these waterways are naturally soft-bottomed, this guideline is not especially relevant for assessing compliance in these streams.

Balguerie Stream Avon Catchment Sites

Habitat quality has generally been better at the two Balguerie Stream sites than at the four Ōtākaro-Avon catchment sites over the monitoring period. This is likely because Balguerie has more intact riparian margins and less surrounding urban land use.

The downstream Balguerie site has generally had lower habitat quality than the upstream site, probably reflecting greater effects from nearby settlement and agricultural land use. Most Ōtākaro-Avon catchment sites showed improving habitat trends, while Dudley Creek and the downstream Balguerie site showed no clear increasing or decreasing trend.

There was also no clear trend in the difference between the upstream and downstream Balguerie sites, suggesting the downstream site is not becoming noticeably better or worse compared with the upstream site over time.

2025: Spot water quality measurements were generally within the expected range for modified urban waterways and were not recorded at levels likely to limit aquatic life.

Some exceedances were recorded for fine sediment cover, total macrophyte cover and periphyton cover, although these results are mainly used to help interpret ecological condition rather than assess compliance consent directly. This is because these indicators can vary considerably over short periods and may be influenced by maintenance activities such as macrophyte clearance.

Rapid Habitat Assessment (RHA) scores indicated that most sites had good or excellent habitat quality, with some rated as fair (Figure 8). Habitat condition varied between and within catchments. Banks Peninsula headwater sites generally had the highest habitat quality, while more urbanised lower catchment sites tended to have lower scores. Reduced habitat quality was mainly associated with limited riparian shading and buffering, low instream habitat complexity, and fine sediment smothering of the streambed.

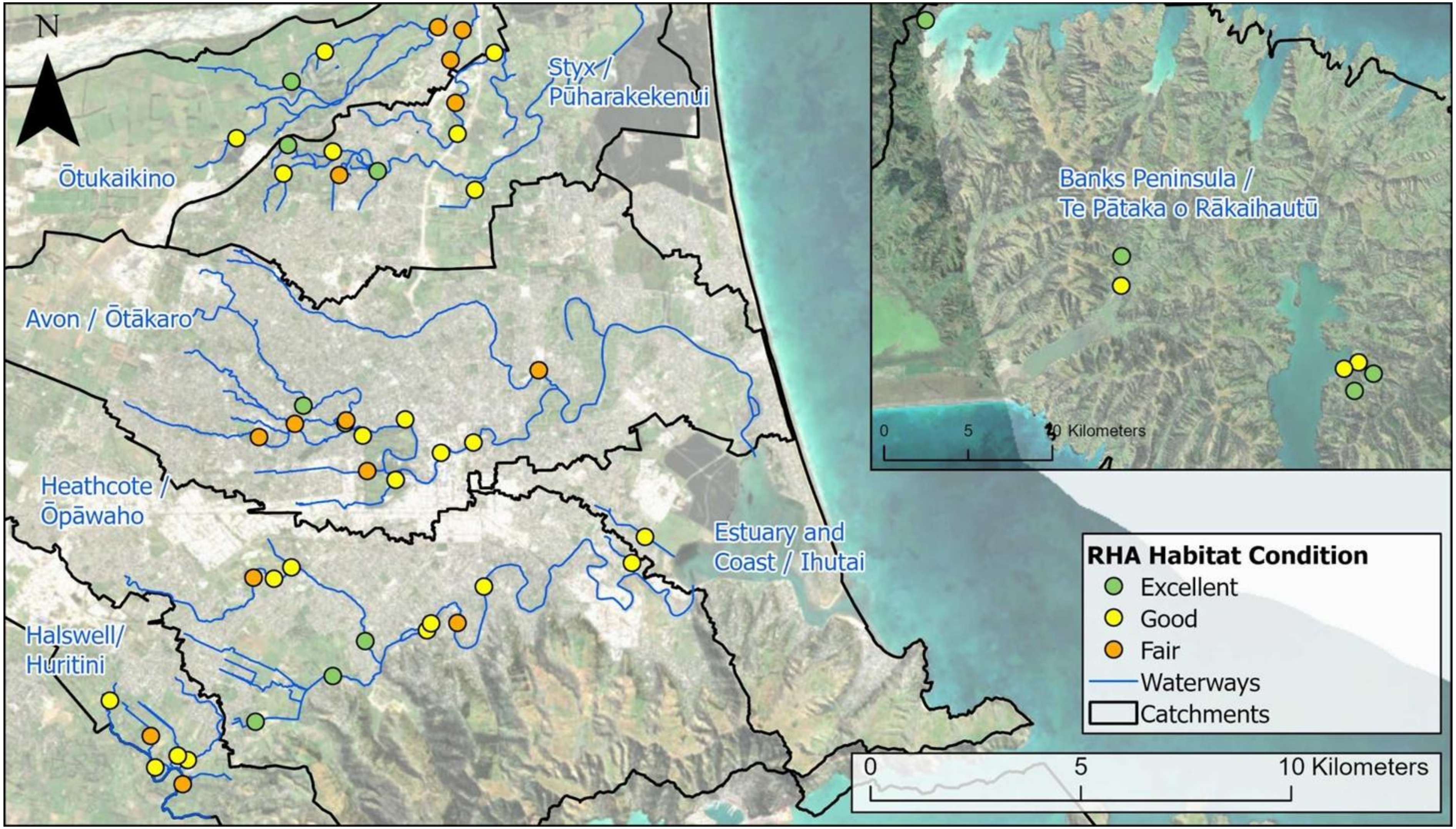

Figure 8: Rapid Habitat Assessment (RHA) scores at ecology monitoring sites. Credit: Instream Consulting Limited.

Instream Sediment Quality

2024: Sediment quality results indicated that sediments were generally dominated by fine to medium sand, consistent with previous monitoring. Organic carbon content was generally low across most sites. Of the metals tested, zinc recorded the highest concentrations, followed by lead and copper. Zinc exceeded the upper sediment guideline value at two sites, while lower guideline values or consent ATLs were exceeded more widely for zinc and lead. Total PAH concentrations also exceeded guidelines at several sites.

The two most downstream Ōtākaro-Avon sites met all relevant sediment quality targets, but most other sites exceeded at least one parameter. Overall, the results indicate an increased risk of adverse ecological effects at many sampled sites, with a higher level of risk at sites where zinc and/or PAHs exceeded upper guideline values.

Long-term sediment metal results show no clear increasing or decreasing trend for copper, lead or zinc. Copper has generally remained below the consent target; lead has declined substantially since 1980 but has been relatively stable since 2013, and zinc has regularly exceeded the consent target at several sites over time.

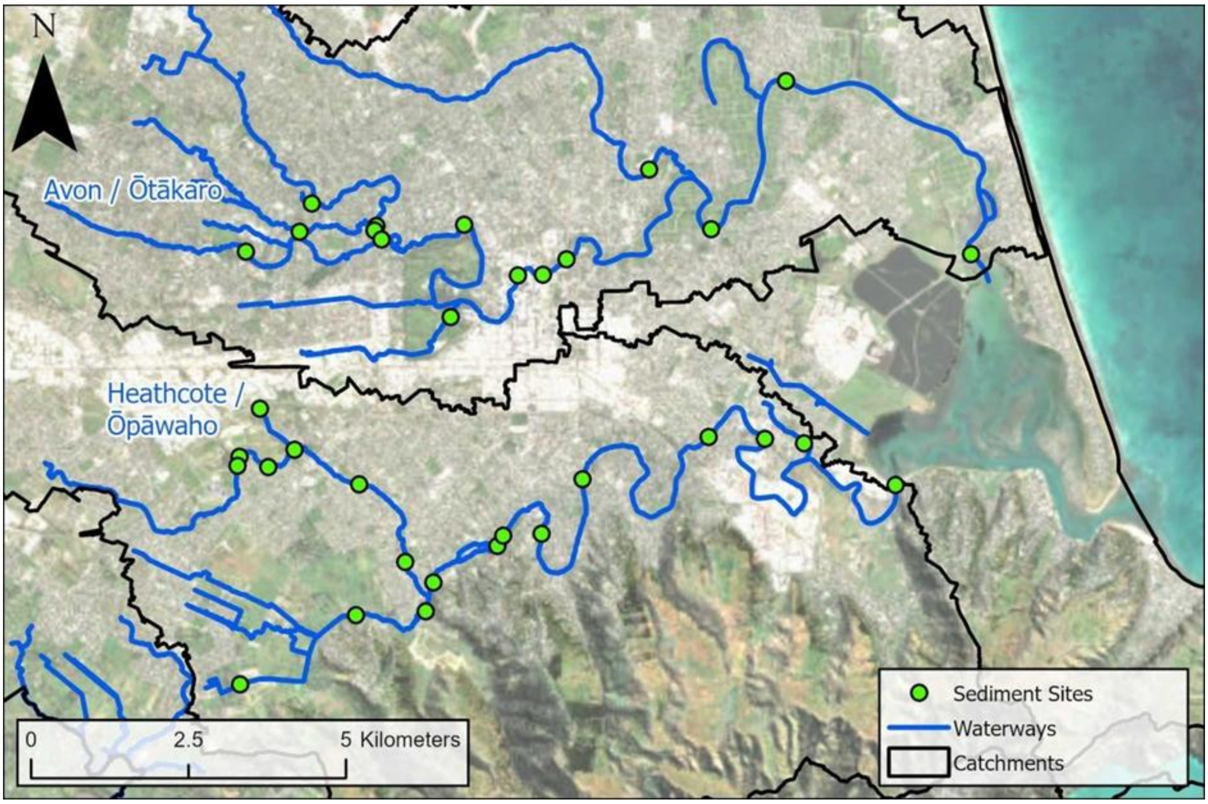

Figure 9: Sediment sampling locations. Credit: Instream Consulting Limited.

Table 11: Sediment quality at monitoring sites in 2024. Data are site means and units are mg/kg dry weight, except for total organic carbon (TOC), which is g/100 g dry weight, and substrate index (SI), which is unitless. Values exceeding the ANZG (2018) Default

Site Code	Site	Copper	Lead	Zinc	TOC		SI	Total PAHs
06	Waimairi Stream Downstream of Railway Bridge	18	165	166	1.47		2.5	**26**
05	Wairarapa Stream Downstream of Fendalton Road	17	41	133	1.01		2.3	**34**
09	Addington Brook Upstream of Riccarton Avenue	27	83	843	1.53		3.0	**77**
10	Dudley Creek at North Parade	10	44	216	0.65		2.4	**86**
26	Avon River at Clyde Road	12	33	162	0.71		3.9	**350**
07	Avon River at Mona Vale	25	42	213	2.69		2.0	**6**
12	Avon River at Carlton Mill Corner	29	53	245	3.69		2.7	**23**
17	Avon River at Victoria Square Near Armagh Street	21	34	163	0.84		2.5	**63**
04	Avon River at Manchester Street	22	41	236	1.48		2.0	**72**
03	Avon River at Dallington Terrace/Gayhurst Road	52	115	873	7.00		1.8	**9**
13	Avon River at Avondale Road	26	45	390	3.73		1.4	**4**

01	Avon River at Pages/Seaview Bridge	6	14	86	0.48		1.9	**7**
02	Avon River at Bridge Street	9	18	85	0.79		1.7	**3**
DGV (equates to consent ATL)		65	50	200	N/A		N/A	**10**
GV-high		**270**	**220**	**410**	**N/A**		**N/A**	**50**

Notes: Total PAHs are normalised to 1% TOC. N/A indicates no applicable guideline values

2025: Instream sediment quality resulted showed that 12 sites met all consent ATLs, generally located in upstream spring-fed reaches or downstream tidal reaches. Most remaining sites exceeded at least one sediment quality parameter. The highest number of exceedances occurred at Curletts Road Stream, downstream of an industrial area and upstream of stormwater treatment, with additional exceedances recorded further downstream and at Spreydon Domain.

Overall, the Ōtākaro-Avon River had more exceedances in its mid-reaches, while the Ōpāwaho-Heathcote River had more exceedances in the industrial headwaters, reflecting differences in surrounding land use. Zinc recorded the highest metal concentrations, followed by copper and lead, and exceeded consent target levels at several sites in both catchments. Higher guideline values were exceeded at three sites, indicating a greater potential risk of toxic effects at these locations.

Total PAH concentrations were higher in the Ōtākaro-Avon than the Ōpāwaho–Heathcote, with two sites exceeding the higher guideline value. TPH results were generally low, although detection was limited at some sites due to insufficient fine sediment for analysis. Site retention will be reviewed after two sampling rounds, in line with the Environmental Monitoring Programme.

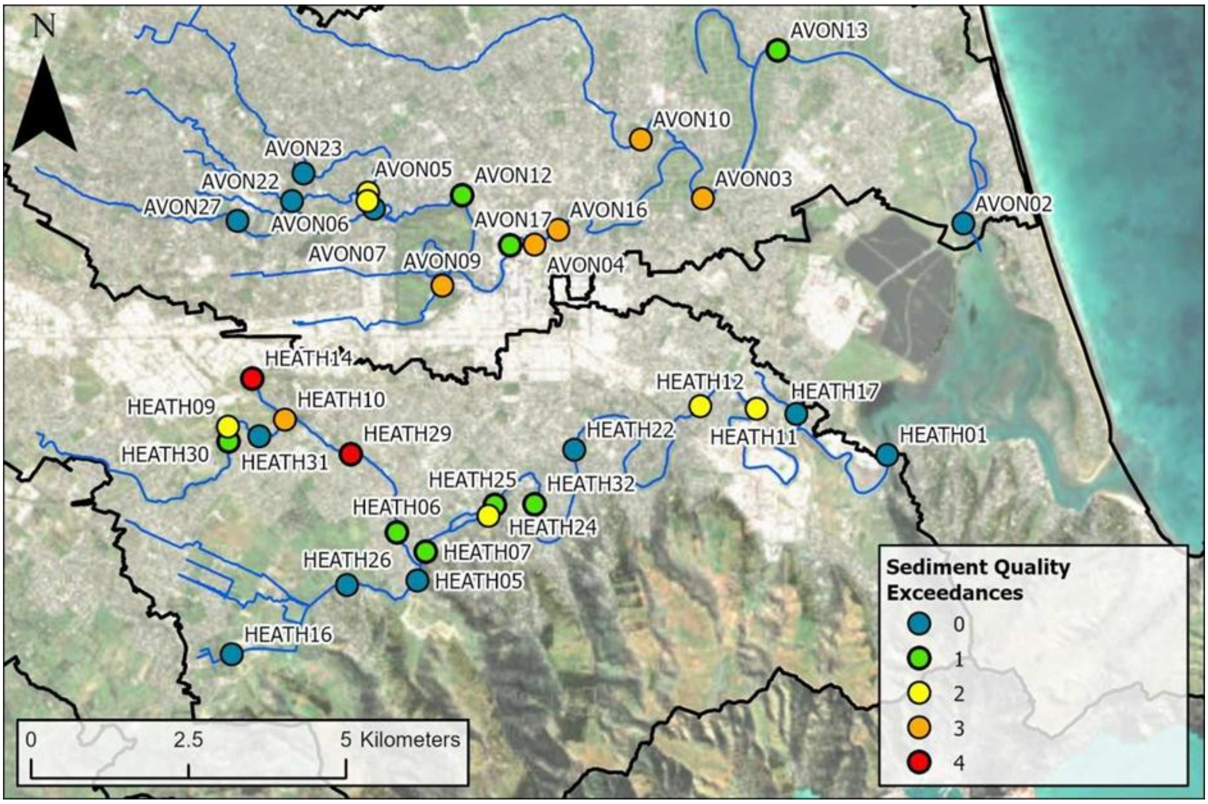

Figure 10: Sediment quality results summarised by the number of consent Attribute Target Level (ATL) exceedances for copper, lead, zinc, total PAHs and TPH. No sites exceeded consent ATLs for

all five parameters. Credit: Instream Consulting Limited.

Macroinvertebrates

2024: The macroinvertebrate community remains similar to previous years being dominated by pollution-tolerant taxa at most Christchurch City waterways. There were some increases in EPT taxa, however relative abundance remains low maintaining a consistent long-term theme. Please note the 2024 results are presented under the previous reporting period of 5 years before it transitioned to annual reporting. Results cover ecology monitoring from 2009-24.

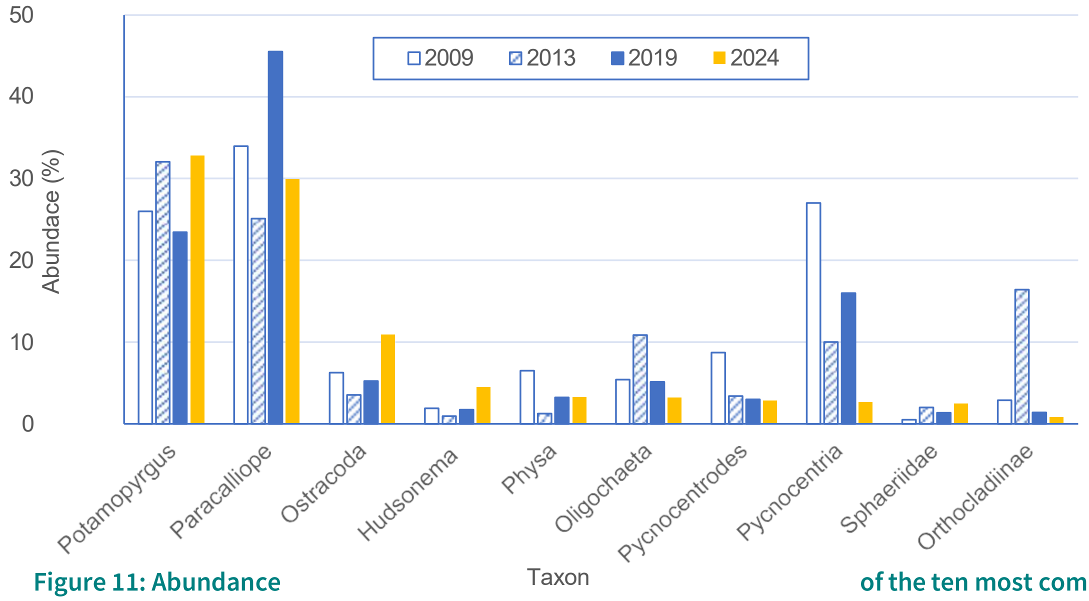

Figure 11: Abundance of the ten most common taxa across all sites in 2024 compared to previous years Credit: Instream Consulting Limited

Macroinvertebrate Community Index (MCI) & Quantitative Macroinvertebrate Community Index (QMCI) remained low and consistent with previous years, reflecting limited EPT taxa. While all sites satisfied consent QMCI targets only AVON 22 & 25 met the national MCI bottom line and just five sites met the QMCI national bottom line. Low scores were largely attributed to instream physical habitat with the most common associations being fine sediment (sediment depth, cover, and substrate index), which negatively impacted on many of the calculated indices.

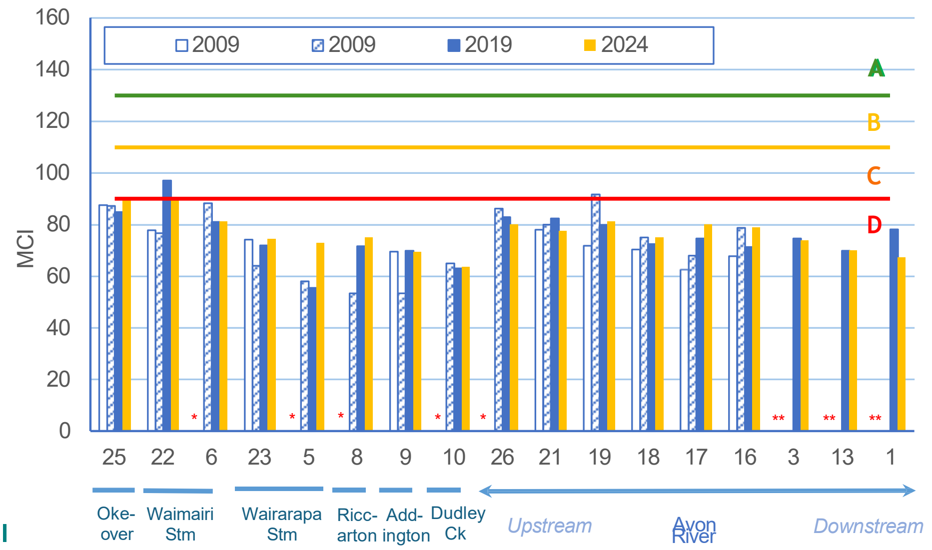

Figure 12: MCI scores at each monitoring site with coloured lines indicating NPSFM attribute bands. The national bottom line MCI score is 90. Asterisks indicate no data collected for that year. Credit: Instream Consulting Limited.

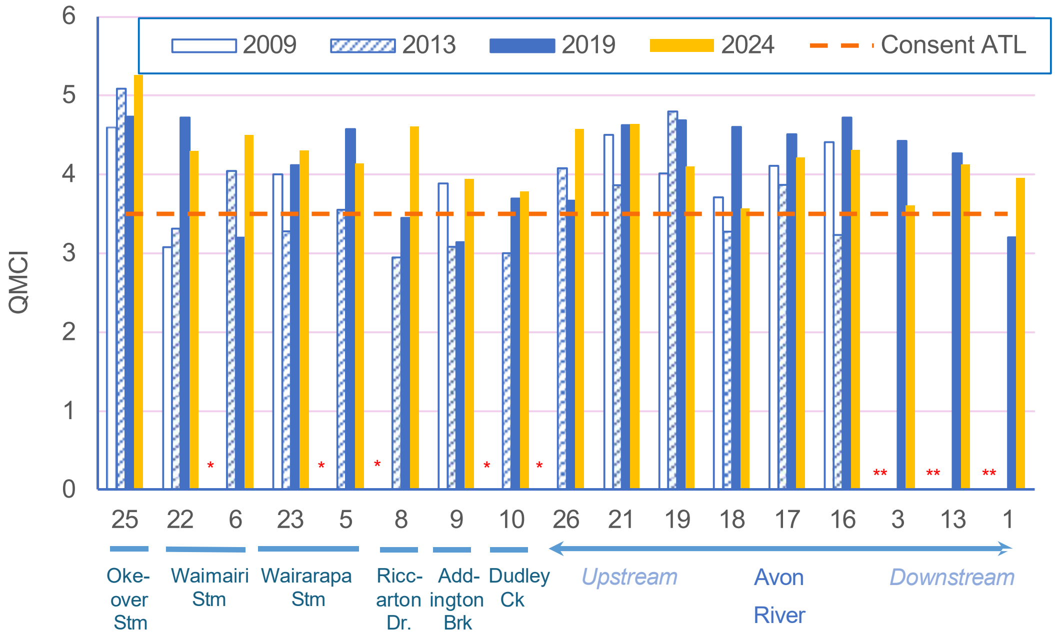

Figure 13: QMCI scores at each monitoring site. Asterisks indicate no data collected for that year (Instream Consulting Limited).

Models Explaining 2024 Invertebrate Community Results for the Ōtākaro-Avon Catchment

The 2024 invertebrate community results for the Ōtākaro-Avon catchment were mainly explained by differences in physical habitat condition, rather than water quality or sediment chemistry. Fine sediment was the most common negative influence, particularly sediment depth, cover and substrate condition, which were linked to poorer invertebrate scores.

Taxa richness was not well explained by the models, likely because it is a relatively weak indicator of ecological health on its own. However, %EPT, EPT taxa richness, MCI and QMCI were all negatively affected by fine sediment-related habitat pressures. This suggests that sediment accumulation and poorer substrate quality are likely important factors influencing the condition of invertebrate communities across the catchment.

Water quality variables and sediment chemistry are not strong predictors once physical habitat factors were included in models. For example, dissolved inorganic nitrogen and zinc showed some relationship with the indices, but these effects were much less important than physical habitat drivers.

Overall, the results indicate that improving habitat condition, particularly by reducing fine sediment impacts is likely to be important for supporting healthier invertebrate communities.

Trends at Annual Monitoring Sites

Invertebrate QMCI scores have remained consistently low at the four Council annual monitoring sites and have not met the consent trigger level of 5 at any point during the monitoring period. Trend analysis showed no clear trend at one Cashmere Stream site, while the other site showed a very likely improving trend. For the Wilsons Drain sites, the monitoring record is still too short to assess long-term QMCI trends.

At the ECan monitoring sites, QMCI scores have been generally higher at the two Balguerie sites than at the four Ōtākaro-Avon catchment sites. This follows the same pattern seen in habitat scores and likely reflects the better riparian condition and lower level of urban land use in the Balguerie catchment.

The downstream reach of Balguerie Stream has consistently demonstrated lower QMCI scores likely attributed to influence from urban settlement and agricultural land use. All six ECan sites showed improving QMCI trends over time, although there was no clear trend in the difference between the upstream and downstream Balguerie sites. This suggests the downstream site is not becoming noticeable better or worse relative to the upstream site.

2025: Macroinvertebrate results showed that QMCIs met the consent Attribute Target Level at 28 of the 52 monitoring sites. Compliance was generally higher in the mainstem of Ōtākaro-Avon and Ōpāwaho–Heathcote catchments, although this less reflects less stringent targets for these modified urban waterways rather than better ecological condition. When assessed against NPS-FM bands, most sites were classified in Band D, indicating degraded macroinvertebrate communities, with only one site achieving Band A.

The Average Score Per Metric (ASPM) index, which provides, a broader measure of invertebrate community health, produced similar overall pattern, with most sites also falling within Band D. Trend analysis showed some encouraging results, with most sites also showing improving ASPM scores. However, declining trends at Okana River upstream of SH75 and Pūharakekenui-Styx River at Mill Road are of concern, as these sites are in catchments with generally higher ecosystem health.

Further analysis suggested that differences in macroinvertebrate health were more strongly associated with habitat quality than with water or sediment quality. Fine sediment, sediment depth, cover and substrate index were the most common factors linked to poorer invertebrate scores. Further work will help clarify the relative influence of water quality, sediment quality and habitat condition on macroinvertebrate community health.

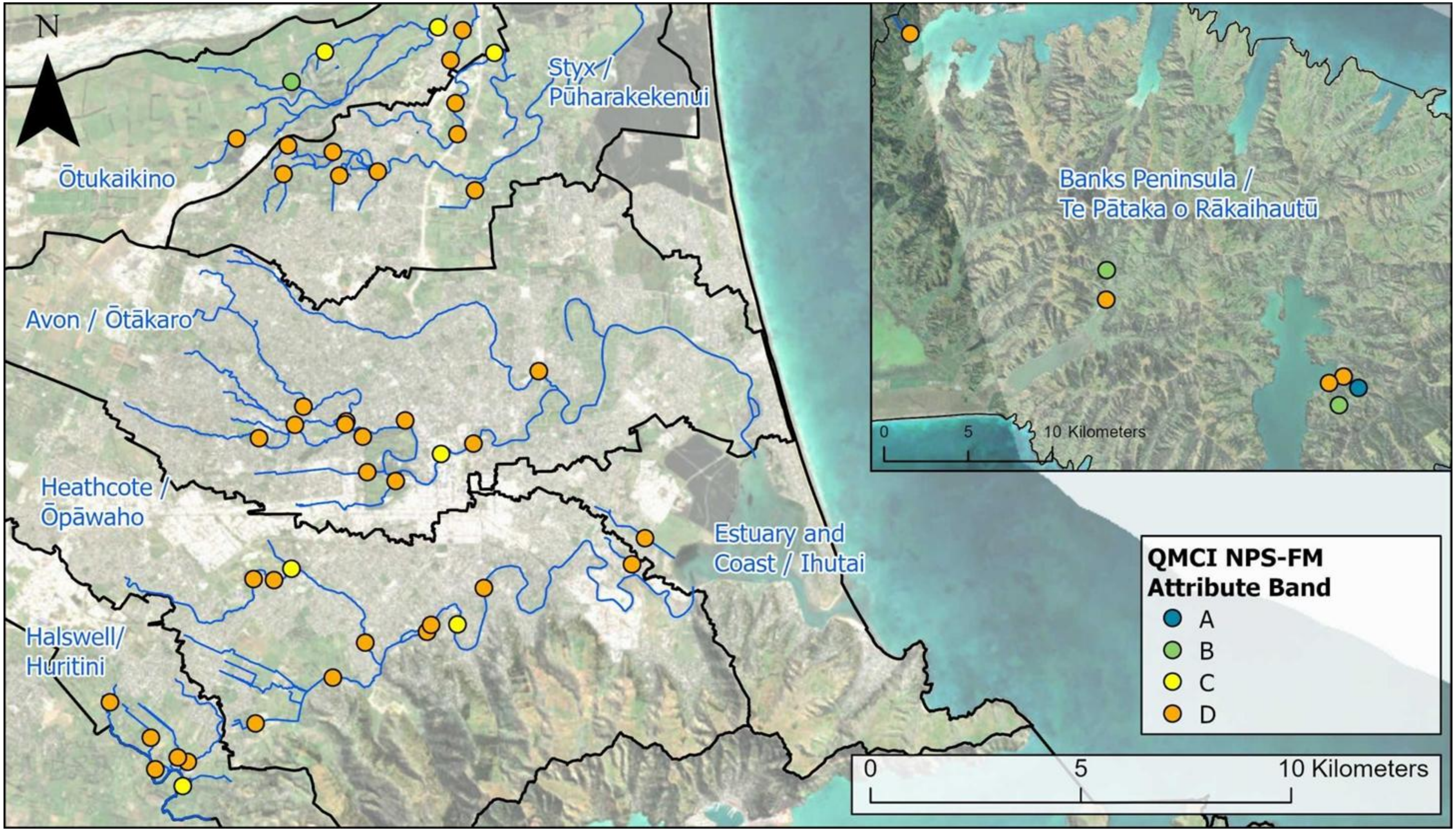

Figure 14: Invertebrate QMCI scores categorised into NPS-FM attribute bands. Credit: Instream Consulting Limited.

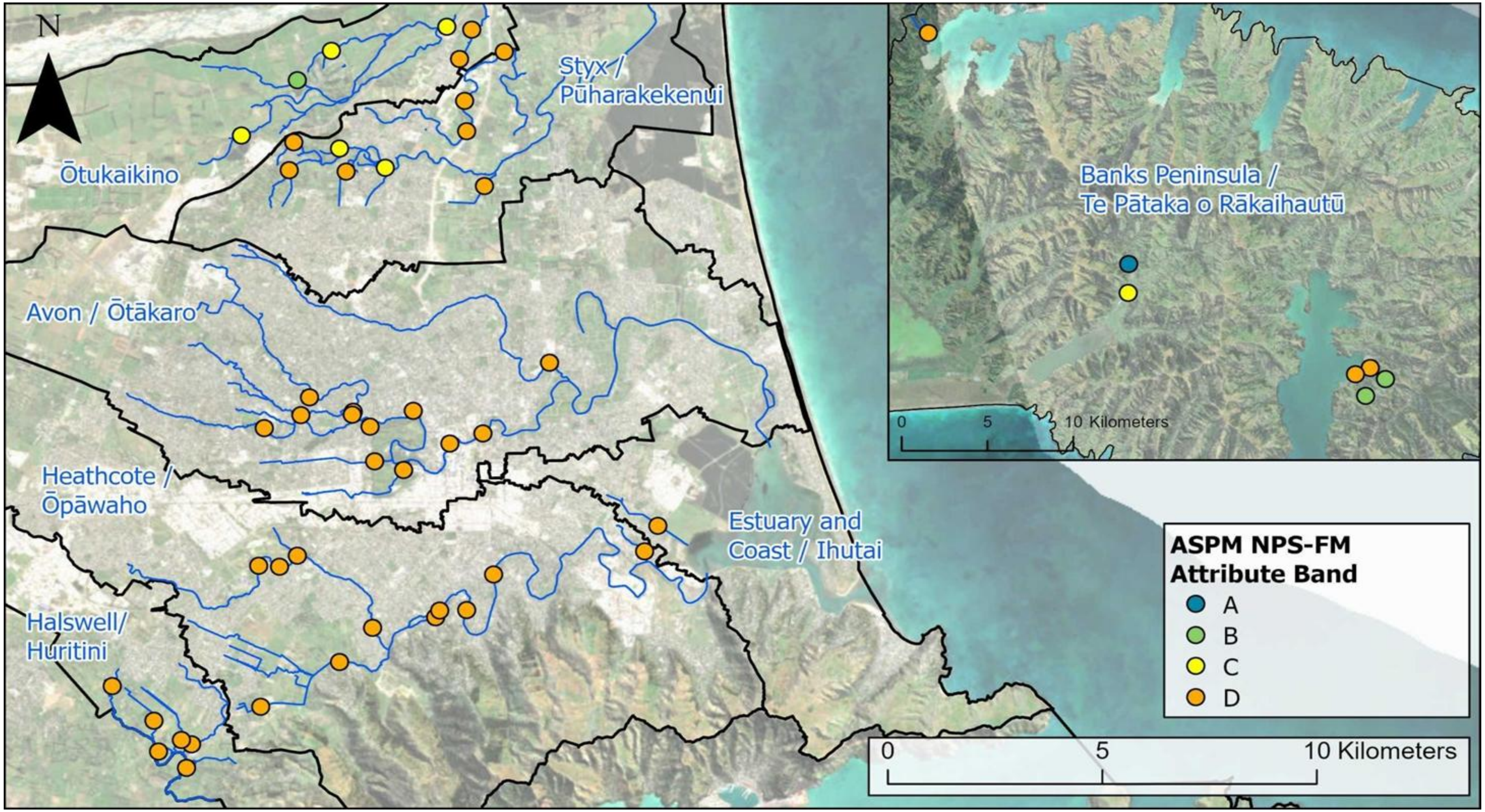

Figure 15: Invertebrate ASPM scores categorised into NPS-FM attribute bands. Credit: Instream Consulting Limited.

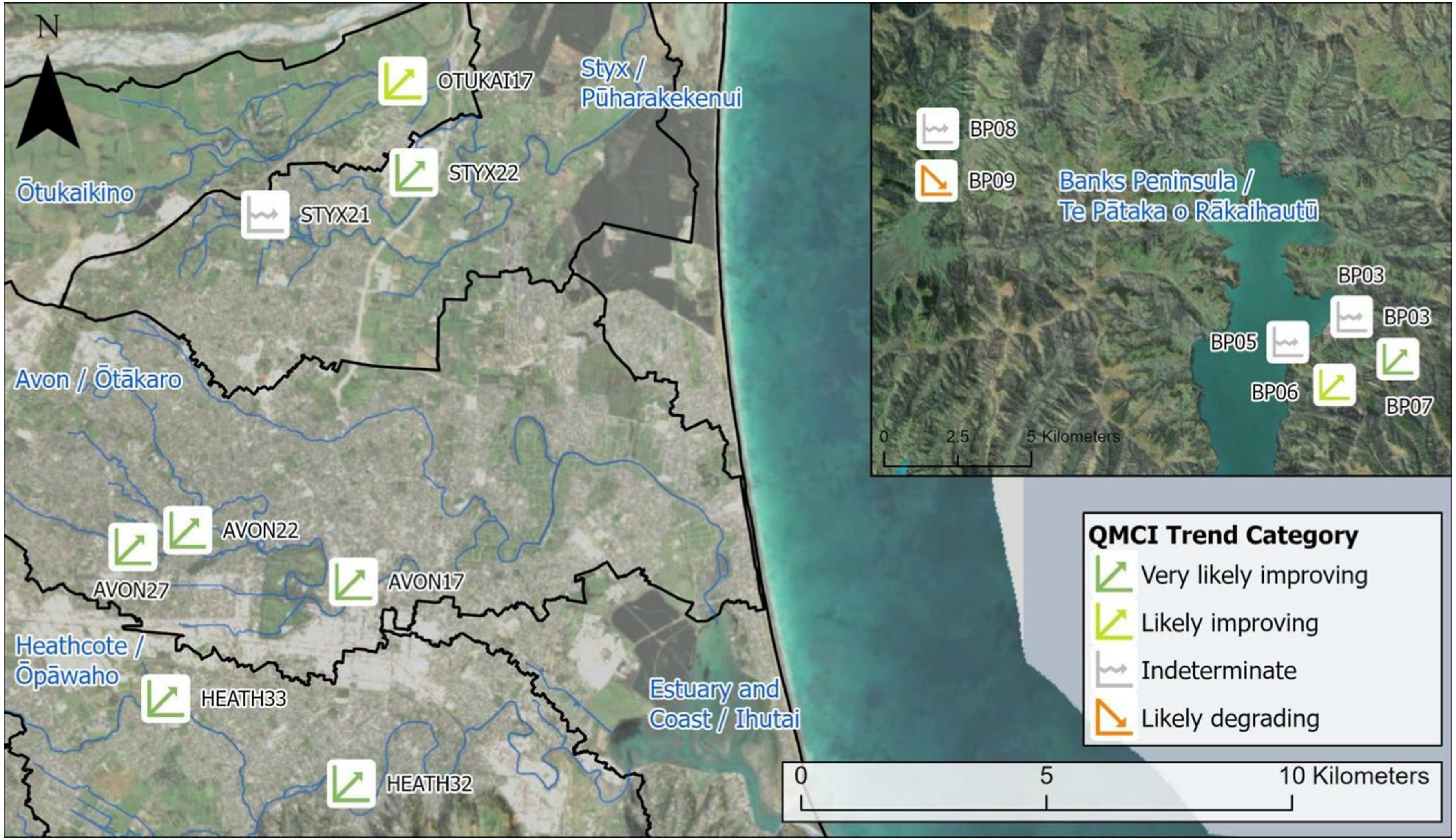

Figure 16: Invertebrate QMCI trends over time. Credit: Instream Consulting Limited.

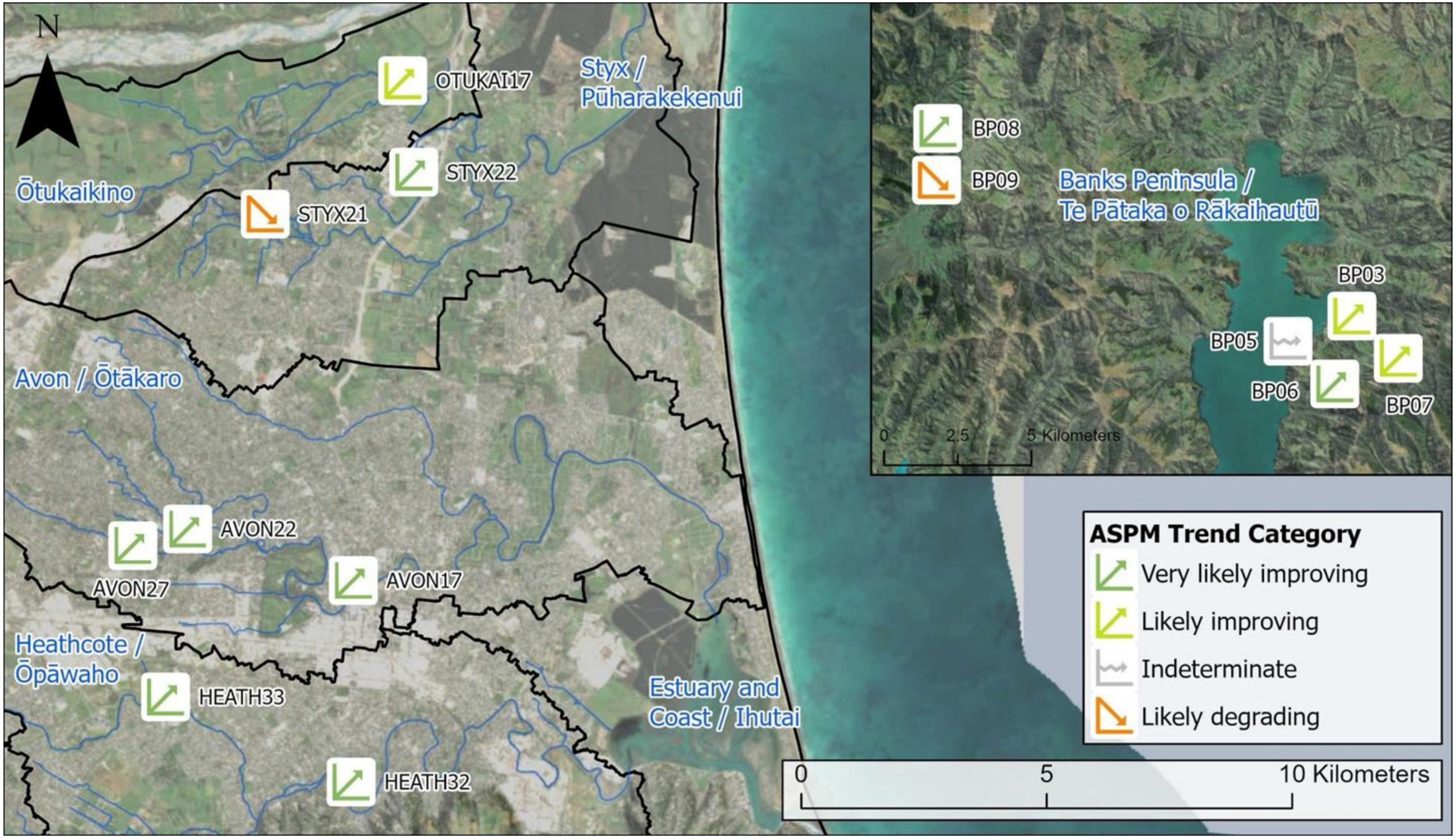

Figure 17: Invertebrate ASPM trends over time. Credit: Instream Consulting Limited

Kahaki

Kahaki are native freshwater mussels classified as an At-Risk species with significant cultural value. Unlike marine mussels, they do not attach to surfaces but instead wedge between stones or burrow into substrate. They face multiple threats arising from human activities, particularly in urban environments, including pollution, channel modification, sediment mobilisation and dredging.

2024: A total of 188 kākahi were found across four of the 16 sites searched in 2024 with the highest abundances located in the mid-reaches of the Ōtākaro–Avon River. The surveys confirmed presence of kākahi at three locations within the Botanic Gardens where they had been previously recorded. In addition, the survey also extended the known range of kākahi upstream and downstream in the Ōtākaro catchment.

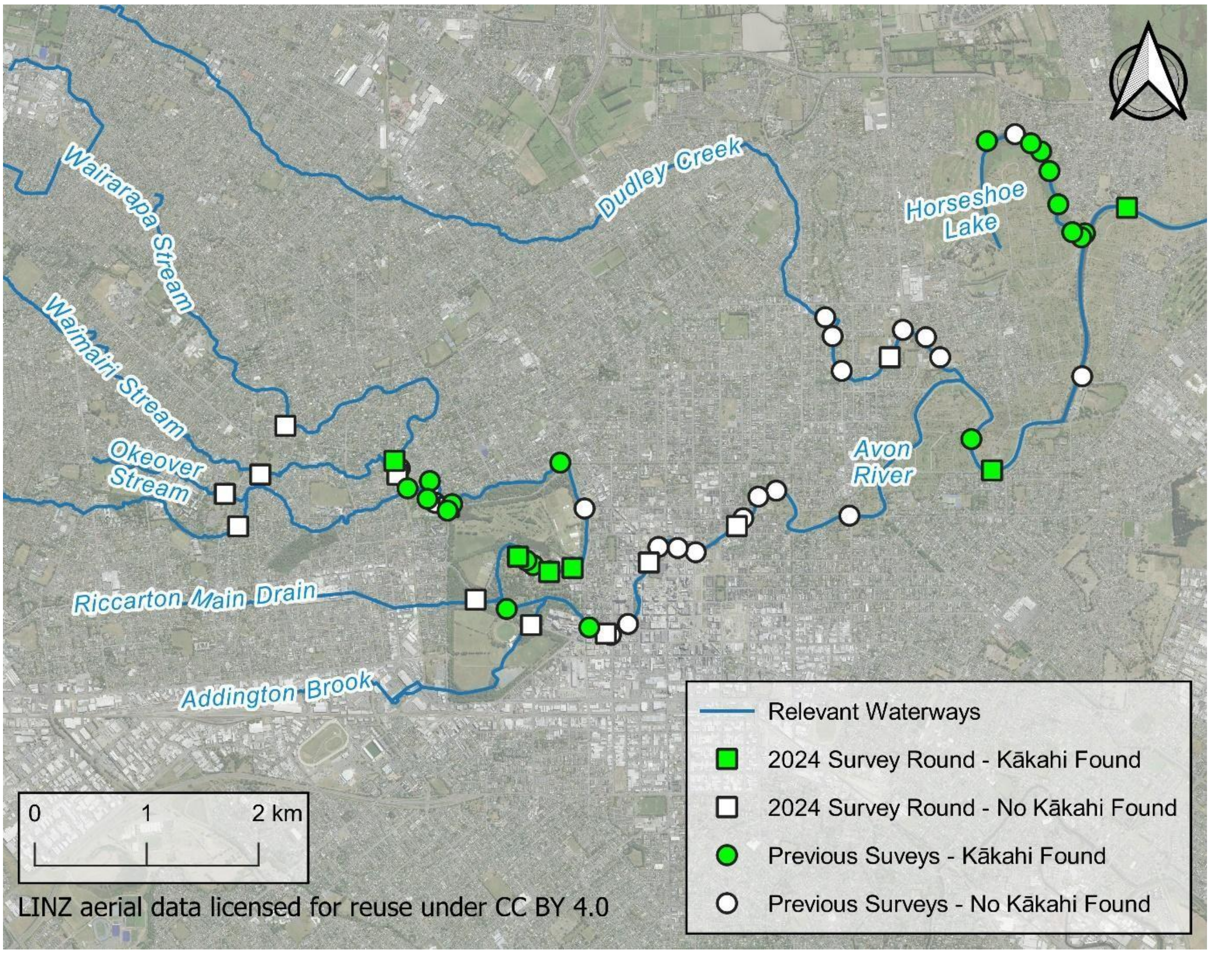

Figure 18: Kakahi records from the Avon River Corridor. Credit: Instream Consulting Limited.

2025: kākahi surveys commenced in November 2025 but were delayed for approximately three months due to prolonged turbidity in the water column, which limited suitable survey conditions. Surveys resumed in February 2026, with results to be presented in the next CSNDC reporting round.

Fish

Fish surveys were undertaken by a combination of electro-fishing and baited minnow and fyke nets during 2024. For the 2025 monitoring season, extraction of New Zealand Freshwater Fish Database (NZFFD) records from the previous 20 years (2004 to April 2024) within the Christchurch district. Fish Index of Biotic Integrity (IBI) scores were calculated at both site-specific and at the catchment levels using the Joy and Death (2004) methods. These scores were then classified into the national attribute bands outlined in the National Policy Statement for Freshwater Management (NPS-FM) and used to support the interpretation of invertebrate data.

2024: Fish monitoring in 2024 recorded ten species within the Ōtākaro-Avon catchment, including nine native species and one introduced species (brown trout). Shortfin eel was the most widespread species, followed by upland bully and longfin eel, with overall fish abundance and community composition remaining broadly consistent with previous survey years. Core species included eels, bullies, and inanga, indicating a relatively stable fish assemblage over time.

Several species of conservation significance were present, including longfin eel, inanga, bluegill bully, giant bully, torrentfish, and previously recorded lamprey thus highlighting the ecological value of the catchment despite its urbanised profile. Increased records of bluegill bully and inanga in 2024 were likely influenced by greater trapping effort and timing of surveys during the spawning season.

While some species such as yelloweye mullet were absent in 2024, their occurrence is known to vary naturally between years. Overall, the fish community was considered typical of Christchurch waterways, although the presence of several at-risk and threatened species elevates the conservation importance of the catchment.

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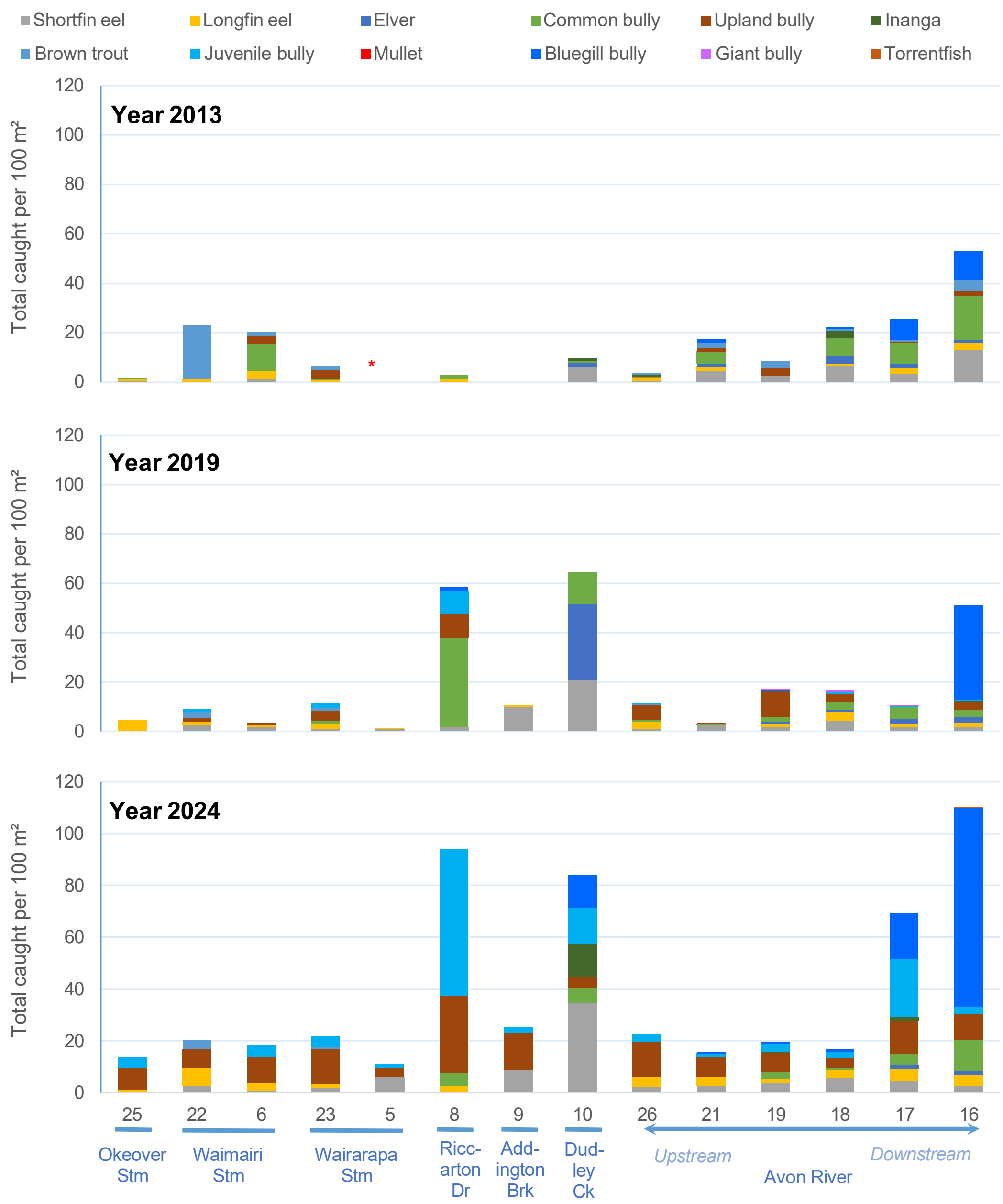
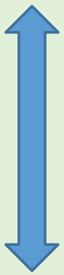


Figure 19: Electric fishing results at monitoring sites from 2013 to 2024. Asterisk indicates no electric fishing data available for that date (Source: Instream Consulting Limited)

Table 12: Total number of fish caught in 2024. Size range (mm) is in brackets. † = sampled by electric fishing; ‡ = sampled by trapping (Credit: Instream Consulting Limited)

Waterway	Site	Brown Trout	Longfin Eel	Shortfin Eel	Elver	Common Bully	Bluegill Bully	Giant Bully	Upland Bully	Juvenile Bully	Triplefin	Inanga	Torrent-fish	Total Catch
Okeover Stream	25 †‡		4 (742-1301)	1 (572)					11 (34-64)	7 (29-34)				23
Waimairi Stream	22 †	3 (81-110)	6 (171-640)	2 (129-392)					6 (40-64)					17
	6 †		4 (154-1001)	1 (200)					14 (33-65)	6 (24-32)				25
Wairarapa Stream	23 †	1 (115)	2 (624-668)	2 (276-505)					16 (35-64)	5 (30-36)				26
	5 †			16 (126-631)					10 (35-59)	3 (20-34)				29
Riccarton Main Drain	8 †		1 (135)			2 (60-74)			12 (32-79)	23 (24-36)				38
Addington Brook	9 †			4 (212-334)					7 (45-66)	1 (30)				12
Dudley Creek	10 †‡		1 (622)	28 (125-844)		5 (48-103)	9 (34-41)		4 (42-53)	12 (23-33)		49 (52-111)		108
Avon River	26 †		4	2					13	3				22

			(173-538)	(455-550)					(34-73)	(31-33)				
upstream	21 †		8 (159-931)	5 (134-362)			1 (51)		17 (32-70)	3 (30-32)				34
	19 †		7 (167-1162)	12 (153-554)		8 (45-111)	2 (45-55)		27 (34-68)	11 (22-49)		1 (64)		68
	18 † ‡		14 (154-1048)	16 (151-598)		4 (66-112)	3 (43-49)		11 (37-54)	8 (26-35)		1 (57)		57
	17 †		7 (145-543)	6 (95-201)	2 (92-111)	6 (51-91)	25 (35-56)		18 (36-58)	32 (22-38)		2 (39-101)		98
	16 † ‡		22 (122-812)	9 (170-539)	6 (88-134)	54 (45-114)	259 (31-65)		34 (31-64)	16 (22-34)			1 (92)	401
	3 ‡		19 (445-1021)	14 (501-860)		235 (48-126)		4 (82-105)	1 (65)	1 (37)		125 (49-116)		399
downstream	13 ‡		2 (623-683)	17 (369-815)		81 (51-110)		2 (62-87)		3 (28-32)		420 (46-120)		525
	01 ‡		4 (474-914)	9 (221-974)	1 (94)	12 (55-75)				1 (35)	62 (40-91)			89

	Total	4	105	144	9	407	299	6	201	135	62	598	1	1,971

2025: Fish communities were summarised using the NZFFD with data extracted for the previous 20 years (2004 to April 2024) within the Christchurch district. Fish IBI scores were calculated at both site-specific and at the catchment levels using the Joy and Death (2004) methods. These scores were then classified into the national attribute bands.

Fish communities in Christchurch waterways are dominated by species such as shortfin and longfin eels, bullies and inanga. Many of these species are diadromous and rely on movement between freshwater and the marine environment to complete their life cycles. Ongoing work is being undertaken to improve fish passage and better understand species such as the threatened lamprey.

Fish community health, assessed using the IBI, generally showed higher scores in larger, connected waterways such as the Ōpāwaho-Heathcote, Ōtākaro-Avon River and Puharakekenui-Styx catchments, where habitat diversity and connectivity are greater. Lower scores were more common in modified waterways, reflecting reduced habitat complexity and barriers to fish.

While some catchments have extensive fish records, limited long-term data in developing areas presents difficulty in assessing trends over time. Overall, macroinvertebrates communities are considered more reliable indicators of stormwater impacts than fish assemblages.

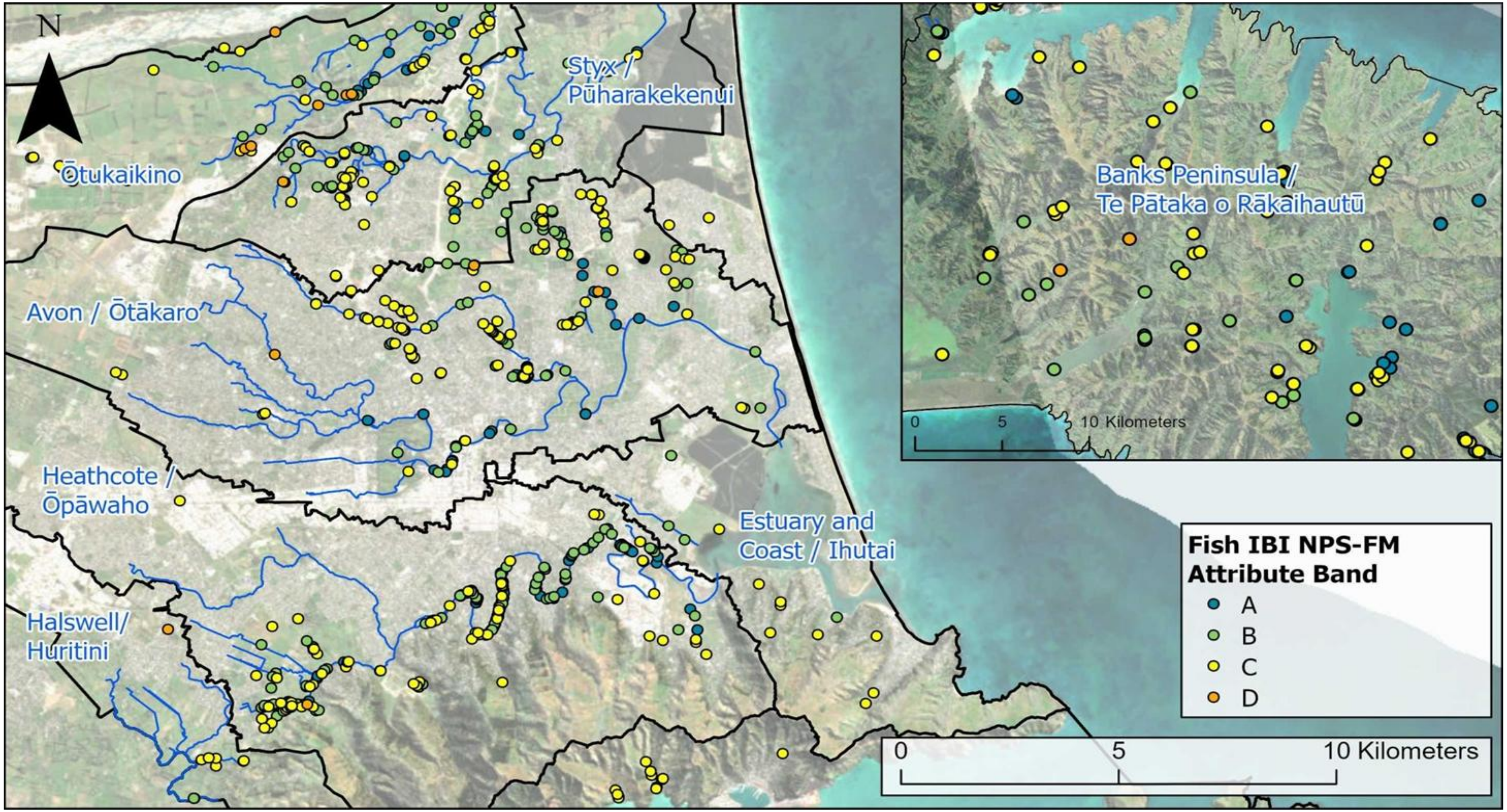


Figure 20: Freshwater Fish Database records summarised using the fish Index of Biotic Integrity (IBI) and categorised into NPS-FM Attribute Bands. Credit: Instream Consulting Limited.

2024 Ecosystem Health Summary:

Overall, ecosystem health outcomes presented were mixed for 2024.

Consent ATLs apply to sediment cover, macrophytes, filamentous algae, and QMCI scores. In 2024, sediment metal ATLs) were met at all sites for copper, most for lead, and fewer for zinc, with no clear long-term trend in metals. In contrast, compliance with total Polycyclic aromatic hydrocarbon (PAH) ATLs declined, with only 4 out of the 13 sites achieving targets. This was attributed to lower Total Organic Carbon (TOC) concentrations in 2024, which increased the calculated toxicity of PAHs. There is no evidence that elevated PAHs have negatively affected invertebrate communities, as demonstrated by QMCI trends remaining positive at monitored sites.

Filamentous algae ATLs were generally met, while macrophyte compliance varied and was found to be influenced more by sampling time and maintenance activities than stormwater discharges. Fine sediment cover compliance declined in 2024 and has never been met at annual monitoring sites.

QMCI, a key indicator of invertebrate health, met consent targets at all wadable sites in 2024, demonstrating in comparison to previous years. Annual monitoring indicates positive trends at ECan sites, though compliance remains low at Council sites.

2025 Ecosystem Health Summary:

Overall, some measures of ecosystem health (e.g., sediment depth, macrophyte cover, Macroinvertebrate Community Index, QMCI and Average Score Per Metric) at sites presented mixed results.

Invertebrate QMCI & ASPM remained below national ecological thresholds despite achieving guideline compliance and demonstrating improvements in over the long term. Sediment exceedances persist in Ōpāwaho-Heathcote and Ōtākaro-Avon likely attributed to legacy contamination. Habitat degradation and fine sediment remain the primary pressures rather than stormwater inputs.

Restoration and remedial work have commenced on highly modified waterways. This has encompassed re-naturalizing waterways with increased riparian planting, installation of woody material, creating runs, riffles and pools, fish passage remediation and wetland creation.

Continued recommended remedial measures for the future are removal of fish passage barriers, increase riparian planting, protect and enhance riparian corridors on private land, continue restoration of the OARC, monitor restoration effectiveness, and trial sediment removal in highly contaminated areas.

10.4.3. Fine Sediment

Fine sediment monitoring undertaken between 2024 and 2025 (Appendix I) showed considerable variability across sites, with no clear spatial pattern between catchments. Fine sediment cover exceeded consent targets at most monitored locations (10 of 17 sites), reflecting both naturally elevated sediment levels in some spring-fed systems and the influence of surrounding rural and urban land uses processes.

The highest median sediment cover was recorded at Curlett Road Stream, Ka Putahi Creek, Ferniehurst Street and Addington Brook, all of which are located within highly urbanised or industrial catchment and are likely influenced by stormwater-derived sediment inputs. While several stormwater treatment facilities are present upstream of some sites, elevated sediment cover suggests the continued influence of historical sediment deposition.

Trend analysis undertaken from data collected since 2021 identified a small number of increasing trends at Addington Brook and Ka Putahi Creek, while several sites showed decreasing trends, potentially reflecting local catchment management and stormwater improvements. The lowest sediment cover was observed at Main Road North and Carlton Mill Corner, likely influenced by faster-flowing conditions, coarser substrates and less urbanised upstream environments that reduce fine sediment accumulation.

10.4.4. Mana Whenua Values

For the 2024 monitoring period, mana whenua values monitoring was carried out at 13 sites within the Ōtākaro-Avon catchment. Monitoring for 2025 was undertaken across five sites within the Te Roto o Wairewa (Lake Forsyth) catchment and seven sites throughout the Whakaraupō (Lyttelton) catchment, all monitoring was managed by Mahaanui Kurataiao Ltd (MKT). Monitoring reports for these two years can be viewed in Appendix J.

Monitoring carried out in 2024 across the Ōtākaro-Avon catchment recorded scores of 2.3 from the State of Takiwā (SOT) assessment and 2.2 from the Cultural Health Assessment (CHA). The overall averaged score for the catchment from the most recent SOT monitoring conducted in 2012 was 1.7. This shows there was a slight improvement throughout the catchment on average, however they are still below the Attribute Target Level of 5.

Key issues and recommendations highlighted within the 2024 report include:

- Absence of flowing water (i.e., Site 1 Avonhead and Site 2 Burnside Park).
- Little to no vegetation and the presence of exotic vegetation, rubbish and weeds.
- Poor water clarity and high volumes of sediment instream.

- Lack of waterway access, riparian planting, indigenous vegetation and/or mahinga kai species.
- Unidentified direct stormwater discharges into waterways, and toxic algae blooms.

The monitoring results for 2025 indicate that the overall cultural health of both catchments is rated as ‘poor’ to ‘moderate’. The average SOT score for the Whakaraupō catchment was 2.0, and 2.4 for Te Roto o Wairewa, with a combined Cultural Health Index (CHI) average of 2.1. These scores fall significantly below the Attribute Target Level of 5.

Key issues and recommendations highlighted within the 2025 report include:

- Erosion and sedimentation were consistent concerns identified in many waterways across both catchments.
- Weed control and the enhancement of native vegetation is vital.
- The degree of modification was among the lowest scoring indicators across all monitoring site.
- Wetlands, springs, and riparian margins are wāhi taonga for Ngāi Tahu, treasured for their role in protecting and enhancing mauri, as providing habitat for mahinga kai and maintaining the overall health of freshwater environments.

Additional concerns relating to:

- Marine vessel and port-related pollution at Lyttelton Port,
- Contaminant runoff from a historic landfill (Allandale Outlet)
- Blocking a culvert at Site 6 (Te Wharau Stream) from wood debris.
- Long-term impacts of historical deforestation and land use change

10.4.5. Comparison to Attribute Target Levels

Table 13: Assessment against Comprehensive Stormwater Network Discharge Consent Schedule 7 (Waterways) Attribute Target Levels (ATLs) for 2024 & 25. PAHs = Polycyclic aromatic hydrocarbons; QMCI = Quantitative Macroinvertebrate Community Index; TSS = T

Objective	Attribute	Attribute Target Level	Monitoring	Outcome
Adverse effects on ecological values do not occur due to stormwater inputs	QMCI	Lower limit QMCI scores: Spring-fed – plains – urban waterways: 3.5 Spring-fed – plains waterways: 5 Banks Peninsula waterways: 5	Instream Annual Ecology Report 2024 Instream Annual Ecology Report 2025	2024: Five yearly: Met at all 14 sites. Annual: Not met at the 4 sites. 2025: QMCI ATL met at 28 out of 52 sites. 14 sites with sufficient data for trend analysis, nine had improving trends in QMCI score, 4 showed no clear trend, and 1 showed a declining trend.
Adverse effects on water clarity and aquatic biota do not occur due to sediment inputs	Fine sediment (<2 mm diameter) percent cover of stream bed. TSS concentrations in surface water	Upper limit fine sediment percent cover of stream bed: Spring-fed – plains – urban waterways: 30% Spring-fed – plains waterways: 20%	Instream Annual Ecology Report 2024 Instream Annual Ecology Report 2025	2024: Five yearly: fine sediment cover not met at 5 of the 14 sites

		Banks Peninsula waterways: 20% Upper limit concentration of TSS in surface water: 25 mg/L No statistically significant increase in TSS concentrations	Surface water quality monitoring report: Appendix E Monthly fine sediment cover: Appendix E of Annual Report	Annual monitoring: fine sediment cover not met at all 4 sites. 2025: Monthly fine sediment cover: not met at 10 of the 17 sites (covers 2024-25) Monthly TSS: Statistical increase recorded at two sites (Addington Brook & Kā Pūtahi Creek)
Adverse effects on aquatic biota do not occur due to copper, lead and zinc inputs in surface water	Zinc, copper and lead concentrations in surface water	Upper limit concentration of dissolved zinc: Ōtākaro-Avon River catchment: ≤0.0295 mg/L Opāwaho-Heathcote River catchment: ≤0.0396 mg/L Cashmere Stream: ≤0.0063 mg/L Huritini-Halswell River catchment: ≤0.0174 mg/L Pūharakekenui-Styx River catchment: ≤0.0117 mg/L Ōtūkaikino River catchment: ≤0.0091 mg/L Stream Reserve Drain & Aylmers Stream (Banks Peninsula): ≤0.0029 mg/L	Surface water quality monitoring report: Appendix E	2024: Zinc: not met at 18 of 51 sites, Copper: not met at 11 of 51 sites Lead: Not met at 2 of 51 sites 2025: Zinc: not met at 17 of the 51 sites, Copper: not met at 10 of 51 sites Lead: met at all the 51 sites

		Balguerie Stream (Banks Peninsula): ≤0.0025mg/L Upper limit concentration of dissolved copper: Ōtākaro-Avon and Opāwaho-Heathcote River catchments: ≤0.0018 mg/L Huritini-Halswell, Pūharakekenui-Styx and Ōtūkaikino River catchments: ≤0.0014 mg/L Cashmere Stream and Banks Peninsula waterways: ≤0.001 mg/L Upper limit concentration of dissolved lead: Ōtākaro-Avon River catchment: ≤0.0154 mg/L Opāwaho-Heathcote River catchment: ≤0.0239 mg/L Cashmere Stream: ≤0.0043 mg/L Huritini-Halswell River catchment: ≤0.0109 mg/L Pūharakekenui-Styx River catchment: ≤0.006 mg/L Ōtūkaikino River catchment: ≤0.0041 mg/L Stream Reserve Drain & Aylmers Stream (Banks Peninsula): ≤0.0014 mg/L Balguerie Stream (Banks Peninsula): ≤0.0011mg/L		

Excessive growth of macrophytes and filamentous algae does not occur due to nutrient inputs	Total macrophyte and filamentous algae cover (>20 mm length) cover of stream bed	Upper limit total macrophyte cover of stream bed: Spring-fed – plains – urban waterways: 60% Spring-fed – plains waterways: 50% Banks Peninsula waterways: 30% Upper limit filamentous algae cover of the stream bed: Spring-fed – plains – urban waterways: 30% Spring-fed – plains waterways: 30% Banks Peninsula waterways: 20%	Instream Annual Ecology Report 2024 Instream Annual Ecology Report 2025	2024: Five-yearly macrophyte data: not met at 13 of the 14 sites Annual macrophyte data: met at 1 of 4 sites Five-yearly algae data: met 12 out of 14 sites Annual algae data: met at all 4 sites. 2025: Annual macrophyte data met at 40 out of 52 sites. Annual algae cover data met at 50 of 52 sites.
Adverse effects on aquatic biota do now occur due to zinc, copper, lead and PAHs in instream sediment	Zinc, copper, lead and PAHs concentrations in instream sediment	Upper limit concentration of total recoverable metals for all classifications: Copper = 65 mg/kg dry weight Lead = 50 mg/kg dry weight Zinc = 200 mg/kg dry weight Total PAHs = 410 mg/kg dry weight No statistically significant increase in copper, lead, zinc and Total PAHs	Surface water quality monitoring report: Appendix E	2024: Zinc: met at 6 of 13 sites. Lead: met at 9 of 13 sites. Copper: met at all 13 sites. Total PAHs: met at 5 of 13 sites. 2025: Zinc: met at 19 of 52 sites. Lead: met at 22 of 52 sites.

				Copper: met at 30 of 52 sites. Total PAHs: met at 24 of 52 sites.
Adverse effects on Mana Whenua values do not occur due to stormwater inputs	Waterway Cultural Health Index and State of Takiwā scores	Lower limit averaged Waterway Cultural Health Index and State of Takiwā scores for all waterway classifications: 5	Mana whenua vales monitoring: Appendix F of Two-Year Report.	Values not met for 2024 and 2025 assessments.

Table 14: Assessment against Comprehensive Stormwater Network Discharge Consent Schedule 8 (Coastal Waters) Attribute Target Levels (ATLs) for 2024 & 25. PAHs = Polycyclic aromatic hydrocarbons; TSS = Total Suspended Solids. Includes tidal waterway sites of Avon

Objective	Attribute	Attribute Target Level	Monitoring	Outcome
Adverse effects on ecological values do not occur due to stormwater inputs	QMCI	Lower limit QMCI scores: Spring-fed – plains – urban waterways: 3.5 Spring-fed – plains waterways: 5 Banks Peninsula waterways: 5	Instream Annual Ecology Report 2024 Instream Annual Ecology Report 2025	2024: Five yearly: Met at all 14 sites. Annual: Not met at the 4 sites. 2025: QMCI ATL met at 28 out of 52 sites. 14 sites with sufficient data for trend analysis, nine had improving trends in QMCI score, 4 showed no clear trend,

				and 1 showed a declining trend.
Adverse effects on water clarity and aquatic biota do not occur due to sediment inputs	Fine sediment (<2 mm diameter) percent cover of stream bed. TSS concentrations in surface water	Upper limit fine sediment percent cover of stream bed: Spring-fed – plains – urban waterways: 30% Spring-fed – plains waterways: 20% Banks Peninsula waterways: 20% Upper limit concentration of TSS in surface water: 25 mg/L No statistically significant increase in TSS concentrations	Instream Annual Ecology Report 2024 Instream Annual Ecology Report 2025 Surface water quality monitoring report: Appendix E Monthly fine sediment cover: Appendix E of Annual Report	2024: Five yearly: fine sediment cover not met at 5 of the 14 sites Annual monitoring: fine sediment cover not met at all 4 sites. 2025: Monthly fine sediment cover: not met at 10 of the 17 sites (covers 2024-25) Monthly TSS: Statistical increase recorded at two sites (Addington Brook & Kā Pūtahi Creek)
Adverse effects on aquatic biota do not occur due to copper, lead and zinc inputs in surface water	Zinc, copper and lead concentrations in surface water	Upper limit concentration of dissolved zinc: Ōtākaro-Avon River catchment: ≤0.0295 mg/L Opāwaho-Heathcote River catchment: ≤0.0396 mg/L Cashmere Stream: ≤0.0063 mg/L Huritini-Halswell River catchment: ≤0.0174 mg/L	Surface water quality monitoring report: Appendix E	2024: Zinc: not met at 18 of 51 sites, Copper: not met at 11 of 51 sites Lead: Not met at 2 of 51 sites 2025:

		Pūharakekenui-Styx River catchment: ≤0.0117 mg/L Ōtūkaikino River catchment: ≤0.0091 mg/L Stream Reserve Drain & Aylmers Stream (Banks Peninsula): ≤0.0029 mg/L Balguerie Stream (Banks Peninsula): ≤0.0025mg/L Upper limit concentration of dissolved copper: Ōtākaro-Avon and Opāwaho-Heathcote River catchments: ≤0.0018 mg/L Huritini-Halswell, Pūharakekenui-Styx and Ōtūkaikino River catchments: ≤0.0014 mg/L Cashmere Stream and Banks Peninsula waterways: ≤0.001 mg/L Upper limit concentration of dissolved lead: Ōtākaro-Avon River catchment: ≤0.0154 mg/L Opāwaho-Heathcote River catchment: ≤0.0239 mg/L Cashmere Stream: ≤0.0043 mg/L Huritini-Halswell River catchment: ≤0.0109 mg/L Pūharakekenui-Styx River catchment: ≤0.006 mg/L		Zinc: not met at 17 of the 51 sites, Copper: not met at 10 of 51 sites Lead: met at all the 51 sites

		Ōtūkaikino River catchment: ≤0.0041 mg/L Stream Reserve Drain & Aylmers Stream (Banks Peninsula): ≤0.0014 mg/L Balguerie Stream (Banks Peninsula): ≤0.0011mg/L		
Excessive growth of macrophytes and filamentous algae does not occur due to nutrient inputs	Total macrophyte and filamentous algae cover (>20 mm length) cover of stream bed	Upper limit total macrophyte cover of stream bed: Spring-fed – plains – urban waterways: 60% Spring-fed – plains waterways: 50% Banks Peninsula waterways: 30% Upper limit filamentous algae cover of the stream bed: Spring-fed – plains – urban waterways: 30% Spring-fed – plains waterways: 30% Banks Peninsula waterways: 20%	Instream Annual Ecology Report 2024 Instream Annual Ecology Report 2025	2024: Five-yearly macrophyte data: not met at 13 of the 14 sites Annual macrophyte data: met at 1 of 4 sites Five-yearly algae data: met 12 out of 14 sites Annual algae data: met at all 4 sites. 2025: Annual macrophyte data met at 40 out of 52 sites. Annual algae cover data met at 50 of 52 sites.
Adverse effects on aquatic biota do now occur due to zinc, copper, lead and PAHs in instream sediment	Zinc, copper, lead and PAHs concentrations in instream sediment	Upper limit concentration of total recoverable metals for all classifications: Copper = 65 mg/kg dry weight Lead = 50 mg/kg dry weight Zinc = 200 mg/kg dry weight Total PAHs = 410 mg/kg dry weight	Surface water quality monitoring report: Appendix E	2024: Zinc: met at 6 of 13 sites. Lead: met at 9 of 13 sites. Copper: met at all 13 sites. Total PAHs: met at 5 of 13 sites.

		No statistically significant increase in copper, lead, zinc and Total PAHs		2025: Zinc: met at 19 of 52 sites. Lead: met at 22 of 52 sites. Copper: met at 30 of 52 sites. Total PAHs: met at 24 of 52 sites.
Adverse effects on Mana Whenua values do not occur due to stormwater inputs	Waterway Cultural Health Index and State of Takiwā scores	Lower limit averaged Waterway Cultural Health Index and State of Takiwā scores for all waterway classifications: 5	Mana whenua vales monitoring: Appendix F of Two-Year Report.	Values not met for 2024 and 2025 assessments.

11. Stormwater Quality Investigation Programme (Schedule 3)

11.1. Schedule 3(b) – Develop an Instream Contaminant Concentration Model

In order improve stormwater quality management, the University of Canterbury and DHI were commissioned to develop an Instream Contaminant Concentration Model (ICCM). This would allow Council to gain a better understanding where pollutants come from and to identify contamination hotspots and predict pollutant loads across Christchurch's stormwater catchments.

The model development report for the ICCM is provided in Appendix L. The model covers Christchurch City's four major stormwater catchments (Ōtākaro-Avon, Huritini-Halswell, Ōpāwaho-Heathcote and Pūharakekenui-Styx). More than 225,000 individual impervious surfaces were identified. The surfaces are made of 90% roofs, 6% roads, and 4% paved carparks. Roofs are classified into eleven types based on their material; roads are categorized into seven types based on their usage; and three types of carparks were identified. Contaminant loads and concentrations for Total Suspended Solids, Total Zinc, Dissolved Zinc, Total Copper, and Dissolved Copper were generated for each surface for over 200 storm events. Surface-level results were aggregated at three hierarchical levels – Treatment System (~500), Stormwater Catchments (~160), and at various locations (~170) within the waterways. Results can be obtained for individual stormwater events or annual total before any treatment measures are put in place or after the implementation of treatment measures. The cumulative impact of the treatment measures on the waterways is also computed.

The model is currently available internally for use for planning purposes and is being user tested by a limited number of external users, including ECan. The Council is continuing its research into ICCM, by comparing it against the C-CLM, which was the CSNDC original model. Validation against water quality results will also take place. It is planned that the ICCM will replace the C-CLM when validation is completed.

11.2. Schedule 3(e) – Feasibility Study of Receiving Environment Response Research Programme

In 2023 NIWA produced a feasibility study to establish the existing knowledge base and investigate the feasibility of robustly predicting the responses of the receiving environment to changes in network contaminant loads and resulting in-stream concentrations.

To further progress this research, Council commissioned Instream in 2025 to undertake Generalised Additive Modelling (GAM) to examine relationships between water quality, habitat, and invertebrate communities, with a focus on total suspended solids (TSS), copper, and zinc (Appendix K). Results indicated no strong relationships between copper or zinc and invertebrate metrics, while TSS showed moderate predictive ability for ecological health—particularly QMCI and ASPM—although habitat factors were often equally or more influential.

Physical habitat (e.g. riparian width, sediment cover, and hydraulic diversity) and TSS were the strongest predictors of invertebrate condition. Reducing TSS and improving habitat—such as increasing riparian buffers, limiting deposited sediment, and enhancing flow variability—are predicted to improve QMCI and ASPM scores. MCI was less reliable due to sensitivity to outliers, so QMCI and ASPM are preferred for management use.

TSS emerged as the primary stressor, with many sites exceeding the 25 mg/L target, degrading water clarity and habitat. Copper and zinc were generally low but occasionally exceeded guidelines locally, indicating a need for continued monitoring.

Recommended actions include reducing sediment inputs through erosion and stormwater controls, restoring riparian zones, and improving instream habitat complexity. Restoration should prioritise degraded sites and be coordinated at the catchment scale to address upstream pressures and maintain ecological connectivity. Overall, combined habitat restoration and water quality improvements provide the most effective pathway to improving stream health.

11.3. Schedule 3(i) – Device Effectiveness Monitoring and Modelling

To demonstrate contaminant reduction as set out by Table 2 of the Consent and validate our contaminant models, Council undertook treatment performance monitoring of our stormwater treatment devices. This can also help to assess whether improvements to device management are required and provides an opportunity to review our design philosophy and identify ways to further reduce effects on the receiving environment.

11.3.1. No 1 Floating Wetland

Tonkin & Taylor Ltd (T+T) was commissioned by Council to undertake surface water monitoring (Appendix N) to assess the treatment performance of a floating wetland for TSS, zinc, and copper. The waterway restoration and wetland were constructed in 2019 within the Christchurch Golf Course as part of the Land Drainage Recovery Programme. Results of previous post-construction water quality and stream ecology monitoring in 2021 was provided with the CSNDC Annual Report (Collaborations, 2022).

In 2025, monitoring was undertaken during two dry-weather (baseline) events and two wet-weather events. While two rainfall events are insufficient to determine long-term treatment performance, this monitoring was incorporated into a wider project and was therefore considered useful as an initial indication of whether the system was performing in accordance with the design assumptions.

Rainfall totals were 20.2 mm over two days for Wet Event 1 and 128 mm over four days for Wet Event 2, which is well above the design event (approximately 25mm, in line with Waterways Wetlands Design Guide (WWDG)). Overall, downstream TSS concentrations were generally lower than upstream concentrations, indicating treatment, except for a mid-event sample during Wet Event 2. This anomaly is likely influenced by weed removal works undertaken prior to the event. Similarly, dissolved and total copper and zinc concentrations were typically lower downstream compared to upstream, except for post rainfall samples during Wet Event 2, likely reflecting wetland saturation and reduced hydraulic residence time during prolonged and intense rainfall.

The 2025 results indicated that the floating wetland is effective at reducing sediment and metal concentrations under normal and moderate flow conditions, and in keeping with design flows. However, performance was reduced during the large rainfall event presumably due to limited treatment capacity and shortened residence times. T+T suggested potential enhancements to improve storm surge management and maintain retention under high-flow conditions, which could further improve treatment performance and downstream water quality. Further modifications were recommended to address low DO and high pH to improve general habitat conditions.

Annual treatment efficiencies from the Council's ICCM are provided in Table 15 for comparison with measured efficiencies[1].

Table 15: Measured upstream and downstream water quality parameters vs ICCM annual treatment efficiencies.

Water quality parameters	Measured (event based)	ICCM (annual)
TSS	47 – 80 %	72%
Zinc (dissolved)	49 – 94 %	25%
Zinc (total)	47 – 90 %	33%
Copper (dissolved)	41 – 75 %	54%
Copper (total)	38 – 51 %	57%

From the monitoring, the treatment efficiency of the wetland at treating/reducing stormwater contaminants varies during different rainfall

[1] The range of measured efficiencies are based on only two wet weather events with high variability and are therefore not directly comparable to assumed annual treatment efficiencies.

events. However, these individual events help to understand the range of treatment efficiency expected.

Further monitoring was not deemed necessary given this is one of few floating wetlands in Christchurch and results are largely in accordance with the predicted annual treatment efficiencies.

11.3.2. Burlington Village Floating Wetland

Burlington Wetland was constructed in 2021, and observations from staff have noticed that the water level and extent of vegetation in the wetland is different to design. To determine if this was having an impact on treatment performance, Instream were engaged to do some grab samples upstream, mid-wetland and outlet. Two rainfall events were monitored for TSS, zinc and copper in 2025.

Figure 21 indicates the sampling locations for Burlington Stormwater Wetland. The first flush location is at the outlet of the first flush basin, mid-system is at the inlet to the final wetland (the third of the two larger wetland cells) and the outlet is post-treatment.

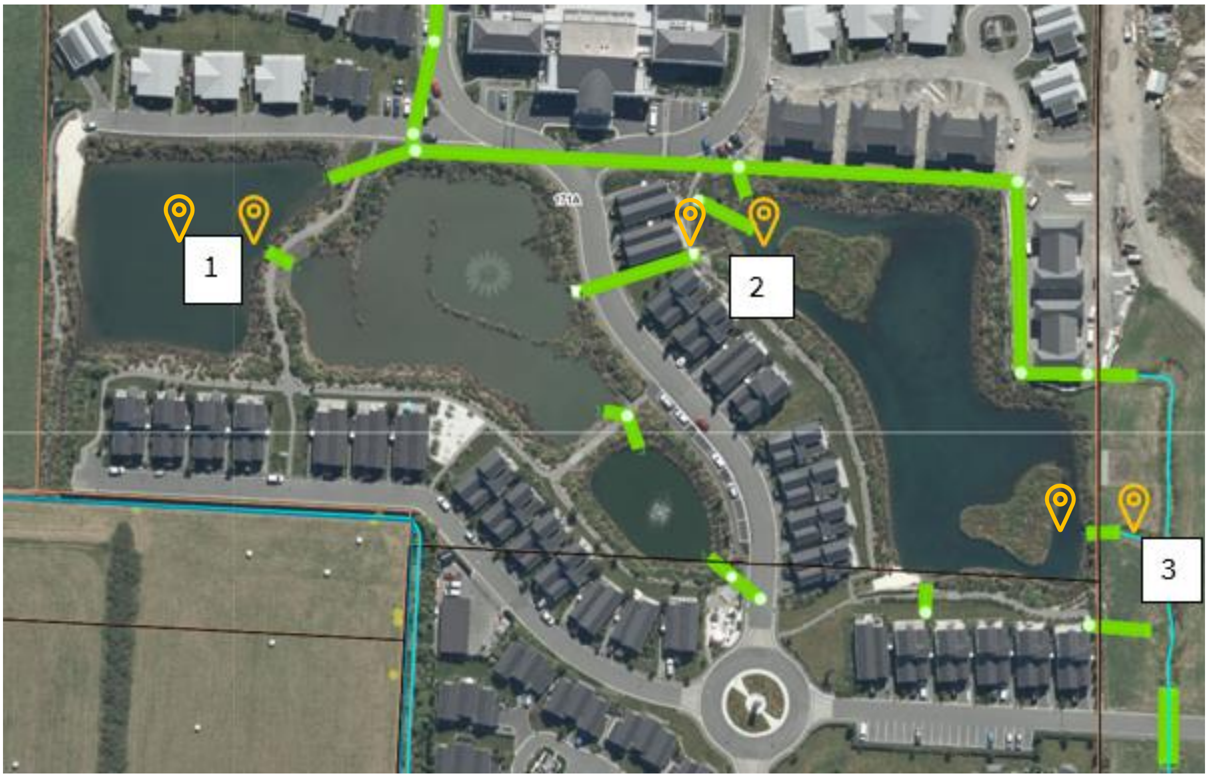


Figure 21: Sampling locations for Burlington Stormwater: 1 -"first flush" is at the outlet of the first flush basin, 2 - "mid-system" is at the inlet to the final wetland cell and 3 -"outlet" is post-treatment.

The samples were taken in accordance with the first flush criteria of the EMP. Council target the first flush of a rainfall event because it typically carries the highest contaminant loads of a rainfall event.

- 13/11/2025 (21 mm over 12 hours, samples collected after approx. 11mm of rainfall), and

- 17/12/2025 (16 mm over 8 hours, samples collected after approx. 14 - 15mm of rainfall).

Table 16: Measured upstream and downstream water quality parameters vs ICCM annual treatment efficiencies.

Water quality parameters	Measured (event based)	ICCM (annual)
TSS	31 – 55%	79%
Zinc (dissolved)	68%	29%
Zinc (total)	55 - 60%	31%
Copper (dissolved)	-60 - -26%	50%
Copper (total)	-15%	54%

This monitoring underrepresents the treatment performance because the sampling did not include monitoring at the inlet of the first flush basin. From previous monitoring at Knights Stream (PDP, 2024) first flush basins were observed to provide a significant amount of TSS and particulate metal removal. Further investigation is required into the poor copper reduction rates. It is understood that operations staff at the retirement village have been adding "REGEN – Sediment" and "REGEN – Blue", to maintain nuisance aquatic macrophyte growth. However, this may also be at the detriment of plant growth necessary for treatment. This will be investigated further.

11.3.3. Stormfilter at Richardson Terrace, Bells Creek

An investigation into the maintenance and performance of the Stormfilter at Richardson Terrace, Bells Creek was initiated in 2024. It was determined that more information was necessary to understand the hydraulic and water quality performance and WSP were engaged in 2025.

The monitoring is designed to help Council understand the contaminant load of the contributing sub-catchments, improve management of this device to ensure optimal performance and provide design considerations for proposed pumped devices (e.g. in the Ōtākaro-Avon River Corridor).

The Stormfilter cartridges were out of service during their replacement mid-2025 and so only one rainfall event was monitored in the 2024-2025 monitoring period. However, Council did take grab samples from the contributing sub-catchments which have been reported on in the Condition 59 report.

Results will be available in the next annual report.

11.3.4. Mussel Shell Filters

Mussel Shell Bunds, made up of crushed mussel shells, were installed at Te Kuru in response to the 2024 Port Hill Fire and Wigram East Retention Basin to investigate their ability to be used in large-scale stormwater treatment facilities. Unfortunately, due to insufficient hydraulic conductivity of the media, treatment performance monitoring was not considered worthwhile.

In 2026, a further pilot of new, less brittle, mussel shell material will be installed in a section of Eastman wetlands at Te Kuru.

Results will be reported in the next annual report.

11.3.5. Waitaki Tidal Wetland

Waitaki Tidal Wetland was constructed within the OARC. It was designed to provide water quality improvement by capturing and treating the first-flush runoff from an urban residential catchment and treating it in a 3 Ha constructed wetland system.

GHD, the designers of the Waitaki Tidal Wetland, wrote a paper for the Water NZ Stormwater conference[2]. In the paper, GHD noted the additional benefits of this system (although not named) include:

- "Ecological restoration through giving back space to a tidally influenced river and allowing natural enhancement and, ultimately, restoration of an existing tidal wetland (1.8 ha), as well as providing space for new coastal forested areas (0.9 ha).
- Flood protection by incorporating ways to mitigate flooding from waterways via a flood defence system (stopbank or flood wall) which will protect approximately to 160 properties from flooding during a 50-year ARI storm event.
- Community liveability improvement though the inclusion of areas for passive recreation and enhanced community connection in terms of people and natural systems."

Surface water quality monthly sampling for the first year is required upstream and downstream of the system under CRC252419. TSS was not a parameter required to be monitored because this monitoring was designed to investigate potential passive discharge from an adjacent landfill. Monitoring of dissolved zinc and dissolved copper shows little change upstream and downstream of the wetland. This is typical until such time vegetation becomes fully established in the wetland. Furthermore, these samples were taken irrespective of rainfall and as such do not reflect stormwater treatment. Samples generally did not exceed ATLs.

11.4. Schedule 3(j) – Implementation of Device Effectiveness Monitoring and Modelling

This condition requires the Council to apply monitoring outputs from Schedule 3(i), along with other stormwater modelling and monitoring data being gathered, to inform the planning and design of stormwater systems and

[2] Drumheller, C., Bennett, J., & Guidon, A. (2026). *Making the invisible, visible: The real value of nature-based solutions*. For Water NZ, Stormwater Conference 2026.

facilities, including in the development of Implementation Plans, and reviews of SMPs, Infrastructure Design Standards (IDS) and the WWDG. This task has no start or end dates assigned to it and has been considered an ongoing objective of implementation of findings.

Although no changes to the IDS or WWDG have been recommended as a result of the treatment performance monitoring, more effort is being made during the design phase with the Capital Delivery team to ensure devices are fit for purpose from an operational perspective, and are better equipped to prove compliance. This includes facilities being designed to include water level monitoring, undertaking more pre and post-construction water quality monitoring to optimise design and test treatment performance upon commissioning. A lessons learnt workshop on wetland design was held to improve wetland outcomes, and these lessons are being worked into new designs.

11.5. Schedule 3(k) – Targeted Wet Weather Monitoring Programme

The Targeted Wet Weather Monitoring Programme is designed to improve the level of detail of particular receiving environments. Council prioritised four sub-catchments (Nottingham Stream, Charlesworth Drain, Styx Drain and the Richardson Terrace Stormfilter sub-catchments) for carrying out Targeted Wet Weather Monitoring to improve knowledge of the state of the receiving environment, finer level of contaminant inputs and treatment efficiency, and to inform mitigation options under the SMPs.

Nottingham Stream (Appendix O) was chosen for further investigation under Condition 59, for which the investigation compromised of a TWWM programme and to inform mitigation options.

Charlesworth Drain (Appendix M) monitoring was chosen to inform mitigation options for Ihutai – Coastal project Linwood Paddocks and also affirm some observations made with respect to avifauna in the area.

Styx Drain is a quickly urbanising catchment and Council staff thought it would be worth building a longer-term data set specific to tracking the impact of zinc roofing on a waterway with “good” water quality.

Richardson Terrace/Bells Creek StormFilter contributing sub-catchments were included in the treatment performance monitoring. The three largest contributing sub-catchments: Bells Creek, Arran Drain, and Ferry Road (sampled at SW Access 8168) have been monitored. This sub-catchment monitoring was on the suggestion of the Land Drainage Operations Team to help investigate opportunities to optimise the treatment potential of the Richardson Tce StormFilter, and minimise operating costs.

11.6. Condition 59 – Response to Monitoring

Under the CSNDC, Council is required to monitor and investigate sites where multiple water quality ATLs are exceeded. Please see Appendix P for full results of 2024-25 investigations. Three priority sites were initially selected for further investigation based on 2023 and previous monitoring results: two in Curletts Stream and one in Nottingham Stream. These sites were prioritised due to repeated ATL exceedances, particularly for zinc and increasing contaminant concentrations. Wet weather monitoring indicated that copper, zinc, and total suspended solids issues at these sites are most likely associated with authorised stormwater discharges under the consent, although other illicit or dry-weather sources may also be contributing.

Following review of the 2024 and 2025 monitoring data, two additional sites have been recommended for investigation: Stream Reserve Drain and Cashmere Stream at Sutherlands Road. Both sites exceeded multiple ATLs, showed increasing zinc trends, and are considered sensitive receiving environments. Investigations into likely sources of contamination at these sites are proposed over the next two years.

Targeted wet weather monitoring has also been undertaken in Charlesworth Drain, Styx Drain and Richardson Terrace sub-catchments to better understand contaminant sources, treatment performance, and future mitigation options. Industrial site audits were also undertaken in the Heathcote River and Curletts Stream catchments during 2024 and 2025.

Overall, this work is intended to identify high contaminant source areas, prioritise stormwater treatment where contaminant loads are the greatest, and help prevent illicit discharges. The work is considered long-term, evidence-driven, and adaptive, with annual reviews applied to reassess priorities and build on lessons from previous investigations.

12. Other Actions (Schedule 4)

12.1. Schedule 4(i) – ESCP within Building Control and Resource Consent Processes

The SDMP was updated in 2025 to bring it in line with updated Condition 42(a), which now allows the Council to exclude sites from using the CSNDC, if they do not comply with their ESCP.

Council launched its Erosion and Sediment Control - Remediation Action Plan (RAP) at the end of 2023, this RAP resulted in the Council undertaking the following actions in 2024 and 2025 to reduce sediment discharges from construction sites:

- Over 400 additional ESCP building site audits were completed by Three Waters staff during 2024.
- In 2025 Councils RMA compliance team completed over 160 ESCP audits as part of the resource consent monitoring.

- Development of a ESCP auditing app for Council staff.
- Council staff gave ESCP best practice presentations to several construction companies, Industry Expos and Master Builders meetings.
- Building on Small Sites" ESC brochure released by Council in 2024. New Council marquee, signs and posters (targeting ESC) for public and industry events purchased in 2025.
- Multiple meetings with ECan to improve the ESCP auditing process.

12.2. Schedule 4(j) – Developing a Programme for Operational Inspection of Private Stormwater Treatment Devices

Under this section, the Council must implement a programme to inspect a representative sample of privately owned stormwater treatment and/or retention devices on non-industrial sites (Appendix Q). These include commercial complexes, rest homes, residential and multi-apartment buildings, education centres, and similar properties. The programme ensures devices function as designed and are properly maintained.

In both 2024 and 2025, 24 representative devices (proprietary and non-proprietary), approved between 2013 and 2023/24, were inspected across various catchments.

In 2024, all inspected devices were fully compliant (100%). Three devices were excluded due to vacant properties, temporary installations, or being too new for inspection. In 2025, three devices were not investigated due to co-ownership and unclear management responsibility. Inspection reports for three additional sites are still pending.

Overall, awareness of operation and maintenance requirements remains strong, with high levels of property owner engagement.

In 2026, Council will focus inspections on commercial properties, as residential sites are considered lower risk and are covered by existing guidance. Planned improvements include addressing non-compliance and co-owned properties, developing device-specific maintenance manuals, and centralising device records.

12.3. Schedule 4(m, n and o) – Community Waterways Partnership

The Community Waterways Partnership (CWP) has developed a dedicated three-year Action Plan, approved by the CWP Steering Group. The Action Plan sets out priority actions aligned with agreed Goals and Objectives and provides a framework to guide delivery and collaboration across the Partnership. A CWP Progress Report can be found in Appendix T.

The CWP launched its own website, providing a central platform to communicate the purpose of the Partnership, identify partner organisations and their projects, promote waterways-related events, and host a shared resource directory. The website supports greater visibility, coordination, and knowledge-sharing across the sector.

Council has also launched the Wai map, an interactive tool that presents water quality monitoring data across Ōtautahi Christchurch. CWP partners contributed to shaping this resource to ensure it meets community needs. The Wai map enables partners to readily access and use water quality data to inform and guide their waterways restoration efforts.

The CWP delivered a workshop in collaboration with the National Science Challenge research team. The workshop presented key findings from research into influencing human behaviour to protect and restore urban freshwater health. Participating community partners gained practical tools and insights to support behaviour change initiatives within their own catchments

In 2024 and 2025, the CWP convened its annual end-of-year hui. These hui provided an opportunity for partners to reflect on the year's strategic direction and achievements, hear from other partners, and participate in action-planning workshops. The Hui included kōrero focused on integrating mātauranga Māori ki te wai into our mahi.

Across 2024 and 2025, a total of 17 community-led projects were funded through the CWP. These projects spanned waterways education, citizen-science monitoring, clean-ups, and community events aimed at raising awareness of local waterways and strengthening stewardship.

The CWP supported CWP partners and local community groups, to deliver the 'Linwood Waterways Celebration Day'. The event engaged more than 160 Linwood Avenue School students and approximately 200 community members, promoting care for local waterways and connections to place.

During 2024 and 2025, CWP partners delivering waterways education provided nearly 200 education programmes and learning opportunities to schools across Christchurch, helping students of all ages build their understanding of freshwater systems and stormwater impacts.

Council's presentation of the CSNDC in 2024 and 2025, had strong attendance following the expansion of this presentation to the Community Waterways Partnership rather than just the River Care Liaison Group. Attendees now also include City Council and ECan staff, as well as a selection of Councillors. In 2025, the presentation adopted a catchment-by-catchment format to clearly demonstrate progress under the consent conditions for each catchment. In 2025, a Wastewater Overflows section (CRC224552, Condition 12) was added to the presentation, with members of the Compliance and Monitoring Liaison Group, who would normally receive this information separately, were also invited to attend. Feedback indicated this addition was valuable for all attendees, and the Wastewater Overflows section may therefore remain part of the CSNDC presentation. Minutes of the CSNDC presentation are available upon request.

12.4. Schedule 4(p) –Industrial Liaisons Group

Council provided an email newsletter to Industrial Liaison Group members in both 2024 and 2025. These newsletters provide updates on the following topics:

- CSNDC Two Year Report
- Stormwater Management Plan Programme Update
- Transitional Plan
- Industrial Site Audit Process
- New Stormwater Technologies
- Consent Compliance
- Monitoring
- Stormwater Superhero Awards

12.5. Schedule 4(q, r, s, t and u) – Pūharakekenui-Styx River Weed Management

This section of the CSNDC sets conditions for macrophyte (weed) management in the Pūharakekenui-Styx River. In 2023, NIWA investigated how different management practices could reduce flood risk, with findings documented in Schedule 4(R). This work was extended by Boffa Miskell in 2025, who assessed best-practicable flood mitigation options, including cost–benefit analysis and hydraulic and flood-scenario modelling (Schedule 4, S–U).

Boffa Miskell report (Appendix R) assessed four control methods: hessian matting, aquatic herbicide application, mechanical cutting, and riparian shading. All methods reduced flood risk compared to no intervention, with hessian matting proving most effective, followed by aquatic herbicide and riparian shading; mechanical cutting was least effective. Cost-effectiveness analysis identified hessian matting as the most expensive option and aquatic herbicide as the least expensive. Multi-criteria analysis consistently ranked riparian shading and hessian matting highest overall.

Council's next steps are to trial the use of hessian matting and riparian shading to test their effectiveness for weed suppression, in-situ.

12.6. Industrial Site Audit Programme

Condition 47 requires the Council to audit as least 15 industrial sites per year to gain an understanding of site processes, inspect stormwater (and wastewater) infrastructure, and provide actions to be completed by the site to remain covered by the CSNDC.

All industrial sites deemed as high-risk and covered by the CSNDC were subject to a desktop assessment to determine their suitability for audit by the Industrial Stormwater Discharge Audit team.

Following the amendment of Stormwater and Land Drainage Bylaw 2022, the council introduced the Industrial Stormwater Discharge Licence (ISDL) programme as a key regulatory tool. The programme aims to further promote best practice stormwater management in industrial areas and has been combined with the Condition 47 audit process to provide a single wraparound industrial site auditing system.

Under this programme, occupiers of industrial premises undertaking activities listed in the Register of Industrial and Trade Activities are required to apply for a licence. For new industrial premises established after the compliance timeframes specified in the Register, occupier must apply for a licence within three months of commencing operations.

Over time, this programme is intended to bring all qualifying industrial activities under a single framework. This will enable consistent risk assessment and the implementation of recommendations aimed at reducing the risk of contaminant discharge to waterways.

Businesses that remain operational and meet the criteria for an Industrial Stormwater Discharge Licence (ISDL) are subject to audits with actions to reduce risk are monitored by Council staff.

The main objectives of the audit programme are to:

- Identify contaminant hotspots
- Promote good management practices (GMPs)
- Mitigate contaminated discharges
- Require treatment controls where necessary

Council completed 15 audits across the Ōpāwaho-Heathcote, Ōtākaro-Avon, Pūharakekenui-Styx and Huritini-Halswell catchments in 2024, covering a wide range of industrial and commercial sites.

In 2025 Council focused much of its audits on Banks Peninsula sites, to support the development and implementation of the new Banks Peninsula SMP, the remaining audits occurred primary in the Ōpāwaho-Heathcote and Ōtākaro-Avon catchments, in total 15 sites were audited in 2025.

All sites selected under the CSNDC programme undergo a thorough audit and risk assessment. Site-specific actions are then recommended, including the development of a Stormwater Management Plan for each site, with defined timeframes for implementation. The quality of stormwater runoff from each audited site is assessed against the target values set for each catchment under the Council's Environmental Management Plan (EMP). Where target values are not met, further recommendations are provided, which may include the installation of stormwater treatment devices.

Actions identified for each audited site under the CSNDC are shared with Environment Canterbury (ECan) for review and feedback, ensuring a coordinated approach and improved environmental outcomes.

Since the establishment of this programme, the focus has been on building strong relationships with businesses. Efforts have included supporting improvements to trade waste connections, promoting updated approaches to stormwater runoff treatment, and undertaking regular discharge sampling to assess the effectiveness of implemented actions.

Table 17: ISDL sites audited in 2024 -2025

ISDL sites audited in 2024		
Business	**Site Address**	**Catchment**
Enviro NZ	10 Barton Street	Heathcote River
SKOPE Industries	66 Princess Street	Avon River
SKOPE Industries	57 Princess Street	Avon River
Goldpine	196 Springs Road	Halswell Junction Outfall
Verkerks	94 Vagues Road	Styx River
Plating Solutions	9 Kotzikas Place	Heathcote River
Southern Seafoods Ltd	24 Klondyke Drive	Halswell Junction Outfall
Warner Fencing and Gates	19 Kotzikas Place	Heathcote River
Angus Meats	35 Washbournes Road	Heathcote River
Novus Glass	69 Hayton Road	Heathcote River
Southern Pallets	21 Calgary Place	Halswell Junction Outfall
WasteCo	421 Blenheim Road	Heathcote River
Tumblar Products	648 Halswell Junction Road	Halswell Junction Outfall
Fahey Fence Hire	32 Clarence Street	Avon River
Carter's Tyre Service	63 Hayton Road	Heathcote River
ISDL sites audited in 2025		
Business	**Site Address**	**Catchment**
Ikana Ltd	1 Brixton Street, Islington	Heathcote River
Rubisco	15 Sheffield Crescent, Burnside	Avon River
Skellerup	124 Hayton Road, Wigram	Heathcote River
Livestock Improvement Corporation (LIC)	5 Produce Place	Halswell (to ground)
DC Marine	71-71A London Street, Lyttelton	Lyttelton Harbour
NPD Akaroa	57 Rue Lavaud, Akaroa	Akaroa Harbour

NPD Diamond Harbour	141 Marine Drive, Diamond Harbour	Diamond Harbour
Matipo Garage	16 Lowe Street	Avon River
Zelandia Horticulture	8 Vega Place	Heathcote River
Zelandia Horticulture	33A Avoca Valley Road	Heathcote River
Solvent Rescue	32-34 Coleridge Street	Heathcote River
Intergroup	47 Newtown Street	Estuary
Akaroa Wastewater Treatment Plant	301 Beach Road	Akaroa Harbour
CCC Parks Yard	6095 Christchurch-Akaroa Road	Akaroa Harbour
ThermoFisher Scientific	5 Brixton Street	Heathcote River

13. Appendices

Appendix A	Developments Authorised Under CRC252424
Appendix B	Transitional Plan
Appendix C	Sediment Discharge Management Plan
Appendix D	C-CLM– 5 year report
Appendix E	Environmental Monitoring Programme (V11)
Appendix F	Stormwater devices soil quality
Appendix G	Groundwater quality and quantity
Appendix H	Surface water quality
Appendix I	Annual Fine Sediment
Appendix J	Mana Whenua Values Monitoring
Appendix K	CSNDC Ecosystem Responses
Appendix L	ICCM Report
Appendix M	Charlesworth Drain Investigation
Appendix N	No 1 Floating Wetland Assessment
Appendix O	Targeted Wet Weather Monitoring at Nottingham Stream
Appendix P	Response to Monitoring – Condition 59
Appendix Q	Inspections of private stormwater treatment devices
Appendix R	Pūharakekenui-Styx River Weed Management
Appendix S	CSNDC Schedule 1
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