2025

# River Ecology in Tāmaki Makaurau: Annual Data Summary

Auckland Council's online interactive Water Quality and River Ecology Data Explorer presents State of the Environment (SoE) monitoring data for rivers, lakes, groundwater and the coast. River ecology metrics can be compared across the region and over time[1].

This report provides a summary of **river ecology** monitoring results for the period **July 2020 to June 2025,** or **2021-2025** based on the hydrological year.

## Key findings

### Land use impacts stream ecological health

- Stream ecological health was generally poorest in urban streams and best in streams within catchments dominated by either exotic or native forest.
- The macroinvertebrate communities within forested streams were dominated by pollution-sensitive taxa, indicating high water quality.
- Urban streams contained mainly pollution-tolerant macroinvertebrates due to poor water and habitat quality. This is reflected in lower ecological metric scores.

### The majority of monitoring sites had either 'excellent' or 'good' SEV scores

- Sixty-nine percent of sites had median Stream Ecological Valuation (SEV) scores that placed them within either the 'excellent' or 'good' categories for ecological value. This compares to 49% of sites that were rated as 'excellent' or 'good' for the MCI metric and 28% for QMCI, reflecting differences in the attributes measured.

### Urban streams had the worst overall ecological quality

- Nine of the 10 worst-ranked sites across all ecological metrics were located in urban catchments, with Ōmaru Creek, a soft-bottomed urban site in Glen Innes, ranking as the worst overall.

[1] This does not include the detailed statistical analysis that is required to assess trends in water quality over time and is reported in our five-yearly State of the Environment reports.

# Our river ecology monitoring programme

| Where | When | How | What |
|---|---|---|---|
| •70 river ecology sites throughout the Auckland Region.[2]<br>•Sites are broadly representative of a range of river and catchment sizes, biophysical classes, and dominant land cover pressures across the region. | •Annually during the summer sampling season (Nov-Apr) for macroinvertebrate sampling.<br>•Every two years for SEV assessments. | •Sampling stream macroinvertebrates using standardised kick- and sweep-netting methods.<br>•Recording physical and biological parameters within the stream channel and riparian zone for SEV assessments. | •Four metrics derived from counting the number and type of macroinvertebrates found at each site.<br>•An SEV score that represents the overall ecological value of each site. |

See the 'Water Quality and River Ecology Data Explorer User Guide and Methodology' report for more information on the water quality parameters we monitor, how we collect and analyse samples, how we analysed the data, and how to use the data explorer.

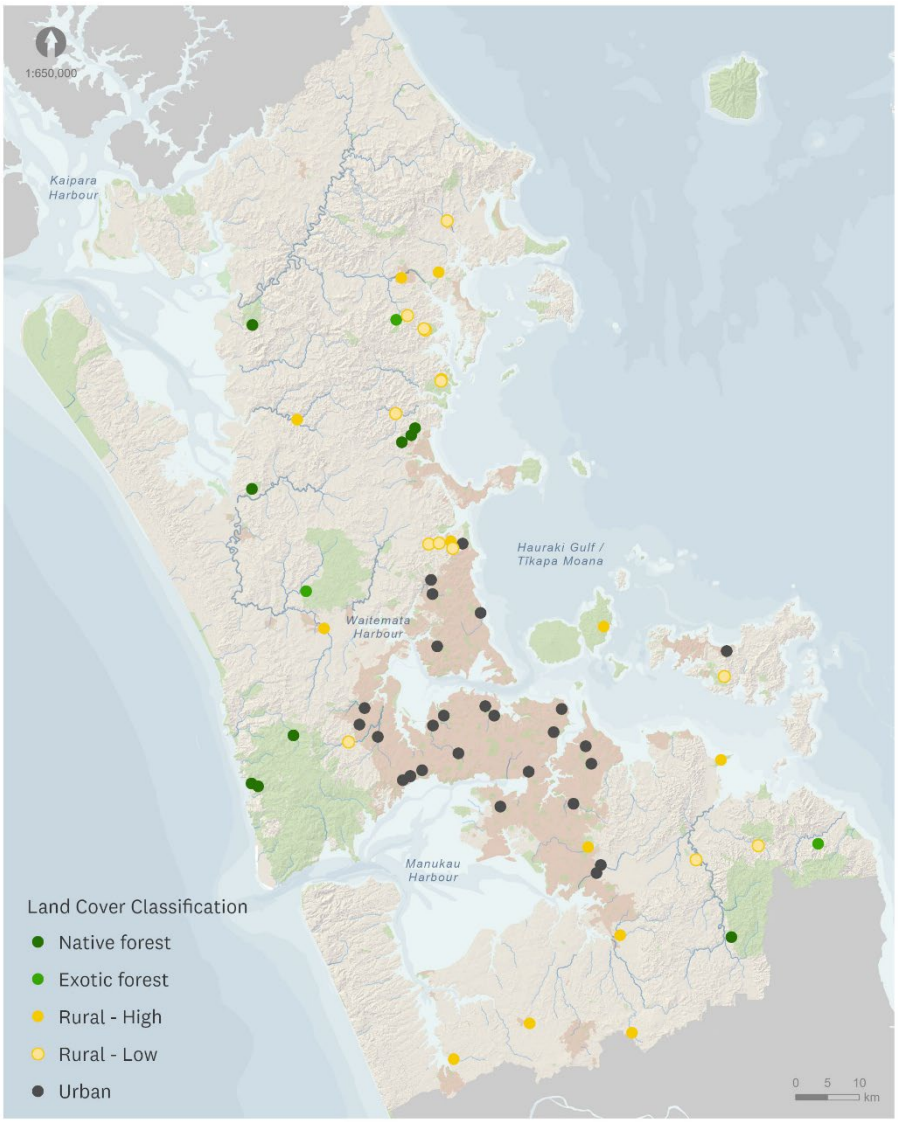


**Figure 1:** Land cover classification and location of sites monitored from 2021 to 2025.

[2] There are currently 70 river ecology sites in Auckland Council's SoE monitoring network. Not all these sites have yet generated sufficiently large datasets for reporting purposes, hence the discrepancy between this number and the number of sites reported on for the macroinvertebrate metrics (n=61) and SEV assessments (n=68).

# Macroinvertebrate Community Index (MCI)

The Macroinvertebrate Community Index (MCI) uses macroinvertebrates (aquatic insects) as bioindicators of water and habitat quality, as they are present in all freshwater environments, can be easily sampled, and exhibit a range of sensitivities to pollution.

Each taxon is assigned a tolerance score, and the MCI is calculated as the average score of all taxa found at a site. Sites with high proportions of pollution-tolerant taxa have lower MCI scores that indicate poor water quality, while those with high MCI scores generally have better water quality and in-stream habitat. MCI scores typically range from about 50 to 150 and can be interpreted using the quality classes shown in Table 1.

*Table 1: Interpretation of Macroinvertebrate Community Index (MCI) scores (Stark & Maxted 2007)[3]*

| MCI score | Quality Class | Description |
|---|---|---|
| >119 | Excellent | River in excellent ecological condition. Indicative of excellent water quality and habitat conditions. |
| 100-119 | Good | River in good ecological condition. Indicative of possible mild pollution and/or good habitat conditions. |
| 80-99 | Fair | River in fair ecological condition. Indicative of probable mild pollution and/or fair habitat conditions. |
| <80 | Poor | River in poor ecological condition. Indicative of probable severe pollution and/or poor habitat conditions. |

MCI scores ranged from lows of 37, recorded at both Tararata Creek and Ōtara Creek (East), which are urban sites[4], to a high of 141 at Ōrere Tributary, which is in an exotic forestry catchment [5].

Of the top 10 sites, ranked on their median MCI scores, four were located within native forest catchments and four within rural-low[6], with one exotic forest and one rural-high[7] site making up the remainder. None of the top 10 were located within urban catchments.

Sixteen percent of sites (n=10) had median MCI scores that were classed as Excellent (MCI score >119), while 3% (n=20) were Good, 43% (n=26) were classed as Fair, and the remaining 8% (n=5) were assessed as having Poor water quality.

# Quantitative Macroinvertebrate Community Index (QMCI)

The QMCI uses the same macroinvertebrate taxa scores as the MCI, but counts the number of individuals in each taxon, making it more sensitive to subtle changes in water and habitat quality. Together, the MCI and QMCI provide complementary information to characterise site water and habitat quality. QMCI scores can be interpreted using general quality classes (Table 2) with a scoring scale that distinguishes them from MCI results.

*Table 2: Interpretation of Quantitative Macroinvertebrate Community Index (QMCI) scores (Stark & Maxted 2007)[8]*

| QMCI score | Quality Class | Description |
|---|---|---|
| >5.99 | Excellent | River in excellent ecological condition. Indicative of excellent water quality and habitat conditions. |
| 5.00-5.99 | Good | River in good ecological condition. Indicative of possible mild pollution and/or good habitat conditions. |
| 4.00-4.99 | Fair | River in fair ecological condition. Indicative of probable mild pollution and/or fair habitat conditions. |
| <4.00 | Poor | River in poor ecological condition. Indicative of probable severe pollution and/or poor habitat conditions. |

[3] Stark, J.D. and Maxted, J.R. (2007). A user guide for the Macroinvertebrate Community Index. Prepared for the Ministry for the Environment, 58 p.

[4] A site with more than 7% urban land cover in the upstream catchment

[5] More than 80% exotic forest

[6] A site with more than 50% native or exotic forest in the upstream catchment.

[7] A site with less than 50% native or exotic forest in the upstream catchment.

[8] Stark, J.D. and Maxted, J.R. (2007). A user guide for the Macroinvertebrate Community Index. Prepared for the Ministry for the Environment, 58.

QMCI scores ranged from a low of 0.91 at Kumeū River, a rural-high site, to a high of 7.9 at Ōrere Tributary, an exotic forest site. Overall, 28% of sites had median QMCI scores within either the Excellent or Good categories, with the majority (66%, n=40) being classed as Fair and four sites (7%) classified as Poor.

The top 10 sites, ranked on their median QMCI scores, included three sites each in native forest and rural-low catchments, two sites in exotic forest catchments, and one site each in rural-high and urban catchments.

Of the 10 sites with the lowest median QMCI scores, eight were in urban catchments, and two sites were located in rural-high catchments.

## %EPT taxa richness

EPT stands for Ephemeroptera, Plecoptera and Trichoptera, otherwise known as mayflies, stoneflies and caddisflies. These types of macroinvertebrates are generally highly sensitive to pollution, so a high proportion of EPT taxa is an indicator of good stream health.

The percentage of EPT taxa richness is calculated as a proportion of the number of EPT taxa to the total number of all taxa within the sample.

The highest %EPT taxa richness score recorded across all sites was 69% at Ōrere Tributary, a stream within an exotic forest. There were no EPT taxa at all at five sites – all located within heavily urbanised catchments, indicating degraded water quality.

## Average Score per Metric (ASPM)

The ASPM combines MCI, EPT taxa richness (number of EPT taxa), and %EPT abundance (proportion of individual that are EPT taxa) into an overall average score.

The highest ASPM score of 0.76 was recorded at Ōrere Tributary, which was also consistent with the highest MCI, QMCI and EPT% taxa richness scores recorded during this period. The lowest score of 0.06 was recorded at two sites within urban catchments, Tararata Creek and Ōtara Creek (East).

When ranked in order of median ASPM scores, five of the top 10 sites were in rural-low catchments, three were in native forest, and one site each were in exotic forest and urban catchments. For the bottom 10 sites, nine were in urban catchments and one was in a rural-high catchment.

Overall, the results for this metric demonstrate that streams with higher proportions of native or exotic forest have more diverse macroinvertebrate communities and more sensitive species. Urban catchments are more likely to have lower scores reflecting the absence of sensitive species and greater abundance of pollution tolerant species.

## Stream Ecological Valuation (SEV)

The Stream Ecological Valuation (SEV) integrates instream habitat, channel morphology, and riparian vegetation data measured over a 100 m long stream reach in a single ecological score. SEV scores range from 0 to 1.00 and can be interpreted into general quality classes as per Table 3.

*Table 3: Interpretation of Stream Ecological Valuation (SEV) scores (Chaffe, 2021)[9]*

| SEV score | Quality Class | Description |
|---|---|---|
| ≥0.81 | Excellent | River in excellent ecological condition. Indicative of ecological function and habitat conditions close to or at reference condition. |
| 0.61-0.81 | Good | River in good ecological condition. Indicative of good habitat conditions, few stream functions are impaired. Low deviation from reference state. |
| 0.41-0.60 | Fair | River in fair ecological condition. Indicative of fair habitat quality, some stream functions are impaired. Moderate deviation from reference state. |
| <0.40 | Poor | River in poor ecological condition. Indicative of poor habitat condition, several stream functions are impaired. Substantial deviation from reference state. |

[9] Chaffe, A. (2021). River ecology state and trends in Tāmaki Makaurau / Auckland 2010- 2019. State of the environment reporting. Auckland Council technical report, TR2021/05.

The SEV analysis used a slightly different dataset than other metrics, excluding two sites without SEV assessments and but including nine others not yet meeting data requirements for other metrics, resulting in a total of 68 sites for SEV.

Across the region, scores ranged from Excellent to Poor. The highest SEV score recorded was 0.95 at Marawhara Stream, a native forest site, while the urban Newmarket Stream site had the lowest score of 0.26.

Overall, 25% of sites (n=17) were in the Excellent category, 44% (n=30) were Good, 12% (n=8) were Fair, and 19% (n=13) were classed as Poor.

The top 10 sites, ranked on median SEV scores over the last 5 years, were predominantly in native forest catchments, with exotic forest and rural-low catchments each having one site represented. Of the 10 bottom-ranked sites, eight were urban sites and two were in catchments classified as rural-high land cover (Kumeū River and Kumeū Tributary). Seven of the bottom-ranked sites were within the Poor category, with the remainder classed as Fair.

SEV scores across all sites showed a similar pattern to the other ecology metrics, with sites in native forest catchments having the best habitat quality and urban sites showing the most ecological degradation.

## Overall site rankings

The 56 sites with both macroinvertebrate and SEV data were ranked according to scores for each of the five metrics (SEV, QMCI, MCI, ASPM, %EPT taxa richness), and the sum of individual rankings calculated to give an overall site ranking.

Wairoa Tributary, a hard-bottomed site in a native forest catchment, had the highest overall ecological quality, followed by Ōrere Tributary, which is in an exotic forestry catchment, and Cascades Stream on Waiheke Island, which is in a rural-low catchment.

Of the 10 sites that were ranked highest overall, four were in native forest catchments, four were in rural-low catchments, and one of each were in exotic forest (Ōrere Tributary) and urban catchments (Onetangi Stream on Waiheke Island).

Tararata Creek ranked lowest overall, followed by Ōmaru Creek and the Kumeū River. Nine of the ten lowest-ranked sites were urban, with the Kumeū River the sole exception (rural-high catchment).



### Disclaimer



### Find out more:

Visit the Data Explorer: https://environmentauckland.org.nz/Data/Dashboard/456

Read the methodology report: https://www.knowledgeauckland.org.nz/publications/water-quality-and-river-ecology-data-explorer-methodology-supplementary-report/

For more information and data, contact: EnvironmentalData@aucklandcouncil.govt.nz

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