



**TR2023/15
Summary
December
2023**



Tāmaki Makaurau / Auckland Marine Sediment Contaminants

Summary of TR2023/15 – 2022 monitoring for the Regional Sediment Contaminant Monitoring Programme.

Key points:

- **40 sites were sampled across the Upper Waitematā Harbour, Tāmaki Estuary, Mahurangi Harbour, the East Coast Bays (including Okura Estuary), and Tāmaki Strait.**
- **The spatial pattern of contamination remains consistent with previous monitoring, with rural locations recording low levels, while elevated concentrations were observed in the upper reaches of the Tāmaki Estuary and (to a lesser degree) in the Upper Waitematā Harbour.**
- **Concentrations of metals over time at most sites sampled in 2022 have remained relatively stable.**

This document summarises [TR2023/15](#), *Tāmaki Makaurau / Auckland marine sediment contaminant monitoring: data report for 2022*, which reports on the findings of Auckland Council’s Regional Sediment Contaminant Monitoring Programme (RSCMP) for sites sampled in 2022. Changes through time (trends) are only analysed when we have multiple new samples since the last trend report. For a detailed assessment of marine sediment contaminant state and trends across Tāmaki Makaurau up until 2019, see [TR2021/10](#).

Overview

Contaminants such as copper, lead, and zinc, can accumulate in the sediments of our harbours,

estuaries, and beaches. These metals originate from a range of different activities and land uses, including vehicle tyre and brake wear, industrial activity, and some building materials. When it rains, these pollutants are washed into our stormwater networks and waterways, ending up in our marine environment. The build-up of these contaminants can affect ecological health, by reducing the number or diversity of animals living in the sediment. This can have harmful effects on the natural functioning of these ecosystems and result in degraded communities that are dominated by few species that are tolerant of higher contaminant levels. Understanding the distribution and level of chemical

contaminants in marine sediments provides a useful indicator of land use impacts on marine receiving environments and ecosystem health.

What we monitor

Monitoring focuses on the main metals associated with urban stormwater, copper (Cu), lead (Pb) and zinc (Zn), along with mercury (Hg) and the metalloids arsenic (As). Cadmium (Cd) was included in the suite of analytes for sampling conducted in the Mahurangi Harbour as it can be elevated in marine sediments of rural areas due to it being associated with phosphate fertiliser.

Concentrations are compared with Sediment Quality Guidelines (SQGs). SQGs are specific values used to assess the potential impact of sediment contamination on aquatic life. Conservative SQGs have been developed specifically for the Auckland region for copper, lead and zinc, known as the *Environmental Response Criteria* (ERC). A traffic light system indicates the contaminant level and associated impact, where **Green** indicates a low level of contaminants, **Amber** indicates moderately elevated levels where adverse effects on ecology may be beginning to appear, and **Red** indicates levels of contamination where ecological degradation is likely to be occurring. A range of other established SQGs are also used for comparison and for contaminants other than copper, lead, and zinc. Details of all SQGs used and comparisons with all chemicals analysed can be found in the full annual report, TR2023/15

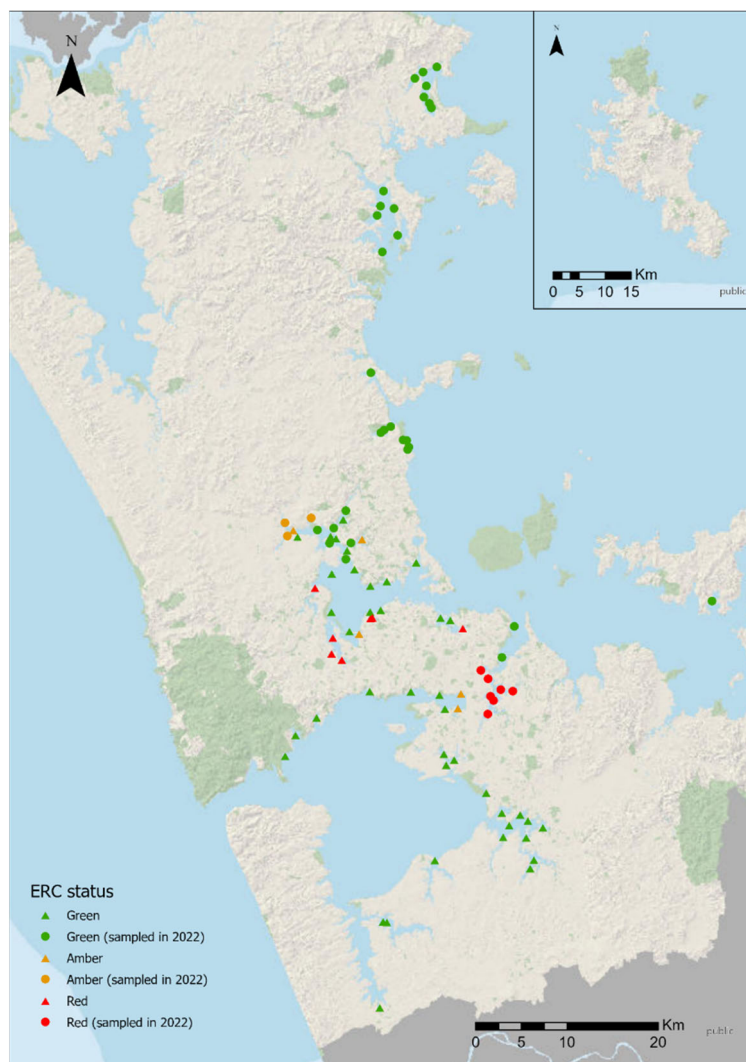
Marine ecology and sediment mud content are measured at all sites in conjunction with sediment contaminant monitoring. See [TR2021/09](#) for the most recent analysis of RSCMP ecology data.

Where we monitor

Auckland Council's RSCMP conducts regular monitoring in the intertidal sand/mud flats at around 80 sites across the region's harbours, estuaries, and beaches. As a key objective is to monitor the impacts of urban development, most of the sites are in areas receiving run-off from predominantly urban catchments. Other marine monitoring programmes have also collected sediment contaminant data in recent years expanding the spatial coverage of

contaminant monitoring, particularly in more rural catchments.

In 2022, 40 sites were sampled, spread across the Upper Waitematā Harbour, Tāmaki Estuary, Mahurangi Harbour, the East Coast Bays (including Okura Estuary, Long Bay and Weiti River), and Tāmaki Strait.



Environmental Response Criteria (ERC) contaminant state of sites sampled in 2022 (●), and in previous years (▲).

What we found: general summary

Results from sampling undertaken in 2022 showed a wide range of sediment contaminant levels. Rural locations recorded low levels of all metals tested, in line with previous monitoring, while sites that have higher concentrations were located mostly in the Tāmaki Estuary and (to a lesser degree) the Upper Waitematā Harbour.

Zinc remains a key contaminant of concern, and the metal most regularly exceeding ERC sediment quality guidelines (see [TR2021/09](#)). In 2022, zinc triggered the ERC red threshold at seven sites, all located within the Tāmaki Estuary. Elevated zinc levels are most prevalent in catchments with intensive industrial and urban areas, particularly where there is a long history of this type of land use, such as the catchment surrounding the Tāmaki Estuary.

In general, the ERC state at sites sampled in 2022 has remained relatively stable over the monitoring period, and overall, changes in the concentrations of metals over time at most sites have been relatively small.

What we found: specific areas

Whangateau Estuary

Results showed very low levels of all contaminants measured (some of the lowest levels recorded in the region; mercury levels were below lab detection limits at all sites). Concentrations are currently well below thresholds where impacts on benthic ecology might be expected.

Mahurangi Harbour

Results of contaminant concentrations in Mahurangi were low, with no sites triggering any SQGs. Overall, levels of cadmium were low. At two sites, levels were below lab detection, and at the remaining sites concentrations were well below levels where ecological impact might occur.

East Coast Bays

Results at sites in Okura and Weiti Estuaries showed low concentrations of all contaminants analysed.

At Long Bay, sediment at both beach sites (Awaruku Beach and Vaughan Beach) showed very low mud

and metal content. Stream sites showed higher metal content, however no sites triggered any of the applied SQGs.

Upper Waitematā Harbour

Sites in the Upper Waitematā show mostly low levels of contamination. The exception to this is the metal copper, which reached the amber ERC category at three sites. Mercury levels were also elevated at these same sites. This area has a long history of elevated copper levels, with sites observed above the amber threshold since monitoring began in 1998. Copper concentrations are higher than expected given the surrounding predominantly rural land use. The cause or causes of this are unknown, however it is possible that largely historic copper-based pesticide and herbicide use in the catchment has been a contributing factor.

Tāmaki Estuary and Tāmaki Strait

Results in 2022 show several sites in the upper reaches of the Tāmaki Estuary (seven in total) with levels of zinc in the ERC red category. Several of these sites, including Middlemore, Ōtāhuhu, Panmure, Pakuranga Upper and Princes St, also show levels of copper that fall within the ERC amber threshold. Additionally, five sites trigger SQGs for mercury, and one site (Middlemore) also triggers the ERC amber threshold for lead. Sites in the lower half of the estuary (Benghazi and Roberta Reserve) have concentrations below any guideline thresholds. This is likely a reflection of their location in sandier substrate, exposed to higher wave and tidal energy in the more open lower reaches.

Results for site Te Matuku on Waiheke Island remain low (all metals are well below guideline thresholds) and are comparable to concentrations recorded there during the last time of monitoring in 2020.

Find out more:

Allen, H. (2023). [Tāmaki Makaurau/Auckland marine sediment contaminant monitoring: data report for 2022](#). Auckland Council technical report, TR2023/15

Mills, G N and H Allen (2021). [Marine sediment contaminant state and trends in Tāmaki Makaurau / Auckland 2004-2019. State of the environment reporting](#). Auckland Council technical report, TR2021/10

For more information or to request data, email environmentaldata@aklc.govt.nz

Technical reports are available on Knowledge Auckland, www.knowledgeauckland.org.nz