Te oranga o te taiao o Tāmaki Makaurau

The health of Tāmaki Makaurau / Auckland's natural environment in 2025

aucklandcouncil.govt.nz

26-PRO-0044

He mihi

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Ko Ranginui e tū iho nei te matua e whakamarumaru nei i a tātou.

Ko Papatūānuku e takoto ake nei te whaea i ahu mai ai tātou te tangata, te papa e noho nei hei tūrangawaewae mō tātou katoa.

Ko Tāne e tū rangatira mai nei hei whakahaumaru i te tangata.

Ko Tangaroa hei whakaāio i te iwi.

Ko te hā o Tāwhirimātea hei hā ora ki te tangata.

Ka heke, ka heke, ki a tātou te tangata.

Haere te wā, haere te wā, ka tini te tangata, ka mahue i a tātou ngā hononga ki te rangi, ki te whenua, ki te ngahere, ki te moana.

Nō tātou te haepapa kia tiakina te taiao, hei whakamana i ngā whakareanga o mua, hei oranga anō mō ngā whakareanga ā muri nei.

Kia mārama tātou ki ngā pānga o te tangata ki ngā huringa taiao. Mā roto noa mai i te pūtaiao me te mātauranga e whakaorangia anō ai te mauri me te wairua o te taiao.

Kua eke te wā e tū ai te tangata hei kaitiaki i te whenua, i te ngahere, i te moana. Nō tātou katoa te haepapa – hoake!

Tuia ki te rangi

Tuia ki te whenua

Tuia ki te moana

Tuia te here tangata E rongo te pō, e rongo te ao

Tīhei mauri ora!

Ranginui, our sky father,
provides our shelter from above.

Our earth mother, Papatūānuku, from whence all people originate, provides the foundations upon which we stand.

Tāne, god of the forests, stands as our protector.

Tangaroa, god of the seas, helps to calm us.

Tāwhirimātea, god of winds, provides the air we breathe.

We trace our descent from these gods.

Over time, we have multiplied, outgrowing our surroundings and forsaking our familial links to the sky, to the land, forests and seas.

We have a responsibility to care for our environment, to honour past generations and provide for those yet to come.

We must understand how we as people have changed our environment. Only through science and knowledge will we be able to restore its mauri and wairua.

Now is the time for us all to stand up as kaitiaki for our land, forests and seas. It is a responsibility we must all share – let us uphold it!

Bind the domain of the upper realm

Bind the domain of the land

Bind the domain of the seas

Bind the tapestry of life which affirms our connection to the natural world and to one another

Let there be life!

Contents

Kupu takamua
Preface

With a land area of nearly 5000km^2 spanning from Te Hana in the north to Pukekohe in the south, the natural environment of Tāmaki Makaurau / Auckland is diverse and magnificent. From harbours, lakes and streams to productive soils, indigenous forest, maunga, ranges and motu, our environment is a key reason people choose to live, work and play in our region.

Hosting Aotearoa New Zealand's largest city, the natural environment is under inevitable stress. How we live, work and interact with our natural places creates pressures that can reduce environmental quality and resilience, ultimately diminishing the legacy for future generations.

To make the best decisions for the future, we need to understand where we are now and where we have been. Sustained long-term monitoring and reporting is critical to our understanding. We need reliable data and science so that we can be informed and empowered to act to protect and restore our environment.

The breadth of work carried out in the latest health of the natural environment report is impressive. Twenty technical reports underpin this synthesis which collectively provide a comprehensive analysis of our natural environment. The report covers the state and changes over time in air, land, and water, to tell the story of the health of the natural environment in Tāmaki Makaurau. It also highlights the ways Auckland Council is working to improve the health of our environment.

The foresight of those who established our long-term monitoring has provided a depth of information to measure our progress and to inform our decisions. I would also like to acknowledge the mahi of the environmental specialists and scientists who continue this legacy, undertaking monitoring all year round in all weather and terrain.

The current state of our natural environment reflects decades of change, use and degradation. This 2025 report illustrates some improvements but there is still much work to be done to restore and build resilience in our environment. This report highlights the growing challenge of a changing climate. Through Tē Tāruke ā tāwhiri Auckland's Climate Plan 2020 we committed to a zero-emissions region that is resilient, healthy and better connected to the environment

The mayor's vision is that we want to create an Auckland that is beautiful, thriving, and safe, for all Aucklanders. This includes a stunning natural environment – harbours, beaches, forests, maunga, islands, urban trees – that can be accessed and enjoyed by Aucklanders across the region. Whether its collaboration with our pest-free volunteer groups, the significant investment through the water quality and natural environment targeted rates, partnership with mana whenua, there are signs we are moving in the right direction. A great example of this is the Tū Mai Taonga Project on Aotea / Great Barrier Island, where, guided by the leadership, vision, and tikanga of Ngāti Rehua Ngātiwai ki Aotea, native species and ecosystems are being restored, and local whānau connections are growing.

We look forward to our continued work with mana whenua to deepen and enhance our understanding and relationship with the world around us. Mana whenua exercise tino rangatiratanga and kaitiakitanga of their ancestral lands. I acknowledge and thank them for their partnership in restoring the mauri of te taiao (the environment), which benefits all communities in Tāmaki Makaurau. I also thank the many communities, businesses and landowners taking action to protect and restore our region.

A healthy environment is fundamental to a resilient Tāmaki Makaurau and our wellbeing. We are aware of the scale of the challenge. It takes a commitment from all of us to restore our whenua, improve air quality, and clean up our beaches, rivers, and streams. This report shows the potential for environmental gains when we work together and invest in protecting and restoring our environment. We will continue this work with our mana whenua partners, communities, government and the private sector, so that future generations can inherit a Tāmaki Makaurau they can be proud of.

Councillor Richard Hills
Auckland

Land area **4,941** sq km or **31%** of the Auckland territory

Total territorial area **16,156** sq km

445 Threatened + At Risk species

4000 **parks including 300km of beaches**

27 Regional Parks covering **40,000** hectares

36 different terrestrial and wetland ecosystems

27% indigenous forest and shrubland

43% exotic grassland

TĀMAKI MAKAURAU
Our region
2025

1,797,300 people, about a third of New Zealand

Daily rainfall observations in Auckland date back to **1852**

Continuous air quality observations since **1964** at Penrose.

16% of Auckland's land area classed as Highly Productive Land

12% urban area

Carbon emissions of **5.9 tonnes** carbon dioxide equivalent per capita

Seven unique aquifer types

Over **19,000** km of permanently flowing rivers across the region

3,200 km of coastline, split between two coasts

108 natural and artificial lakes

1 km between the Manukau and Waitematā harbours

Marine area **11,215** sq km or **69%** of the Auckland territory

21 species of native freshwater fish

25 species of seabirds breeding in the region

Tara/White-fronted tern, Motuihe
Hamish Allen

Pararaha stream, Waitākere Ranges
Hamish Allen

Ngā karere mātua
Key findings

Hau / Air

- Overall air quality is good, and the trends are positive.
- Traffic pollution is still decreasing, particularly in the CBD.
- Reductions in particulate pollution have slowed down in the last five years.
- Between 2016 and 2023, greenhouse gas emissions decreased by 9.5 per cent for gross and 8.3 per cent for net emissions.
- Greenhouse gas emissions are dominated by the transport and energy sectors.

Whenua / Land

- Findings highlight potential for biodiversity gains through effective control of pest mammals and plants, and enhancing forest extent and connectivity across Tāmaki Makaurau.
- Indigenous forest and scrubland have increased by 1 percentage point (+5550 ha) from 2018 to 2023, now covering 27 per cent of the region.
- Abundance and richness of native plant and bird species have increased in forest and wetland sites especially where pest animals have been effectively controlled and in areas dominated by indigenous vegetation.
- Most bird species in forest and wetlands are native.
- Wetland conditions have improved slightly, but 88 per cent of wetlands are experiencing pressure from catchment modifications, reduced water quality, stock access, exotic plants and pest mammals.
- Soil quality has not improved, including in our agricultural areas where soil quality is poor.
- Since the 1970s, Auckland has lost over a third of its highly productive land to development, and much of what remains, is now fragmented into small parcels.

Wai Māori / Freshwater

- Many rainfall sites received much less rainfall than the previous five years but extreme rainfall events in the 2022/2023 summer masked overall drier trends.
- Groundwater levels are reflecting both the overall drying and the extreme rainfall events.
- River flows and trends varied for individual rivers; all were impacted by extreme rainfall.
- Sediment loads were high during storms, especially in steeper catchments with pastoral land cover.
- Lake water quality is generally declining from already poor conditions.
- High nutrients and faecal contamination are the most widespread water quality issues across rural and urban rivers, with high metals in urban areas and many sites are degrading.
- Stream ecological health ranges from ‘excellent’ in native forest streams to ‘fair’ in many rural areas to ‘poor’ in streams with intensive rural and urban land use.
- Groundwater quality remains a concern in Pukekohe with longstanding elevated nitrate concentrations and in urban aquifers receiving stormwater discharges.

Te takutai moana / Coasts

- Water quality is good to excellent at the coast and estuary mouths, fair in the mid-estuary and poor in upper estuary and tidal creeks, though most locations have improved over time.
- Marine sediment contamination is encouragingly stable—increased urbanisation has not resulted in increased contamination.
- Ecological health is generally declining in estuaries due to increases in sedimentation.
- There were some locations where poor estuarine health improved.
- Subtidal reefs are showing widespread declines in ecological health, likely driven by climate related stressors like marine heatwaves and extreme weather events.
- Our beaches are changing, and long-term erosion is a problem at many, but not all as the conditions that affect our beaches are diverse.

Kupu whakataki
Introduction

Tāmaki Makaurau / Auckland has a diverse and much-loved natural environment. Hosting Aotearoa New Zealand's largest city, one that continues to grow quickly, it is an environment under inevitable stress. How we live, work and interact with our natural places creates pressures that can reduce environmental quality and resilience, ultimately diminishing the legacy for future generations.

We have been producing regular, comprehensive State of the Environment (SOE) reports for the region since 1999. The reports allow us to understand our environmental impacts, both negative and positive. A single, integrated report helps us make sense of the data collected across all the different parts of the environment and focus in on the issues that matter most to Aucklanders. This report is both a report card on how successfully we are managing our natural environment now, and an insight into emerging problems we face that can inform our future actions and investment.

This State of the Environment report is an important input to Council's planning and work programmes to ensure our investment responds to key environmental issues to ensure a resilient future.

Making good planning and investment decisions for our natural environment requires that we understand the underlying causes of environmental issues and current and future risks. This can be more complex than it sounds. For most issues, we need long-term monitoring so we can detect any trends and consider relationships to other factors, including variation and change caused by natural factors such as weather events and seasonal climate conditions.

The need for robust environmental knowledge through monitoring has been recognised nationally. Section 35 of the Resource Management Act requires Auckland Council (and all other regional councils and unitary authorities) to monitor the natural environment. Data collected by Auckland Council feeds into national environmental reporting (managed by the Ministry for the Environment under the Environmental Reporting Act) to inform government priorities and to understand if Tāmaki Makaurau has similar issues to other regions. For more information on the issues for New Zealand, see **Our Environment 2025**.

State of the Environment monitoring and reporting generates knowledge to inform Auckland Council decisions on where to prioritise our response, actions and funding. That knowledge supports and provides a measure of progress achieved through delivery of seven areas of council services identified in the Long-term Plan 2024-2034: Natural Environment, Water, Transport, Community, Built Environment, Economic and Cultural Development and Well Managed Local Government.

State of the Environment monitoring data improves our understanding of the natural environment and provides an evidence base for decision making and planning. It also helps us to measure environmental progress holistically by integrating across environmental domains and the region. State of the Environment monitoring directly provides data, analysis and progress measures for:

- Auckland Plan 2050
- Auckland Unitary Plan
- Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan
- Māori values reporting by Houkura (Independent Māori Statutory Board)
- State of the Gulf reporting by the Hauraki Gulf Forum
- State of the Waitākere Ranges Heritage Area reporting.

Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan, had significant mātauranga input from mana whenua and has at its heart a cultural narrative that is deeply embedded in this place – Tāmaki Makaurau. Within this is shared a whakapapa centred approach to climate resilience and to sustaining the natural balance with tūpuna Atua and increasing the mauri of te taiao (environment). This is also reflected in Te Haumanu Taiao (an ecological restoration guide for Tāmaki).

The knowledge and wisdom of Iwi Mana Whenua, passed through whakapapa and deep connections to te taiao, is fundamental to lifting the mauri of te taiao and for sustaining life. This report does not attempt to incorporate and report mātauranga māori. It provides information from environmental monitoring that can sit alongside mātauranga and support mana whenua and others in achieving better outcomes for te taiao and ourselves. Mātauranga provides a long-term context and deep understanding of place that our more recent monitoring can nest within and add to. We are increasingly working in partnership with mana whenua and there is a strength of narrative that comes from joining our monitoring and knowledge that will be needed as climate change continues to challenge us.

Navigating this report

What is happening in our economy, in our communities and with our climate is connected in many ways to the pressure placed on our natural resources and the quality of the environment we enjoy.

There are primary drivers of environmental change (like population growth) that produce specific pressures (like housing demand, earthworks and more emissions from traffic) that affect the state of our environment and specific resources, places and values, and these define most State of the Environment reports that generally adopt a DPSIR (driver – pressure – state – impact – response) reporting framework – or some variant of that framework.

First, we consider the interconnected drivers and pressures of population growth, land use change and intensification, and climate variability and change.

Second, we report on how these drivers and pressures manifest in the state and trends of core natural environments, ecosystems and biodiversity across:

- Our Air
- Our Land
- Our Freshwater
- Our Coasts.

We report Auckland Council's responses to the issues identified through the monitoring results. Some of these responses are broad and seek to address many risks often over the long term while others are specific to particular issues or places and seek more immediate results.

While we report within a general DPSIR framework, the environmental issues are always complex and inter-related. This report's response to that complexity is to identify and discuss themes, case studies and integrated responses throughout the report. These aim to provide information in an accessible way and highlight connections between cause, effect and response.

Council collects a wealth of information across its many monitoring programmes. This report is a summary and synthesis only. Detailed technical reports for our environmental monitoring programmes are referenced in the report and available on **Knowledge Auckland**. We hope you explore these as well if you are interested.

Additional broader information that may be of interest in understanding the context of our environment in Tāmaki Makaurau is listed below.

Safeswim (recreational water quality): Safeswim enables people to make informed decisions on when and where to swim. It provides access to real-time information on faecal contamination, swimming conditions and safety hazards for popular swimming locations. Check **Safeswim** to swim safely at your favourite swimming spots.

Heritage: Since 2018, Auckland's **Heritage Counts** has reported annually to highlight key statistics and research on heritage places and buildings.

Population Demographics: Tāmaki Makaurau-specific demographic information and trends from the New Zealand Census of Population and Dwellings can be found in the **2023 Auckland Summary reports**.

Tiaki Tāmaki Makaurau Conservation Auckland is an online resource to support Aucklanders in protecting and restoring our environment. It offers information on local history, conservation initiatives, practical guidance, and community involvement opportunities.

Looking back

It has been 25 years since the first comprehensive State of the Environment report was produced for the Auckland region. It promised a "snapshot of the region at the end of the millennium". Similar reports have been produced every five years since, and 2025 provides us the opportunity to look back on how Tāmaki Makaurau, and the issues it faces, has changed over the first quarter century of the new millennium.

The 1999 report had the region's 1996 population at just over 1.1 million. The 2024 population is over 1.79 million – an increase of over 600,000 people in 25 years. The 1999 Tāmaki Makaurau population was growing at about twice the national rate, and it was forecast to grow from 30 to 39 per cent of the national population by 2041 (see next section for where we are today).

Environmental issues identified in 1999 were similar to those reported in this 2025 report. Air quality issues, impacts on native ecosystems, plant and animal pests, risks to rivers and harbours from earthworks, pollution events, pressure on ground and surface water, beach water quality and natural hazards were all described as issues for Tāmaki Makaurau in 1999 and as set out in this report, remain of concern today. Environmental change can be slow and happen over many years and decades. As we move through this current report, the 1999 report provides a useful marker in time to look back to and understand how much Tāmaki Makaurau has changed and what the impacts have been on our environment.

We also compare changes in the five years since the last State of the Environment Report.

Kaitarakihi beach, Manukau Harbour
Hamish Allen

He kaikōkiri panonitanga me te pēhanga
Drivers of change and pressure

Population growth

Tāmaki Makaurau / Auckland has a long history of high population growth. Although growth rates have varied over time, the population of our region has consistently grown faster than Aotearoa New Zealand as a whole. At times more than half the national population growth has occurred in Tāmaki Makaurau. This is a result of high natural increase (birth minus deaths) and high net migration (people moving to Tāmaki Makaurau from overseas and from other parts of Aotearoa).

In 2024, there are 116,800 more people calling Tāmaki Makaurau home than there were five years ago (1,797,300 people, StatsNZ June 30, 2024). That's less of an increase than in the previous five-year period but still equivalent to a city the size of New Plymouth or Palmerston North being added to Tāmaki Makaurau.

An increased population is associated with more activity, changing land uses, more development and building and more environmental modifications to accommodate more people and more activity. Auckland Council processed more than 7,500 new resource consents in 2023/24, the highest in the country.[1]

More people inevitably require more housing. The 2023 Census counted a total 611,895 dwellings in Tāmaki Makaurau (including unoccupied dwellings and dwellings under construction). This is an increase of 64,800 (12 per cent) since 2018.

Although the Auckland isthmus and well-established outer suburbs have the greatest concentration of dwellings, there is a clear pattern of growth in the number of dwellings on the periphery of the urban area.

In 2023/2024, 13,855 dwellings were consented. That represents a decrease of 27 per cent from the previous year but an increase of 63 per cent in dwellings consented annually relative to the 8,500 consents issued in 1999. In the year 2023/2024, 72 per cent of Tāmaki Makaurau private dwellings were separate detached dwellings, down from 77 per cent in 1996.

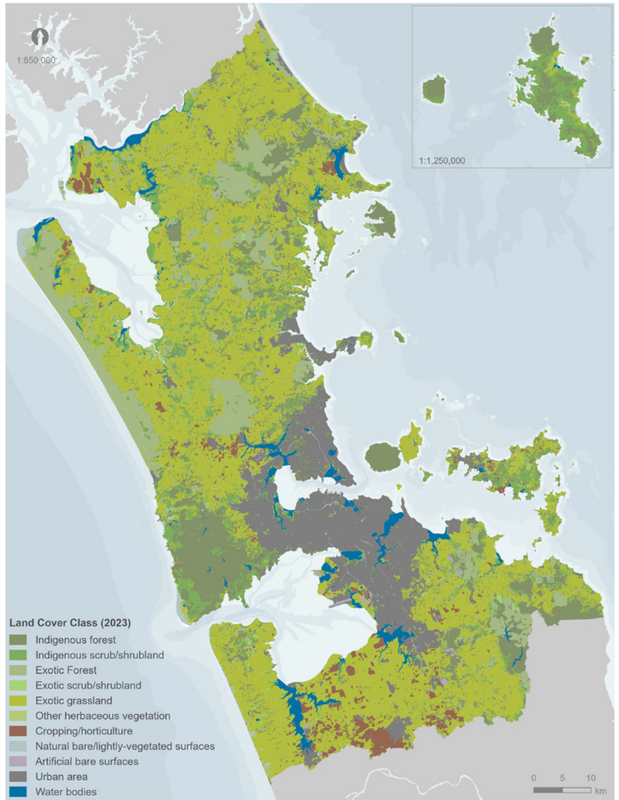
Land cover change

Land cover, which refers to the types of vegetation and built or natural features that cover the land's surface, is an important determinant of the health of the environment across the region. Tāmaki Makaurau exhibits a diverse land cover mosaic, shaped by a long history of human activity and ongoing development pressures. In the 25 years since the 1999 State of the Environment report, exotic grassland extent has decreased by around 10 per cent.

Today, exotic grassland remains the dominant land cover class in Tāmaki Makaurau, occupying 43 per cent of the region, reflecting the extensive historical modification of the landscape for pastoral agriculture.

Urban areas (including built-up and parkland) have increased by about 23 per cent since 1999, and account for 12 per cent of the region, typically concentrated around major settlements and transport corridors. These developed areas frequently overlap with locations that historically supported rich lowland forest ecosystems. Exotic forest plantations cover 10 per cent of the region, including both actively growing and harvested areas, primarily *Pinus radiata*, and generally occur in consolidated blocks across a range of elevations. Other land cover classes, including cropping and horticulture (three per cent), water bodies (three per cent), and natural bare or lightly vegetated surfaces (combined two per cent), along with smaller areas of exotic scrub/shrubland, other herbaceous vegetation, and artificial bare surfaces, collectively contribute to the region's complex land cover mosaic and exhibit varied spatial distributions and extents.

[1] Ministry for the Environment. 2025. Patterns in Resource Management Act Implementation – National Monitoring System data from 2014/15 to 2023/24. Wellington: Ministry for the Environment



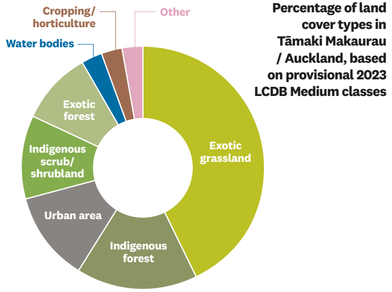
Since 2018 (the last Land Cover Data Base update and reported in the 2020 State of the Environment report), Tāmaki Makaurau has experienced notable land cover shifts, predominantly driven by continued urban growth and evolving land management practices.

Exotic grassland experienced the most substantial net reduction, decreasing by 11,200 hectares, or five per cent. This decline is primarily attributable to both the expansion of urban areas and increases in indigenous forest and shrubland classes. Urban expansion into greenfield areas is more concentrated to city fringes and growth corridors, this conversion represents a direct pressure on productive exotic grassland from urban development, a process largely enabled by the Auckland Unitary Plan. Whereas increases in indigenous cover are more widespread. Expansion of indigenous forest and shrubland is notable for coinciding with urban growth areas, alongside road infrastructure development, within rural subdivisions and through on-farm riparian restoration, in addition to replanting efforts in regional and local parks, and reserve land. This highlights the significant role of consent requirements and the importance of private land in achieving ecological restoration outcomes. Additionally, conversion to rotational cropland or horticulture has contributed to the grassland decline, with the notable expansion of avocado orchards in areas like Tāpora. This shift can introduce pressures related to water demand, nutrient loading, and pesticide use. Smaller areas of grassland have also been converted to new exotic forest plantations, for example in Riverhead Forest, driven by commercial forestry interests and carbon sequestration incentives.

The urban footprint of Tāmaki Makaurau continues its substantial expansion, largely displacing exotic grassland, open space and, to a lesser extent, exotic forest classes. Built-up areas, representing the core residential, commercial, and industrial development, increased by 7 per cent (3,650 hectares). Parkland and open space also experienced a 6 per cent net increase (500 hectares). While contributing to green infrastructure, much of this expansion is linked to consent requirements for new urban developments, which mandate the provision of public open space. Furthermore, surface mine or dump areas increased significantly by 47 per cent (360 hectares), predominantly attributed to quarry expansions necessitated by increased demand for construction materials. Transport infrastructure also increased by 19 per cent (200 hectares), driven by major projects such as the Ara Tūhono – Pūhoi to Warkworth State Highway 1 extension and the O Mahurangi – Penlink construction.

The region also experienced an overall net decrease in exotic forest (forested and harvested area) of 1,200 hectares (-2 per cent). This decline is a result of an imbalance between harvesting and replanting, with significantly more harvesting having occurred than new planting, and with only just over half of previously harvested areas being replanted. A portion of this decline is additionally attributed to the conversion of exotic forest land to other uses, including transport infrastructure and large-scale open space developments like the Te Arai Links golf course, further illustrating the pressure on rural land from urban and recreational development.

Since the 1970s, Auckland has lost over a third of its highly productive land (or: best farming land) to development, and much of what remains is now fragmented into small parcels, often under eight hectares.



Percentage of land cover types in Tāmaki Makaurau / Auckland, based on provisional 2023 LCDB Medium classes

Climate

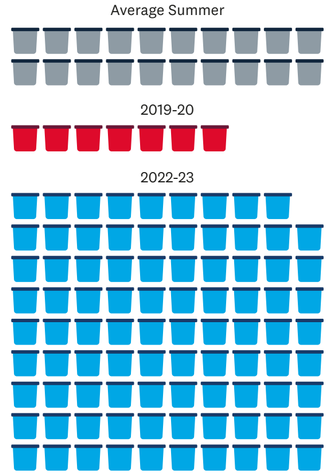
Climate influences our daily lives and our natural environment. It influences what plants and animals can live where and how well they grow. The climate of Tāmaki Makaurau is changing. We are already starting to see higher temperatures, increased drought, more intense rainfall events and sea level rise. Over the past century, the mean annual temperature has increased by about 1.7 degrees Celsius. Temperatures in our streams and coastal waters are increasing. Measurements taken from the Port of Auckland tide gauge show an average sea level rise of around 1.6mm per year since 1899 with an acceleration in recent decades.

During the five years since the last State of the Environment report, there was a ‘triple dip’ La Niña event in the tropical Pacific Ocean region, with three consecutive years when La Niña was declared by international agencies that monitor global climate conditions. This type of La Niña occurrence is rare but not unprecedented. It helped to produce more frequent northerly- and easterly-quarter wind flow across the North Island, and this impacted typical weather patterns Tāmaki Makaurau experiences.

Two of the most extreme dry and wet summers to impact Tāmaki Makaurau occurred during the past five years: the 2019/2020 summer drought and the 2022/2023 summer deluge. The 2019/2020 summer drought was likely the most severe dry event within the long-term historical instrumental record.
The rainfall intensities observed during Auckland Anniversary Weekend 2023 broke records for 1h, 2h, 6h, 12h, 24h, and 48h rainfall amounts. A comparison of the total rainfall for this event with the longest daily rainfall observations from Albert Park shows this event shattered the previous 1-day rainfall record that was set in 1869.

These storms had many impacts on our natural environment, some temporary and some more lasting. We can expect more climate change impacts in the future and our long-term monitoring will support identifying, mitigating and adapting to change.

In 2019-20 the total rainfall was less than half of normal, but in 2022-23 there was more than four times as much rainfall
Each bucket represents 10mm rainfall at Albert Park, the site with the longest record



Case study: Storm impacts

The 2022/2023 summer had repeated high-intensity and high-volume rainfall events that caused significant flooding across the region. As well as recording the extreme rain falls and river flows, the impacts of these extreme events were evident across many of our individual monitoring efforts. Here are just a few of the impacts our monitoring programmes captured.

Increased sedimentation

The floods of late January 2023 closely followed by the rain, winds and waves of Cyclone Gabrielle caused slips and landslides across Tāmaki Makaurau. This resulted in sediment-laden flows to the marine environment. During these extreme weather events, up to three times more sediment than the previous maximums were recorded at some sites. Higher sediment concentrations were measured in coastal waters, especially in the Kaipara Harbour, and layers of fine sediment were observed on inter-tidal sand flats around the region. Landslides in the catchment of Lake Wainamu discoloured the entire lake, with water clarity reduced to near zero for three months afterwards. Such events can be catastrophic in lakes if submerged vegetation is smothered or the growth is limited by poor light penetration.

Despite the high flows, stream ecology recovered

Ecological indices in streams were compared before and after the floods, including sites where there were visible impacts such as bank scouring. At some sites, there were declines in the indices, but there were also many sites with improvements in scores, and most sites showed minimal change. Macroinvertebrates have short life cycles so communities can re-establish if the habitat remains and there are other populations nearby. This means they generally recover within a few months of a flood event, as we observed in our monitoring of sites with both good and poor ecological communities.

Decline in sandflat dwelling invertebrates

Two days after the cyclone, a fieldwork team headed to Ōkura Estuary to collect ecology and sediment samples and run behavioural experiments (testing the ability of shellfish to rebury and gastropods to turn over) to gauge an understanding of the initial impact on the intertidal ecological communities. Immediately after the storms the abundance, richness, and diversity of the sandflat invertebrates decreased. Richness (the number of species) recovered to pre-disturbance levels after two months and diversity (the number of species and their relative abundances) did after eight months, however overall abundances remained low eight months after the weather events.

The investigation of storm impacts on Ōkura Estuary (which were also observed in many of our estuary ecology monitoring sites) highlighted the potential for short- to medium-term losses in biodiversity associated with heavy rainfall events. The investigation showed increases in sediment mud content, which is important given that the frequency and severity of such events is likely to increase with climate change.

Habitats destroyed and burrows flooded

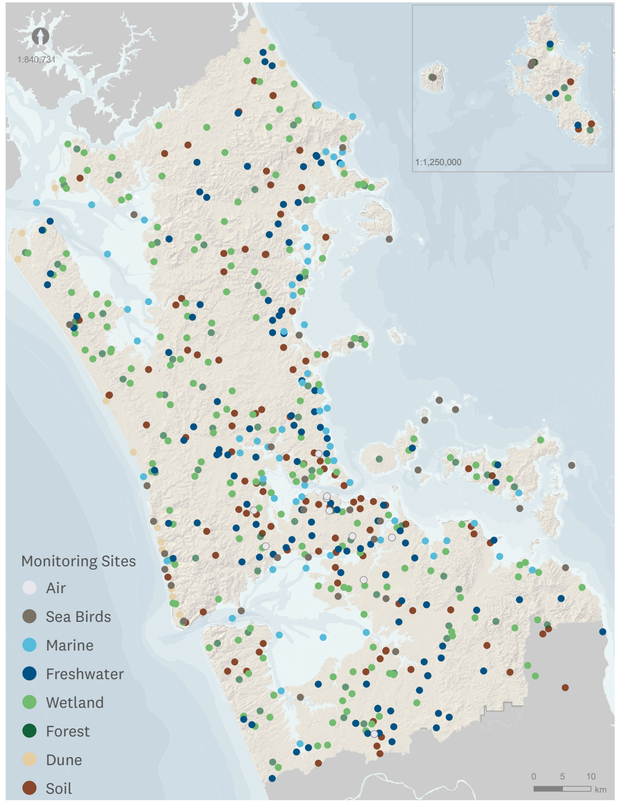
Our seabirds were impacted by habitat destruction and flooding. Pied shags nest on trees overhanging the water, Cyclone Gabrielle destroyed at least two colonies, one because of a land slip, and the other because of the strong winds felling the trees. Such events make this species – and other shag species – vulnerable. Slips and falling trees also destroyed a small part of the Cook's petrel colony on Te Hauturu-o-Toi / Little Barrier Island. Hauturu and other sites also experienced burrow flooding. Black petrel burrows were flooded both on Hauturu and Glenfern Sanctuary (Aotea / Great Barrier Island, and lower breeding rates were observed during the 2022/2023 summer with the lowest breeding success on record on Hauturu. Similar breeding failure with flooding of burrows was reported for other breeding colonies. The expected increase in frequency of storm events poses a real risk to this threatened species that is only found in the Auckland region. White-faced storm petrel on Maria Island (The Noises) were heavily impacted by storm events, with breeding success extremely low and a very high mortality of chicks.

Tā mātou hōtaka aroturuki ā-rohe
Our regional monitoring programme

Monitoring is a core requirement to provide evidence to enable good decisions on how we respond to improve the state of the environment. Monitoring is a systematic process that involves the planned and repeated collection of data, its analysis, interpretation, and reporting. State of the Environment monitoring aims to achieve the following:

- **Robust design and analysis:** The careful design of a monitoring programme is key to the statistical analyses that can be carried out and the ability to make inferences from the data.
- **Regional coverage:** Distributing monitoring effort across the region ensures a regional context and baseline to support the resource consent process and associated compliance monitoring as well as specific projects and investigations.
- **Representativeness:** Sites are selected to represent a range of environmental conditions (e.g. native, rural, urban) or types (e.g. geology, soil type) within the region.
- **Continuity:** Long-term monitoring uses consistent methods repeated over time at selected sites. Long-term data sets enable trends to be assessed even in the presence of natural variability which can otherwise mask chronic and/or cumulative impacts, often until critical levels are reached.

Modelling is increasingly being used to inform our environmental decision-making, particularly to make predictions and test scenarios. Long-term monitoring is a vital source of data required to build models. Models also require ongoing monitoring data for validation.



Northern head of the Manukau Harbour
Hamish Allen

What we monitor

Hau / Air

Air quality pollutants (nitrogen dioxide, carbon dioxide, ozone, particulate matter etc.) are measured continuously at permanent monitoring sites distributed across the region. Some data sets date back to the 1960s, with consistent monitoring since the late 1990s. We also estimate emissions from various human activities to determine the major drivers of air pollution.

The **greenhouse gas** (GHG) inventory identifies and quantifies major sources of GHG emissions for the whole region. Auckland's GHG inventory was first compiled for 2009 emissions.

Whenua / Land

Soil quality monitoring is carried out across different land use types providing information about the effects of land uses on soil.

Wetland, forest and **dune biodiversity** monitoring sites are spread widely across the mainland and islands of Tāmaki Makaurau. Information on plant species (native, exotic and pest), bird diversity and overall ecosystem condition is collected. These programmes aim to identify changes in biodiversity, assess the relative impacts of key threats (such as weeds and pests) and determine the effectiveness of management initiatives.

Wai Māori / Freshwater

The hydrological monitoring programme measures **rainfall, river flow, groundwater level** and **soil moisture** throughout the region. The Albert Park rainfall site was established in **1853**! These observations help us understand long term trends that can be affected by changes in climate, and to monitor droughts, floods and the impact of water takes. They also inform management of water resources and provides information for Emergency Management, Rural Fire and stormwater management.

Groundwater quality is monitored in some of the region's aquifers to understand how activities on the land affect the quality of water that infiltrates into aquifers.

The **Event-based sediment yield** programme measures the amount of sediment in rivers during storm events which help us understand and manage how our land use activities, and erosion, impacts on rivers.

River water quality monitoring measures physical, chemical and microbiological variables that can be affected by land use activities, point and diffuse source discharges and land/stream erosion. Water quality affects the river's capacity to support healthy ecosystems.

River ecology monitoring is undertaken to understand overall ecological health and condition. It includes monitoring freshwater invertebrates (e.g., insects, snails, worms, kōura) and fish living in streams as well as the types and quality of habitat available to native plants and animals.

Lake water quality and ecology monitoring tells us about lake health and helps us to understand the impacts our activities have on them. Along with water quality variables, monitoring lake plant communities (native and exotic species) provides an indicator of lake ecological health.

Te takutai moana / Coasts

Manu moana / seabirds connect the land and sea and are monitored across the region at key mainland, island and at-sea sites to assess their abundance and condition.

Coastal processes monitoring tracks changes in our coastal areas, focusing on beach erosion, accretion and coastal inundation. Regular monitoring supports our understanding of natural coastal dynamics, informs resilience planning and enables effective management responses to coastal hazards and climate change.

Coastal water quality monitoring focuses on nutrients and water clarity, which can be altered by differences in land use, freshwater inputs and other discharges to the coast, land erosion and activities in the coastal environment. Healthy coastal waters are important for supporting marine life, recreation, fishing and aquaculture.

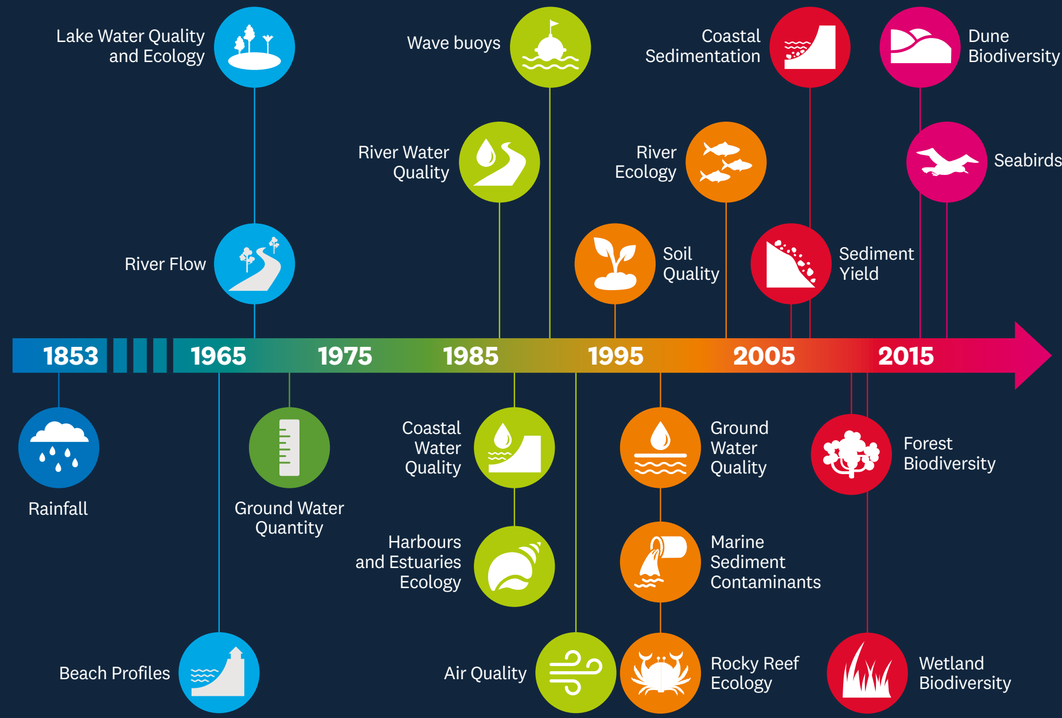
Sediment contaminants are monitored at intertidal sites in harbours and estuaries to assess the levels of copper, lead, zinc, mercury and arsenic present in marine sediments, which can reduce the numbers and diversity of animals living there. Contaminants from the land enter rivers and streams and attach to fine sediments that settle and accumulate in sheltered coastal areas.

Harbours and estuaries ecology monitors changes over time in the numbers and types of animals living in and on muddy and sandy sediments. They are an important part of regional biodiversity and provide food for fish, birds and people, as well as providing ecosystem services such as cleaning the water.

Reef ecology monitors the numbers and types of animals and plants (seaweeds) living on our subtidal and intertidal reefs. Rocky reefs play a vital role in supporting biodiversity, productivity and coastal food webs. Monitoring helps us assess ecosystem health and understand the impacts of exotic species, land-based pollution and climate change.

Environmental monitoring programmes

Start dates of environmental monitoring programmes



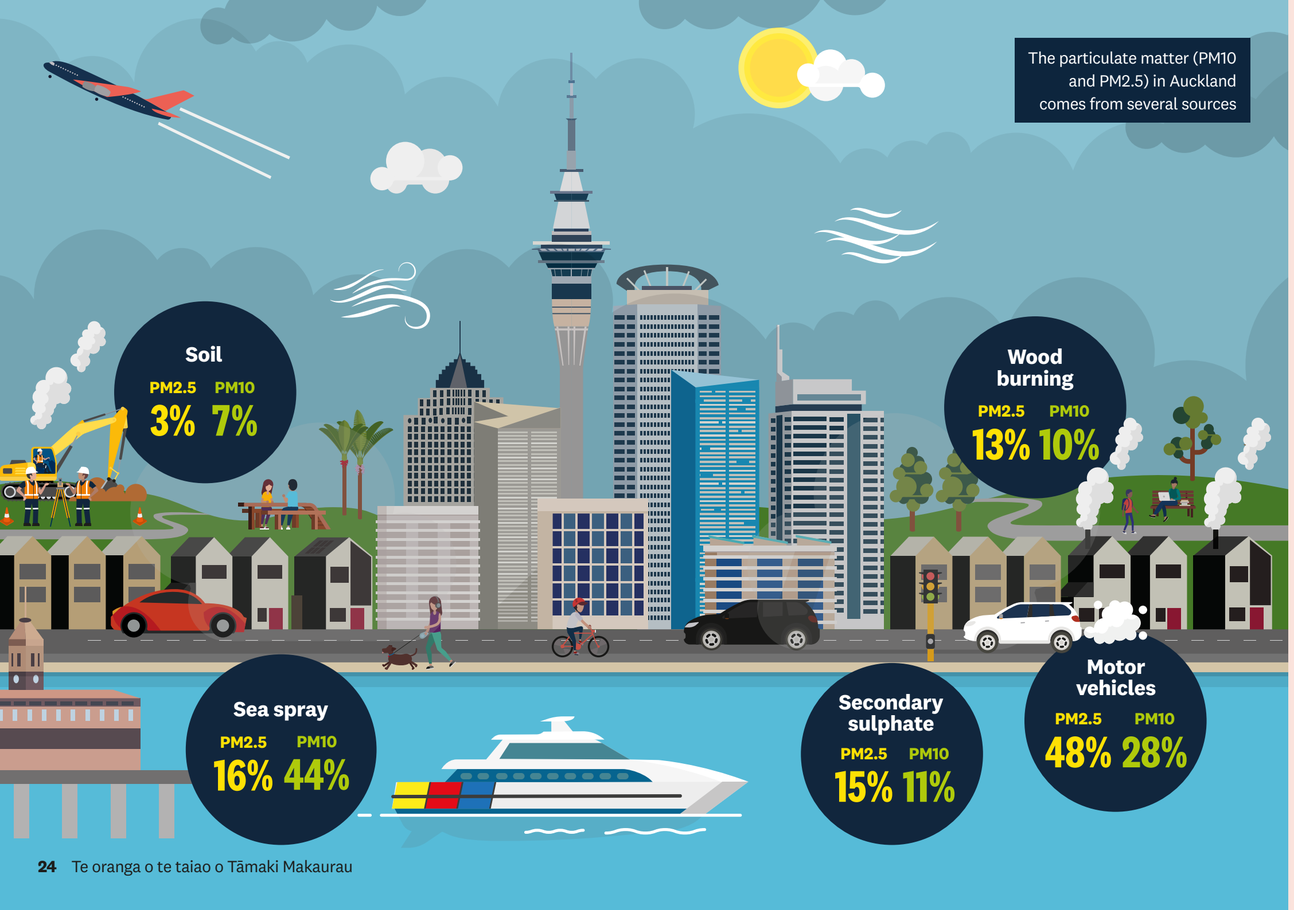
Hau
Air

Good air quality is essential for the wellbeing of individuals and the health of ecosystems. Poor air quality – caused by fine particulate matter and gaseous pollutants – can cause respiratory and cardiovascular diseases and can even lead to premature death. Air pollution also reduces visibility and can sometimes create brown haze.

Despite the growing urban population, Tāmaki Makaurau air quality is generally good compared to many cities worldwide. This is thanks in part to its geography and climate and long-term trends show regional improvements in air quality. These gains are largely due to cleaner fuels, improved vehicle technology and declining use of solid fuels (coal and wood) for home heating. Natural sources such as marine spray, bush fires and volcanic eruptions also contribute to air pollution but are outside our sphere of control.

Auckland Council has monitored outdoor air quality for over four decades using high-accuracy equipment and nationally recognised standards. This long-term monitoring supports a robust scientific understanding of pollutant levels, trends, and sources, enabling the council to manage air quality effectively under the Resource Management Act 1991. We use data from the monitoring network to check whether pollutant levels in the air, meet the National Environmental Standards for Air Quality (NESAQ).

Te-Tāruke-ā-Tāwhiri: Auckland's Climate Plan sets the target of keeping within 1.5 degrees of warming and net zero emissions by 2050, with an interim emissions reduction target of 50 per cent by 2030 (against a 2016 baseline). An emissions inventory identifies and quantifies the most recent sources and sinks of greenhouse gas (GHG) and trends. This is an essential tool to evaluate our progress, frame mitigation actions and inform future policy development. The emissions inventory is prepared annually but is included with this state of the environment monitoring as air quality and greenhouse gases and their mitigations are so closely linked.



Case study: air quality in the city centre

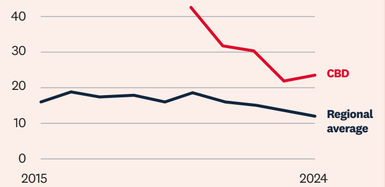
Auckland's city centre is evolving. Strolling through Queen Street reveals a vibrant urban core with increased pedestrian activity, community events around Britomart and the ever-busy Aotea Square serving as a national meeting point. The City Rail Link (CRL) development is also becoming more tangible, with Te Waihorotiu Station taking shape alongside supporting infrastructure that will enable future growth.

These positive changes come with environmental changes – particularly in terms of air quality. Over the past five years, our monitoring data paints a complex picture of pollution trends in the CBD.

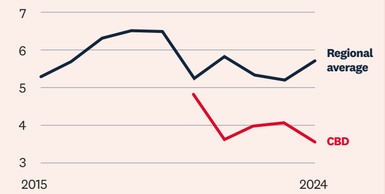
NO_2 concentrations keep dropping

Since 2020, traffic patterns along Queen Street have shifted dramatically. With a strong emphasis on public transport and active modes, private vehicle use has been significantly discouraged. Vehicle counts have halved, and the reduction in traffic lanes has contributed to a more breathable environment. This transformation is reflected in a nearly 50 per cent drop in nitrogen dioxide (NO_2) concentrations recorded by our monitors on Queen Street and Customs Street.

NO_2 has decreased across the region, especially in the central business district



but PM2.5 has remained relatively stable



Temporary challenges

While urban development brings long-term benefits, it also introduces short-term air quality issues. Construction projects – essential for Auckland's growth – generate emissions from diesel machinery and earthworks. These activities have led to increased particulate matter (PM) levels at the Queen Street monitoring site over the past few years.

Fortunately, this impact appears to be highly localised. Customs Street, only a couple hundred metres from the Queen Street site, is less affected by construction and has shown a consistent decline in PM concentrations. This contrast gives us confidence that the elevated PM levels at Queen Street are temporary and site-specific.

A success story in SO_2 reduction

The implementation of MARPOL Annex VI (International Convention for the Prevention of Pollution from Ships) regulations in mid 2022 – which limit the sulphur content in marine fuels near ports – has resulted in significant reductions in sulphur dioxide (SO_2) levels across all port areas, including Auckland.

Where to from here?

Air quality in Auckland's CBD is improving, though the spatial variability remains complex. This variability highlights a gap in our understanding of air quality dynamics in the city centre. Closing this gap will help us better assess the benefits and trade-offs of urban projects. To that end, we're expanding our monitoring network using distributed low-cost sensors, a tool that we expect to use increasingly in other parts of the region.

How is our air changing?

Air quality is good and even improving for some pollutants

While air quality across the region is good, local activities, including transport, domestic heating, and industry, continue to influence pollutant levels. Encouragingly, Auckland has not exceeded national air quality standards since 2022. Concentrations of nitrogen dioxide (NO_2), a key traffic-related pollutant, have decreased across the region at a rate of around 5 per cent each year, with particularly strong improvements in the central business district that have seen reductions of nearly 20 per cent over the past five years. In contrast, particulate matter (PM_{10} and $PM_{2.5}$) concentrations have remained relatively stable over the past three years, with some areas showing signs of worsening. The source mix for PM pollution has remained consistent over the last decade, with sea spray contributing approximately 45 per cent of PM_{10}, motor vehicles around 30%, and wood burning about 10 per cent. For $PM_{2.5}$, motor vehicles are the dominant source, contributing over 40 per cent, followed by sea spray and wood burning. As tailpipe emissions have decreased, the relative contribution of non-tailpipe emissions (e.g., brake and tyre wear) has increased, reflecting the changing nature of urban pollution.

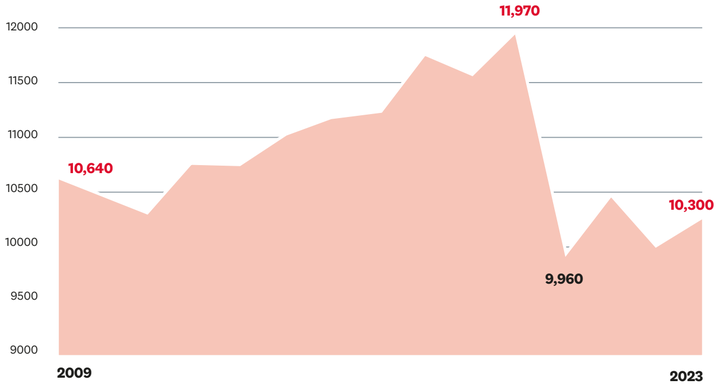
Significant spatial variation in traffic pollution remains a monitoring challenge, and many fast-growing areas lack sufficient monitoring data. For some communities particularly in the north-west and south of the region, pollution levels are still unknown. This is a challenge to overcome to ensure the bigger picture and finer details of regional air quality is understood.

Emissions have decreased

Between 2016 and 2023, greenhouse gas emissions decreased by 9.5 per cent for gross and 8.3 per cent for net emissions. On a finer level, gross and net emissions generally increased from 2009 to 2019, showed a marked drop from 2019 to 2020 (largely driven by the COVID-19 restrictions), then rebounded from 2020 to 2023. Furthermore, from 2009 to 2023, there was a downward trend in both per capita emissions and emissions per unit GDP.

This shows that emissions have not increased as fast as population and economic growth. While this trend is promising, we still have a long way to go. In 2023, Auckland's gross emissions were 10,919 kilo-tonnes of carbon dioxide equivalent (kt CO_2e) and when land and harvested wood products (HWPs) were included, net emissions were 10,298 kt CO_2e. To achieve the target of halving 2016 emissions by 2030, a reduction of 6,030 kt CO_2e for gross emissions and 5,618 kt CO_2e for net emissions is required.

Net emissions (kt CO_2 equivalents) increased up to 2019, showed a marked drop in 2020 and have somewhat rebounded to 2023



Fairy Falls, Waitākere Range
Hamish Allen

Blue carbon

Blue carbon ecosystems, like mangroves, saltmarshes and seagrasses have a high capacity to absorb and store carbon. This is because the carbon that ends up below ground in these oxygen-poor ecosystems can stay captured in the sediment for long time periods, sometimes thousands of years, making these ecosystems excellent carbon sinks.

How much of Tāmaki Makaurau is covered by blue carbon ecosystems?

A study commissioned by Auckland Council used satellite imagery paired with machine learning to quantify the extent of saltmarsh, mangrove, and seagrass ecosystems in the Tāmaki Makaurau / Auckland region. This refined mapping approach was used to estimate that these ecosystems occupy approximately 22,760 ha on the west and east costs of Auckland. Carbon sequestration rates measured primarily from New Zealand were then used to estimate how much carbon these ecosystems might hold – a combined carbon sequestration of 11,950 tC per year. In other words, Auckland's blue carbon ecosystems likely store about as much carbon as is emitted by 10,000 petrol-powered passenger vehicles driven for one year. Or, using emission unit prices, this service equates to $2,192,000 per annum.

These ecosystems are not just valuable as carbon sinks – they also provide many other ecosystem services[2] (benefits) and functions. They reduce sediment surface erosion, contribute to nutrient and sediment filtration and trapping and mitigate against flooding and storm impacts. These benefits have cascading impacts that improve overall environmental health and resilience.

The extent of our blue carbon ecosystems and their potential contribution to carbon abatement and ecosystem services highlights the importance of protecting and enhancing these ecosystems. The detailed information provided in the full report will inform our next steps as we seek to maximise the potential of these ecosystems to capture carbon. We plan to improve region-specific carbon sequestration data and continue to develop fine-scale habitat mapping to enable us to detect change. We will also consider restoration opportunities and how our blue carbon sinks might be impacted by predicted sea level rise.

[2] Ecosystem services are the diverse benefits that humans receive from nature and healthy ecosystems, including provisioning (like food and water), regulating (for example, climate and water quality), cultural (such as recreation and spiritual values), and supporting services (like soil formation and nutrient cycling).

Whenua
Land

Tāmaki Makaurau / Auckland has a diverse range of ecosystems and landforms, extending across the mainland and the islands. This diversity supports a variety of native species on land. Most of these are unique to Aotearoa New Zealand and some are found only in the region.

Over decades, growth of Tāmaki Makaurau has placed pressures on our biodiversity, land cover and soil resources. Native ecosystems have been replaced over time with exotic grassland and urban development. This has resulted in loss of ecosystems and the diversity they support. Many species are now threatened as their habitat has been degraded, fragmented or removed. For a region with such a large urban centre, Tāmaki Makaurau is unusual in retaining several large continuous tracts of indigenous forest in Te Wao Nui a Tiriwa (Waitākere Ranges), Te Ngāherehere o Kohukohunui (Hūnua Ranges) and on Aotea (Great Barrier Island). However, a larger proportion of forest habitats are found in smaller and more isolated forest fragments, often surrounded by rural or urban land. Pest plants, animals and pathogens also threaten many species, and forests that are disturbed and fragmented are more susceptible. Tāmaki Makaurau is estimated to be home to over 445 threatened and at-risk species. Our changing climate will make it even harder for some species to survive.

Besides forests, one of our most important and vulnerable terrestrial habitat types is our wetlands. It is estimated that 96 per cent of the original wetland extent in Tāmaki Makaurau has historically been lost through drainage and vegetation clearance for farming, settlement and urban development. Wetlands not only support a wide variety of specialist plants and animals, they also provide many ecosystem services, including flood attenuation and cleansing water of sediment, nutrients and contaminants. These services will become even more important with a changing climate and increased storms.

Soil quality underpins our terrestrial ecosystems, sustaining our native plants and animals as well as plant and animal production. Rural production continues to be a valuable and important part of the regional economy and national food supply, and a functioning soil ecosystem is essential to support these land use activities. Poor soil quality and conditions can lead to too much sediment and nutrients entering our waterways and coasts.

Kākā, Glenfern Sanctuary Regional Parkland, Aotea / Great Barrier Island
Gaia Dell'Ariccia

How is our land changing?

Soil quality has not improved

Across all land use types that we monitor, only slight changes in soil quality indicators and trace elements were detected. This stability could be considered positive for our native vegetation sites. However, for our horticulture (outdoor vegetable and orchard sites), pasture (dairy, drystock and lifestyle block converted sites) and urban (mainly parks) sites, it means that poor soil qualities, like high phosphorus levels, have been maintained over time. While it is challenging to improve soil quality in intensive farming areas, there is scope to adopt sustainable practices, such as cover cropping, crop rotation, reduced tillage, composting and promoting biodiversity. It is hoped that current and future efforts to improve soil quality degradation will promote highly productive soils to support our primary land uses and enhance environmental sustainability. Organic matter and soil organisms play an important role in crop production and environmental protection. We are considering using biological soil indicators and conducting measurements of emerging contaminants like pesticide residues and microplastics in future soil monitoring efforts.

Conservation status

Although not part of State of the Environment monitoring, conservation status assessments are good indications of biodiversity status within the region. These assessments are provided by the Biodiversity Focus Area (BFA) Programme, which conducts species and ecosystem surveys and monitoring across the region with the primary purpose of prioritising and informing biodiversity management action. This complements regional State of the Environment monitoring with more detailed species and location specific information.

One aspect of the BFA programme work is tracking indigenous reptiles, amphibians, bats, freshwater fish, birds and vascular plants in Tāmaki Makaurau. Their published regional conservation status assessments from 2022-2025 establish a framework against which we can compare future species and state of the environment monitoring. The framework helps us measure success in protecting our indigenous species.

Most of our native animals are “Threatened” or “At Risk”. This is true for reptiles, bats, amphibians, freshwater fish, and birds (excluding non-resident natives). Some species that also occur elsewhere in New Zealand are more threatened in our region. Tuatara is “Regionally Critical” but nationally “At Risk”, and the Pacific and Raukawa gecko are regionally “At Risk” but nationally “Not Threatened”. For our native vascular plants, 45 per cent are Threatened or At Risk, and an additional 27 species have become extinct or no longer occur in the region.

Species assessments have also turned up some positive discoveries. The Raukawa gecko, thought to be restricted to offshore islands, was discovered at a mainland Auckland Council managed site. The bluegill bully (*Gobiomorphus hubbsi*) has remained present in the region with positive finds at several streams on Aotea / Great Barrier Island. These and many other survey results are used to inform where and how we should undertake active management to protect and secure our region’s threatened indigenous species.

Indigenous vegetation gains, but restoration quality mixed

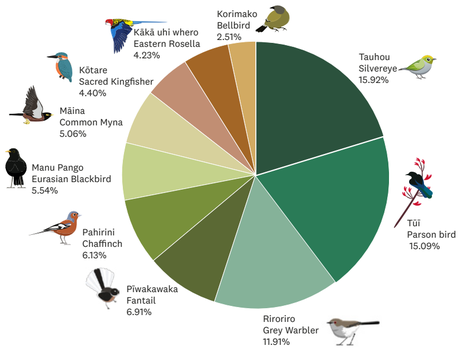
Indigenous forest and scrubland has increased by one percentage point over previous land cover estimates from 2018. Between 2018 and 2023, net gains of 1,021 hectares of indigenous forest and 4,534 hectares of indigenous scrub/shrubland were recorded. Gains in native woody vegetation cover arise from active replanting in regional parks, replanting associated rural subdivisions and greenfield developments, and to a lesser extent from natural regeneration processes on marginal farmland. Forest losses result from conversions to urban expansion and infrastructure development, as well as from many small accumulated losses that have crossed a classification threshold. Increases in native vegetation cover are promising, but the benefits of ecological restoration may be limited by low species diversity and poor maintenance, highlighting the need for further assessment to evaluate actual ecological outcomes.

From a biodiversity perspective, large, continuous forest blocks and sites under intensive and sustained pest control consistently support higher indigenous species diversity of both plants and birds. Urban forest patches on the other hand consistently exhibit higher pest plant and lower native plant species richness, reflecting fragmentation, isolation and exposure to human activity. These findings highlight both the persistent effects of historic forest clearance and degradation and the potential for biodiversity gains through effective pest control and enhancing forest extent and connectivity across Tāmaki Makaurau.

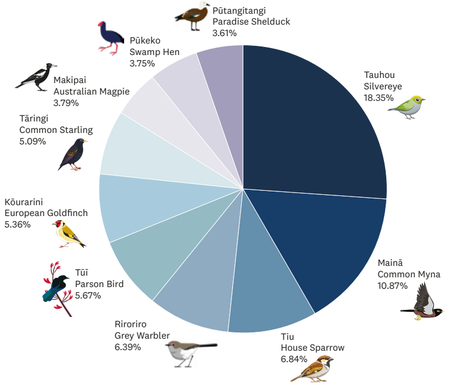
Native bird numbers are rising

Our Terrestrial Biodiversity Monitoring Programme also collects and reports bird data from forests and wetlands in Auckland on a five-year monitoring cycle: forests (2009-2023) and wetlands (2011-2024). Most birds counted in forest and wetland sites were indigenous species (nearly 68 per cent and 56 per cent respectively), with only a small percentage of these being regionally categorised as “Threatened” (1.3 per cent) or “At Risk” (1.6 per cent). Native species were more prevalent in sites containing indigenous land classes, while introduced species thrived in modified landscapes. Abundance and richness of native species have increased over the years in forest and wetland sites, especially where pest animals have been effectively controlled, while the number of introduced species have remained stable. Abundance of kererū and kākā in forests and fernbirds in wetland were strongly linked to habitat quality, indicating their potential as indicators of habitat health. The positive trend in the numbers of native birds in these habitats is encouraging. However, this trend is limited to broad-habitat, non-threatened species, highlighting the ongoing need for efforts to support native and endemic species that rely on well-managed and preserved habitats for survival.

Top 10 forest birds



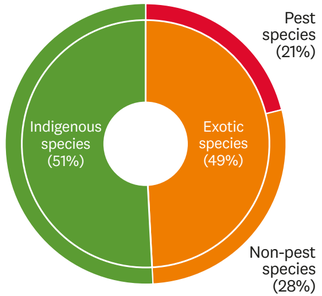
Top 10 wetland birds

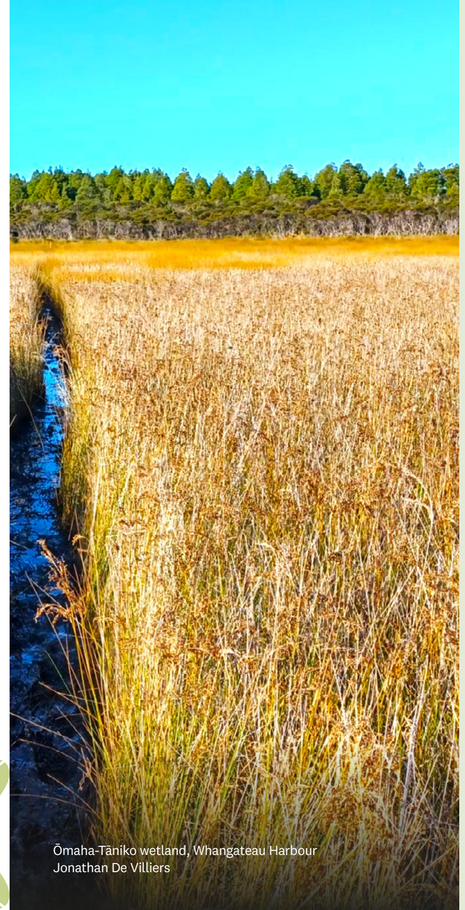


Wetlands under pressure

Fifteen years of data on plant biodiversity and ecological integrity of wetlands from 189 permanent plots across Tāmaki Makaurau paints a picture of ecosystems under pressure. Of the 391 species recorded in the latest survey, only 51 per cent are indigenous, the remainder are exotic or pest plants (21 per cent). Pest plants, especially grasses, increased in cover over the 15-years of monitoring. There was a small but significant increase in the wetland condition index across the 15-year window, and 37 per cent of plots were in excellent condition, 53 per cent were in good condition, 9 per cent were in moderate condition and one was in a degraded condition. However, 88 per cent of our wetlands had a moderate or high Wetland Pressure Index (WPI) score, with pressures including modifications to the catchment, reduced water quality, stock access, exotic plants and animal pests. Also, 60 per cent of wetland edges were in moderate or poor condition, indicating modifications, stock access, drainage and high weed density in the buffer zone. While there was no trend of increased pressure or degradation of edge condition over the 15-year timeframe, it remains important to keep tabs on these delicate ecosystems that are vulnerable to so many pressures.

Nearly 50% of plant species in our wetlands are exotic and 21% of those are pest species





Ōmaha-Tāniko wetland, Whangateau Harbour
Jonathan De Villiers

Case study: Managing exotic pests

Considerable degradation of Auckland's natural environment is driven by problematic non-native species. These exotic pests threaten the biosecurity of both terrestrial environments and, increasingly, our aquatic environments. Auckland Council works to prevent pests from establishing populations, using methods that range from eradication to mitigation to slow the spread. Here are some of the pests we control for.

Weeds: There are more than twice as many naturalised non-native plant species compared to native plant species in the Tāmaki Makaurau / Auckland region, with 226 designated as problematic and listed in Auckland Council's Regional Pest Management Plan 2020-2030. The number of problematic weed species continues to grow – about four exotic species become naturalised in Auckland every year. Weed plants can out-complete native species and displace them locally, affecting the abundance, species richness and local distribution of native flora. They can even influence ecosystem processes such as decomposition and nutrient cycling. This year we think we have successfully eradicated two pest plant species (great reedmace and nassella tussock) from the region and have three more species approaching eradication (water poppy, marshwort and balloon vine).

Mammals: More than 80 non-native animals have become established in New Zealand. In particular, rats, mustelids, cats, dogs, the brush-tailed possum, deer, goats and pigs that impact our native flora and fauna. Predatory mammals kill the eggs, nestlings and adults of native birds, and herbivorous mammals browse the young shoots of native plants, affecting forest composition and regeneration dynamics. For many of our mammalian pests, we take an integrated site-led approach, minimising the impact and pressure on our high value ecosystems. We manage possums across the region and work to keep the Hunua and Waitākere Ranges free of deer and goats. We have successfully eradicated pests from several of our islands, and we are currently working on eradication of wallabies and possums from Kawau Island which will allow the island's biodiversity to flourish.

Invertebrates: Where invasive invertebrates, such as wasps and paper wasps, are abundant, they are known to consume and seriously deplete invertebrate fauna, particularly butterflies and moths. The disappearance of the forest ringlet butterfly from Tāmaki Makaurau since the 1990s has in part been attributed to predation by invasive wasps. We have added wasp monitoring to our Biodiversity Monitoring Programme plots to better understand their prevalence and impact.

Pathogens: The two pathogens causing the most damage to indigenous plants in Tāmaki Makaurau are *Phytophthora agathidicida* (the causal agent of kauri dieback disease) and *Austropuccinia psidii* (the causal agent of myrtle rust disease). *Phytophthora agathidicida* is soil-borne; it can spread through damp soil on its own or can hitch a ride on anything from pigs to muddy hiking boots. Cleaning stations and track closures have helped reduce disease spread by limiting soil movement. A comprehensive survey in 2023 did not detect *P. agathidicida* in the Hunua Ranges. As most other large kauri forests have *P. agathidicida* infection, this finding highlighted the national importance of the Hunua Ranges for kauri protection and prevention. *Austropuccinia psidii* is a wind-dispersed pathogen that is capable of infecting plants across the myrtle family, including our pōhutukawa and rātā. Especially vulnerable species are ramarama (*Lophomyrtus bullata*), rōhutu (*L. obcordata*) and maire tawake (*Syzygium maire*). Severely infected populations of susceptible species are being treated with the help of Auckland Council, Plant & Food and local communities to give trees a fighting chance – helping them flower and fruit so that they can be propagated and preserved.

Aquatic pests: Exotic aquatic species, including fish, turtles, invertebrates and plants, are a growing threat to our freshwater and marine ecosystems. These pests can prey on and/or compete with native species, disrupt food webs, increase nutrient levels, and/or contribute towards algal blooms. Exotic caulerpa (comprising two species of seaweed) can quickly outcompete and smother native seagrasses and bottom dwelling invertebrates, altering habitats. Freshwater gold clams, first found in New Zealand in 2023, are prolific breeders, able to produce populations larger enough to clog electric generation plants, irrigation systems and water treatment plants. Auckland Council is working to detect, monitor and manage these and other aquatic pests. For example, pest fish are being excluded from the freshwater mussel beds in Lake Rototoa to allow kākahi restoration. Kākahi is a keystone species that filter the water and maintain the health of the lake.

Wai Māori
Freshwater

Aucklanders have strong connections to water across Tāmaki Makaurau, and our freshwater environments hold immense significance for Māori. Water is highly valued, providing us with drinking water, irrigation for growing food, recreation and wellbeing and habitat for a diverse range of native plants and animals. Improving and sustaining water resources and the health of our freshwater ecosystems is therefore of great importance.

Freshwater across the region takes many forms as part of a complex and connected system. There are nearly 19,000 kilometres of streams and rivers. Streams in areas with volcanic geology receive a high proportion of their flow from groundwater (baseflow). Most of our streams are short and narrow, draining quickly to the coast. The largest river systems in the region include the Hōteo River to the north and the Wairoa River to the south. The topography in Tāmaki Makaurau forms rivers and streams that are typically slow flowing and low gradient, with predominantly soft stream beds. Hard-bottomed streams are mainly found in the Hunua and Waitākere ranges and on the Gulf Islands. Most naturally formed lakes in the region are dune lakes, except for Lake Pupuke which is a deep volcanic lake.

Tāmaki Makaurau has many aquifers, which are a source of groundwater for irrigation, domestic and industrial uses. Tāmaki Makaurau also has two major geothermal aquifers in Waiwera and Parakai. South Auckland has some of the region's most productive aquifers. Fractured volcanic aquifers in parts of the central isthmus are used for stormwater soakage (rather than being diverted to streams).

Since freshwater systems are inherently interconnected, flowing from the mountains to the sea (Ki uta ki tai), our actions in one part of the system, such as on land, will affect other parts of the system, flowing through our groundwater, rivers and streams to our coastal waters. Water quality can be affected by land use activities, discharges, land and stream channel erosion, as well as seasonal and climatic variability. Over time, our freshwater environments have been degraded from the pressures of Tāmaki Makaurau's growth and the way we look after and use our land and water.

Ōtara Stream
Jade Kraus

How is our freshwater changing?

Rainfall extremes mask drier trends

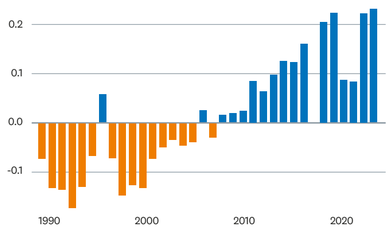
The period covered by this report included two of the most hydrologically extreme summers to ever impact Auckland: the 2019-20 summer drought – likely the most severe dry event within the long-term historical record – and the record-breaking rainfall events in the 2022/2023 summer. The rainfall amounts received in the past five years show that many sites received much less rainfall relative to the previous five years. Short-term climate variability would have been much more severe if not for the exceptionally wet 2022/2023 period. Repeated, drier-than-normal autumns that have recently occurred are concerning because they run counter to recent climate change projections of increased rainfall during autumn – if this type of situation persists into the future, then overall drying impacts will be worse than anticipated.

The rainfall trends for the region give clues that there is an overall reduction in long-term rainfall that is occurring along the northwest and northern margin of Tāmaki Makaurau, with long-term rainfall increase along the southern margin. These trends are seasonally specific though, and in many places are masked in-part due to individual years and seasons that are extreme toward the end of the observing period.

Groundwater quantity responsive to climate

The groundwater aquifers of Auckland show responses to recent climate variability such as the 2019/2020 drought and 2022/2023 summer deluge. There are clear patterns of long-term change for the Kaawa aquifer in the south, that indicate lower groundwater levels occurring during spring, summer and autumn and a narrowing window of recharge during late autumn winter and spring. A plausible explanation for both changes is due to increased use and climate change impacts, but more groundwater use data is required to confirm those hypotheses. The Mt Wellington volcanic aquifer shows a long-term rise in groundwater levels potentially related to increased stormwater disposal. This area is susceptible to groundwater flooding impacts from extreme rainfall events and antecedent wet conditions.

Groundwater levels have increased over time in the Mt Wellington aquifer
These bars represent the annual average change (in metres) in groundwater level compared to the 30-year normal



Groundwater quality concerns in two locations

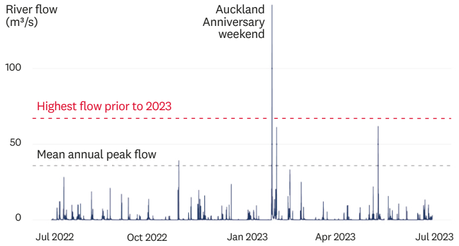
Groundwater quality varies across the region due to different depths, geology, and land use pressures, with some key localised pressures and issues. There are high concentrations of nitrate in the shallow basalt aquifers and springs of the Pukekohe area, with concentrations at some sites exceeding the drinking water Maximum Acceptable Value. These levels reflect long-term impacts from intensive horticultural activity, and while generally stable, are unlikely to decline quickly due to long groundwater residence times (18–36 years). Concerningly, we are also starting to see evidence of increases in nitrate in some deeper, more confined aquifers. Urban groundwater in Auckland's isthmus shows signs of contamination from stormwater infiltration via soak pits: *E. coli* and nitrate levels were consistently elevated. We also identified elevated lead at one site, possibly from industrial sources.

River flows impacted by rainfall and land use

River flow across our regional catchments varies. Many long-term trends for changes in flows are detectable, but they are small. There is evidence for increased impervious surface and increased rainfall for individual rain events as drivers of positive flushing flow, trends that are predominantly occurring in urban catchments. A reduction in the annual low flow in some catchments is likely in response to long-term reduction in rainfall and/or an increase in impervious surface cover.

The Auckland Anniversary 2023 flood event was exceptional, and it significantly changed regional flood flow statistics. This extreme event also contributes to masking long-term hydrological changes in flows that would be identified in linear trend analysis.

On Auckland Anniversary weekend, the stream flow at Wairau Creek was more than twice the previously recorded maximum and four times the peak flow expected on average each year



Sediment loads high during storms, but catchment restoration helps

Sediment loads in our rivers and streams were estimated across 11 sites. Our estimates are based on water samples gathered during wet weather events. During this reporting period, sediment yields were higher in streams from catchments with steeper pastoral land than from catchments with flatter topography and native forest cover.

There was variability in sediment loads between years, with wet years (2017 and 2023) transporting higher sediment loads than drought years (2020). Very large loads of sediment were transported in 2023, although we could not collect samples for some of the weather events due to flooding and damage to equipment across the region.

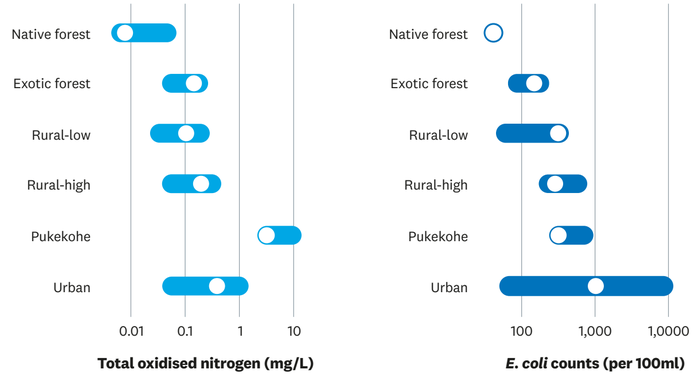
At some sites sediment loads are increasing over time whereas at other sites, they are decreasing. Climate change is anticipated to increase sediment loads, however, with some catchment interventions, these loads could be reduced. At the Te Muri site, there has been extensive catchment-wide restoration, stock exclusion and retiring of pastureland. Sediment load has decreased significantly following these efforts, emphasising the ability of restoration efforts to reduce sediment loss from land.

Whangaparapara Stream, Aotea Great Barrier Island
Graham Surrey

Poor river water quality in rural/urban areas, and few generalisable trends

Streams draining native forest catchments were found to be in the best condition. Water quality was generally worse in streams flowing through predominantly rural and urban catchments, with urban streams in the poorest condition. Land cover explained a lot of variation in water quality, except for clarity and total suspended solids, which was more clearly explained by climate and underlying geology. All monitored rural and urban waterways were impacted by high *E. coli* levels that indicate faecal pollution, and most rural and urban waterways have elevated nutrient concentrations and low dissolved oxygen that can influence ecosystem health and function. Each of the 37 monitoring sites shows a different trend, with some improving, some degrading and some staying about the same. There are many locations with poorer water quality, which are getting worse, particularly for measures of metals and phosphorus. The variability in trend direction and magnitude observed highlights the complexity of interactions between land use activities, different contaminant pathways, and climatic influences. Temperatures are increasing in most sites across all land cover groups, including sites in our native forest catchments. Additional continuous monitoring of water temperatures will improve our understanding of this issue.

Nitrogen and indicator bacteria were lowest in streams in native forest catchments and highest in rural and urban areas



Case study: Water quality improvements guided by monitoring

Our monitoring programmes are mostly designed to inform big-picture management across the region. They can also show small-scale issues, where Council operations can target effective actions. Here's how long-term monitoring has guided water quality improvements in our freshwater environments.

The Safe Networks programme

Healthy Water and Flood Resilience's Safe Networks programme is a joint Auckland Council initiative with Watercare, established to identify and mitigate faecal contamination in stormwater networks affecting coastal recreation sites. The programme is funded by the Water Quality Targeted Rate and in part by Watercare.

Initially focused on supporting Council's Safeswim programme through targeted stormwater investigations at recreational beaches, Safe Networks has expanded its scope to include degraded and degrading freshwater environments identified through Council State of the Environment monitoring.

This collaboration pairs our long-term water quality datasets and trend analysis with catchment investigations and coordination of interventions, enabling Council to more effectively locate and address pollution sources.

Pakuranga Creek: Linking monitoring observations to source detection

Pakuranga Creek was flagged for investigation after the previous State of the Environment report showed consistently elevated ammonia concentrations at this site – up to 10 times higher than other regional urban sites. These, along with high nitrite levels, suggested a significant contamination source was nearby.

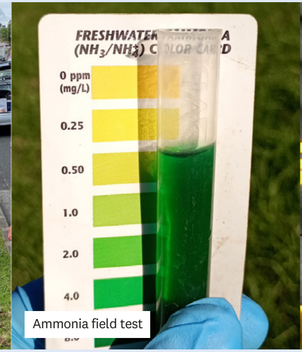
Investigations traced the ammonia up the stormwater network to the boundary of the closed Greenmount landfill. Leachate management at this site is under review through investigations by Council's Landfill team, who are working with Regulatory Services on consenting and management options. Meanwhile, Council's Industrial Trade Activity (ITA) programme is addressing other periodic pollution sources (foam, paint, fat discharges) in the surrounding Greenmount industrial area.

Ōtara Creek: Responding to degrading water quality trends

Ōtara Creek was investigated in early 2025 based on monitoring data that revealed high and increasing *E. coli* and ammonia concentrations. In June 2025, Safe Networks traced a major source of contamination to a broken wastewater pipe discharging raw sewage in the upper catchment. Watercare installed a temporary bypass within 24 hours, with full repairs completed within two days. Safe Networks is continuing to investigate other sub-catchments of Ōtara Creek where wastewater has also been detected.

The wastewater network in Ōtara also faces long-standing capacity issues, particularly during storms. These lead to wet-weather overflows into the local environment, including streams and the Tāmaki Estuary. Watercare is progressing infrastructure upgrades, supported by inflow and infiltration investigations targeting illegal cross-connections and private drainage issues.

Manhole sampling



Ammonia field test

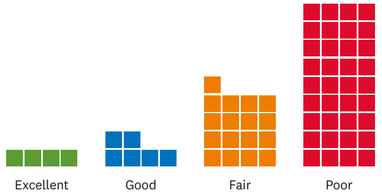
Sample for *E. coli* laboratory test

Freshwater river ecology is poor at many rural and all urban sites

Our freshwater ecology monitoring focuses on measuring invertebrates, which respond to changes in water quality and habitat, and we also undertake Stream Ecological Valuation surveys that include measures of habitat. These indicators show that the ecological health of our rivers ranges from 'excellent', in streams in our native forest catchments, to 'fair' in many rural areas and 'poor' in streams with the most intensive rural and urban land use catchments. Over half the sites are classed as poor based on one or more invertebrate metrics – sites that fall below this threshold are described as suffering severe ecological degradation.

Stoneflies, mayflies and caddisflies are a good measure of the stream water quality and health. Although there are diverse communities of these species in hard-bottomed native forest streams, nearly a third of streams monitored lacked these insects. In terms of trends, more streams in rural areas were improving than degrading, but there were high proportions of sites in native forest and urban catchments experiencing degrading trends.

There were more sites with poor ecology than excellent
Each square represents a site in our freshwater ecology monitoring network



Bluegill bully *(Gobiomorphus hubbsi)*
Graham Surrey

Freshwater fish monitoring

We used to rely on macroinvertebrate community data for assessing the ecological health of rivers and streams in the region. Then, in the summer of 2021/2022, we began a three-year pilot freshwater fish monitoring programme and have now completed the first year of our routine long-term monitoring programme. This programme uses electrofishing, spotlighting and trapping methods to identify, count, measure and release fish at 44 sites. eDNA was used to identify additional species that may be present. Fish were found at all streams investigated including those with high proportion of urban land cover in the catchment. Between two and seven different species were found at each location surveyed using fishing/trapping methods and up to 10 additional species were identified using eDNA.

Across all sites and years, 15 fish species were identified, 11 of which were native. Longfin tuna (*Anguilla dieffenbachii*), shortfin tuna (*Anguilla australis*), common bully (*Gobiomorphus cotidianus*), and īnanga (*Galaxias maculatus*) were the most frequently observed and abundant species, all present in over 50 per cent of sites fished. Four of the native species identified are regionally (and some nationally) threatened: kōaro, torrentfish (*Cheimarrichthys fosteri*), giant kōkopu (*Galaxias argenteus*), and common smelt (*Retropinna retropinna*). Freshwater crayfish kōura (*Paranephrops planifrons*) were also observed at 15 sites. Three pest species were present: mosquito fish (*Gambusia affinis*), perch (*Perca fluviatilis*), and goldfish (*Carassius auratus*). The introduced rainbow trout (*Oncorhynchus mykiss*) was found at one site.

Continued monitoring of our freshwater fishes will help guide the prioritisation of species for targeted survey, management, and research to ensure regional viability of indigenous species is maintained over the long-term. Since fish occupy the top of the food chain in freshwater ecosystems and help maintain ecosystem balance, freshwater fish monitoring also provides valuable insights and indications into the overall health of our rivers and streams.

Lake water quality is declining from already poor condition

Most lakes in Tāmaki Makaurau are in poor condition. These lakes have elevated nutrient and algae concentrations, poor water clarity and poor ecological conditions, and many are facing pressure from invasive species. Lake Keretā has the worst water quality in the region and was in a non-vegetated, algal dominated state. Lake Rototoa has the best water quality in the region and is in a high ecological condition but is degrading over time. We were able to analyse 10-year trends in four lakes: Lake Pupuke, Lake Rototoa, Lake Tomorata and Lake Wainamu. Trends in nutrients, dissolved oxygen and *E. coli* are consistent with degrading lake water quality, though those trends did vary by lake and sampling location (surface and bottom waters). Degrading conditions highlight the vulnerability of our lakes and emphasise the importance of ongoing management efforts, like Auckland Council's work on raising awareness of invasive species entering lakes, managing pest fish, controlling invasive aquatic plants, and improving kākahi conservation.

In 2024, most lakes showed poor or very poor water quality and no lakes were classed as very good or good
Each square represents an individual lake in our lake water quality monitoring network

Characterising temperature in Auckland's natural environments

Temperature plays an important role in structuring natural ecosystems, governing where different species may live and thrive. Temperatures in Auckland are expected to increase on average and may also become more variable with more frequent temperature extremes. These temperature changes pose a threat to indigenous biodiversity as they are expected to cause stress to individuals and alter the composition of ecological communities.

The Environmental Evaluation and Monitoring Unit routinely monitors temperature in freshwater, groundwater and nearshore coastal water quality programmes. Continuous water temperature measurements are taken in 46 streams across a range of catchments. Streams draining native forested catchments are generally the coolest, while urban streams tend to be the warmest (particularly those with limited shading and modified channels). In most urban and rural streams maximum daily temperatures are rising, and in four urban streams, temperatures already reach levels that can harm freshwater species. In coastal surface waters, the average temperature over the past five years (to June 2024) ranged from 12°C to 24°C with median values of 18°C, and temperatures increased by 0.06°C per year on average across the region (measured across 31 sites).

We expanded temperature monitoring in 2023 to include rocky intertidal reefs and intertidal sandflats, with the potential to grow into other environmental domains (such as seabird burrows, forests and wetlands). Small temperature loggers were deployed to record temperature (up to every 15 minutes) and will remain in the environment long term. The aim is to understand current temperature characteristics within habitats and ecosystems, like how temperature varies over the course of a day/week/season/year, the typical minimum and maximum temperatures and how often these are experienced, and how the specific habitat or ecosystem influences temperature. Where possible, temperature data will be paired with ecological monitoring to improve our understanding of the ecological consequences of changes in temperature regimes. This evidence base should help identify the species, habitats and ecosystems that are most sensitive to change so that management can be targeted towards building their resilience.

Te takutai moana
Coasts

Tāmaki Makaurau / Auckland's coasts and harbours are some of its most highly valued natural features. Tāmaki Makaurau is a predominantly marine region with roughly 70 per cent (11,117km²) of our territorial area being made up of estuaries, bays and coastal seas. This vast marine environment is characterised by varied seascapes, including large shallow harbours, small winding estuaries, black sand surf beaches and offshore islands split between the sheltered east and rugged west coasts.

This variety provides the setting for a great diversity of marine ecosystems. Within these ecosystems are a variety of habitats that support diverse plants and animals, including seaweeds, invertebrates, mangroves, seagrass, shellfish, marine mammals, fish and sea birds. Our coastal environments are a source of kai moana and wellbeing, and they support many recreational and economic activities through fishing, aquaculture, transport and tourism. Coastal and marine environments also play a critical role in mitigating climate change impacts.

The aesthetics, use and health of coastal waters are influenced by the quality of surface water that runs from the land through streams, rivers, overland flow paths, stormwater and discharges to the coast, as well as activities in the coastal environment. The current state of many of our harbours and estuaries reflects decades of land use change – from deforestation to the first waves of urbanisation.

Climate change impacts are being seen with increasing marine heatwaves, more regular algal blooms and storm-driven erosion and sedimentation. Our coastline is dynamic and ever changing, a buffer between land and sea, and at the forefront of many climate change impacts. Our beaches, dune and wetland ecosystems play a vital role in maintaining the resilience of our coastlines and the adjacent land.

Whangapoua Estuary. Aotea / Great Barrier Island
Tarn Drylie

How are our coasts changing?

Our beaches are diverse and dynamic

We evaluated long- (30+ years) and short-term (5-10 years) beach state and trends by assessing variations in beach dynamics, beach volume, beach width, and for certain beaches, dune dynamics. Long-term trends in beach change across Tāmaki Makaurau indicate that some of our beaches are experiencing long-term erosion, with the widths of our beaches narrowing over time. However, we found that Tāmaki Makaurau beaches exhibit considerable diversity in their long- and short-term trends, despite similarities in geographic setting and wave climate within each coastal group. Human activities such as sand mining, beach renourishment, dune planting, and the construction of coastal structures have strongly influenced beach states, sometimes masking or exacerbating natural trends. The high variability of beach change across Tāmaki Makaurau reflects a complex interplay of local drivers – including wave climate, sediment supply, bathymetry, geographic setting and human interventions. Improving understanding of these drivers at the site level will be key to managing future coastal change.

The Coastal Monitoring Programme continues to evolve, integrating long-term data sets with new technologies, such as including nearshore bathymetry surveys, a pilot drone monitoring programme and efforts to improve public access to coastal data. All of these strengthen Auckland's ability to evaluate, protect and adapt its coastline in response to future environmental challenges.

Extreme weather events expected to shift our intertidal reef communities

Community structure and invertebrate assemblages on rocky shores were similar across intertidal reef communities in the Auckland region. Most monitoring sites shared a similar suite of invertebrates and macroalgae. Sediment cover varied in relation to reef morphology and wave exposure and appears to have a strong influence on species richness and community composition, particularly in mid and low tidal zones of mainland east coast sites. This makes the significant sediment inundation recorded at many of these sites in 2023 important to note. Likely driven by extreme rainfall and landslides triggered by Cyclone Hale, Auckland's January floods and Cyclone Gabrielle, sediment inundation was associated with marked declines in species richness and invertebrate abundances, especially in the low shore zone. These extreme weather events may provide a preview of future conditions likely to be experienced by Tāmaki Makaurau's intertidal reefs. Sediment-driven community shifts (e.g. dense cockle beds at Omana) suggest a transition toward soft-sediment assemblages may be occurring at some of the inner-most mainland east coast sites.

Subtidal reef health is declining

Endemic and native species are in decline in our shallow subtidal reefs. This includes large declines in endemic brown algae species and in total gastropod numbers, as well as general declines in certain sponges and sea squirts. Conversely, there has been a general increase in turfing and filamentous algae, sediment cover and invasive species at many sites. These long-term changes, particularly over the past five years, are generally consistent with a transition to an unhealthier state for temperate reefs. The widespread nature of these changes suggests they are regional and likely related to large-scale factors, rather than any specific local-scale or catchment-based impacts. While the exact cause and mechanisms for the observed changes remain undetermined, it is likely that recent changes are linked to the combined stress of climatic events like heat waves and extreme rain and storm events. These trends are expected to continue with climate change, so ongoing monitoring is necessary to document these changes, understand links with climate variability and potential recovery dynamics following extreme events. Targeted research is also needed to better understand causal mechanisms which can then help inform what management measures can be implemented to mitigate future impacts, increase resilience of reef communities and potentially restore these ecosystems.

Tākoketai/black petrel in nesting burrow, Aotea/Great Barrier Island
Gaia Dell'Ariccia

Seabird monitoring and research

Our region is an internationally recognised hotspot for seabird diversity. Remarkably, 25 seabird species are known to breed here, 15 of which are Aotearoa New Zealand endemic species or subspecies. Since most of our region's seabirds are "Threatened" or "At-Risk", Auckland Council has established the first local government-led regional Seabird Monitoring and Research Programme. The programme aims to increase our knowledge on the presence, health and trends of our seabird populations and the factors affecting them.

This programme identified 17 priority species to focus on: nine have major knowledge gaps, six have partial knowledge gaps, and two species are important for education and/or research purposes. Specific study sites/areas were also selected based on their importance for seabirds and for the presence of these prioritised species.

Initial data collected on priority species and important sites show mixed results. The tāiko / black petrel population on Te Hauturu-o-Toi / Little Barrier Island is small despite high protection, showing yearly fluctuations in number of breeding birds. Tītī / Cook's petrels on the other hand are showing positive numbers of breeding birds and good breeding success. Takahikare-moana / white-faced storm petrel are abundant at The Noises after rat eradication and trials for restoration of kawau tikitiki / spotted shag, pakahā / fluttering shearwater and kororā / little penguin are ongoing on these islands.

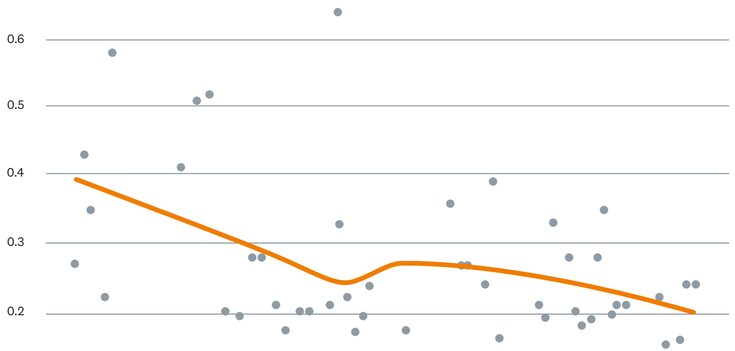
This programme is very recent, and additional projects are still being established. The data collected from the programme form the baseline for long-term studies, which are essential if we want to identify population trends or patterns to better understand species restoration requirements, and to evaluate the impact of conservation efforts and environmental issues on our seabirds.

Coastal water quality is mostly improving

At most sites that we monitor, indicators of water quality either improved from or remained the same as previous reporting periods. More than 75 per cent of sites showed a decrease in total nitrogen, dissolved reactive phosphorus and turbidity, all signs of improved quality. At 70 per cent of sites, there was a decrease in ammoniacal nitrogen and total suspended solids, and more than 50 per cent of sites showed decreases in chlorophyll a. When we compared the states of different sites, we found that water quality was better at sites at the open-coast and outer estuarine sites with high exposure to marine waters. At these sites, water quality was generally rated as "good" or "excellent".

Increased nutrient pressures and reductions in water clarity were more pronounced in more sheltered estuarine sites with higher freshwater input. Here, the water quality was poorest, with most of these sites classified as "marginal" or "poor". There were signs of nutrient pressures and reduced water clarity in the Manukau Harbour, the upper Waitematā Harbour and at the Kaipara River Mouth. In a few locations in the Manukau Harbour and the upper Waitematā Harbour, increasing nutrients were degrading water quality, whereas in the Kaipara Harbour, water clarity was improving at some sites.
To better understand local conditions and identify drivers of local change, we recommend targeted investigation for some of these areas.

Total nitrogen has decreased over time at many sites, including in the Tamaki Estuary at Panmure Bridge
Each grey dot shows the results from one monthly sample and the orange line shows the general direction



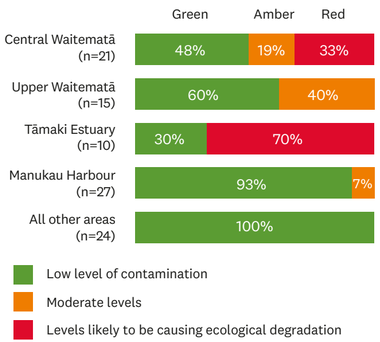
Stable marine sediment contamination levels are encouraging

Contaminants can accumulate in the sediment of our harbours, estuaries and beaches. When elevated or if they build up over time, metals (such as copper and zinc), nutrients (like nitrogen and phosphorus) and organic compounds (like pesticides and hydrocarbons) can all cause acute and long-lasting harm to coastal ecosystems.

Most sites show relatively low metal contamination levels, and the remaining sites (about a quarter) are moderately contaminated or highly contaminated. Contamination patterns are consistent with previous reporting. The highest levels are found along the southern coastline and sub-estuaries of the Central Waitematā, the Tāmaki Estuary and to a lesser extent, the Upper Waitematā and Māngere Inlet. Outside of the urban areas of Auckland and in the more exposed bodies of harbours, concentrations are low. At any given site, there were relatively few changes in contaminant concentrations during the reporting period. Where changes were observed, these were typically gradual rather than abrupt.

The relative stability of metal concentrations in Auckland is encouraging. While this may suggest that to date, growing pressures are being offset by improvements in areas like vehicle emissions and stormwater management, maintaining broad spatial monitoring remains important. It allows for the detection of potential shifts in contaminant distribution and supports the ongoing evaluation of efforts to reduce contaminant inputs.

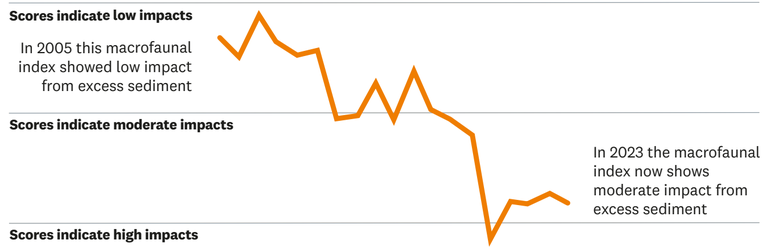
Per cent of all sediment quality guideline grades at sites within each area



Ecological health is generally declining in estuaries

Harbour and estuary ecology monitoring focused on benthic ecosystems (those associated with the seafloor rather than the water column) in the intertidal zone (the area that is periodically covered and uncovered by the tides) because of their high ecological value and because their physical and biological components are responsive to land-derived pressures. From 172 monitoring sites across 15 estuaries, we collected data on sediment characteristics, indicator species, invertebrate communities and benthic health. Sediment-dwelling invertebrates can reflect local conditions thanks to their generally limited mobility and often well-known preferences and sensitivities. Data was used to assign a Combined Health Score to each site. Only 2 per cent of the monitored sites were in "Excellent" overall health and 22 per cent were "Good". Sites most commonly had "Fair" (34 per cent) or "Marginal" (30 per cent) health and 12 per cent of sites were "Poor". At an estuary level, every monitored estuary exhibited at least moderate impacts from excess land-derived sediment (fine silts and clays) and long-term degrading conditions at one monitoring site or more. In terms of trends, it was most common for ecological condition to have degraded and for overall health to be poor (as was the case for Mahurangi Harbour, Pūhoi River and Mangemangeroa Creek, for example). However, there were also some heartening examples of locations where poor ecological conditions were improving, such as the tidal creeks of the Manukau Harbour and Tāmaki Estuary. Management interventions need to focus on reducing the pressures on these estuaries, such as minimising the input of pollutants from land-based activities.

At many sites the health of macrofaunal communities has declined over the long-term and now shows at least moderate impacts of sediment
This plot shows the benthic health (mud) score declining since 2005 at a site near Herald Island



Case study: Sediment

Sediment from the land is the most prevalent stressor affecting all harbours and estuaries in our region. At half of our harbour and estuary monitoring sites, the mud content of the sediment is more than 30 per cent, which can lead to less diverse and abundant ecological communities.

In many locations, current sediment levels are due to historic sediment inputs. For example, European settlement around the Waitematā Harbour and Tāmaki Estuary resulted in conversions of indigenous forest to pastureland and then to urban land use. These changes resulted in sediment increasing in estuaries by up to 20mm per year.

Our coastal monitoring shows that there are some locations where sediment continues to increase. Locations like the Upper Waitematā Harbour and many of the small east coast estuaries have increasing amounts of mud on the inter-tidal flats. Increased mud makes it harder for invertebrate communities living in those intertidal mud flats to thrive.

Our river water quality programme also shows some locations with high sediment concentrations most of the time. Okura River has the highest sediment concentration and the lowest water clarity in the region. Avondale Stream and Ōtara Creek, which both drain urban catchments, also have high sediment compared to other urban and rural streams. These three streams also have poor scores for freshwater ecology, with Ōtara Creek (east) measured as worst in the region. Even healthy streams, like those in native forest catchments, show occasional high concentrations of sediment. These mostly coincide with rainfall events and may be 10-fold higher than the concentration measured during low flows.

Although sediment is a widespread issue, there are actions we can take to reduce the amount getting into our harbours and estuaries. Stricter controls on earthworks have reduced some major sources. For example, neither regular monthly monitoring nor storm event sampling showed a noticeable increase in sediment in Vaughan Stream during the land development in Long Bay. Development in this area used improved erosion and sediment control methods, along with principles of Water Sensitive Urban Design, successfully preventing soils exposed by earthworks from being transported via streams to the coast.

Auckland Council started the Strategic Approach to Sediment programme in 2018 to address sediment sources that are small individually but can add up across the region. One project within this, Closing the Gap, visited 11,000 small building sites over two years, served over 1000 infringement notices and improved on-site compliance from 10 per cent in 2019 to 80 per cent in 2024. New technologies like cameras and turbidity sensors, combined with AI to generate real-time alerts, will help to identify whether the erosion and sediment controls are working and how we can amend them to be fit for purpose.

In rural areas, stock exclusion fencing and planting helps to reduce erosion and filter sediment out before it reaches streams. These methods are being used in key programmes supported by Auckland Council in the Kaipara and Mahurangi Harbour catchments. These catchment-wide efforts will take time to result in improvements, but our initial monitoring in a small stream in Te Muri Regional Park has shown that sediment can decrease by approximately 20 per cent by revegetating the catchment. This gives us confidence that these efforts are moving in the right direction to reduce sediment in the region.

While improvements have been observed and we continue to progress sediment reduction measures, the storms of 2023 demonstrate the potential for weather events to add very large amounts of sediment very suddenly. This highlights the need to continue to prevent gradual soil loss from land and reduce the sediment entering our waterways.

Case study: Plastic pollution

It's not only water, sediment and contaminants, that our rivers carry from the land to the sea. They also increasingly carry plastic. Plastic pollution is widespread in our environment and ranges from large, visible litter to microplastics, tiny particles that often go unnoticed but pose serious risks. These persistent fragments are found everywhere; from the air we breathe to the depths of the ocean. Microplastics come from various sources, including synthetic textiles, packaging, personal care products, and the breakdown of larger plastics.

The **Aotearoa Impacts and Mitigation of Microplastic** project examined the environmental threats posed by microplastics. Key findings revealed their presence even in remote marine areas, the persistence of so-called biodegradable plastics, a wide range of associated chemical contaminants, and the transfer of these harmful substances into marine food webs.

Addressing plastic pollution is complex and requires a coordinated, multi-agency response. **The Waste Minimisation and Management Plan 2024** sets out Auckland Council's strategy to achieve Zero Waste by 2040 and includes specific actions relating to plastic waste and use reduction. The strategy is informed by research and guided by engagement with the community, industry and mana whenua. It outlines strategic goals, statutory context, key challenges and opportunities, and an action plan with funding and monitoring frameworks.

To bring this plan to life, Auckland Council is implementing a range of targeted initiatives. This includes the Urban Contaminant Reduction Programme, which targets retrofit opportunities for stormwater treatment. A wide range of treatment options are available, including Gross Pollutant Traps, which are designed to capture and retain pollutants from road runoff. These devices are especially effective at capturing rubbish like packaging, bottles, and fragments, before they wash into waterways.

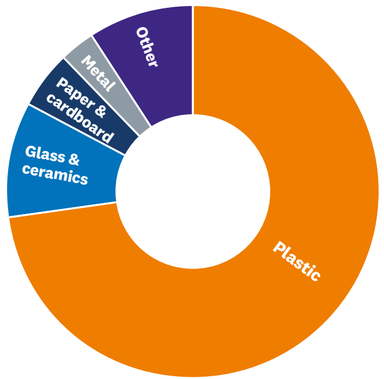
Other recent efforts have focused on the use of Expanded Polystyrene (EPS) in construction. If not properly managed, this lightweight material can easily be carried by wind or rain into the environment, where it poses threats to wildlife and gradually releases toxic chemical additives as it breaks down. Auckland Council is working with WasteMINZ and building industry partners, looking into sustainable alternatives to EPS, strengthening regulations, and improving recycling options to reduce its potential environmental impact.

Citizen science plays an important role in tackling plastic pollution. Run by **Sustainable Coastlines**, the Litter Intelligence programme is a nationwide initiative that conducts ongoing, standardised surveys to monitor litter. Since 2019, volunteers and community groups have completed over 500 surveys at 134 sites across Tāmaki Makaurau, removing nearly two tonnes of waste. These surveys showed that plastic makes up over 70 per cent of litter found in streams, within stormwater systems, and on beaches. Understanding the types of litter in our environment helps identify pollution sources and inform targeted reduction efforts.

With this in mind, we hope you decide to pick up the next bit of rubbish you see, whether it's a bag drifting by on the street or small bits of plastic on your local beach. Wherever it came from, let's make sure that the next place it goes is the bin.

Percentage of items collected during Litter Intelligence surveys in Tāmaki Makaurau.

Data sourced on 8/7/2025 from **insights.litterintelligence.org**



E aha ana mātou?
What are we doing?

Understanding the nature and extent to which our environment is under pressure is important in identifying issues, understanding what is working, and informing what we need to prioritise or where we need to do more. It is also important to recognise that Council's responses to environmental issues are not limited to the various challenges and risks identified in this report. We also need to think about the future – 10, 20, 50 and more years ahead. What will the pressures be then and what can be done now to lessen or avoid some of the potential future impacts; how can we help ensure a healthy, resilient environment and resilient Tāmaki Makaurau for our future generations?

Long Bay towards Rangitoto
Jonathan De Villiers

Looking forward

While the future is never easy to predict and uncertainty will always exist, there are some trends that can be expected to continue. Tāmaki Makaurau will continue to grow, and our climate is also changing.

The population of Tāmaki Makaurau is forecast to continue to increase to a total of 2,230,800 – over 520,000 additional people – by 2053 (projections as at March 2023).

Based on population projections, the number of households is forecast to grow by 34 per cent or just under 200,000. Tāmaki Makaurau will need at least the equivalent number of additional dwellings, bringing the total number of dwellings in 2053 to around 773,000.

Successful implementation of the Future Development Strategy will see most – but not all – growth accommodated within existing urban areas through more intensive development. Although intensification is the focus, new greenfield residential development is planned in various locations around the existing urban area in the north, west and south.

The region is projected to become progressively warmer and annual total rainfall and seasonal rainfall patterns are likely to change. Tāmaki Makaurau is projected to be more drought prone, with an increase in the number of dry days. At the same time, rainfall intensity is projected to increase, with more intense storms – because a hotter atmosphere can hold more moisture. Our climate is changing and that will have challenges and opportunities for not only people but for our natural environment.

Increased temperature, decreased relative humidity and reductions in seasonal rainfall at certain times of the year, and changes in wind speed and direction will influence air quality and potentially heighten associated health impacts.

Changes in the pattern of drought conditions have the potential to alter terrestrial ecosystems, particularly those with restricted spatial distributions that make them more vulnerable to regional extinction. For example, tree species like taraire and rimu, are more susceptible to drought stress. Droughts could impact forest composition in regions where drought-sensitive trees dominate.

Increasing frequency and severity of extreme weather events, events that may lead to landslides, flooding or erosion, can severely impact the health of terrestrial and aquatic ecosystems. In the worst-case scenarios, ecosystems can be completely inundated or destroyed. A changing climate may enable more pests and diseases to establish and thrive in both terrestrial and aquatic ecosystems.

Aquatic ecosystems are highly susceptible to the effects of climate change. Increases in air and water temperature, ocean acidification, sea level rise and changes in circulation and storm intensity can all affect marine and freshwater ecosystems. Some of the most vulnerable species are those that have limited capacity to migrate and those that will experience a 'coastal squeeze', for example intertidal rocky reef ecosystems that can't move inland with increasing sea level.

These climate stressors are on top of existing environmental change and human-induced stressors. Working to address these stressors, restoring ecosystems and improving the health of our environment is critical to ensure resilient and healthy ecosystems for the future.

Healthy ecosystems are important for our treasured biodiversity, they are core to our identity and wellbeing, and they provide many benefits that Tāmaki Makaurau relies on every day, including land and coast stabilisation and storm protection, oxygen production, climate regulation, food and clean water.

Changing ecosystems will impact our ability to adapt. Healthy ecosystems are vital for a resilient Tāmaki Makaurau in a changing climate.

Tawhitokino Regional Park
Tarn Drylie

Planning and investing for success

Auckland Council responds to the immediate and future risks and challenges our region will face in many different ways. Some specific examples of responses to environmental issues are highlighted in the case studies throughout this report. Here, we set out an overview of Auckland Council's environmental management activities and investments.

The Auckland Plan 2050 sets out the long term 'outcomes' (the future we seek). These shape and direct all the responses outlined below. Our **progress towards the Auckland Plan outcomes** is reported every three years.

Shaping how and where Tāmaki Makaurau urban area grows

The Council's 30-year **Future Development Strategy** seeks quality, compact urban growth based around identified nodes that reduce car dependency and greenhouse gas emissions, coordinate with infrastructure, build resilience to climate change, and protect and restore the natural environment as Tāmaki Makaurau expands to accommodate a growing population. Understanding how the environment is changing through State of the Environment Monitoring helps inform our future development decisions.

Ensuring the use of natural resources leaves a lighter footprint

The Auckland Unitary Plan (AUP) is a detailed set of policies and rules controlling the use of land and the coastal marine area as well as the taking of water and the discharging of contaminants to the environment. In short, the AUP controls what Aucklanders can and cannot do in urban, rural and marine environments, and aims to manage the adverse effects of resource use to acceptable levels. Monitoring of the effectiveness and efficiency of the AUP provides insights on how the AUP is meeting outcomes set for the region; this draws on State of the Environment monitoring.

Taking a strategic approach to environmental issues

Environmental plans and strategies direct council activity to address specific environmental issues. For example, our monitoring highlights many water quality and quantity issues across the region. The importance of clean, healthy water to life in Tāmaki Makaurau and our future is recognised in the **Auckland Water Strategy**. Our water strategy will help us ensure that all decision making and investments will contribute to improving the health of our waters.

Investing where it's needed

The financial planning to ensure we can deliver is provided by Council's **Long-term Plan** which sets out council's investment over a 10-year planning horizon to promote the six outcomes of the Auckland Plan. Auckland Council has seven investment areas set out in the Long Term 2024-2034 and Annual Plan aimed at strengthening the financial and physical resilience of Tāmaki Makaurau. For example, **Making Space for Water** is a $760 million, 10-year programme to prepare for floods and reduce flood risks in our stormwater systems.

Managing for a changing climate

Tāmaki Makaurau has a plan for its long-term approach to climate action called **Te Tāruke ā Tāwhiri: Auckland's Climate Plan**. It is a regional Tāmaki centred plan and sets out eight priority action areas to deliver our goals to reduce emissions and adapt to the impacts of climate change.

The impacts of climate change and extreme events are being felt in Tāmaki Makaurau. Climate impacts for our region are expected to worsen in the coming decades. Auckland Council is investing in activities that both reduce emissions and increase resilience of our assets and services. In the **Long-term Plan 2024-2034 (10-year budget)**, Council set out a multi-faceted response to the impacts of the storm events in early 2023. This includes repairing our assets, supporting affected residents and improving resilience to future events.

Auckland Council is working to reduce exposure and vulnerability to natural hazards and risks and build a more resilient Tāmaki Makaurau through strengthening the unitary plan, **making space for water** and accelerating community adaptation action, as well as undertaking natural hazards research to improve our knowledge and ability to plan for natural hazard impacts. Natural Hazard-scape of Tāmaki Makaurau Auckland documents current, accurate information on the region's most significant natural hazard risks including flooding, landslide and coastal inundation.

Coastal inundation and sea level rise are already affecting Aucklanders. Our Coastal Monitoring Programme has documented significant storm driven damage to our coastlines. Accurate mapping of Auckland's exposure to a range of coastal storm and sea-level rise scenarios is available on **Geomaps**. **Shoreline Adaptation Plans** look at how we respond to the impacts of coastal hazards and climate change over the next 100 years.

Te Tāruke-a-Tawhiri has a cultural narrative that is deeply embedded in this place – Tāmaki Makaurau / Auckland. It calls for a change in our response to climate change, a shift from a human-centred approach to an ecological approach, acknowledging the interconnected relationship between Ngā Aho Taiao, Ngā Aho Whenua and Ngā Aho Tangata.

Healthy ecosystems are critical to a resilient Tāmaki Makaurau in a changing climate. Managing other pressures identified in this report like pests and sediment will help the resilience of the natural environment to climate change impacts.

Getting positive things done

Using funding from the **Natural Environment Targeted Rate** and the **Water Quality Targeted Rate**, Council is able to deliver a range of programmes to address risks to and impacts on the natural environment and water quality.

Some examples include wetland restoration, plant and animal pest control, reduction of risks from plant pathogens (like what is causing kauri dieback) and supporting enhanced monitoring and community action. Similarly, a range of initiatives aim to achieve cleaner harbours, beaches and streams. These include investment in new stormwater infrastructure, stream rehabilitation and increased inspections of septic tanks and stormwater infrastructure to isolate problems and improve compliance.

Through implementation of Shoreline Adaptation Plans, council is prioritising, renewing and adapting its 1,700 coastal assets (ranging from boat ramps to seawalls) to the impacts of coastal hazards and climate change over time.

Supporting Māori to exercise tino rangatiratanga and kaitiakitanga through Te Tiriti based relationships.

Auckland Council works with Māori to support their role as kaitiaki (guardians) of Te Taiao, the natural world that surrounds us. An example is Tū Mai Taonga Project on Aotea / Great Barrier under the leadership, guiding vision and tikanga of Ngāti Rehua Ngātiwai ki Aotea. This is a significant multi-entity project seeking to restore native species and ecosystems and grow local whānau connection, employment and skills.

Working with our communities

A focus of our natural environment work is enabling Aucklanders to act as stewards of the natural environment and make sustainable choices through access to information, education and opportunities for community-led initiatives.

Across the council, we have many touch points connecting and supporting community groups and individuals along with organisations and businesses. They contribute in many ways, ranging from planting to clean-ups to citizen science monitoring through to advocacy, education and fundraising. Visit the **Auckland Council website** to see how you can get involved.

Te Haumanu Taiao: Restoring the natural environment in Tāmaki Makaurau supports Aucklanders to achieve their ecological restoration goals and to further enable the indigenous biodiversity of our region to heal and flourish.

The resource was created in partnership with Ngā Iwi Mana Whenua o Tāmaki Makaurau and includes their perspectives on restoration including kaitiakitanga, prioritising the practices of local tribal authorities to uphold 'Te Mana o te Taiao' and guidance on engaging with mana whenua.

Managing land and ecosystems

Our regional parks span over 40,000 hectares of open space and more than 220km of coastline. They encompass a wide range of ecosystems and landscapes, providing habitat and refuge to hundreds of native plant and animal species, including many rare and threated species. Regional Parks contain much of the region's remaining large tracts of native forest ecosystems. There are also numerous local parks that can play an important role in supporting biodiversity, especially through local community support with pest trapping and planting.

Auckland Council manages approximately 180 closed landfills across the region that no longer accept waste, but which have potential hazards arising from the wastes and their breakdown products if not managed. Sites are managed under an asset management plan through programmes to monitor, investigate, undertake risk assessment, operate leachate and gas control systems, asset maintenance and consent compliance to ensure they do not present unacceptable risks to the community, the environment and other infrastructure.

Monitoring what's happening

As Tāmaki Makaurau grows and the climate changes, robust long-term monitoring will continue to provide evidence to inform how well we are looking after the environment and where we need to prioritise or do more. It will support climate adaptation planning by providing the evidence of environmental signals and triggers for actions and evaluating the success of those actions.

Our ability and confidence in our reporting has grown tremendously in the past 25 years. The 1999 report drew on a monitoring record which in most cases was barely 10 years old. Accordingly, that report provided more of a snapshot in time, reporting narratively on the nature of issues.

While our ability to monitor and report robust quantitative data has vastly improved since 1999, we are constantly evaluating our monitoring, adding new sites and new technologies to ensure we can best answer questions to support future decisions.

Our goal is for the data and information we gather to be visible, available and useful. All data underpinning this report can be requested through our **Environment Auckland Data Portal**. Here you will also find our Water Quality and River Ecology Data Explorer, an interactive tool to explore water quality and river ecology data in Tāmaki Makaurau. This tool provides data analysis and summary statistics, allowing users to explore results across the region. You can also dive into the Coastal Portal from here and visualise the data we are collecting, including real time wave buoy data, live beach camera imagery and beach survey data.

All reports are available on the **Knowledge Auckland** website.

Sampling freshwater fish using an electric fishing machine at Rata Vine Stream Reserve, Wiri
Graham Surrey

New monitoring technologies

Improvements in and adoption of new technologies are boosting our ability to monitor and track changes in the environment. One of these new technologies is environmental DNA (eDNA). Just like forensic specialists might use hair or a fingerprint to identify individuals present at a crime scene, eDNA helps us identify the presence of elusive species at a site during monitoring. We have used this technique to investigate freshwater fish communities and the presence of submerged plants. We were able to identify 18 freshwater fish species across the 13 lakes, including nine native species, two introduced and naturalised species and seven pest fish species. In streams, we have detected 27 different species, including some regionally threatened species. In most, but not all cases, the eDNA identifications matched observations. We will continue to evaluate the use of eDNA for biodiversity monitoring. We are also using this method for biosecurity surveillance – eDNA detections could provide an early warning for the presence of an invasive species, well before the species is observed through our routine monitoring or reported by the public.

Besides eDNA, Auckland Council now has the tools and growing expertise to use GeoAI–technology that combines artificial intelligence with geographic data. A successful example of GeoAI is using aerial imagery to map and measure tree canopies across the city. When trained correctly, this technology can automatically identify where trees are, how large they are, and potentially what species they are. It supports urban forest monitoring, green space planning, and ecosystem protection.

Aerial image collection has been greatly improved by advances in drone technology. Drones enable frequent, low-cost surveys, supporting detailed seasonal and event-based comparisons. For example, traditional beach monitoring relies on fixed-profile surveys, which are accurate but offer only limited spatial coverage. Drones now allow us to collect aerial imagery using high-resolution cameras, capturing entire shorelines in a single flight. These images can be used in tandem with modelling tools to measure sand levels across the beach. These techniques can be used to monitor shoreline change and sediment movement across large areas with high precision.

Drones also allow us to access hard-to-reach places or to take a bird's eye view – literally – of ecosystems or communities that are harder to capture from an on-the-ground view. In the future, we could use drone imagery and GeoAI to count birds in colonies or segment and classify coastal ecosystems–saving time and improving accuracy. This would help track bird populations and support conservation efforts.

With the right equipment now in place and our knowledge growing, Auckland is ready to use GeoAI to care for the environment in smarter, faster ways.

Te aroturuki tahi me te hoa patui
Monitoring in partnership

The scale and pace at which Tāmaki Makaurau is growing and changing means there is a strength in bringing together iwi mana whenua and council knowledge and monitoring coverage of the region to provide a stronger narrative on the health of te taiao, our natural environment. We are committed to continuing to work with iwi mana whenua to build relationships, share knowledge and to find ways of working together to increase our knowledge and understanding and to ensure that future iterations of the State of the Environment report can better reflect that shared kaupapa.

Mana whenua partnership in stormwater management – a proactive inspections approach

As mana whenua kaitiaki and their kaimahi are consistently walking the footprint of their whenua every day, they continue to see issues such as pollution, contamination, poor stormwater asset management, and outdated infrastructure within their rohe. Auckland Council Healthy Waters and Flood Resilience's stormwater inspections programme, developed with mana whenua, reflects a partnership approach by aligning Auckland Council stormwater outcomes with iwi priorities, in respect to Te Mana me Te Mauri o te Wai. The inspections programme was first driven by Lucie Rutherfurd (Kaimahi Ngāti Tamaoho) and co-developed with other mana whenua kaimahi.

Mana whenua select and employ full time "wai officers" who split their time between working for their iwi and contracting to Auckland Council in a role where they undertake stormwater inspections. While they are with their iwi, they gain experience and learn as kaimahi/kaitiaki, and when they are contracted to the council, they train and operate as stormwater specialists.

The area of focus for Ngāti Tamaoho (as the first mana whenua on the pilot) was a stream in south Auckland called Otuwairoa or Slippery Creek catchment, a site of significance and a portage to mana whenua. During the pilot, residential sites and several commercial and industrial properties were inspected within the catchment. Pollution incidents identified were transferred to council compliance teams for further enforcement action, and issues with the public stormwater network, like a damaged outfall, were reported to council stormwater operations contractors.

A spatial water quality monitoring programme using cultural indicators was also developed by Ngāti Tamaoho within the Drury and Otuwairoa Slippery Creek catchments. The Wai Officer, having completed sampling and water quality training, was able to undertake cultural indicator monitoring combined with water quality sampling for biological and chemical parameters at six upstream sampling locations. These parameters could be correlated and considered with cultural indicators to monitor both the health and the wellbeing of the stream and the taonga species within.

An unplanned benefit that emerged since starting the programme (now with four Auckland mana whenua participating) is that it has become a form of rangatahi development. With one of the objectives being to increase the capability and capacity of Iwi Mana Whneua, the roles have been taken up by younger employees from their iwi, as a means of employment and upskilling.

Edith Tuhimata, Kaitiaki Taiao Matua – Ngāti Tamaoho, says "*The work that has been done in this project has been pivotal for Ngati Tamaoho. It has encompassed our aspirations. We are a water tribe, and this project enables us to kaitiaki the waterways in our cultural footprint. This has been important for baseline readings in green spaces that are being intensively developed, it gives us the ability to monitor the waterways that run through vegetable growing areas and gives us the ability to monitor over a long period of time while the land use is changing. It will also help us in areas of the south that are prone to flooding, the maintenance of the assets will ensure that our people are not as affected by floodwater as they have been in the past. With our indicator it gives us solutions and enables restoration, a cloak of protection should the waterway fall below a level that is unacceptable.*"

State of the Environment Monitoring to support mana whenua

More recently, relevant state of the environment monitoring and environmental DNA data from waterways within their rohe have been shared with Ngāti Tamaoho, to complement the information already gathered through their cultural indicator and help with understanding the bigger picture. Data will also contribute to their Taiao Database. In other cases, council provides technical advice and equipment to support iwi led monitoring as well as opportunities for kaumātua, kaitiaki and rangatahi to join us in the field. These field trips are just as beneficial for council kaimahi, as knowledge shared with them gives a deeper connection and understanding to the monitoring they undertake. There are many more opportunities for working together to explore.

Rocky reefs, Long Bay
Jonathan De Villiers

He whakatepenga
Conclusions

This 2025 synthesis has similar findings to the 2020 report and to those before that. The health of many environmental domains in Tāmaki Makaurau remain poor, reflecting decades of change, use and damage, and some are still declining. It is also true that there are few regionally consistent changes across the environmental indicators. Instead, there is spatial variability and 'some ups, some downs' across the monitoring network and over time. This is commonplace in detailed environmental reporting and illustrates the complexity of cause and effects relationships.

The 2020 report identified three main regional challenges.

- How urban areas are changing and growing
- How we manage our land and water
- Our changing climate

These challenges remain the same today, and revisiting the first State of the Environment report from 1999 shows that these were similar concerns back then.

In 1999, Phil Warren (Auckland Regional Council Chair) said, "This report shows that the Auckland region has many good qualities; a diverse community, a strong economy, and a generally good quality environment. The report also shows that the Auckland Region faces some challenges, such as accommodating urban growth, traffic congestion, and maintaining the environmental qualities enjoyed by the population".

In that sense, we might conclude that not much has changed. But that would not be entirely true. Detecting meaningful, long-term trends can be challenging given the effect of weather variability and a changing climate – but it is clear that we can manage earthworks and stormwater and protect biodiversity much better than we did 25 years ago. Nevertheless, continued pressure and impact are inevitable as our population grows and our footprint on the land expands.

We have also had some notable gains over 25 years. Removal of lead from fuel has resulted in steady and large declines in lead in marine sediments. Sediment quality is also improving in the Mangere Inlet where industry historically discharged untreated wastes. Indigenous forest and shrubland cover has increased, partly due to natural revegetation but also the efforts of many in replanting and restoring areas. Native bird numbers are also increasing in some locations. Our island sanctuaries and mainland managed sites are bird strongholds. Some gains, like some improvements in water quality, are more incremental and localised.

The main change in the five-year period since the 2020 report is that the impact of a changing climate on our natural environment is more prominent in monitoring. The extreme weather of droughts and floods in the past five years are starting to influence even long-term trends. We know that Tāmaki Makaurau / Auckland is going to continue to grow. And we know that the climate is changing. We also know that we can make a difference with good planning and investment and through working with iwi and community. It requires a collective effort.

A striking difference from the 1999 report is the increase in the breadth and depth of data, which allows us to document changes over time and provide stronger evidence to help inform how Tāmaki Makaurau changes.

Ensuring a healthy environment is fundamental to a resilient Tāmaki Makaurau and our wellbeing in the face of a changing climate. Monitoring and reporting on our environment and our partnership with Iwi Mana Whenua who bring their Mātauranga Māori, are critical to navigating these challenges and opportunities.

Ka ora te wai, ka ora te whenua,
ka ora ngā tāngata.

If the water is healthy, the land is healthy, the people are healthy.

Hīkoia Te Wai, Hīkoa Te Mārama.

Uncovering hidden Wai: iwi and council unite to understand ancestral waters

Ngāti Whātua Ōrākei are currently delivering Te Whakaorangatanga o te Wai (TWotW), an ambitious programme of kaupapa that collectively will work towards their vision for Wai within Te Kahu Tōpuri o Tuperiri. That the Wai flows clean, clear and true, that the moana teems with life and vitality, and that their people are actively integrated with an enduring and regenerative relationship with Papatuanuku, Tāne Mahuta, and Tangaroa.

Ngāti Whātua Ōrākei and environmental specialists from Te Kaunihera recently went on a hikoi to visit three urban awa Te Waihorotiu, Te Ako o Te Tūī, and Waipapa. At each awa Ngāti Whātua Ōrākei shared tribal hītori, speaking of connection and the landscape context of these sites. Whānau undertook a mauri assessment, looking at what was living in and around the awa. Te Kaunihera took eDNA and E.coli samples from each site to support the data shared by whānau.

Jess Hiscox, Regenerative Practices Lead for Ngāti Whātua Ōrākei says this mahi is a key part of Te Whakaorangatanga o te Wai, Wai building connection between these Wai and their people.

"*We really appreciate the partnership with Te Kaunihera in the planning and delivery of this Kaupapa. There was a lot of scoping and behind-the-scenes mahi but ultimately these hīkoi provide opportunities for our people to engage with their tribal Wai. Many of these are hidden or unknown to Whānau. These initiatives are part of the healing our relationship with these vital systems.*"

For Ngāti Whātua Ōrākei, this mahi is far more than data collection, it is a cultural reconnection and spiritual restoration. It is about reminding these Wai that their people remember them and are actively working to regenerate the mana and the mauri they still hold.

"*Visiting these sites, connecting with them and collecting data like we have, builds mātauranga that benefits both groups and is a fantastic example of the power of the partnership between Ngāti Whātua Ōrākei and Te Kaunihera o Tāmaki Makaurau.*"

The programme is grounded in the vision of creating an empowered collective of tribal kaitiaki, guardians who are re-placed into the taiao (natural world) and actively participate in the regeneration of Wai. In the broader frame it is about fostering resilience, increasing biodiversity, restoring habitat, regenerating both kai and cultural materials systems. It ensures the tribe will once again reinstate its people to their native and natural role as kaitiaki, exercising their ahi-kā in, with, of and for their taiao. These outcomes will benefit all of the community.

Te Kaunihera Environmental Evaluation and Monitoring Unit (EEMU) and the Healthy Waters and Flood Resilience Department team are supporting iwi through data collection training, technical guidance, and collaborative fieldwork, building capacity and shared knowledge. Together, they are working not just to identify what lies beneath, but to restore the mauri and mana of the Wai. This is a valuable opportunity for Te Kaunihera scientists and iwi kaitiaki to work and learn together.

This flaxroots initiative is, one that honours the past while shaping a healthier, more connected future. Both parties look forward to building on this initiative in the future.

Ngāti Whātua Ōrākei and environmental specialists from Te Kaunihera
Photo provided by Ngāti Whātua Ōrākei

Supporting reports

This report draws together and summarises a suite of underpinning technical reports which present the findings from state and trend analyses for each of the monitoring programmes.

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- Dell'Ariccia, G., Fessardi, M. & Landers, T.J. (2025). Establishing a seabird monitoring and research programme for Tāmaki Makaurau. Programme overview and initial findings as of 2024. 2025/16.
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- Guinto, D. (2025). Soil quality and trace elements in the Auckland region, 2018-2022. State of the environment reporting. 2025/23.
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- Olivares Pino, G. (2025). Ambient Air Quality in Auckland – trend analysis 2015 to 2024. 2025/26.
- Spyksma, A. & Shears, N. (2025). Tāmaki Makaurau / Auckland intertidal reef monitoring report: 2011 to 2024. State of the environment reporting. 2025/25.
- Surrey, G. & Storey, R. (2025). River ecology current state and trends in Tāmaki Makaurau/ Auckland 2024. 2025/28.
- Shears, N. (2025). Tāmaki Makaurau / Auckland east coast subtidal reef monitoring report: 2007 to 2024. State of the environment reporting. 2025/24.
- Tsyplenkov, A. and Neverman, A. (2025) Analysis of sediment yields for the Auckland region (2009 - 2024).
- Tuck, M. (2025). Beach change in the Auckland region: current state and trends. 2025/13.
- Xie, S. (2025). Auckland's greenhouse gas inventory to 2023. 2025/14.

All related reports (past and present) can be obtained from the **Knowledge Auckland** website.

All data underpinning this report can be requested through our **Environment Auckland Data Portal**. Here you can also view live rainfall, river flow and air quality data and use a number of data explorer tools.

Further enquiries in relation to this or any other reports can be directed to **environmentaldata@aucklandcouncil.govt.nz**

Looking towards Motutapu from Motukorea/Browns Island
Hamish Allen

September 2025

Te oranga o te taiao o Tāmaki Makaurau – The health of Tāmaki Makaurau
Auckland's natural environment in 2025: a synthesis of Auckland Council state of the environment reporting

Engineering, Assets and Technical Advisory Department
Environmental Evaluation and Monitoring Unit

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