



Te oranga o te taiao:
He whakarāpopoto
**A summary of the
Waikato State of
the Environment
report 2022**

In the Waikato region, our natural environment is rich and diverse. We've got New Zealand's longest river, about a quarter of its best soils, most of its geothermal resources, the largest karst area, as well as internationally significant wetlands.

The Waikato region has experienced some big changes in a fairly short time. Our population grew 20 per cent from 2006 to 2018. Pastoral intensification took place on an estimated 504,335 hectares of land between 2001 and 2018, which exceeded the area of de stocking (280,921 hectares). Understanding the effects of these changes on our air, land and water is critical for safeguarding what we use and rely on, now and in the future.

The *Waikato State of the Environment report 2022* is based on 23 technical reports, that interpret decades of environmental monitoring data collected by the Waikato Regional Council. It also recognises people as an important source of information, including mana whenua as holders of mātauranga Māori for this region.

The changes reported here are limited to the changes we monitor, and freshwater quality and quantity has been a focus of state of the environment monitoring. This report presents key issues arising from the technical reports, which may be of concern to people of the Waikato.

The solution to problems in the water are often found in how we use the land. To that end, the report provides recommendations on how environmental outcomes can be improved, and is helpful for developing policies and supporting actions, including filling monitoring gaps.

The full State of Environment report can be found here: waikatoregion.govt.nz/stateoftheenvironment

Ngā tino take

Key issues

Air quality is mostly good, but is sometimes poor in winter.

Our region enjoys good air quality most of the time, but on cold, still days, pollutants can become trapped close to the ground.

The air quality in Tokoroa is improving, but it's the only airshed that hadn't met national air quality standards by 2020, mostly because of pollution from wood burners for home heating. One of the measures we use for air quality is particulate matter less than 10 microns, or PM₁₀.

Wood burners
are the main
contributor to
wintertime
PM₁₀
exceedances



Wetlands and forest in trouble.

Wetlands and forest continue to be subject to development pressure, including the clearance of indigenous shrub and scrubland. The efforts of many people to retire land, and plant native trees, has therefore counteracted, rather than increased forest and wetland extent.

Lake Taupō is doing better than expected.

Lake Taupō is achieving water quality targets ahead of schedule.

Rules were introduced in the early 2000s to tackle nitrogen entering the lake via groundwater. The decision to implement rules supported community action to protect Lake Taupō, before its water quality deteriorated, and the water clarity remains high, often exceeding 15 metres. In streams with 'older' water, the rise in nitrogen is levelling off, and in streams with 'younger' water, nitrogen levels are declining. Stream water's age is the length of time it takes for rainwater to travel through soils and groundwater to the stream

Phosphorus discharges have decreased.

Phosphorus discharges to rivers have decreased, including discharge to Waikato River from Pukete Waste Water Treatment Plant in Hamilton city.

Chlorophyll levels (used to measure algae) have improved in the Waikato River, reducing risks to ecosystems, drinking water supply and recreation.

Land use in the Waikato

53% **pastoral farming**

27% **indigenous vegetation**

12% **plantation forestry**

2% **horticulture and cropping**

1% **urban areas**

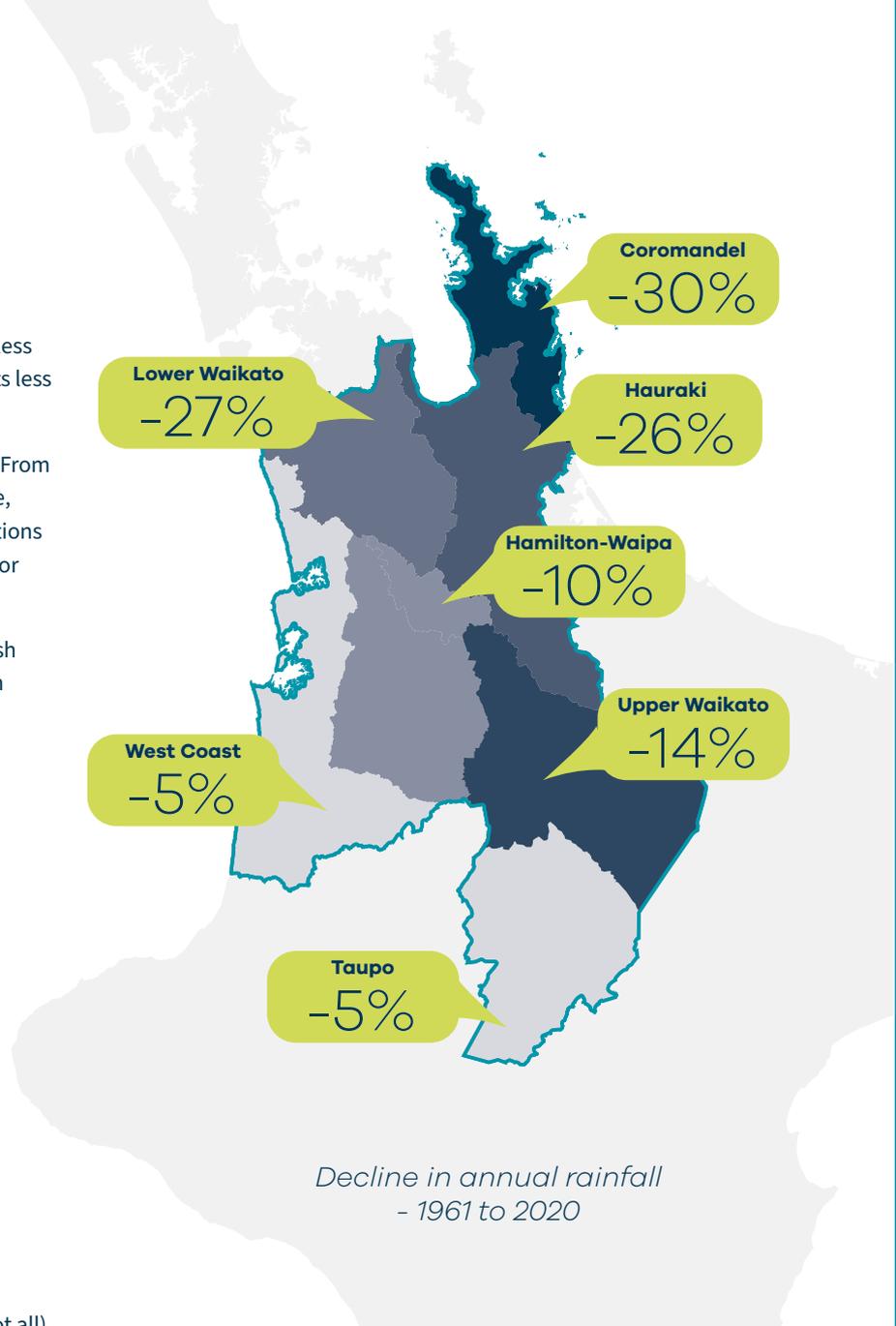
5% **other uses**

Less rain, and water use is increasing.

Rainfall has decreased across the region – we get less rain in summer, and the east of the region also gets less rain in spring.

River flows have decreased over the last 25 years. From 1995 to 2005, there was a big increase in water use, including municipal takes for the growing populations of Hamilton and Auckland and agricultural takes for irrigation.

The drought of 2020 caused lakes to dry up and fish to die. Drier soils impact pasture growth and farm productivity, and irrigation has further increased.



Nitrogen levels have increased.

Nitrogen has continued to worsen in many (but not all) waterbodies.

For example, increases in nitrogen were detected in groundwater and streams in horticultural areas such as Pukekawa and Pukekohe. Between 1990 and 2020, nitrogen trends also worsened in monitored tributaries of the Waikato River between Taupō and Karāpiro.

Pasture cannot capture all the nitrogen from livestock urine and fertiliser applications, and the excess nitrogen travels to streams via groundwater.

Our estuaries are under pressure.

The key pressures on our estuaries are eroded sediment and increasing inputs of nutrients such as nitrogen.

In estuaries, mud builds up where fine sediment settles. This affects the animals that live on the bed of the estuary.

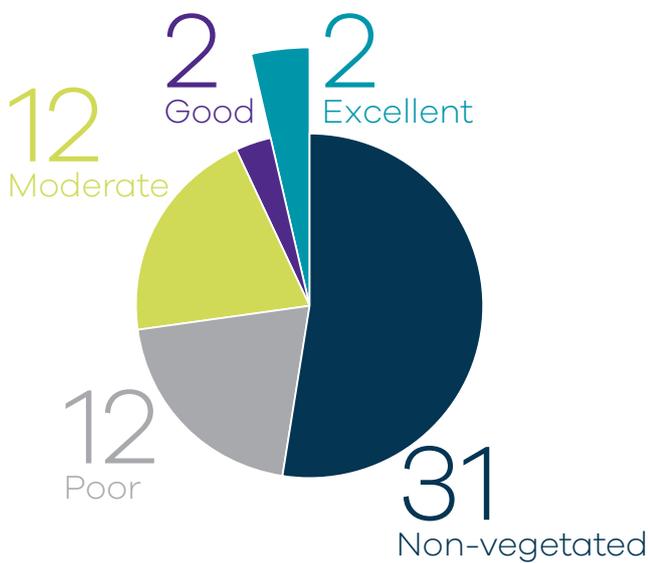
Bacteria levels remain high.

Despite extensive fencing and planting of streambanks by farmers and community groups, bacteria levels in our rivers remain high. Both farmland and urban stormwater are likely sources of bacteria.

Our shallow lakes have deteriorated and are at risk.

The region supports the largest collection of peat lakes in New Zealand. Many of these shallow lakes have lost their natural plant communities and now experience persistent algae blooms.

Increasing inflows of nitrogen, in addition to historic phosphorus inputs that can be recycled from the lake sediments, make lakes one of our most sensitive receiving environments for nutrients.



Count of lakes in each plant category

Stream ecosystems are degraded.

The ecosystem health of many of our waterways does not meet national bottom lines.

More than 50 per cent of streams in developed catchments scored poorly on the Macroinvertebrate Community Index, which measures the presence of sensitive animals, including insect larvae. Organic pollutants, such as wastewater, and sediment affect macroinvertebrates.

For our freshwater native fish, barriers to their migration are more of a problem. A single perched culvert can prevent native fish from accessing upstream habitat. Also, most need to travel between streams and the ocean. For example, tuna and kōkopu populations are restocked by juveniles returning from the ocean as elvers and whitebait. Streams that offer access will support more diverse fish communities.

Ngā mahi tautoko

What can help

The *Waikato State of the Environment* report 2022 is just the first step in finding solutions to the problems identified.

Its focus is on bringing together decades of monitoring data across multiple domains to identify issues, not on providing specific answers to the problems.

Working with those impacted, scientific investigation and modelling are essential for formulating responses to the complex problems outlined.

The report does, however, make the following high level, non-binding recommendations. For more information, see the full report, *Waikato State of the Environment 2022*, which can be found at waikatoregion.govt.nz/stateoftheenvironment.

1 Gaps in environmental monitoring

Council's state of environment monitoring for forests and wetlands, biosecurity, geothermal and coastal habitats is limited. Decades of forest damage from goat browsing are not revealed by the measures we use now, which only reveal a change if the canopy vegetation is lost.

Extending the routine monitoring of wetlands and forests beyond land cover is recommended to also look at the

health of these ecosystems. And monitoring the impact of pests is important in understanding ecosystem health. Rapid expansion of geothermal development as a renewable energy source, is not matched by council investment in monitoring of the resource. In coastal areas, the extension of water quality and habitat monitoring would help us understand the consequences of how we manage the land from mountains to sea.

2 Recognise increasing water security issues

The Waikato is traditionally considered water-rich, but the region is now experiencing increased water security issues. We have observed long-term trends of reducing rainfall and increasing water demand. Climate change is predicted to increase drought frequency, further reducing water availability and increasing demand.

Future growth and development of the region and its neighbours will require improved management of water

supply and demand. Actions by urban and rural users to improve water use efficiency will need to be significantly ramped up. Investigations of alternative water supply options are urgently needed. At the same time, the fundamental requirement of Te Mana o te Wai needs to be recognised and we need a better understanding of how to build resilience of ecosystems to water stress, while supporting human uses of water.

3 Better protection of soils from erosion

Soil erosion continues to be a problem for the Waikato region, where sediment reduces water clarity and smothers the habitat of small animals that live on the bed of rivers, lakes and estuaries.

Forestry operations contribute to sediment loads, as does the clearance of indigenous forest and scrub for pastoral development. Tracks on farmland represent a large area of bare soil and erosion risk. Erosion from earthworks to meet increasing demand for housing risks countering the fencing and planting to date in rural areas.

Catchments draining to the west coast exhibited more erosion than other parts of the region, reflecting the lower capacity of this land to support development. Extensive areas of the Whāingarua Harbour catchment (Raglan) have already been fenced and planted, and other harbour catchments should be prioritised for erosion control.

4 Controls on diffuse nitrogen sources, particularly for streams draining to the Firth of Thames and shallow lakes

Land management decisions have consequences for marine life. For the Firth of Thames, management of diffuse nitrogen sources from the land is important to limit algae blooms and prevent low oxygen, making it a nutrient-sensitive receiving environment.

The water quality of Lake Waikare has deteriorated from bad to worse in recent years. The worsening trend is expected to continue until nutrient inflows are less than nutrient outflows. If good land management practices cannot achieve that, then other methods would be required to halt the worsening trend, such as land use change.

Large areas of pine forest were cleared for dairy pasture near Tokoroa. Nitrogen concentrations have increased in streams draining these areas, including Whakauru Stream, despite extensive fencing and planting of stream margins.

The worsening nitrogen trend has been turned around in the Lake Taupō catchment, where a nitrogen cap and trade system was introduced 20 years ago.

5 Better control of faecal bacteria from critical source areas through farm plans

The lack of improvement in faecal bacteria levels in streams to date indicates that more work is needed on the land to control potential sources. Extensive riparian fencing and planting has not translated to a reduction in *E. coli* concentrations in monitored streams to date.

Much of the faecal discharge may be bypassing fenced buffers, negating the reduced inputs achieved from stock exclusion.

Farm tracks and laneways can generate runoff from less rainfall than grass paddocks, so are expected to contribute to bacterial loading more frequently than paddocks. These tracks represented 77 per cent of bare soil exposure on dairy farms and 37 per cent on drystock farms, according to a 2017 survey. Other critical source areas can include intensive grazing of forage crops in areas that generate runoff.

Urban runoff from roads and footpaths can also be a significant source of bacteria for urban streams.

6 Better pathways to and from the sea for migratory fish

A single perched culvert can prevent native fish from accessing habitat upstream. Fish communities are often more constrained by migration barriers than by water quality. Beyond regulating the construction of new structures, existing barriers should be prioritised for repair or replacement, including culverts, floodgates, dams and other structures. For example, fixing culverts upstream of natural barriers, like a waterfall, might be a low priority.

An action plan for fish passage would enable prioritisation of existing structures that prevent access to more important habitat. The Pathways to the Sea project has already started prioritising pump stations owned and operated by the council and has investigated a range of mitigation options, including development of 'fish friendly' pump designs to enable tuna (eel) spawning migration.

7 Action to meet new air quality standards

Air quality is improving in most towns of the Waikato region. Actions such as clean heat incentives and education campaigns already implemented in Tokoroa are working. The recommendation is to continue these campaigns in Tokoroa and extend them to other airsheds where proposed guidelines for particulate matter less than 2.5 microns ($PM_{2.5}$) may not be met.

Special consideration will be needed for the South Waikato and Waitomo districts where social deprivation has increased. Converting to clean heat sources and changing behaviours will benefit the health of vulnerable people in these areas.

Population growth, particularly in Hamilton city and Waikato district, has the potential to worsen air quality from increased traffic emissions along key traffic routes. This could be mitigated by shifting to lower emission transport such as cycling and electric vehicles. Air pollution near sensitive areas, such as schools, could be mitigated by limiting vehicular flow and establishing vegetated buffers.



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He taiao mauriora ▲ **Healthy environment**

He hapori hihiri ▲ **Vibrant communities**

He ōhanga pakari ▲ **Strong economy**

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