

Rivers & streams

Introduction

Northland has an abundance of rivers and streams. Many of these are relatively short and drain small areas of land, called their 'catchment'. The Wairoa River near Dargaville is the region's largest river and drains 29% of Northland's land area. Most of Northland's major rivers flow into enclosed harbours, rather than into the open coast, so they have a big influence on water quality in these areas.

Water quality in our rivers and streams is affected by the direct release of contaminants into the water from such things as industrial discharge. They are also affected by the indirect release of contaminants into the water, for example, from rainfall run-off carrying contaminants off the land. Water quality is also affected by pest plants and animals and environmental incidents, such as oil spills.

River water quality monitoring network

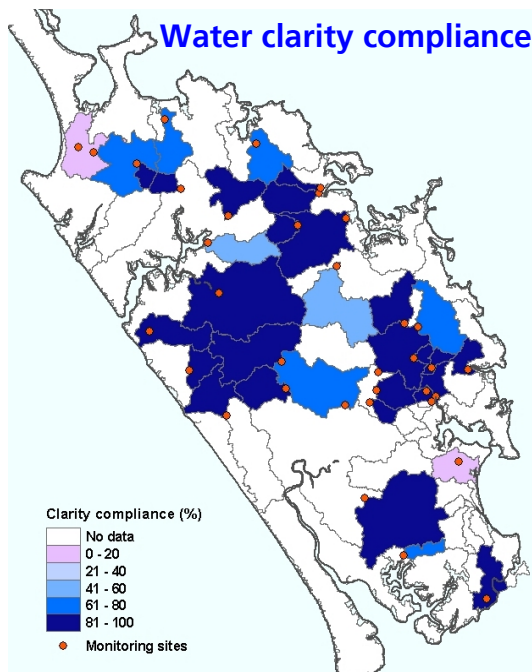
The Regional Council monitors water quality in a selection of the region's rivers and streams through the River Water Quality Monitoring Network (RWQMN). In 2008-09, 35 sites were included in this network, of which four are part of the National River Water Quality Network, monitored by the National Institute of Water and Atmospheric Research (NIWA). Results from these four sites are used to compare results from Northland with results from rivers and streams across the rest of New Zealand.

Water quality at each site is monitored monthly for a range of properties, such as bacteria, nutrients and temperature, and stream macroinvertebrates are surveyed annually. Most results are compared to the New Zealand trigger values for the protection of aquatic environments, found in the 'Australian and New Zealand Guidelines for Fresh and Marine Water Quality' (ANZECC 2000). The majority of sites in the network now have enough data to identify long-term trends.

Water clarity

Water clarity measures how clear or cloudy the water is. It indicates how much sediment or other suspended solids (such as algae or faecal material) the water is carrying. In New Zealand, the guideline for water clarity is to be able to see more than 0.6m through the water.

Trend analysis indicates that water clarity has increased (improved) at four sites. The improvement in water clarity could be as a result of increased streamside planting or better land management in the surrounding catchments. An improvement in the quality of direct discharges in these catchments may also be a factor. Water clarity is decreasing in the Awanui River (upstream of the Waihue channel) and Victoria River, which may be due to land-use changes in the catchment.



Rivers and streams monitoring performance targets

Continue to implement and improve a prioritized State of the Environment (SOE) monitoring programme and monitor compliance with, and the effects of, the exercise of resource consents and Regional Plans by:

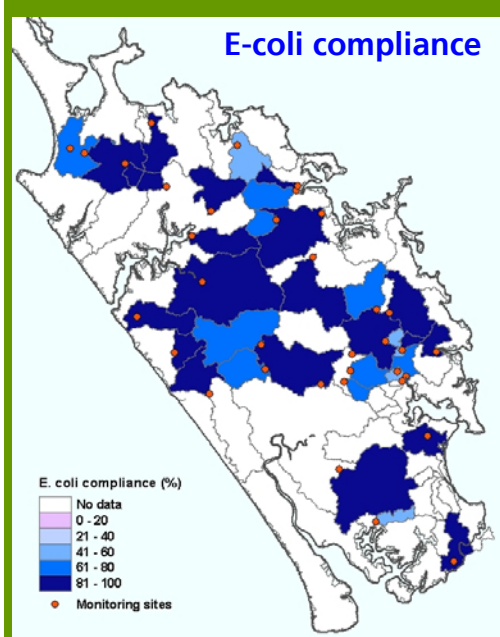
- Operating a region-wide water quality network for the measurement, recording and reporting of river, lake and groundwater quality trends.
- Reporting to the Council annually on environmental monitoring activities within three months of the end of the financial year
- Making the results from the annual SOE monitoring programmes available on the Council's website at www.nrc.govt.nz/soe



The map shows the sites monitored by the Council in the RWQMN (yellow). The pink sites are monitored by NIWA and the purple label was added to the Council's network in July.

Key points

- Water clarity has improved at 4 sites and decreased at 2 sites
- There has been no change in E-coli compliance
- Only 1 site has increased nitrogen
- Phosphorus levels are decreasing at 11 sites and there are no increases



Bacteria

Low levels of bacteria are present in freshwater bodies as a result of natural processes, such as plant decay. However, land-use practices and human activity can increase the levels of bacteria in freshwater bodies above safe levels. Levels of the indicator bacteria *E. coli* are monitored in all RWQMN sites and the results are compared to the '*Microbiological Water Quality Guidelines for Marine and Freshwater Recreational areas*'.

Trend analysis indicates that there are currently no significant trends in bacterial levels (*E. coli*) in any of the RWQMN sites studied. This means that sites with levels of *E. coli* within the recommended guidelines are not declining, but it also means that sites with levels of *E. coli* above the recommended guidelines are not improving.

Total nitrogen

Nitrogen is needed by aquatic plants for growth and is naturally present in freshwater bodies. Manmade sources of nitrogen — for example, run-off from animal feedlots and fertilised fields, or treated wastewater being returned to streams — can increase levels of nitrogen in the receiving water above the recommended guidelines. In New Zealand, the guideline for total nitrogen in freshwater is $< 0.614\text{mg/L}$.

High nitrogen levels can cause 'eutrophication' of a water body, which can lead to excessive growth of aquatic plants (including pests) and algae ('algal blooms'). An unpleasant odour and taste to the water, as well as reduced water clarity, often accompany this process.

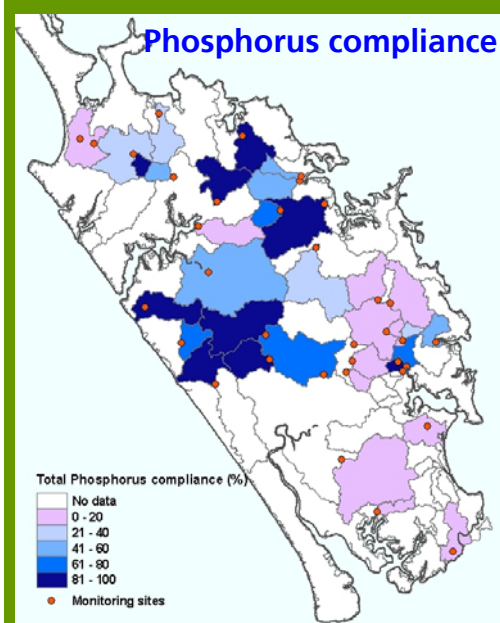
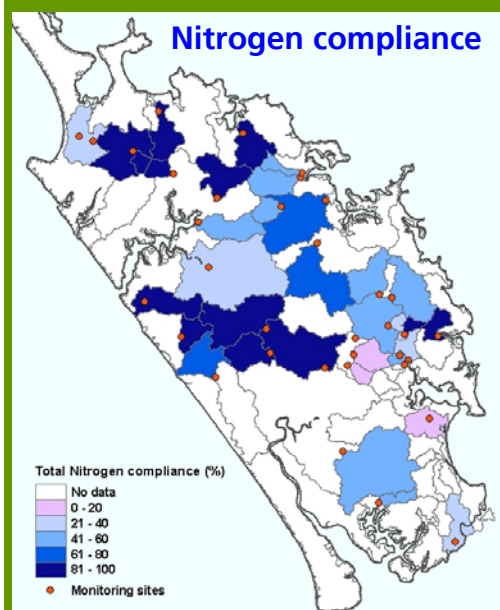
Trend analysis shows that levels of total nitrogen (TN) are decreasing in the Mangere, Punakitere and Wairua Rivers. This could be as a result of improving farm management practices, including streamside planting and better fertiliser application. It could also be as a result of better quality direct discharges, for example, discharges of farm dairy effluent. Only one site, Waitangi at Waimate, appears to have increasing levels of TN. This is a worrying trend that needs to be investigated.

Total phosphorus

Phosphorus exists naturally in freshwater systems, however additional phosphorus can enter freshwater from discharges, such as wastewater from sewage treatment plants, stormwater, agricultural, and land clearance runoff, as well as from within the water system itself, e.g. erosion of rock and sediments from riverbanks.

In freshwater systems, phosphorus is the main nutrient that limits the growth of algae and plants. Excessive phosphorus can therefore lead to increased plant and algal growth, with similar effects to that of excessive nitrogen. In New Zealand, the guideline for total phosphorus in freshwater is $< 0.033\text{mg/L}$.

Trend analysis indicates that total phosphorus (TP) levels are decreasing at 11 sites, with no sites showing a significant increase. However, phosphorus levels are still of concern in the RWQMN, as compliance with the ANZECC guidelines is very poor, with only 9 of the 35 sites complying for more than 81% of the time. For more information go to www.nrc.govt.nz/riverdata



Regional Council Hydrology Monitoring Officer, Alan Bee, gauging water in the Oputeke River.