RIVERS AND STREAMS

Hātea River.

Rivers and streams performance targets:

Continue to implement and improve a prioritised 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 – **ACHIEVED.**
- Annual percentage compliance of rivers with relevant guidelines for five key parameters – **ACHIEVED.**
- Report the results from the SOE monitoring programmes in the annual monitoring report and make available on the council's website at **www.nrc.govt.nz/soe** by 31 October each year – **NOT ACHIEVED (loaded 4 weeks late).**

Key points 2010-2011

- Water clarity improved at 17 sites and declined at 11 sites.
- *E.coli* concentrations improved at 18 sites and declined at five sites.
- Total Nitrogen concentrations improved at 12 sites and declined at nine sites.
- Total Phosphorus concentrations improved at 17 sites and declined at five sites.

Northland has many rivers and streams, and our narrow land mass ensures that most of our rivers are relatively short, draining small catchment areas. None of our rivers are considered large on a national scale.

Our rivers and streams provide habitat for a range of indigenous flora and fauna, as well as being an important water supply for rural communities, horticulture and agricultural demands. Our rivers and streams also provide important recreational, aesthetic and cultural value to our community.

Pollution is delivered to our rivers and streams directly from industrial discharges and indirectly during rainfall periods when the rain creates runoff over the land, which then enters our waterways. Our rivers are comparatively small so they have little capacity to dilute the contaminants they receive and are therefore considered sensitive receiving environments. As the majority of Northland's rivers flow into harbours rather than open coastline, poor river water quality can also affect the health of our harbours.

River Water Quality Monitoring Network

Water quality monitoring of rivers and streams is undertaken at 35 sites throughout Northland as part of the state of the environment monitoring network. Four of these sites are monitored by the National Institute of Water and Atmospheric Research (NIWA). The network covers a large geographic range and is representative of stream types in Northland to give us a good understanding of the state of the environment for the region as a whole.

Water quality is monitored monthly for a range of properties such as bacteria and nutrients. Results are compared to environmental guidelines for bathing safety – *Microbial Water Quality Guidelines for Marine and Freshwater Recreational areas* (Ministry for the Environment, Ministry of Health 2002), and aquatic ecosystem protection – *The Australian and New Zealand Guidelines for Fresh and Marine Water quality (ANZECC 2000).*

In 2010-2011, most sites had moderate or good performance compared to 2009-2010 results. For more information visit **www.nrc.govt.nz/amr**

Water clarity

Water clarity measures how clear or cloudy the water is. Poor water clarity means rivers are less suitable for swimming and it can also impact on river ecosystems by reducing visibility for predators – e.g. wading birds or fish – and by reducing the light available for aquatic plants.

When compared to the previous year's data, water clarity improved at 17 sites and declined at 11 sites. Poorer clarity can be seen in highly erodible catchments – e.g. Utakura, Ruakaka and Paparoa rivers – and generally in response to heavy rainfall. Long-term trends show that there are improving trends for water clarity at 29 percent of sites with more than five year's data.

E.coli 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.

Improvements in bacteriological water quality were seen at 18 sites, when compared to the previous year's data. During 2010-2011, faecal source tracking investigations were undertaken at five sites where there were consistently high bacteria levels in order to try and isolate the source(s) of contamination. Initial results indicate that the main source of contamination is from herbivores.

One site (Mangahahuru River) showed the source of contamination to be avian however the profile was not consistent with ducks (a common avian source). Where faecal contamination is found to be from natural sources – i.e. from birds – little can be done to solve the problem. Where the source of contamination is non-avian, council staff liaise with landowners to discuss and implement land management options and ultimately reduce contamination. Further monitoring will continue in 2011-2012.

Site	Herbivore	Avian
Kaihū River	✓	
Mangamuka River	✓	
Mangahahuru Stream		✓ (not duck)
Waimamaku River	✓	
Kaeo River	✓	

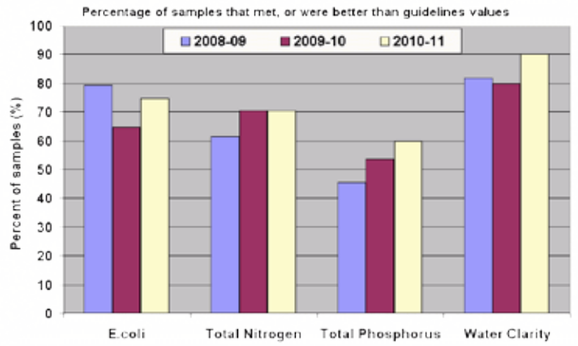

Figure 1: percentage of samples that met, or were better than guideline values.

Nutrients

Nitrogen and phosphorus are needed by aquatic plants and algae for growth and occur naturally in water bodies. Man-made sources of nutrients include fertiliser runoff, urine from farm animals and treated wastewater discharges.

If too much nitrogen or phosphorus enters our rivers it can result in pollution, which can lead to extensive algal growths, and in turn impact on the aquatic ecosystem. The recommended guideline for protection of aquatic ecosystems is that the total nitrogen concentration should remain below 0.614mg/L, and phosphorus concentration should remain below 0.033mg/L. This value is a trigger for further investigation. Values above this level may not pose any threat to aquatic ecosystems as some catchments naturally have levels above this trigger.

When compared to the previous year's data notable improvements in total nitrogen were observed at 12 sites. Long-term trends show that total nitrogen has improved at 18 percent of sites with more than five year's data.

Most sites showed moderate performance in comparison to the total phosphorus guidelines for protection of aquatic ecosystems. This is partly due to Northland's phosphorus-rich sandstone and mudstone catchment geology which provides a naturally high background level of phosphorus to streams.

When compared to previous year's data notable improvements in total phosphorus were observed at 17 sites. Long-term trends show improving trends for total phosphorus at 65 percent of sites with more than five year's data.

CASE STUDY: Mangere River

The Mangere River has been monitored by the council since 1996 and is one of the region's most impacted rivers. It consistently ranked the lowest water quality of all 31 rivers in the River Water Quality Monitoring Network for 2006 and 2007 and generally has high nutrient concentrations, low water clarity and high bacteria counts.

A detailed investigation into the water quality in the Mangere catchment ran from April 2007 to December 2010 to determine the likely cause of the high nutrients and bacteria, and low water clarity. All sites had elevated total nitrogen (TN) concentrations with less than 35 percent of samples below the ANZECC guidelines of 0.614mg/L for TN. The site on the Mangapiu Stream had the highest TN concentration and was above the guideline value on all sampling occasions.

The headwater sites had more than 60 percent of samples below the ANZECC total phosphorus guideline value of 0.033mg/L. The two most downstream sites and the site on Mangapiu Stream were above the guideline value on all sampling occasions.

All sites had *E.coli* levels below the 550/100mL value for less than 50 percent of the time. Water clarity was highest at the upstream sites and generally decreased downstream.

Of 17 rivers in Northland that have more than five years of data, the Mangere River has the highest number of improving water quality trends. There are improving trends in dissolved oxygen levels, pH, water clarity, turbidity, temperature and nutrients. This is seen as a positive indication that water quality in the catchment is improving, and that changes to land management practices – i.e. upgrading farm dairy effluent systems – are having a positive impact on water quality.

While things are improving, water quality is still severely impacted in this catchment and ongoing land management changes are required to continue to improve water quality.

Mangere River.