

# Freshwater Quality Monitoring



**Bay of Plenty Regional Council monitors 52 sites for river water quality, 15 sites across 12 lakes for lake water quality, and 44 river and lake sites for suitability for human recreation, by assessing the following environmental health attributes:**

**Ammonia (NH<sub>3</sub>)** – Ammonia is a gas that reacts to form the ammonium ion (NH<sub>4</sub>) when it is dissolved in water. The balance between ammonia and ammonium in water depends on the pH and temperature of the water. Ammonia is highly toxic to aquatic life.

**Cyanobacteria** – Cyanobacteria, also known as blue/green algae, are a group of bacteria that can photosynthesise like true algae and can produce blooms toxic to people or animals. Cyanotoxins can be produced from cyanobacteria, and when ingested can cause nausea, diarrhoea, gastroenteritis, or liver damage.

**DO** – Dissolved Oxygen is the measure of the concentration of oxygen dissolved in the water. Aquatic life depends on oxygen to breathe, but this nutrient decreases with the growth of other nutrients and algae in the waterway.

**DRP** - Dissolved Reactive Phosphorus is the measure of the dissolved phosphorus compounds that are available for use by plants and algae. DRP can contribute to algal blooms when present in elevated concentrations.

**E. coli** – *Escherichia coli* is a bacterium commonly found in the guts and faeces of warm-blooded mammals (including people) and birds. Elevated levels of *E. coli* in freshwater indicates faecal contamination and an elevated risk to human health.

**Macroinvertebrate Community Index (MCI)** – The MCI is an index based on the presence of freshwater invertebrates, such as: worms, insects, and snails. These organisms are sensitive to changes in environmental health attributes and their numbers are indicative of stream health.

**Nitrate** – Nitrate Nitrogen is the concentration of nitrogen present in the form of the nitrite ion. Nitrate is a plant fertiliser and an important nutrient for plant growth. Due to its high solubility in water, it is one of the most common contaminants in rural and suburban areas.

**National Bottom Line** – this is the minimum acceptable standard for environmental health attributes as per the National Policy Statement for Freshwater Management.

**Suspended fine sediment** – A measure of fine particulate matter carried in the water column. It can impact the clarity of water, which causes problems for visual predators, and form depositions on river-beds that reduces habitat for fish and invertebrates.

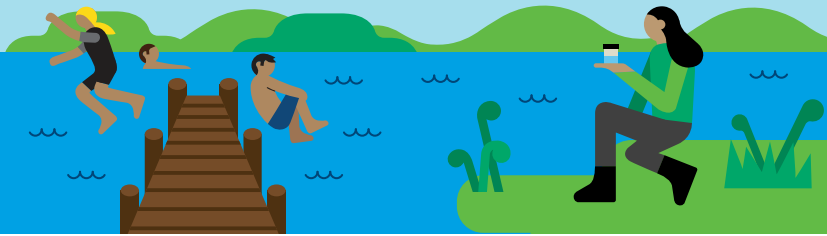
**Periphyton** – algae that grows on rocks in the river and on the riverbed. Excess growth is related to the amount of nutrients in water column, shade, temperature, the suitability of the stream substrate, and how often a stream flushes after rain events.

**TLI** – Trophic Level Index uses multiple water quality parameters to give an overall picture of the health of lakes in terms of nutrient status. Total nitrogen, total phosphorus, water clarity and chlorophyll-a are measured and a number between 1 and 7 is assigned to each lake, the lower the number the better the water quality in the lake.

**Total Nitrogen** – Total Nitrogen is the sum of all organic and inorganic forms of nitrogen that are found in a water sample. Nitrogen is an essential nutrient for plants and aquatic wildlife.

**Total Phosphorus** – Total Phosphorus is a measure of all forms of phosphorus that are found in a water sample. Phosphorus is an essential nutrient for plants and aquatic wildlife.

*This snapshot provides a summary of the findings of recent water quality monitoring data across these different indicators. Gradings from 'very good' to 'poor' are given to each monitoring site and/or indicator, based on monitoring observations and water sample test results.*



# River water quality

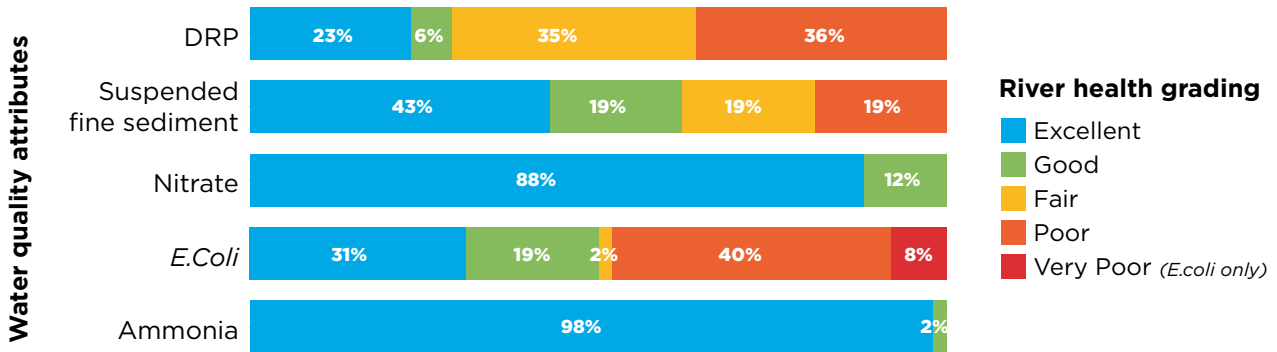
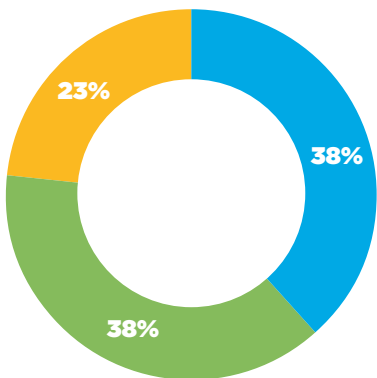


Figure 1: Percentage of river sites graded as being excellent, good, fair, poor, or very poor for five water quality attributes.

Four sites in the Bay of Plenty have been graded as “Very Poor” for *E.coli*. Three of these sites are within Tauranga Moana FMU, and the fourth sits within Ōhiwa Harbour. Overall, 48% (25 sites) of sites in the Bay of Plenty were graded as “Poor”, indicating faecal contamination in many of the rivers in the Bay of Plenty at levels that may cause people to get sick if they drink, swim, or gather shellfish for food. Further, 64% of the rivers graded as “Poor” or “Very Poor” were within the Tauranga Moana FMU. Dissolved Reactive Phosphorus (DRP) in many of the Bay of Plenty rivers is naturally elevated due to the region’s volcanic geology, which the NPSFM does not account for.

## Periphyton

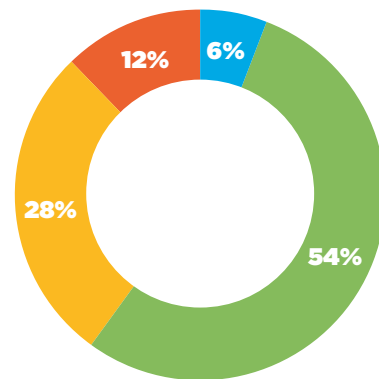


Excellent Good Fair Poor

Figure 2: Percentage of river sites being graded as excellent, good, fair, or poor for periphyton.

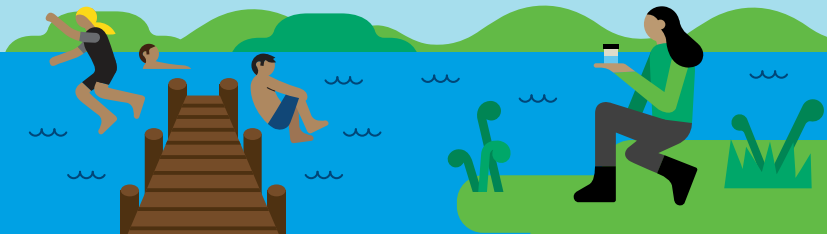
All 26 sites monitored for Periphyton sit above the national bottom line.

## Macroinvertebrates



Excellent Good Fair Poor

Figure 3: Percentage of sites being graded as excellent, good, fair, or poor for MCI.



# Lake water quality

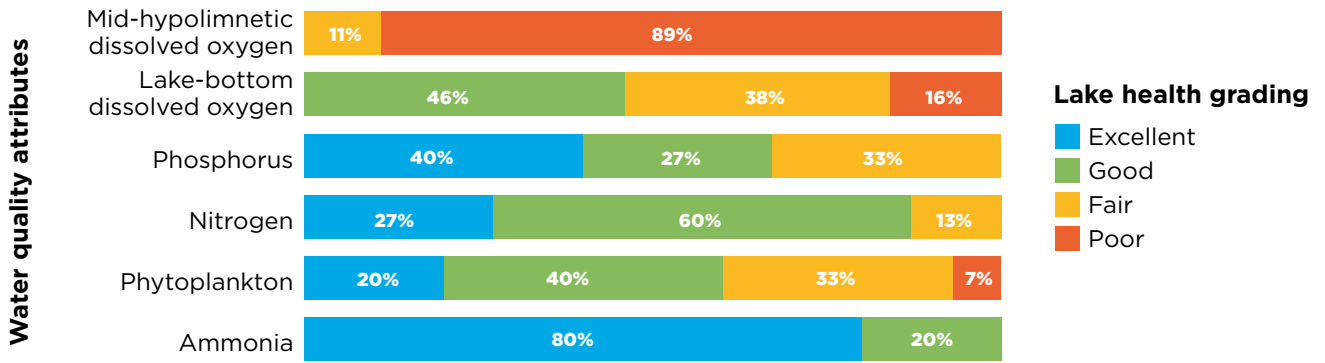


Figure 4: Percentage of lakes graded as being excellent, good, fair, and poor for six water quality attributes.

Dissolved oxygen (DO) attributes often score poorly in Bay of Plenty lakes, despite minimal human influences. DO attributes continue to be investigated.

Lake Rotorua is the only lake to be graded as poor for the phytoplankton attribute, exceeding the national bottom line. This state had worsened since the last assessment in 2019, increasing the risk of excessive plant growth and algal blooms. By comparison, Lake Okaro has improved for phytoplankton since the previous water quality report in 2017 and now sits above the national bottom line.

## Trophic Level Index (TLI)

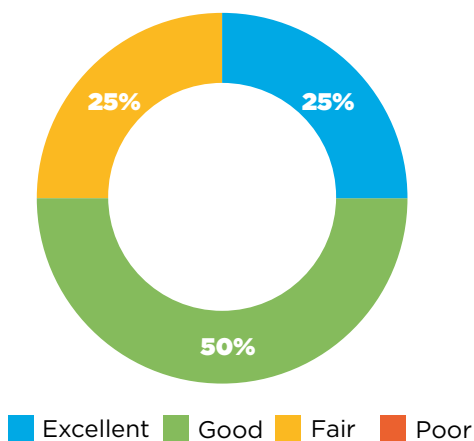
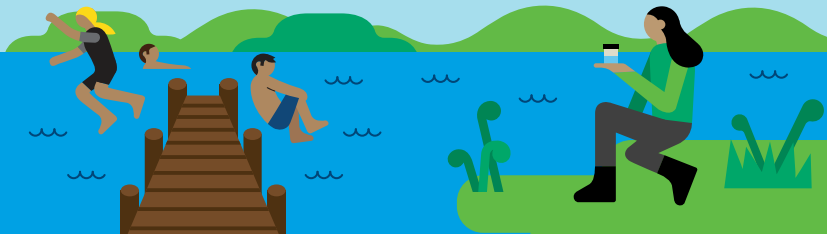


Figure 5: Percentage of lakes graded as being excellent, good, fair, and poor for trophic level index.



Dr Rigo Medina, Algal Monitoring Technician



# Fresh water recreational monitoring

Each summer, 44 freshwater sites across the Bay of Plenty are monitored for their “swimability”. Once a week, a water sample is taken and analysed for *E. coli* which, if present in high quantities, tells us if it is a risk to our health to swim there. Whilst the programme runs, the results are published weekly on LAWA.

## Lakes recreational monitoring

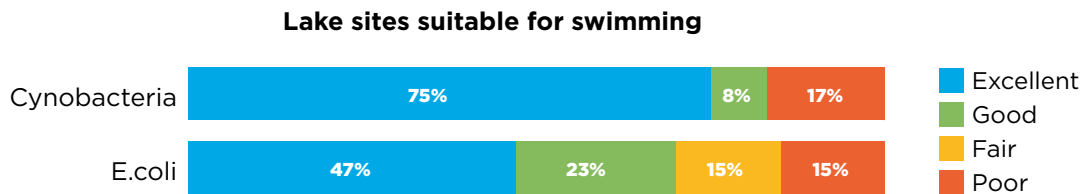


Figure 6: Percentage of lakes sites graded as excellent, good, fair, and poor for *E. coli* and cyanobacteria.

## Rivers recreational monitoring

More than half of the recreational river sites (20 of 31) were graded as poor and have a current state below the national bottom line, indicating that these sites are not currently suitable for swimming. This is a widespread decrease in the suitability for recreation since the previous assessment in 2019. Rivers with monitoring sites rated as poor include: Kopurererua, Utuhina, Ngongotahā, Waiteti, Whakatāne, and Pongakawa.

A total of 35% of monitored sites were graded as “fair” or better and are suitable for contact recreation.

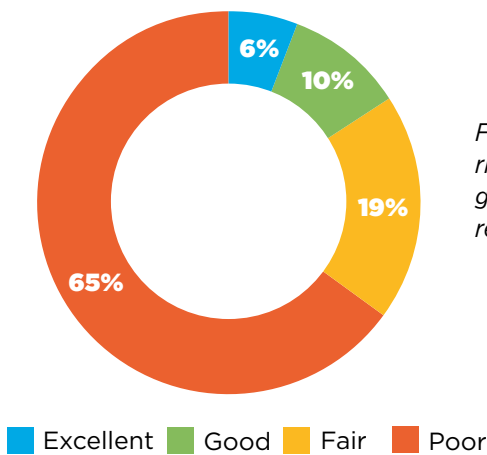


Figure 7: Percentage of rivers graded as excellent, good, fair, or poor for *E. coli* recreational monitoring.

