

Ōngātoro/Maketū Estuary

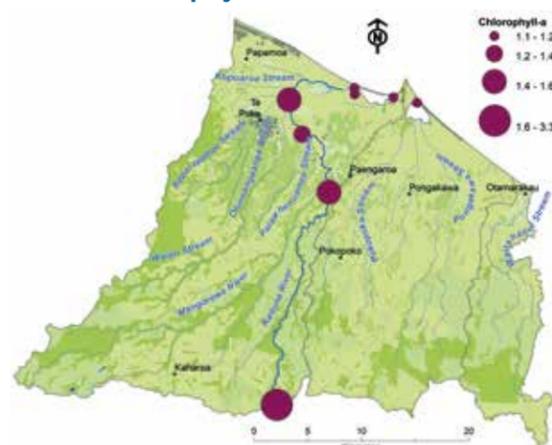
At risk from:

- Increasing nutrients and sediment
- Nuisance plant and algae growth
- Loss of whitebait habitat

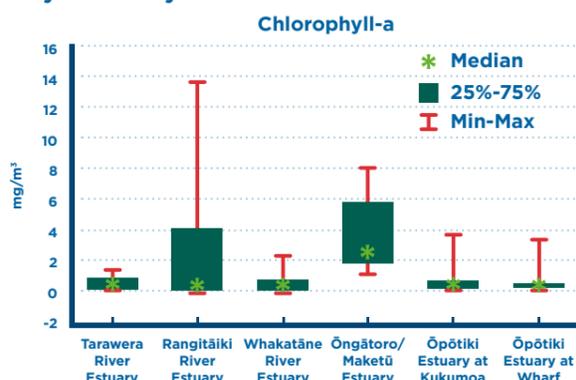
Estuaries are dynamic environments with large changes in tidal and river flows. About 63 percent of our native freshwater fish use estuaries to swim between fresh and salt water.

Nutrients from the land wash into nearby streams and often end up in estuaries. Nutrients can promote excess plant and algae growth. We measure this growth by checking the concentration of chlorophyll-a, the pigment in plants that is used for photosynthesis. More chlorophyll-a generally means more abundance of weed and algae. The Ōngātoro/Maketū Estuary has a higher median chlorophyll-a concentration than any other Bay of Plenty river estuary.

Median chlorophyll-a concentration 2006-2011



Chlorophyll-a concentration ranges for Bay of Plenty river estuaries 2006-2011



Cyanobacteria

Cyanobacteria (also called blue-green algae) are a group of bacteria that have chlorophyll and behave like plants. They occur naturally, but can 'bloom' under certain conditions. Some species of cyanobacteria produce toxins which may be harmful to humans and other animals.

Cyanobacteria generated in Lakes Rotorua and Rotoiti sometimes spread into the Kaituna River, usually during summer months. Productivity, as indicated by chlorophyll-a, in the estuaries has remained low in comparison.

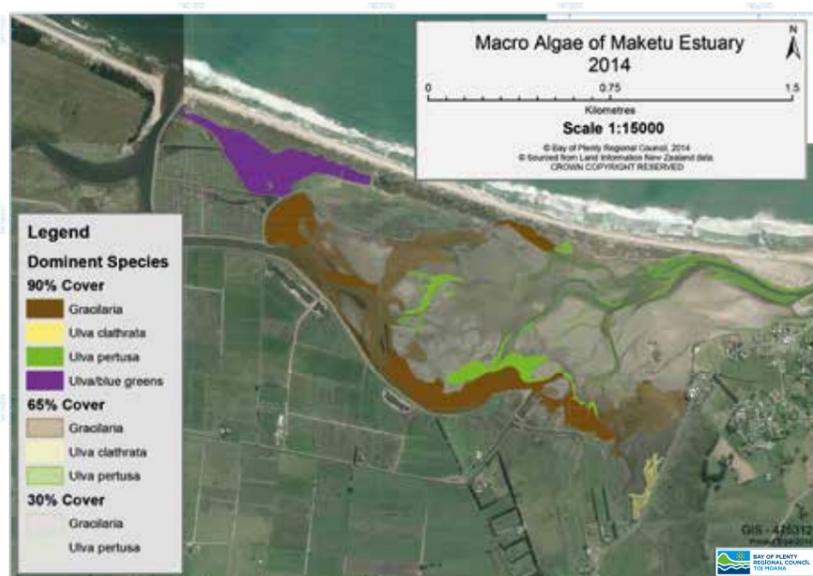
Estuary productivity

Macro algae like *Gracilaria chilensis* (red algae) have been blooming in the upper Waihi and Maketū estuaries. These algae are a feature of changing conditions such as excess nutrients and changing salinity.

River and estuary restoration

The Kaituna River Re-diversion and Ōngātoro/Maketū Estuary Enhancement Project is re-diverting 20 percent of the Kaituna River flow back into the Ōngātoro/Maketū Estuary to improve estuary health.

See more information about this project at www.boprc.govt.nz/kaitunamaketediversion



Water quality and ecology of the Kaituna/Maketū and Pongakawa/Waitahanui catchments

Summary

- Nitrate is increasing in the Kaituna River
- Water quality is usually good for swimming at five of six monitored sites
- Water quality in Lakes Rotorua and Rotoiti is improving
- Stream health is generally 'excellent' in upper catchments, but only 'fair' closer to the sea
- The Kaituna River Re-diversion and Ōngātoro/Maketū Estuary Enhancement Project will improve the health of the estuary.

Upper catchment - Lakes Rotorua and Rotoiti

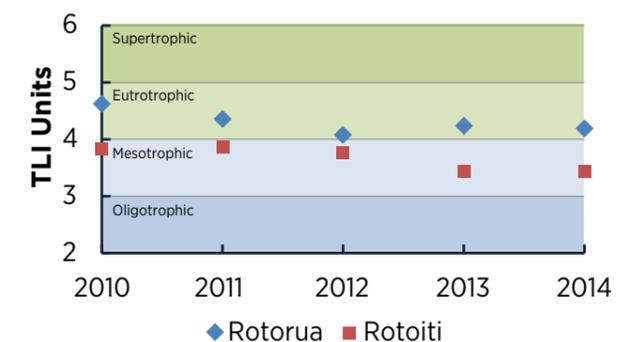
We describe the health of lakes using the trophic level index (TLI), calculated using total nitrogen, total phosphorous, water clarity, and chlorophyll-a.

TLI results show Lake Rotorua to be eutrophic (nutrient enriched) which leads to poor water quality. Lake Rotoiti is classed as mesotrophic (average water quality).

Lake and estuary eutrophication can produce unsightly scums of algae on the water surface, lead to decreased animal and plant diversity, and can also affect recreational water use.

Extensive work to reduce nutrient run-off and improve water quality in the lakes is ongoing. The TLI for both lakes has improved because of this work.

Trophic level index of Lakes Rotorua and Rotoiti 2010-2014



Lake macrophytes (aquatic plants) are important habitats for fish and invertebrates and play a key role in nutrient cycling. They are monitored using a lake health assessment scoring system called the Lake Submerged Plant Indicator (Lake SPI). Lake SPI values greater than 75 percent are considered excellent; values 0-20 percent are considered poor.

Introduced macrophytes dominate in both Lake Rotorua and Lake Rotoiti. The 2013-14 Lake SPI results in the table below show that both lakes are in moderately healthy ecological condition.

	Lake Rotorua	Lake Rotoiti
Lake SPI Condition %	23%	21%
	Poor ← → Good	Poor ← → Good

For more information

Visit www.boprc.govt.nz/kaitunamaketu
 Phone 0800 884 880
 Email info@boprc.govt.nz



Animal and insect life (macroinvertebrates)

Benthic macroinvertebrates (such as aquatic insects, snails and shrimp) live on or just below the stream-bed.

Macroinvertebrates are vital to stream food webs as they feed on algae, aquatic plants, dead leaves and wood, or on each other. They are in turn preyed upon by other animals such as fish and birds.

A water sample captures a single moment in time, however macroinvertebrates are influenced by a wide range of factors over a longer time period so they are very useful for assessing stream health.

A quick way to assess ecological health is by calculating the Macroinvertebrate Community Index (MCI) which involves checking which invertebrate species are present and how abundant they are.

Invertebrates have been monitored in 15 streams in the Kaituna/Maketū and Pongakawa/Waitahanui catchments. Average MCI scores show that 12 streams are in either excellent or good condition, and three streams are in fair condition. No streams are in poor condition. Streams with excellent health are mostly in the upper parts of the catchment, while streams in fair condition were at lower elevation and closer to the sea.



Macroinvertebrates are collected from the streambed by disturbing the streambed immediately above a triangular net, which captures all dislodged material (both invertebrates and organic matter).

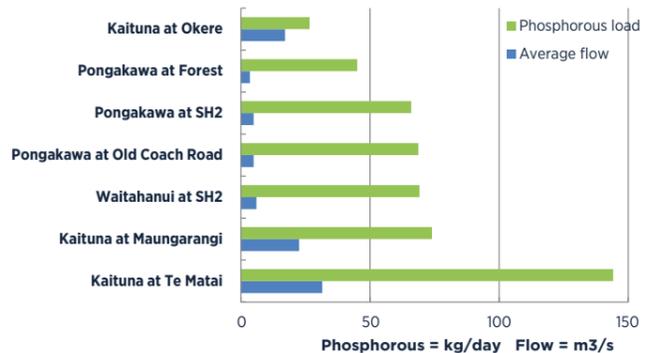
Nutrients

Excess nutrients can cause increased growth of macrophytes and algae. The macrophytes can then clog water intakes, use up dissolved oxygen during the night or as they decompose, and dramatically change habitat suitability for fish and other wild life.

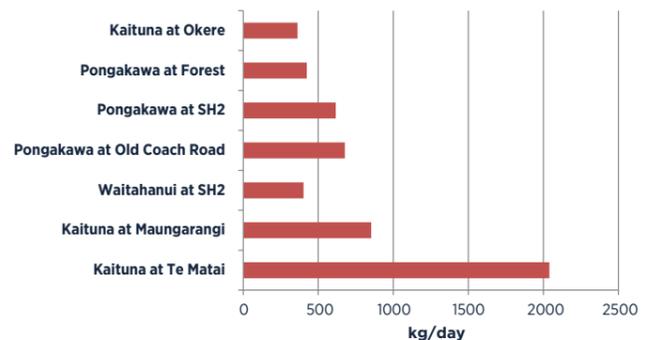
Nutrient loads change depending on the land use in the catchment and the amount of water in the water-body.

The graphs below show total phosphorous and nitrogen loads at sites monitored by the Regional Council in 2013. These graphs show that nutrients in the river increase as it flows from Ōkere Falls to Te Matai.

Average Annual Total Phosphorous Load (2014)



Average Annual Total Nitrogen Load (2014)



Coastal and freshwater recreational monitoring

When contaminated by human or animal faeces water can contain disease-causing bacteria, viruses and protozoa (such as salmonella, campylobacter or giardia).

These organisms can pose a health risk in water used for recreational activities such as swimming.

The most common illness is gastroenteritis but respiratory illness and ear and skin infections may also occur.

The Suitability for Recreation Grade gives a general picture of water quality at a site, and is updated annually. See more at: www.boprc.govt.nz/swimmingwaterquality

National Objectives Framework (NOF)

The National Policy Statement includes a National Objectives Framework (NOF), which sets compulsory national values for freshwater to protect 'human health for recreation' and 'ecosystem health'.

The NOF has a series of 'bands' ranging from A to D, and National Bottom Lines for the following attributes in rivers:

To protect ecosystem health:

- Nitrate
- Ammonia

To protect human health for recreation:

- E.coli
- Cyanobacteria

All of the sites monitored in these catchments in 2014 had nitrate and ammonia levels that were within the 'A' or 'B' band for both nitrate and ammonia. This means that current levels of nitrate and ammonia in the water are unlikely to have an impact on sensitive wildlife.

NOF Banding

Primary contact (swimming)

- Good** A Primary (swimming) recreational contact has a different rating system to secondary contact based on the level of risk to people swimming. Good (Band A) rating means there is less than five percent risk of people getting sick from swimming. Poor (exceeding Minimum Acceptable State) ratings mean there is more than five percent risk of people getting sick from swimming.
- Poor** >MAS

Some sites do not meet the minimum acceptable state (MAS) for recreational waters used for primary contact.

Nitrate

Ammonia

Secondary contact (wading/boating)

Good

A

B

C

Poor

D

Good (Band A) to Poor (Band D) ratings are based on 2014 annual median levels of nitrate, ammonia and performance against safe bacteria level guidelines for secondary contact (wading/boating).

MCI Class

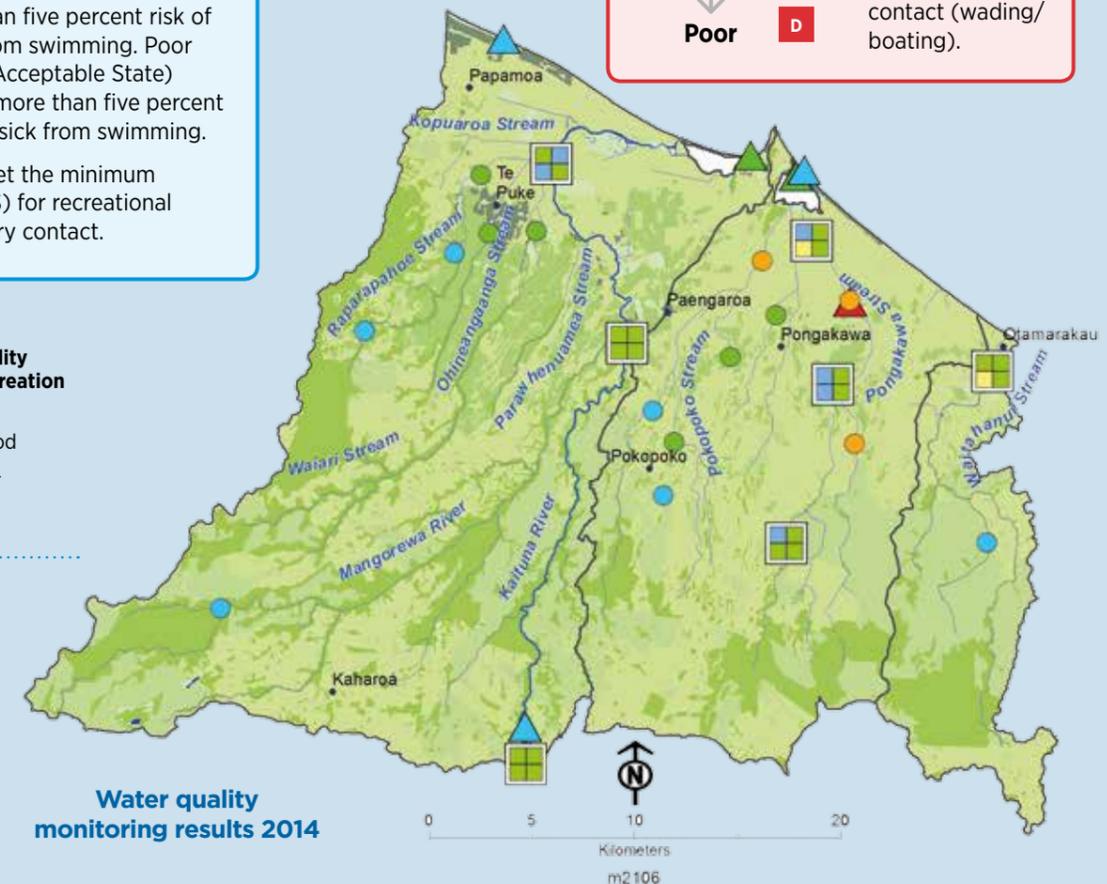
- Excellent
- Good
- Fair
- Poor

Suitability for Recreation Grade

- ▲ Good
- ▲ Fair

Land use

- Urban
- Exotic Forest
- Indigenous Forest
- Horticulture
- Pasture



Water quality monitoring results 2014