Lake Water Quality

State of the Environment **Report Card 2018**

How do our lakes stack up?

What is a healthy lake?

A healthy lake supports wildlife and cultural values, and can be enjoyed by people for activities such as fishing and swimming.

What are the main threats to lake health?

- **Nutrient** levels that are too high can result in nuisance algal blooms. Nitrate and ammonia at high levels can be toxic to freshwater fish and invertebrates.
- **Exotic plants** can take over the shallows of lakes. They can crowd out the native plants that support wildlife and make it difficult to boat or swim.
- **Viruses** and **bacteria** that live in the gut of warm-blooded animals (especially sheep and cows) have the potential to reach high levels in lakes. *E. coli* concentrations are used to assess the likelihood of health-threatening contamination.
- **Potentially toxic cyanobacteria** (sometimes called blue-green algae) can reach levels that pose a threat to human and animal health.

DID YOU KNOW?

There are over **200** lakes in Hawke's Bay.

Around **97%** are privately owned.

The Hawke's Bay Regional Council monitoring is focussed on high value, publically accessible lakes.

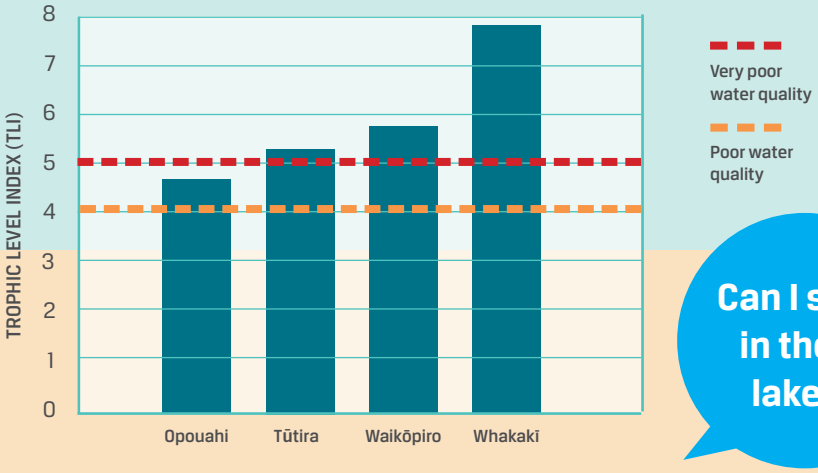
How do we measure lake quality?

The Trophic Level Index is used in New Zealand to describe the overall state of lakes. Higher TLI's are associated with nuisance algal or potentially toxic cyanobacterial blooms.

What was the condition of the four lakes monitored?

The Trophic Level Index indicated that water quality was poor for lakes Opouahi and Tūtira, and very poor for lakes Waikōpiro and Whakakī. Water quality at Whakakī was so bad that aquatic plants no longer grow in the bottom of the lake.

There was a high risk that summer blooms of cyanobacteria and algae could occur for all four lakes. The underlying causes are likely to be high levels of nutrients washed from the land into the lake. Summer weather in Hawke's Bay also provides ideal growing conditions.



Can I swim in these lakes?

Potentially toxic cyanobacterial blooms may be present at all four lakes, so we often advise against swimming for dogs and humans. Please check with locals, or look for signs and media releases. 'Duck Itch' – also known as swimmer's itch – is a reaction some people have when flatworm parasites penetrate the skin during contact with fresh water. There may be duck itch where water fowl are found.

All four lakes are of excellent quality from a viral or bacterial perspective.

Monitoring sites

The Regional Council carries out sampling on different types of lakes.

In 2018, one coastal lake and three freshwater lakes were monitored. All four have water quality problems caused by nutrient enrichment.

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Restoring the mauri of Hawke's Bay lakes

The Regional Council provides scientific support to Tāngata Whenua working in this area. For example, Maungaharuru-Tangitū Trust have ambitious aspirations for the Tūtira Lakes. Whakakī Lake Trust and Iwitea Marae are wanting to revitalise Whakakī Nui a Rua.

The challenge of lake restoration

While catchment management, such as the planting of lake margins and surrounding land, has a positive influence on water quality, there can be a long delay before lake health improves.

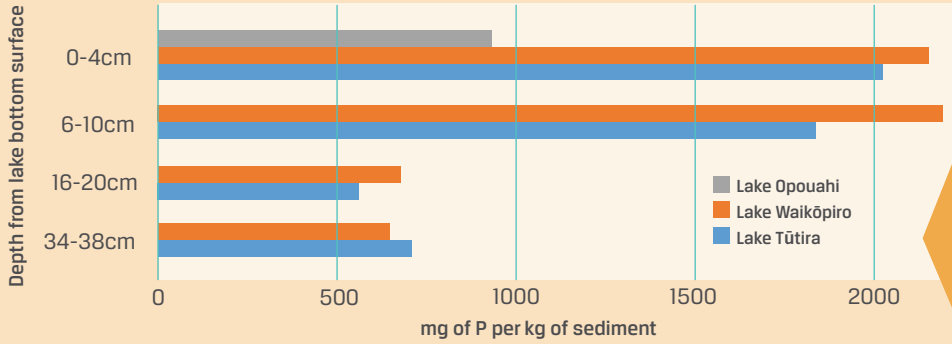
By collecting cores of lake sediment we can understand the legacy effects of nutrient and organic accumulation. Cores can also give an insight into how to deal with these effects. For example, low oxygen conditions in deep water stimulate the release of phosphorus which can trigger cyanobacteria (also known as blue-green algae) blooms. The air curtain in Lake Waikōpiro is designed to combat this.

What we've found so far

Since the Bola cyclone in 1988 approximately 16 centimetres of sediment has accumulated in the bottom of lakes Tūtira and Waikōpiro. For Lake Opouahi sediment accumulation after 1988 was much lower. For the upper layer of the lake bed, phosphorus concentrations are much lower in Opouahi than Tūtira and Waikōpiro. Differences in nitrogen are less pronounced.

Upper lake bed sediments of all three lakes have much higher levels of nutrients and organic material than the deeper layers. This is important information for restoration activities. The influence of ecological processes means that depth profiles do not necessarily reflect changes in deposition.

Phosphorous concentration in sediment



QUICK FACTS

Problem algal blooms are related to excessive levels of nutrients.

Lakes act as sinks of nutrient and sediment.

The majority of our lakes have legacy issues as a result of historic land use, leaving a negative impact on water quality.

The effects of cyclone Bola in 1988 can be seen in Lake Tūtira sediment cores. This is the obvious grey band near the bottom of the core.

Exploring the lake bed

The Regional Council is working with Cawthron Institute to understand how lake sediments influence water quality.

Find out more

The Regional Council monitors our land, water and air.

We use this data to inform our work with communities to improve and protect the environment.

For more details including the full technical reports **visit** www.hbrc.govt.nz (search: #documentsandforms)

For up to the minute monitoring results from Hawke's Bay and other parts of the country **visit** www.lawa.org.nz

HAWKES BAY REGIONAL COUNCIL
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