

# THE WAIKATO AND WAIPĀ RIVERS

## Q. HOW CLEAN ARE THE WAIKATO AND WAIPĀ RIVERS?

**A.** In some respects, the rivers are cleaner than they were 50 years ago. Point source discharges, such as sewage from towns and waste from factories, are now highly regulated, and are properly treated. These point source discharges are not a major cause for contaminants in the Waikato region.

However, land use has intensified, leading to increasing contaminant losses from non-point sources linked to agriculture. Our rivers are showing the signs of being affected by these contaminants with an increase in algal blooms and decrease in swimability. The longer we wait to address these effects, the harder and more expensive it will be to fix.

## Q. WHAT EXACTLY IS 'WATER QUALITY'?

**A.** From a scientific perspective, water quality is a measure of water's suitability for a range of uses, including its ability to support aquatic life and its suitability for human recreational use.

Water's quality is affected by what enters it, whether running off the land or through a pipe, and by flow.

To iwi, the mauri of water is an integral part of the environment and the health and wellbeing of people. ('Mauri' can be thought of as the life essence or life force.) Iwi are kaitiaki (stewards) of natural resources such as water, and each iwi has its own tikanga and kawa (customs and protocols) to fulfil this responsibility.

## Q. IS THE WATER QUALITY IN THE WAIKATO AND WAIPĀ RIVERS GETTING WORSE?

**A.** Some aspects of water quality have worsened, while others have improved. Over the last 20 or more years, levels of nitrogen in both the Waikato and Waipā rivers have risen, due to land use changes and intensification.

In the Waikato River, biochemical oxygen demand and dissolved colour have improved due to improvements in sewage plants and industrial discharges, such as those from dairy factories and meat works. *Chlorophyll a* concentration has also decreased. Dissolved oxygen concentrations are mostly excellent, and levels of toxicants such as ammonia, heavy metals and pesticides are low. Land intensification has caused rising trends in nitrogen, phosphorus, sediment and bacteria in the waterways.

## Q. WHAT CONTAMINATES THE RIVERS?

**A.** Three main types of contaminants affect the rivers: nutrients, sediment and faecal pathogens (indicated by E.coli). They can enter the rivers as:

- Point source discharges: from a clearly identifiable source, such as a pipe
- Nonpoint source (or diffuse) discharges: from a wide area such as run off from land

## Q. WHERE DO MOST OF THE CONTAMINANTS COME FROM?

**A.** Agricultural land is the main source of nutrients such as nitrogen and phosphorus entering the rivers today. In the last few decades agricultural activities such as dairying and beef and sheep farming have intensified. Farms are larger and stocking rates on dairy farms have increased. The use of fertilisers, particularly nitrogen fertilisers, has also increased. These changes have contributed significantly to declining water quality.

Fertiliser contributes to the amount of phosphorus and nitrogen in the river. However, the proportion it contributes is low when compared to the amount of nitrogen coming from animal urine and phosphorus coming from soil washed off farmland.

Most farm animals are outside, and their emissions cannot be controlled. Urine patches are a big problem. When a cow urinates onto a small patch of grass, the grass cannot absorb all the urine, and the nitrogen leaches through the soils and can end up in waterways.

Disposal of effluent from dairy sheds is important to get right, as it is a highly concentrated source of contaminants such as nitrogen, phosphorus and bacteria. But cows are usually only at the dairy shed for about two hours twice a day. The rest of the time they are out on paddocks.

CONTAMINANT	LEVELS	IMPACTS	SOURCES
<b>Nitrogen (N)</b>	Rising trends in both the Waikato and Waipā rivers over the last 20 plus years.  N levels downstream of Taupō are especially low. Lake Taupō acts as a settling pond, cleaning up water from the upper catchment before it enters the Waikato River.	N and P levels above water bodies' natural background levels can over fertilise aquatic plants, lead to excessive plant growth, algal blooms and depletion of dissolved oxygen, affecting fish and other aquatic life.  Should current trends continue, it's expected the Waikato River will have: <ul style="list-style-type: none"> <li>• more algae and a greater risk of blue-green algal blooms, affecting recreation</li> <li>• reduced clarity, from algae (and sediment).</li> </ul>	Rising trends due to land use changes and intensification.  Mainly non-point sources, a small amount from point sources.  Much of the overall N load in the rivers comes from farmland, particularly from urine excreted onto paddocks.  Municipal sewage and industrial discharges are regulated and minor sources.  Urban stormwater is a minor source.
<b>Phosphorus (P)</b>	Waipā: moderate levels, trends vary along the river, but rising in the most downstream site.  Waikato: moderate but mostly stable levels, P levels downstream of Taupō are especially low. Lake Taupō acts as a settling pond, cleaning up water from the upper catchment before it enters the Waikato River.		Much of the P in the rivers comes from: <ul style="list-style-type: none"> <li>soil washed off agricultural land</li> <li>run off containing dissolved phosphorus</li> <li>farm animal dung</li> </ul> Municipal sewage and industrial discharges are regulated and minor sources.  Urban stormwater is a minor source.
<b>Bacteria (E.coli)</b>	Waipā: high but stable levels.  Waikato: moderate levels downstream from Karapiro.  E. coli levels are very low in the upper Waikato because bacteria die off in the hydro lakes.  Levels rise downstream of Karapiro, and again when the undammed Waipā River joins the Waikato River at Ngaruawahia.	Bacteria poses a health risk to both humans and animals and can cause illnesses, such as ear infections or diarrhoea.	Dung from: <ul style="list-style-type: none"> <li>farm animals</li> <li>animals living in the bush e.g. pigs, goats</li> <li>birds e.g. ducks, swans</li> </ul> Farm animal dung is the likely dominant source in the Waipā.  Municipal sewage, urban stormwater and septic tank and industrial discharges are regulated and considered to be minor sources.
<b>Sediment</b>	High levels and rising trends in lower reaches of both the Waikato and Waipā rivers over the last 20 plus years.	Sediment makes the water murky and reduces amount of light for plants and animals living in the water.  It also makes the water less safe for recreation.	Landslides and streambank erosion are the main sources for the Waipā.  Two thirds of the sediment in the lower Waikato comes from the Waipā.  Municipal sewage, urban stormwater, industrial discharges are regulated and considered to be minor sources.  Koi carp also stir up sediment and cause bank erosion as they feed.

## Q. IS ANYTHING ELSE BEING DONE TO PROTECT THE RIVERS?

**A.** Farmers, industry, the council and other stakeholders have already done much to address the issue, and are continuing to do so. Many agencies, organisations and groups, across a range of sectors including dairying, horticulture, dry stock, the fertiliser industry and government are involved.

Many farmers have altered their practices to reduce their impact on rivers, including:

- how fertiliser is used
- how effluent is handled
- stocking rates
- using feed pads and stand-off areas
- fencing and planting riparian margins
- controlling erosion through planting.

To find out more about managing contaminants, visit [waikatoregion.govt.nz/forfarmers](http://waikatoregion.govt.nz/forfarmers).

## Q. DO THE DAMS AFFECT THE WAIKATO RIVER?

**A.** The dams change the upper section of the Waikato River from a fast moving river into a series of lakes. This slows down water flow and affects the riparian areas surrounding the lakes.

The reduced flow rate provides the time for:

- sediment in the water time to settle out, making the water clearer
- UV light from the sun to kill off bacteria
- algae to grow

Although the dams significantly affect the Waikato River, they also provide a large amount of power, which contributes to the regional and national economy. They are not the main contributor to the decline in water, but another factor influencing our river system.

## Q. IS IT SAFE TO SWIM IN THE RIVERS?

**A.** In terms of water quality, it's generally safe to swim in rivers if the water is clear enough to see submerged hazards such as rocks and logs and bacteria levels are low.

You should also consider the current. There are warning signs about swimming in the Waikato River because the current can be very strong in places and is a safety hazard.

We routinely monitor water clarity and E. coli (bacteria) levels, which indicate whether the water quality is suitable for swimming and other contact recreation.

### GENERAL WATER TRENDS

RIVER	LOCATIONS	SUITABILITY FOR SWIMMING
Waikato River	Taupō to Hamilton	Suitable
	Hamilton	Suitable much of the time <ul style="list-style-type: none"><li>Clarity - often lower than the standard</li><li>E.coli - levels mostly within the guidelines</li></ul>
	Beyond Horotiu	Unsuitable <ul style="list-style-type: none"><li>Clarity - too low to swim safely</li><li>E coli - levels sometimes within guidelines</li></ul>
Waipā River		Generally not suitable for swimming. <ul style="list-style-type: none"><li>Clarity - lower than the standard</li><li>E. coli - often above the safe level for swimming</li></ul>

## Q. WHAT WILL HAPPEN TO THE RIVERS IN THE FUTURE IF NOTHING IS DONE?

**A.** If nothing is done, some aspects of the rivers' water quality will worsen and it will take far longer to arrest the problems we're seeing.

Past actions continue to affect the rivers. Parts of our region have large underground storages of water (groundwater), which can take decades to emerge into waterways. For example, in the Lake Taupō area some of the water flowing out of the streams today fell as rain 50 years ago. This means that even if we changed the amount of nitrogen entering the rivers today, this indicator of

water quality is still likely to get worse before it gets better.

Should current trends continue, it's expected that in the future the Waikato River will have more algae, a greater risk of toxic blue-green algae blooms and reduced clarity. These changes would make the river increasingly unsuitable for swimming and water sports.

## Q. WHAT IS THE EFFECT OF WATERBIRDS?

**A.** Although we have not taken specific measurements of the amount of contaminants that ducks and swans contribute, we are fairly certain that it is not enough to be of concern. Waikato Regional Council runs modelling for contaminants for the Waikato River. We do not include ducks and swans. Our models all balance out, suggesting that we are not missing any major contributors in the equation.

## Q. DO KOI CARP AFFECT THE RIVERS?

**A.** Koi carp are abundant along the Waikato River. They are thought to have been accidentally released into the river in the 1980s. When they feed, they stir up the bottom of ponds, lakes and rivers, muddying the water and destroying native plant and animal habitat.

You can find more information about the CarpN Neutral program to manage koi carp on the council website.

## Q. HOW DOES WAIKATO REGIONAL COUNCIL ASSESS THE HEALTH OF WATERWAYS?

**A.** The council measures a waterway's health by monitoring water quality and aquatic life.

### WATER QUALITY MONITORING

Water samples are taken and analysed each month in 62 of the 74 sub-catchments in the Waikato and Waipā catchment. Council is expanding its network of monitoring sites in 2018 to ensure all 74 sub-catchments are monitored.

### AQUATIC LIFE MONITORING

Water quality monitoring looks at a point in time. However, waterways are continually affected by the surrounding environment and a sample might not capture all the contaminants that have entered the stream over time

Monitoring the ecology of streams gives a broader picture of the health of the waterway over a longer timeframe. Invertebrates like bugs are a very good indicator of local conditions.

Fish can give a good indication of the health of the entire network, as many need to swim up and down the river to breed. No fish in a certain area of the river could be due to poor water quality, or due to restrictions in access.



## Q. WHAT IS 'RIPARIAN MANAGEMENT' AND HOW DOES IT HELP THE RIVERS' WATER QUALITY?

A. 'Riparian management' refers to actions such as fencing and planting along the edges of waterways and wetland areas, to help improve water quality. Riparian planting is most effective when there is a long length of stream edge planted, especially for narrow streams. Ideally the smaller outer tributaries all the way through the stream system to the main stem of the river are planted.

ACTION	HOW IT HELPS WATER QUALITY, AQUATIC PLANTS AND ANIMALS
Fencing to keep stock out of streams	<p>Helps to reduce nitrogen and phosphorus entering the water by:</p> <ul style="list-style-type: none"> <li>stopping stock from defecating or urinating directly into waterways</li> <li>reducing streambank erosion.</li> </ul>
Planting riparian areas	<ul style="list-style-type: none"> <li>Roots hold the river bank together, reducing erosion.</li> <li>Plants filter and trap nutrients in surface and groundwater entering waterways.</li> <li>Plants create shade, reducing water temperature thus allowing it to hold more oxygen. Shade also reduces algae and weed growth, which helps to maintain oxygen levels.</li> <li>Plants drop leaves and smaller bugs into the water, feeding aquatic animals. This improves the water quality and the diversity of animals in the water.</li> </ul>
Protecting wetland areas	<ul style="list-style-type: none"> <li>Wetland plants trap sediment suspended in water.</li> <li>Bacteria in wetland soils absorb and break down nitrogen from farm run off and leaching.</li> </ul>

## Q. ARE THERE MANY NATIVE FISH IN THE RIVERS?

A. The abundance of native fish in the Waikato River catchment has declined, and many native fish are now more threatened than kiwi. The following species, found in the Waikato and Waipā River catchments, are classed as 'declining':

- īnanga
- shortjaw kōkopu
- giant kōkopu
- kōaro
- longfin eels
- lamprey
- black mudfish
- torrentfish
- redfin bully

Most of the 17 native fish species recorded in the Waikato River catchment are only surviving in small, distinct areas of a highly modified environment. Some species, such as smelt, common bullies, longfin and shortfin eels and grey mullet, move up and down the river and its tributaries.

Many of these populations do not have more fish joining them; the populations are small and aging, and the future of native fish in the river is far from secure.

Whitebait consists of five different species – the first four species in the list above and banded kōkopu. Whitebait harvests have declined to about a fifth of amounts harvested 50 years ago.

*This information has been provided based on Waikato Regional Council's interpretation of the proposed plan. The proposed plan is subject to change through the hearings process.*



 [WAIKATOREGION.GOV.T.NZ/HEALTHYRIVERS](http://WAIKATOREGION.GOV.T.NZ/HEALTHYRIVERS)

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HE TAIAO MAURIORA HEALTHY ENVIRONMENT  
HE ŌHANGA PAKARI STRONG ECONOMY  
HE HAPORI HIHIRI VIBRANT COMMUNITIES



Healthy Rivers  
PLAN FOR CHANGE  
Wai Ora  
HE RAUTAKI WHAKAPAIPAI

**Waikato**  
REGIONAL COUNCIL  
Te Kaunihera ā Rohe o Waikato