

WATER 2020-2021 and 2021-2022

Water is critical to all aspects of our lives. Freshwater is precious and limited, a taonga of huge significance. The Waikato Regional Council (WRC) collects information on water quality, wetlands, lakes, rivers, ground water, storm water and water allocation. For the purpose of analysing the data at a local level, the two key components examined in this report are ground water availability and river water quality for recreational use.



Groundwater

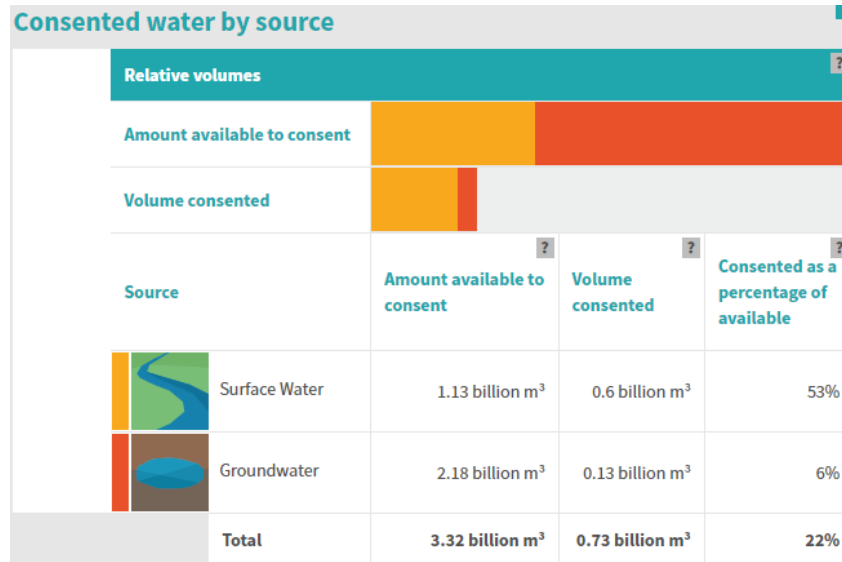
Groundwater is characterised by rainwater that has percolated through soil to underground rock fractures or porous sediment. These are known as aquifers. Groundwater accounts for 90% of the Waikato's fresh water resource. To access the aquifers, wells are drilled to pump the water away from the aquifers to where it is needed. For example, for drinking water, industrial and agricultural use. The amount, quality and usage of groundwater varies greatly within the region.

Ground water quality depends on how vulnerable the groundwater aquifers are to contamination. Contamination of groundwater can take place when pollutants travel through the soil into the aquifers. Once polluted, it can be challenging to reverse this entirely. Hence, the importance of ensuring optimal ground water protection. Contaminants in the ground water can be due to pollution from point source or non-point source. Septic tanks, leaking treatment ponds, waste disposal sites are examples of point source contaminants, while agricultural land use activities, saltwater intrusion, fertiliser and pesticide applications are examples of non-point source pollutants.

Groundwater use, also known as water allocation is monitored by the Waikato Regional Council to ensure these aquifers will sustain everyone's needs. According to Land, Air, Water Aotearoa New Zealand (LAWA), two thirds of water allocated from Waikato Region is from surface water and the remainder is from groundwater. While rainfall does naturally replace water taken from the aquifers, when too much groundwater is used, there is less water left in the aquifers – this is also known as lowering of the water table.

As populations grow, and land use activities grow, Waikato Regional Council has identified an increase in ground water allocation by 22%, from 1997 to 2002. Despite this growth, due to average regional rainfall, there are sufficient ground water resources however this is variable depending on the amount of rainfall a region experiences. This can change from district to district, and also can vary by season.

The image below is sourced from LAWA (<https://www.lawa.org.nz/explore-data/waikato-region/water-quantity/>). Showing the volume of water that has been consented by the Waikato Regional Council versus the amount of water that is available to consent. As stated below only 22% of the total water volume available is consented.



Given that water allocation is a sum of both surface water and groundwater, it is usually during the summer months where there is little rainfall that there is measures put in place to reduce water usage. While the average values for water availability may indicate that there is a significant amount of water available annually, it does not accurately portray the seasonal effects of drought or reduced rainfall in the warmer months.

Groundwater in the Hauraki Plains

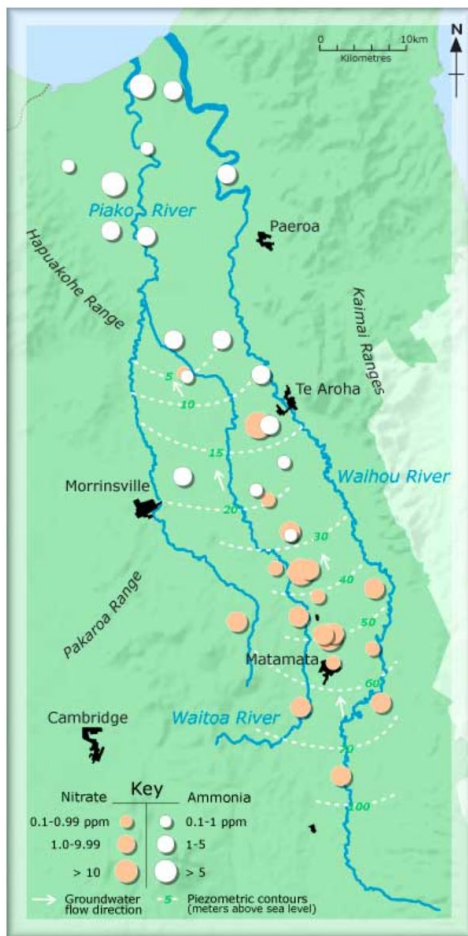
The Matamata-Piako District is made up of three rivers which feed into the Hauraki Gulf. These are the Piako River, Waihou River and Waitoa River. While territorial authorities include certain geographical features into their district, our environment in one district has effects elsewhere as these waterways pass through a number of areas. Therefore, in the data collection sets below, our districts three rivers are included in the Hauraki catchment.

Groundwater quality across the Hauraki Plains is highly variable, however there is more groundwater available than what is presently used each year. The aquifers in the Hauraki Plains are made up of gravel, sand and layers of silt or clay and located in areas of alluvial sediment.

For the most up to date information on Ground water flow in the Matamata-Piako District, please visit Waikato Regional Council’s webpage for an interactive map of groundwater levels in the region. Please select Bore 64 if you would to view the latest live feed for our district:

<https://www.waikatoregion.govt.nz/environment/envirohub/environmental-maps-and-data/station/15742/GWL?dt=Groundwater+Level>

Concentrations of nitrogen and ammonia at sampled sites in the Hauraki Plains



Aquifers recharge by rain falling on the Southern aspect of the Plains. In doing so, the emerging groundwater feeds the streams that are upwelling on the northern low lying aspects of the plains.

Image shows nitrate and dissolved oxygen levels in groundwater are higher in the Southern parts of the Plains than compared to the north. Iron and aluminium levels display the opposite pattern however, with there being high concentrations occurring in the northern parts of the Plains due to the peat content in the soil.

Diagram extract from Waikato Regional Council showing Ground water Quality at testing sites within the Hauraki Plains:

<https://www.waikatoregion.govt.nz/environment/water/groundwater/groundwater-around-the-region/>

River Water Quality for Contact Recreation

Routine monitoring of rivers and streams in the region, is used to assess the suitability of the water for recreational water activities such as swimming and other water sports. Micro-organisms from human and animal faeces can get into the waterways. This can be dangerous for people exposed to these organisms. Other matter such as silts and clay can enter the waterways, reducing the water clarity.

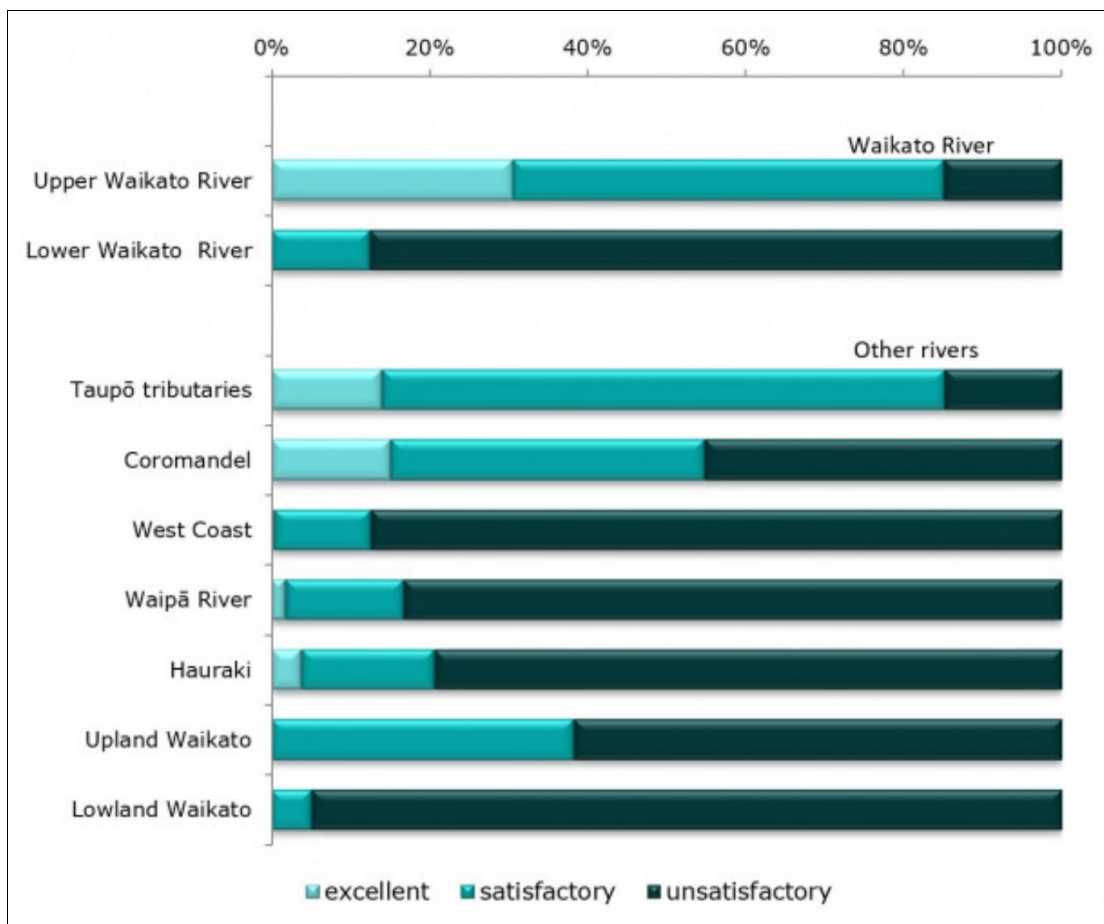
There are a total of 115 sites across the Waikato Region, where testing takes place. There are two important water quality measures taken for each site – faecal bacteria levels and water clarity. Using these values, a ‘pass rate’ is determined for each site.

The results paint an interesting picture. There are some parts of the region where river water quality is good, such as the upper Waikato River, tributaries of Lake Taupo and Coromandel waterways. River water quality in the lowland areas such as the Hauraki and lowland tributaries of the Waikato River aren’t as good which is reflective of the greater land use activities in the lowland aspects of the region and due to waterways collecting water pollutants and creating a pooling of these contaminants. Increased levels of faecal bacteria and fine silts, and impacts of non-point source contamination from runoff are significant attributing factors.

The Waihou/ Piako catchment is not represented in the data carried by Waikato Regional Council, however from the data that is present on the Hauraki catchment we are able to derive

a fair picture of river quality as the Waihou/ Piako catchment feeds into the Hauraki Catchment/ Gulf.

The graph below shows the percent of samples from rivers around the region meeting or exceeding water quality guidelines for recreational use between 2015 - 2019. These are categorised as excellent, satisfactory or unsatisfactory. River samples from within the Hauraki area indicates that less than 5% of the sites sampled – proved to have excellent river water quality for recreational use. It should be noted that over 80% of sample sites from rivers within the Hauraki area showed to have unsatisfactory water quality for recreational use. Please read below for information specific to each of our three rivers in a recreational use context.



Graph sourced from <https://www.waikatoregion.govt.nz/environment/water/river-and-stream-monitoring/indicator-river-water-quality-contact-recreation/>

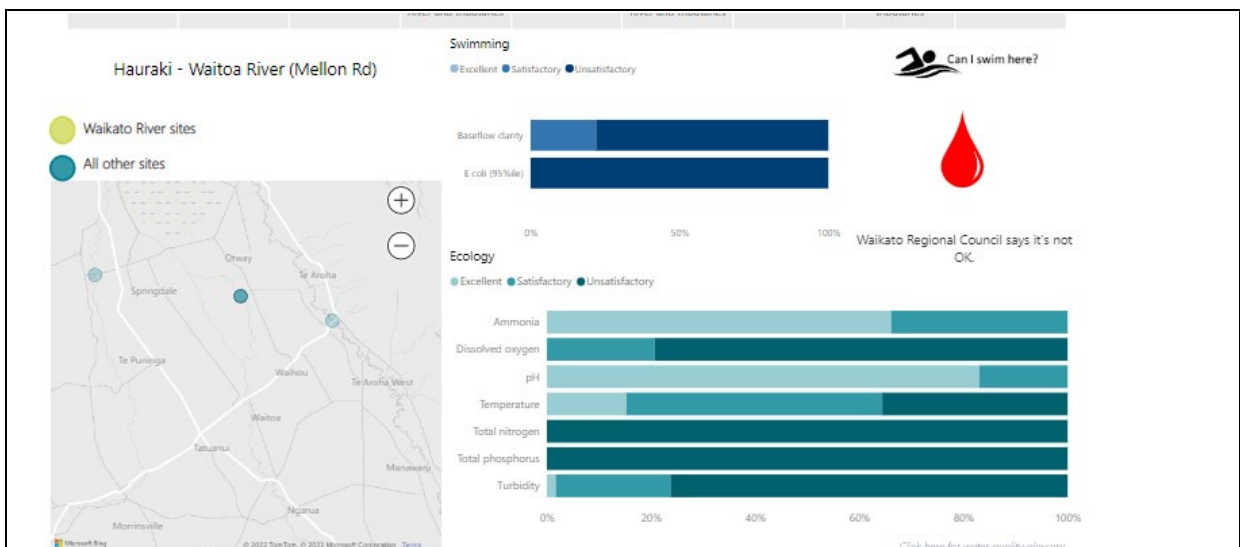
To focus on the Matamata-Piako District a little closer, below are three snapshots of river water quality for contact recreation in the Piako River, Waitoa and Waihou Rivers. Sourced from <https://www.waikatoregion.govt.nz/environment/natural-resources/water/rivers/water-quality-monitoring-map/>



Piako River:

The dark blue shading indicates the water sample returned an 'unsatisfactory' result for both baseflow clarity and presence of E.Coli. The ecology tests show that the Piako River sample contained unsatisfactory levels of nitrogen, phosphorus and high turbidity (suspended particles). There was low levels of ammonia and a suitable pH level.

Despite over half of the indicators being either excellent or satisfactory – The Waikato Regional Council deemed the Piako River unsafe for recreational use.

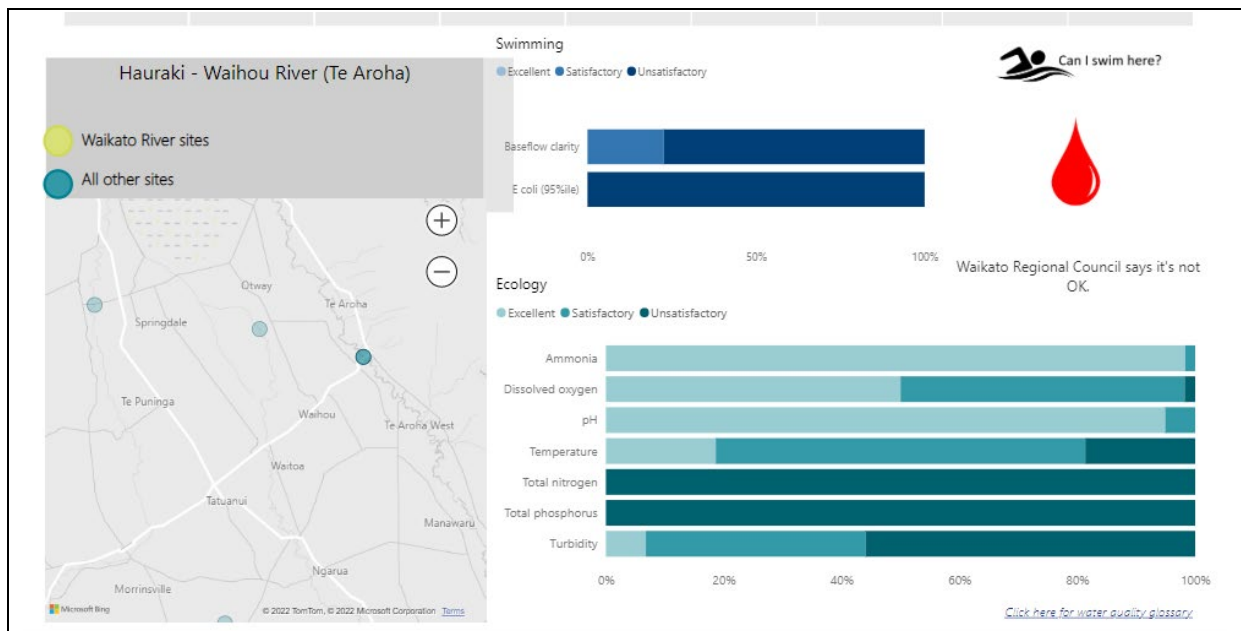


Waitoa River:

Similarly to the Piako River, both indicators showing water clarity and E.Coli levels have produced mostly unsatisfactory samples for recreational swimming.

The ecology samples from the Waitoa River show that there are still unsatisfactory levels of phosphorus present, and even higher levels of nitrogen compared to the Piako River. There is concerning levels of dissolved oxygen which suggest the water has a very poor ability to support aquatic life. There are also slightly higher levels of ammonia in the Waitoa River.

The Waikato Regional Council have deemed the river water in the Waitoa River unsafe for recreational use.



Waihou River:

The Waihou River samples have demonstrated low levels of ammonia, satisfactory levels of dissolved oxygen and excellent pH levels. Much like the Waitoa and Piako rivers, there are still very high levels of nitrogen, phosphorus and turbidity. There are also unsatisfactory levels of water clarity and E.Coli.

The Waihou River was deemed unsafe for recreational use.