

Water Quality Summary for the Mangaotaki-Mairoa Sub-catchment (SC) - 2021

Site Names	Frequency of sampling	Number of samples
KCRC Sites: 9-Kihikihi Stm-232 10-Waitanguru Stm-376 11-Mangaotaki R.	Quarterly sampling	12
WRC Site: ■ Mangaotaki River-SH3 Br	Monthly sampling	12
Total number of samples in 2021		24

Explanatory notes provided below the Table

Annual summary	Deviation from Sub-catchment (SC) Baselines [‡] & the National Bottom Line (NBL) [Ⓞ]	Seasonal & Geographic Patterns
<p><i>E. coli</i>¹, is the main contaminants of concern.</p> <p>Sediment¹ and DRP^a were elevated at 10-Waitanguru stream. Sediment was elevated at Mangaotaki River, the WRC site.</p> <p>Site 9-Kihikihi stream had the best water quality and Mangaotaki River had the lowest water quality in 2021.</p>	<p><i>E. coli</i> - The National Bottom Line for <i>E. coli</i> for swim water quality is 540 cells/100ml. The SC baseline is 5,000 cells/100ml water - significantly exceeding national limits. Only one site, Mangaotaki River - the WRC sit, exceeded national limits in 2021. No sites monitored in 2021 exceeded the SC baseline for <i>E. coli</i>.</p> <p>DRP – The SC baseline is 0.009 mg P/L. There is no NBL for DRP. Concentrations of DRP at 10-Waitanguru stream were 0.015, exceeding the SC baseline.</p> <p>Sediment – Sediment is estimated by water clarity. The NBL for water clarity in Moaku River is 1.34 m. The SC baseline for water clarity is 0.79 m. Sediment was elevated at 10-Waitanguru stream and Mangaotaki River, the WRC site. Median water clarity at these sites were 1.25 m and 1.02 m, respectively.</p>	<p><i>E. coli</i> – Concentrations were greatest at Mangaotaki River-SH3 Br in summer, but were also elevated at this site during autumn and winter. The lowest concentrations were recorded in winter. The highest concentrations were recorded at <u>11-Mangaotaki R.</u> in winter. All sites were below national limits in spring.</p> <p>DRP – The highest concentration was recorded at <u>10-Waitanguru stream</u> during summer. This was a significant peak suggesting the source was close to the monitoring site or that the sample may have been contaminated. The lowest concentrations were consistently recorded at <u>9-Kihikihi stream</u>.</p> <p>Sediment – The highest water clarity (e.g. lowest suspended sediment) was recorded in <u>9-Kihikihi stream</u> in summer & autumn. The lowest water clarity was recorded at <u>Mangaotaki River</u>, in winter.</p>

Explanatory Notes

[‡] **SC Baselines** – Have been determined for each sub-catchment using data collected by Waikato Regional Council (WRC) between Jan 2015 up to and including Aug 2020.

[°] **National Bottom Lines (NBL)** - and attribute bands have been defined under the National Policy Statement for Freshwater Management (2020). Attribute bands for sediment and dissolved reactive phosphorus (DRP) have been assigned on the basis of ecological impacts to communities. NBL has been set for DRP.

¹ ***E. coli (Escherichia coli)*** - A type of bacteria commonly found in the gut of warm-blooded animals and people. *E. coli* naturally occurs in freshwater and is not usually harmful in itself. However, high concentrations of this bacteria exceeding water quality guidelines indicate faecal contamination which can be harmful to humans. *E. coli* is not in itself a risk to ecological health but can be associated with increased nutrients and lower water clarity which can both negatively impact aquatic communities.

¹ **Ammonia** - Covers two forms of nitrogen: ammonia and ammonium. Animal waste (particularly from humans and farmed animals such as sheep and cows) is the major source of ammoniacal nitrogen in New Zealand waterways. If ammoniacal nitrogen reaches very high concentrations it can become toxic under certain temperature and pH conditions.

¹ **Nitrate** - A highly soluble form of [nitrogen](#) that is both a nutrient and, in excess quantities, a toxic substance. Ammoniacal nitrogen is converted to nitrate nitrogen in soils, from where it can then leach into waterways. Nitrate is a plant fertiliser, however, due to its high solubility in water, it is one of the most common contaminants in rural and urban areas.

¹ **Sediment** - Determined as the inverse of water clarity where the higher the clarity the lower the concentrations of suspended sediment and algae. Clarity refers to light transmission through water and has two important aspects: visual clarity and light penetration. Visual clarity can decrease depending on how much sediment, runoff or algae is in the water. Sediment can come from road runoff during rain, or from slips or bank erosion. Algae blooms can also reduce water clarity.

Sediment impacts aquatic life in New Zealand's streams and rivers, while adapted to short-term seasonal pulses of sediment, excessive and/or chronic sediment loading - particularly fine sediment - is extremely damaging to aquatic ecosystems. Fine sediment clogs animals' gills and reducing their ability to see and smothers freshwater and marine habitats. Sediment also contains nutrients and other contaminants which can be released into waterways causing other issues.

[°] **Phosphorus** - Is an essential nutrient for plant and animal life. Total phosphorus (TP) includes all concentrations in a sample, whether dissolved, in solid form or bound to sediment in the river. Dissolved reactive phosphorus (DRP) is the portion which is dissolved and can immediately support plant and algae growth. Excess phosphorus in our rivers can cause large amounts of (sometimes toxic) algae to grow, which can harm river health and reduce the recreational and aesthetic value of rivers. DRP can be influenced by external factors like fertilizer application as well as intrinsic catchment qualities like geology.

General Note - KCRC and WRC use different laboratories to analyse samples, some differences in techniques may influence the sensitivity of measurements.