# Water Quality Summary for the Mid Mokau- Pio Pio Sub-catchment (SC) - 2021

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| **Site Names** | **Frequency of sampling** | **Number of samples** |
| **KCRC Sites:**  7-Mokau R, above Wairere Dam  12-Mangakowhai Strm-344  13-Mokau R. HWY 4  14-Mangapehi R. HWY 4  15-Mapara Stm  16-Mokau R. @ Piopio domain | Quarterly sampling | 24 |
| **WRC Site:**   * No sites |  | 0 |
| **Total number of samples in 2021** | | **24** |

***Explanatory notes provided below the Table***

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| **Annual summary** | **Deviation from Sub-catchment (SC) Baselines *Ŧ* & the National Bottom Line (NBL)Φ** | **Seasonal & Geographic Patterns** |
| ***E. coli*˥, and Sediment˩** are the main contaminants of concern.  **Nitrate ˧** was elevated at and **DRPɞ** were elevated at 12-Mangakowhai stream.  S**ite 13-Mokau R. at HWY 4 had the best water quality and 12- Mangakowhai stream had the lowest water quality in 2021**. | ***E. coli -*** the National Bottom Line for *E. coli* for swim water quality is 540 cells/100ml. The SC baseline is 5,000 cells/100ml water - significantly exceeding national limits. Only one site monitored in 2021 exceeded national limits, 15-Mapara stream. No sites exceeded the SC baseline for *E. coli*.  **Nitrate –** The NBL for nitrate toxicity is 2.4 (mg N/L). The SC baseline is 0.54 mg N/L – below national limits. Only site 12-Mangakowhai stream exceed the SC baseline and although concentrations were well below the NBL, nitrate was much higher at this site than any other in the SC.  **DRP –** There is no NBL for DRP. The baseline for Mokau River is 0.009 mg P/L. Concentrations of DRP in the Mangakowhai stream exceed the SC baseline and were significantly higher than any other site in the SC.  **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 50% of the sites (3 out of 6) in the SC, falling below the NBL. All sites were above the SC baseline for water clarity. | ***E. coli* –** The highest **c**oncentration in 2021 was measured in spring at site 15-Mapara stream. The lowest concentrations were recorded in winter. The lowest concentrations were reordered in 13-Mokau River – HWY4.  **Nitrate –** The highest concentrations across all sites were recorded in winter.Concentrations at 12-Mangakowhai stream exceeded the SC baseline across all seasons with the highest concentrations measured in winter and autumn. The lowest concentration was recorded at site 7-Mokau River (above the Wairere dam). All sites recorded the lowest nitrate concentration over summer.  **DRP –**The highest concentration was recorded at 12-Mangakowhai stream during winter. 12-Mangakowhai stream consistently had much higher concentrations than any other site across all seasons. The lowest concentrations were recorded at sites 7 and 13 in the Mokau River over summer.  **Sediment –** The highest water clarity (e.g. lowest suspended sediment) was recorded in 12-Mangakowhai stream and 16-Mokau River @ Piopio domain in summer. The lowest water clarity was recorded at 7-Mokau River (above the Wairere dam), in winter. Water clarity was lower in winter for all sites except for 15-Mapara stream which had a clarity of 2 m during winter. |

**Explanatory Notes**

***Ŧ*** **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.

**ΦNational 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.

**˥*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.

**˧ 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.

**˧ Nitrate -** A highly soluble form of [nitrogen](https://www.lawa.org.nz/learn/glossary/n/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.

**˩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.

**ɞPhosphorus** - 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.