Adaptive
Environmental Consulting

Upper Mangaokewa – Annual River Monitoring Summary - 2025

Catchment monitoring by King Country River Care commenced in May 2021 and covers between four to six monitoring sites sampled on a quarterly basis. Waikato Regional Council (WRC) has one monitoring site at Lawrence St Bridge, Te Kuiti, which is monitored monthly. A water quality baseline was calculated from the time the catchment group was formed using five years (Jan 2015 – Dec 2019) of monthly monitoring data, collected at the WRC site. The location of the seven monitoring sites are shown on Map 1 (see page 2).

2025 represents the fifth consecutive year of catchment monitoring. Water samples were collected on 27 Feb, 15 May, 25 August and 12 November, during stable weather to avoid any significant rainfall events. River flow strongly influences water quality and the river flow hydrograph for the Upper Mangaokewa River is provided on page 5.

Key Resources Being Lost from the Land

Monitoring results show the key resources being lost from the Upper Mangaokewa catchment in 2025 were Nitrogen, Sediment (reflected by low water clarity) and *E. coli.* Nitrogen was slightly elevated in three out of five sites and elevated in Mangawhauwhi stream. Suspended Sediment was slightly elevated at Lawrence Street Bridge and elevated the two Waiteti stream sites, while *E. coli* was elevated in four out of five sites. Loss of Sediment and Nitrogen represents a loss of soil and nutrients, while elevated *E. coli* represents a loss of organic matter and nutrients as it is largely associated with animal manure in rural catchments.

The below water quality dials summarise the results collected in the Upper Mangaokewa catchment. The dial on the left shows the baseline for the catchment, covering 5 years of regional council monitoring at Lawrence Street Bridge in Te Kuiti. The dial on the right combines all data collected in 2025 at five sites, 27 samples in total. Arrows indicate either an increase or decrease in values compared to the sub-catchment baseline. An increase in water clarity is positive for river health while an increase in all other indicators may impair river health.

In 2025, indicators for phosphorus, nitrogen and water clarity/suspended sediment met water quality limits, while *E. coli* did not. Compared to the baseline – Water clarity was greater in 2025 and the concentration of dissolved reactive phosphorus and nitrogen were lower (see Figure 1).

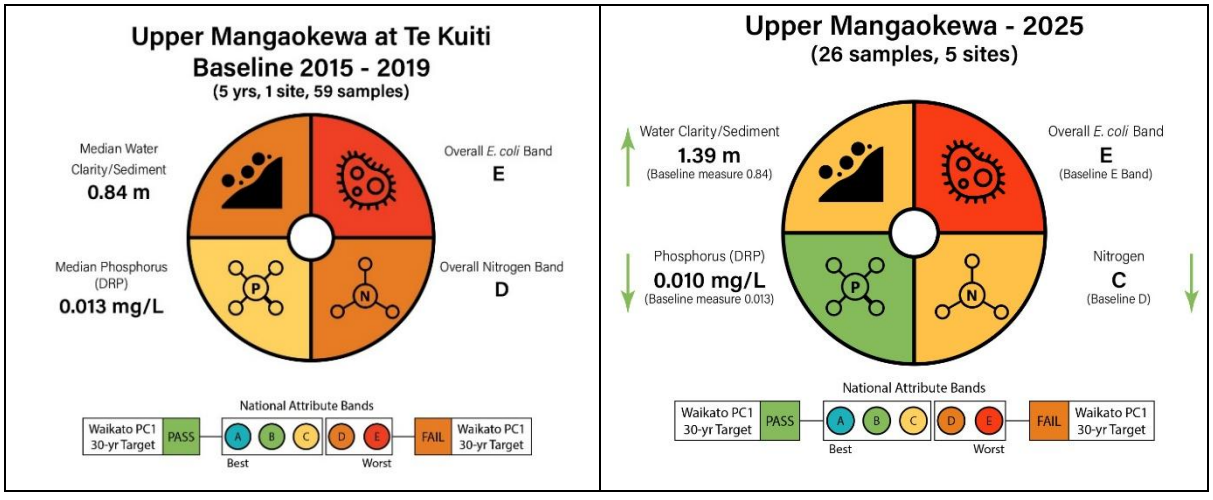
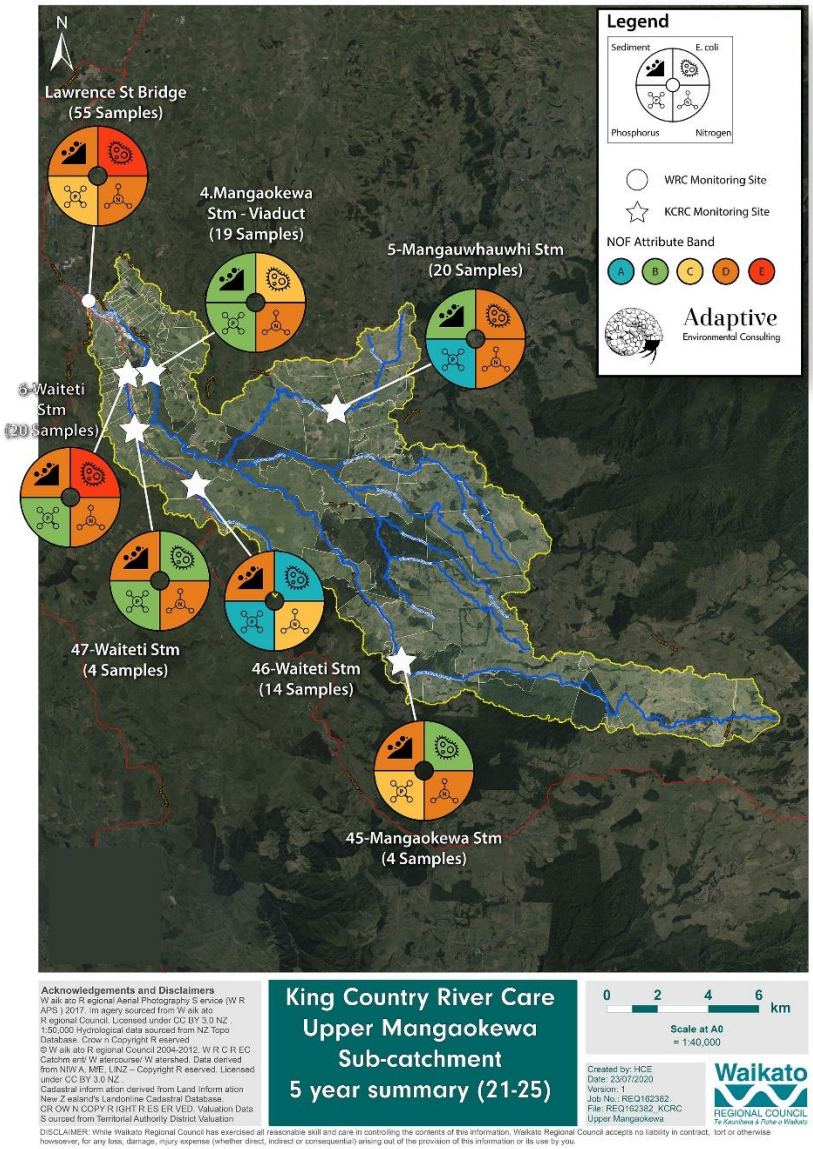


Figure 1. Water quality dials for the five sites in the Upper Mangaokewa catchment. The dial on the left shows the sub-catchment baseline (2015-2019) and the dial on the right combines results collected in the 2025 monitoring period.

The above results have been assessed against the national freshwater attribute bands under the national policy statement for freshwater (NPS-FM 2020). The overall *E. coli* band is based on the following four measures, the percentage of samples exceeding 540 (CFU/100ml), the percentage of samples exceeding 260 (CFU/100ml), the median value and the 95th percentile (or upper 5% of *E. coli* concentrations). The overall nitrogen band is based on the following six measures, Nitrate Toxicity (median and 95th percentile), Ammonia Toxicity (median and maximum annual value) and Dissolved Inorganic Nitrogen (median and 95th percentile).

The dials on the map below show water quality data from seven monitoring sites in the Upper Mangaokewa River catchment. Each dial reflects all data collected at the site since the KCRC monitoring programme commenced in 2021, see Map 1 below.



Map 1. Water quality monitoring results for 5 years of data at the six monitoring sites in Upper Mangaokewa and the WRC Site at Lawrence St Bridge.

Water Quality Tables

Table 1 on the following page presents detailed results for the five monitoring sites (4 KCRC site and 1 WRC site) over the 2025 period. The results of the five-year water quality baseline (2015 – 2019) are shown on the bottom row.

Which resources are being lost, and where is this occurring?

The key resources being lost from the catchment listed in order of significance were:

1. *E. coli*: Elevated at four sites, the Mangawhauwhi stream, Mangaokewa stream viaduct, Waiteti stream viaduct, and Lawrence Street Bridge. Lawrence Street Bridge was extremely elevated, followed closely by Waiteti stream viaduct.
2. Suspended Sediment: Two sites in the Waiteti stream failed to reach the national bottom line due to elevated levels, while Lawrence Street Bridge at Te Kuiti was slightly elevated.
3. Nitrate-Nitrogen: Elevated at one site, the Mangawhauwhi Stream, which returned the highest concentration, and slightly elevated at three sites, Mangaokewa stream viaduct, Waiteti stream viaduct, and Lawrence Street Bridge.

Water quality results have been assessed under both regional (PC1) & national (NPS-FM) water quality targets and have been colour coded as shown the adjacent key, Figure 2.

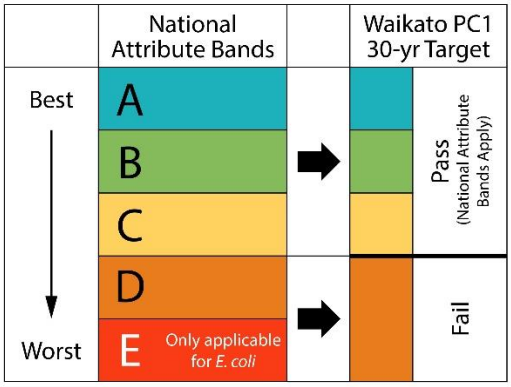


Figure 2 Key for grading shown in Tables 1 to 3

The overall *E. coli* band is based on the following four measures, the percentage of samples exceeding 540 and 260 (CFU/100ml), the median value and the 95th percentile (or upper 5% of *E. coli* concentrations).

The overall nitrogen band is based on the following six measures, Nitrate Toxicity (median and 95th percentile), Ammonia Toxicity (median and maximum annual value) and Dissolved Inorganic Nitrogen (median and 95th percentile).

Table 1) Water quality indicators for individual sites in the Upper Mangaokewa catchment recorded over the 2025 monitoring period. Measured values have been assessed against the National Attribute Bands (NPS-FM, 2020).

Upper Mangaokewa[1] Annual Summary 2025	Number of Samples	Human Health					Ecosystem Health										
							Water Quality									Sediment	
		E. coli /100 ml					Nitrate (mg N/L)		Ammonia (mg N/L)		Dissolved Inorganic Nitrogen-DIN (mg N/L)		Overall Nitrogen Band	Dissolved Reactive Phosphorus (mg/L)		Water Clarity Value[2]	National Bottom Line
KCRC SITES Lab: Analytica		% Exc. > 540	% Exc. > 260	Median	95th Percentile	Overall Band	Median	95th Percentile	Median	Annual Maximum	Median	95th Percentile		Median	95th Percentile	Median	
4-Mangaokewa Stm (viaduct)	4	25%	75%	360	591	D	0.59	0.81	0.005	0.020	0.59	0.81	C	0.013	0.017	1.77	1.34
5-Mangawhauwhi Stm	4	50%	75%	460	1,783	E	0.78	1.06	0.007	0.020	0.78	1.06	D	0.008	0.020	1.66	1.34
6-Waiteti Stm (viaduct entrance)	4	75%	100%	680	2,742	E	0.51	0.70	0.010	0.020	0.51	0.71	C	0.008	0.010	1.21	1.34
46-Waiteti stream (Upper)	4	0%	0%	150	150	B	0.28	0.37	0.005	0.010	0.28	0.38	A	0.014	0.016	1.29	1.34
WRC SITES Lab: Hills																	
Lawrence Street Br	10	73%	91%	1,100	3,700	E	0.64	1.04	0.008	0.066	0.76	1.06	C	0.010	0.021	1.36	**1.34**
Mangaokewa R. Baseline (Jan-2015 to Dec-2019)	**59**	**44%**	**73%**	**480**	**16,400**	**E**	**0.63**	**1.03**	**0.014**	**0.240**	**0.630**	**1.060**	**D**	**0.013**	**0.028**	**0.84**	**1.34**

[1]*Assessed against PC1 & NPS-FM where the most stringent measures apply.*

[2]*Water clarity has been converted from measured turbidity using the formular ln(CLAR) = 1.21 – 0.72 ln(TURB) (Franklin, Booker & Stoffels, 2020).*

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River Flow Graph

The graph below shows river flow recorded by Waikato Regional Council at Mangaokewa River between 1 Jan 2025 and 31 Dec 2025. The black arrows indicate quarterly sampling days (Figure 2).

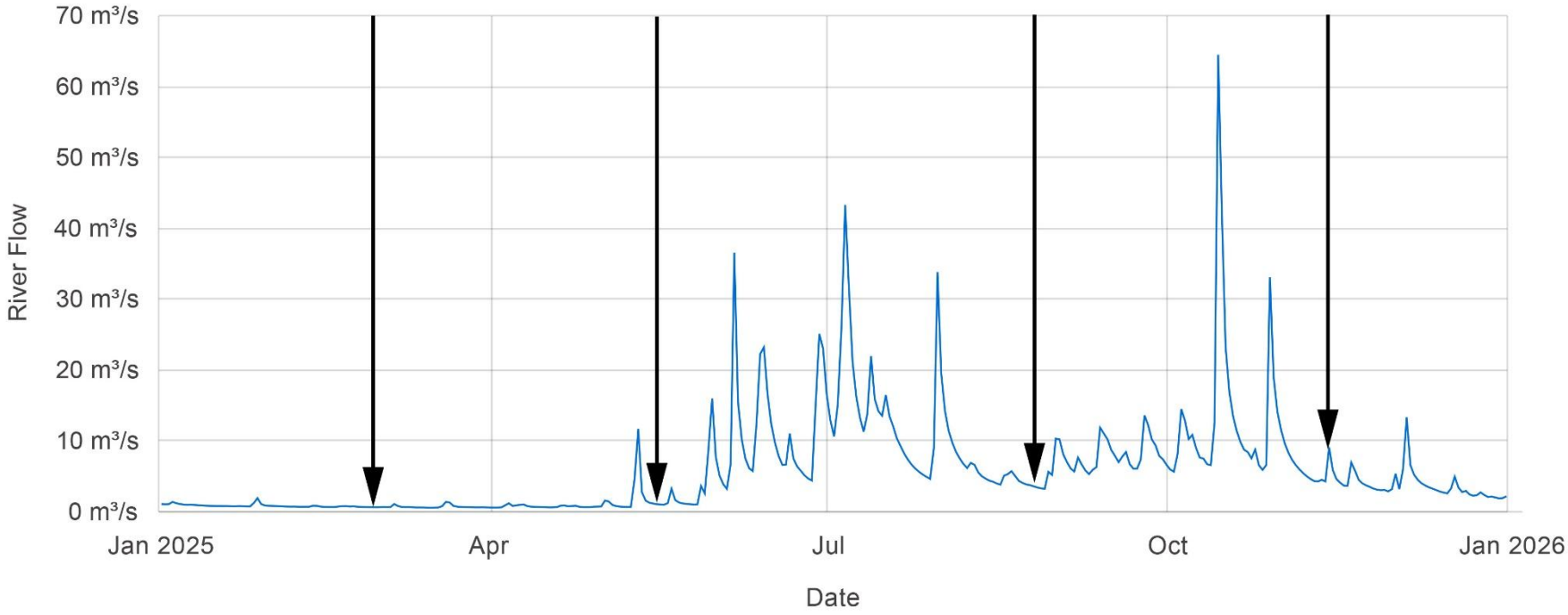

Figure 2. River flow recorded by Waikato Regional Council at Mangaokewa River. The black arrows indicate catchment monitoring days.