Adaptive Environmental Consulting

Kawhia Harbour – Annual River Monitoring Summary - 2024

Catchment monitoring, commissioned by the Kawhia Harbour Care, commenced in May 2022 and covers 8 monitoring sites sampled on a quarterly basis. There are 5 monitoring sites in North Kawhia and 4 sites in South Kawhia. Waikato Regional Council (WRC) has one monitoring site in the lower Oparau River (North Kawhia), which is monitored monthly. A water quality baseline was calculated from the time the catchment group was formed using five years of monitoring data (Jan 2016 – Dec 2020). The data was collected monthly at the WRC site. The location of the 5 monitoring sites in North Kawhia are shown on Map 1 (see page 2). The location of the 4 monitoring sites in South Kawhia are shown on Map 2 (see page 4).

2024 represents the third consecutive year of catchment monitoring. Water samples were collected on 14 Feb, 13 May, 22 August and 18 November. Samples were collected during stable weather to avoid any significant rainfall events. River flow strongly influences water quality, the river flow graph for Oparau River is provided on page 7.

North Kawhia Catchment – Key Resources Being Lost from the Land

Monitoring Results show that the key resources being lost from the North Kawhia catchment are Sediment and *E. coli*. *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 from the 5 sites in the North Kawhia catchment. The dial on the left shows the baseline for the catchment, calculated from 5 years of regional council monitoring at Oparau River, 58 individual samples in total. The dial on the right combines all data collected in the catchment in 2024, 28 samples in total. Arrows indicate either an increase or decrease in values compared to the sub-catchment baseline levels. An increase in water clarity is positive for river health while an increase in all other indicators may impair river health.

In 2024, nutrient indicators met national water quality limits while *E. coli* and water clarity/suspended sediment did not. Compared to the baseline – Water clarity and dissolved reactive phosphorus were lower in 2024 (see Figure 1).

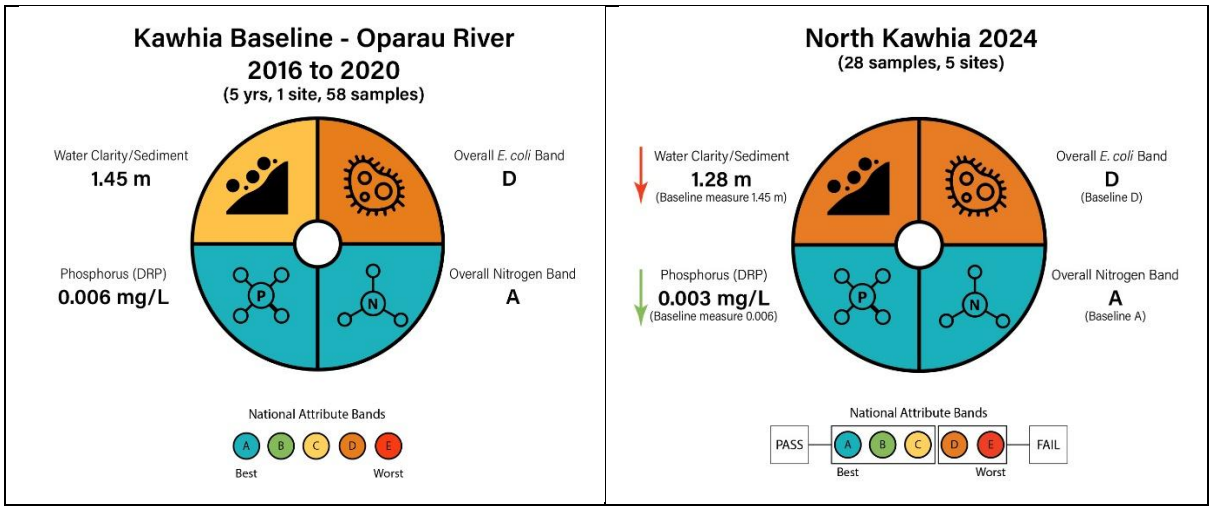


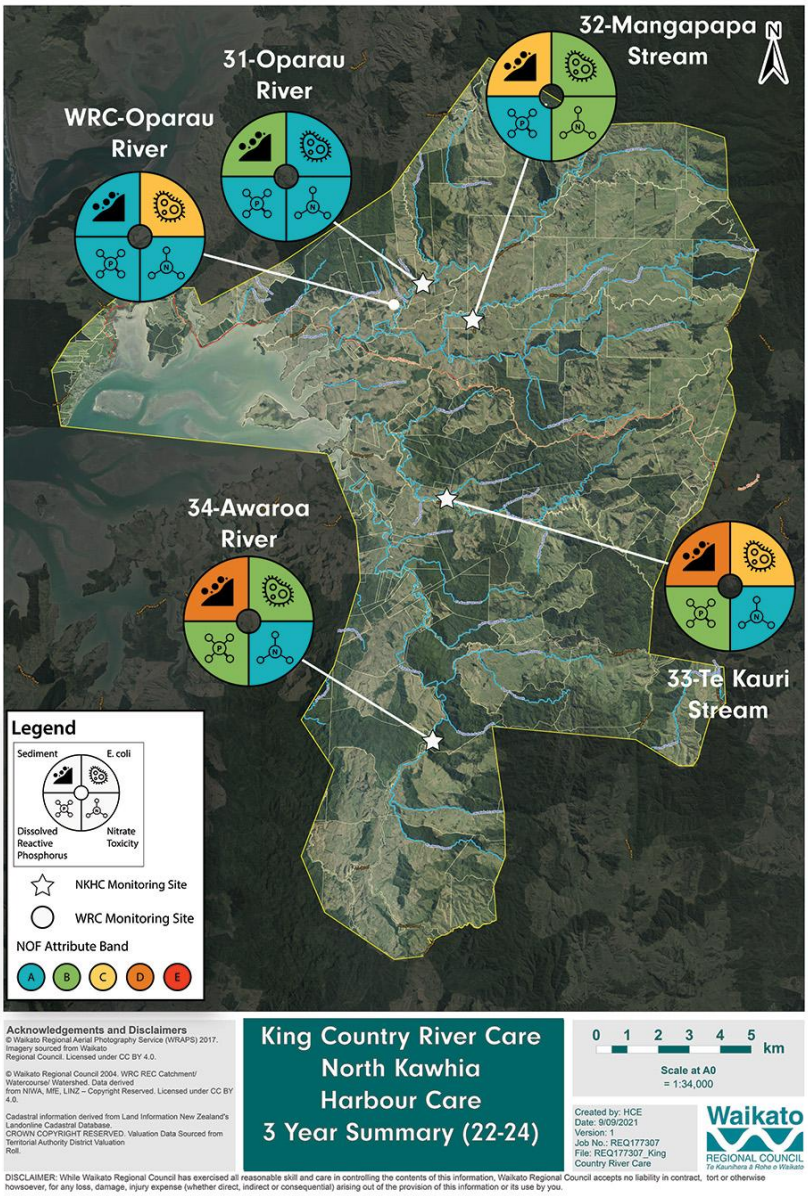
Figure 1. Water quality dials for the five sites in the North Kawhia catchment. The dial on the left shows the sub-catchment baseline (2016-2020) and the dial on the right combines results collected in the 2024 monitoring period.

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 five monitoring sites in the North Kawhia catchment. Each dial reflects all data collected at the site since the KCRC monitoring programme in 2022, see Map 1 below.



Map 1. Water quality monitoring results for 3 years of data at the four monitoring sites and the WRC Site at Oparau River in North Kawhia.

South Kawhia– Key Resources Being Lost from the Land

Monitoring results show the key resource being lost from the South Kawhia catchment is *E. coli*. *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 from the 4 sites in the South Kawhia catchment. The dial on the left shows the baseline for the catchment, cover 5 years of regional council monitoring at Oparau River, 58 individual samples in total. Note the national bottom line for water clarity/suspended sediment has been adjusted on the baseline dial to match the river environment classification for south Kawhia (Hard Sedimentary). The dial on the right combines all data collected at the four sites in 2024, 16 samples in total. Arrows indicate either an increase or decrease in values compared to the sub-catchment baseline levels. An increase in water clarity is positive for river health while an increase in all other indicators may impair river health.

In 2024, nutrient and water clarity/suspended sediment indicators met national water quality limits while *E. coli* did not. Compared to the (Oparau River) baseline – Water clarity was lower in 2024 but there was no difference for any other parameters (see Figure 2).

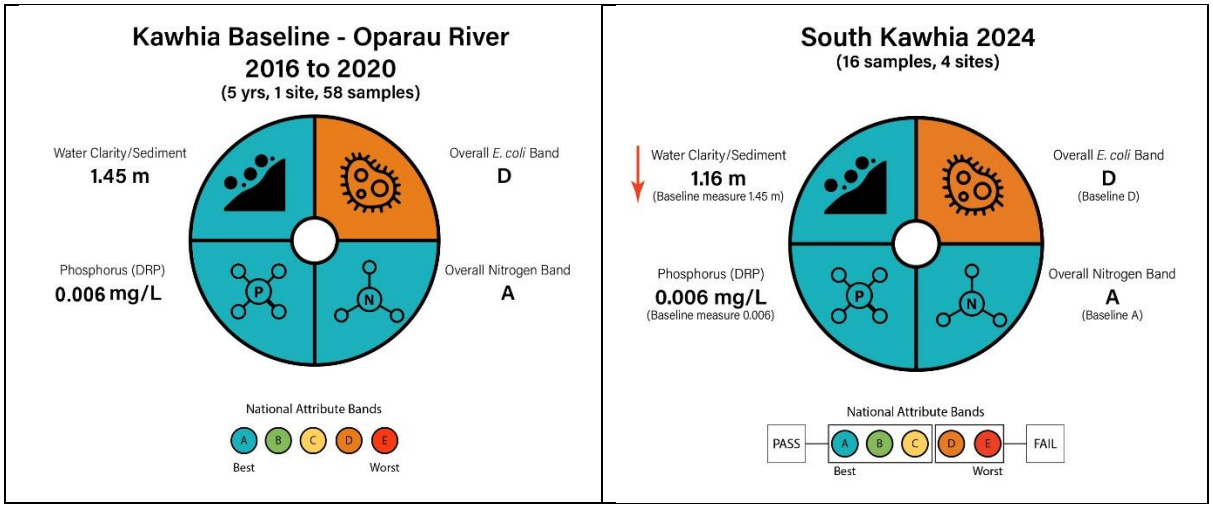


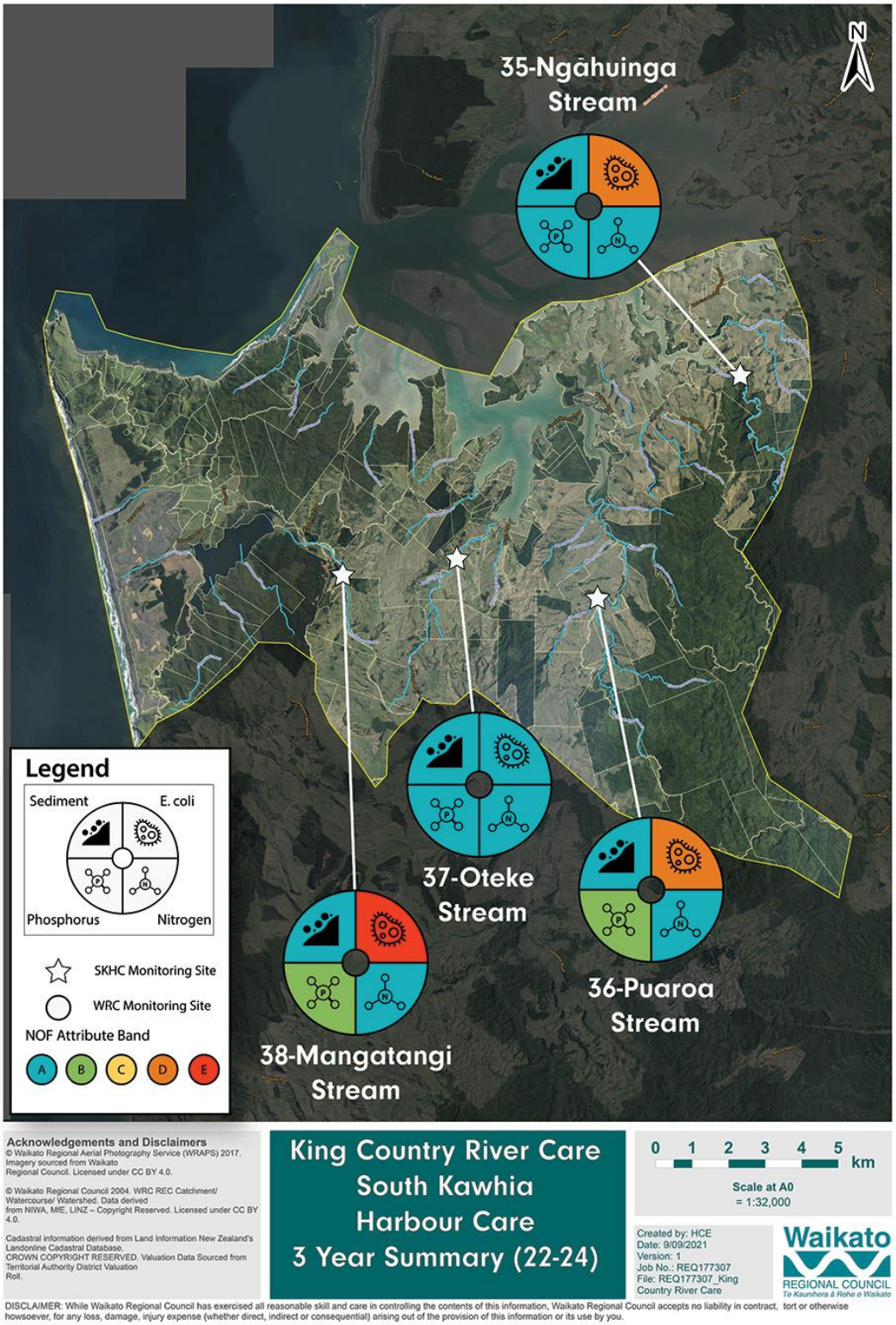
Figure 2. Water quality dials for the four sites in the South Kawhia catchment. The dial on the left shows the sub-catchment baseline (2016-2020) and the dial on the right combines results collected in the 2024 monitoring period.

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 four monitoring sites in the South Kawhia catchment. Each dial reflects all data collected at the site since the KCRC monitoring programme in 2022, see Map 2 below.



Map 2. Water quality monitoring results for 3 years of data at the four monitoring sites in South Kawhia catchment.

Water Quality Tables

Tables 1 & 2 on the following pages present detailed results for each site covering five water quality indicators – *E. coli,* nitrogen, dissolved reactive phosphorus, temperature and sediment (reflected by water clarity).

Results for the five sites in North Kawhia, including the Waikato Regional Council monitoring site are presented in Table 1. The results of the five-year water quality baseline (2016 – 2020) are also presented here. The baseline was calculated from five years of monthly regional council monitoring data, collected at the Oparau River site.

The results for the 4 sites across South Kawhia are presented in Table 2.

Which Resources are Being Lost and Where are the Hotspots

The key resources being lost from the North Kawhia catchment in 2024, listed in order of significance, were:

1. *E. coli*: Elevated at all sites except for the KCRC Oparau River site. The highest concentration was recorded at the WRC Oparau River site, due to a peak reading of 3,700 on the 15 May.
2. Sediment: three out of five sites had elevated concentrations, reflected by a reduction in water clarity. The highest concentrations of suspended sediment were recorded for Te Kauri stream. Suspended sediment concentrations were low in the Oparau River (both KCRC and WRC sites).

The key resource being lost from the South Kawhia catchment in 2024 was *E. coli.*

- Three out of four sites had elevated *E. coli* readings. The highest *E. coli* measurements were recorded at Mangatangi Stream and the lowest were recorded in the Oteke stream.

Water quality results have been assessed under national (NPS-FM) water quality targets and have been colour coded as shown the adjacent key, Figure 4.

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).

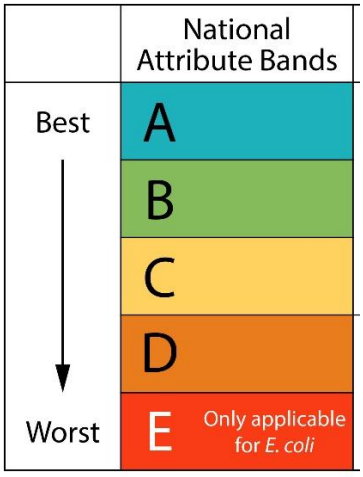


Figure 3 Key for grading shown in Tables 1 to 3

Table 1) Water quality indicators for individual sites in the North Kawhia catchment recorded over the 2024 monitoring period. Measured values have been assessed against the National Attribute Bands (NPS-FM, 2020).

North Kawhia 2024 Summary	Number of Samples	*E. coli* /100 ml					Ecosystem Health										
							Water Quality										
							Nitrate Toxicity (TON mg		Ammonia Toxicity (mg N/L)		Dissolved Inorganic		Overall Nitrogen Band	Dissolved Reactive		Sediment	
KCRC SITES Lab: Analytica		% Exc. > 540	% Exc. > 260	Median	95th Percentile	Overall Band	Median	95th Percentile	Median	Maximum	Median	95th Percentile		Median	95th Percentile	Median	
31-Oparau R.	4	0%	25%	105	450	B	0.12	0.23	<0.005	<0.005	0.12	0.23	A	0.001	0.003	1.52	
32-Mangapapa Str	4	25%	50%	214	1,158	D	0.52	0.57	<0.005	0.007	0.53	0.57	B	0.001	0.003	1.86	1.34
33-Te Kauri Str	4	0%	50%	**270**	499	D	0.42	0.51	<0.005	0.010	0.43	0.51	A	0.006	0.008	0.85	
34-Awaroa R.	4	0%	25%	185	325	C	0.26	0.42	<0.005	0.006	0.26	0.42	A	0.007	0.014	1.61	
WRC SITES Lab: Hills																	
Oparau River (658_1)	12	8%	42%	190	**1,951**	D	0.14	0.29	<0.005	0.009	0.15	0.30	A	0.004	0.006	1.22	1.34
Oparau River Baseline (Jan-2016 to Dec-2020)	58	16%	34%	205	**2,545**	**D**	**0.10**	**0.38**	**<0.01**	**0.023**	**0.11**	**0.37**	**A**	**0.006**	**0.010**	**1.45**	**1.34**

Table 2) Water quality indicators for individual sites in the South Kawhia catchment, recorded over the 2024 monitoring period. Measured values have been assessed against the National Attribute Bands (NPS-FM, 2020).

South Kawhia - 2024 Summary	Number of Samples	*E. coli* /100 ml					Ecosystem Health										
							Water Quality										
							Nitrate Toxicity (TON mg		Ammonia Toxicity (mg N/L)		Dissolved Inorganic		Overall Nitrogen Band	Dissolved Reactive		Sediment	
KCRC SITES Lab: Analytica		% Exc. > 540	% Exc. > 260	Median	95th Percentile	Overall Band	Median	95th Percentile	Median	Maximum	Median	95th Percentile		Median	95th Percentile	Median	
35-Ngāhuinga Stream	4	0%	50%	**265**	496	D	0.33	0.41	<0.005	<0.005	0.33	0.41	A	0.005	0.006	0.82	
36-Puaroa Stream (Owhiro valley)	4	25%	50%	235	541	D	0.26	0.43	<0.005	0.040	0.26	0.46	A	0.003	0.007	1.28	0.61
37-Oteke Stream	4	7%	39%	83	320	B	0.34	0.39	<0.005	0.006	0.34	0.39	A	0.005	0.006	1.95	
38-Mangatangi Stream	4	25%	50%	**300**	770	D	0.53	0.63	<0.005	0.009	0.53	0.63	B	0.010	0.011	1.08	

River Flow Graph

The graph below shows river flow recorded by Waikato Regional Council at Oparau River between 1 Jan 2023 and 31 Dec 2024. The black arrows indicate quarterly sampling days (Figure 3).

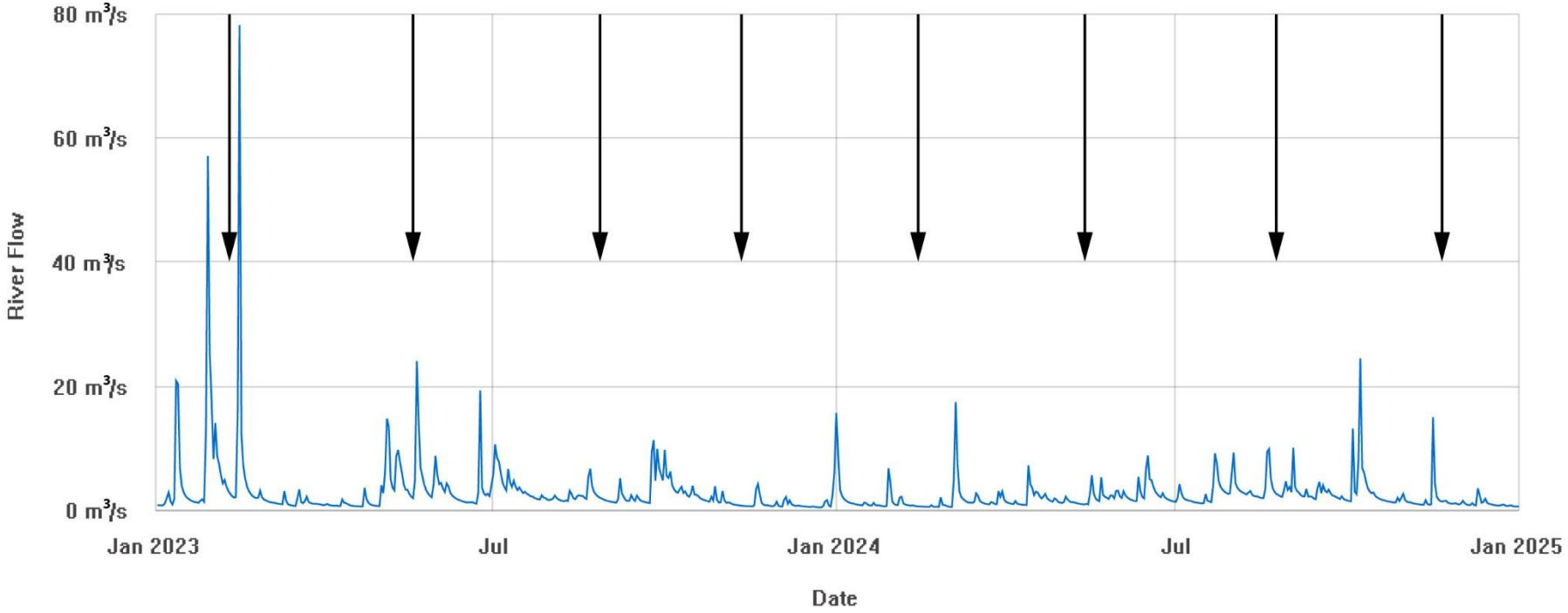


Figure 3. River flow recorded by Waikato Regional Council at Oparau River. The black arrows indicate catchment monitoring days.