Bay of Plenty Regional Council

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The Chairperson and Members

Meeting of Waiari Kaitiaki Advisory Group

1 Introduction

The following report provides a brief summary of the known data on the water quality, ecology, stream flow, and on resource use relevant to the Waiari Stream catchment. More detailed information, such as the full baseline monitoring reports, has been provided to the Waiari Kaitiaki Advisory Group previously, including the ecological monitoring report presented by 4Sight earlier this year.

The stream catchment is approximately 75 km^2 with the upper reaches in forestry, then pastoral farming generally with vegetated stream margins and the lower catchment predominantly in kiwifruit orchards. The Waiari Stream receives treated wastewater from Te Puke and is a consented water source for the municipal supply of water. The municipal water take has not yet been established however, monitoring has been undertaken over several years as part of the application for consent and the consent conditions. The stream has a stopbank for flood control purposes from approximately 3.8km upstream of the confluence with the Kaituna River down to the confluence. The stream water has excellent clarity during fine weather conditions and macroinvertebrate monitoring shows a very gradual declining trend.

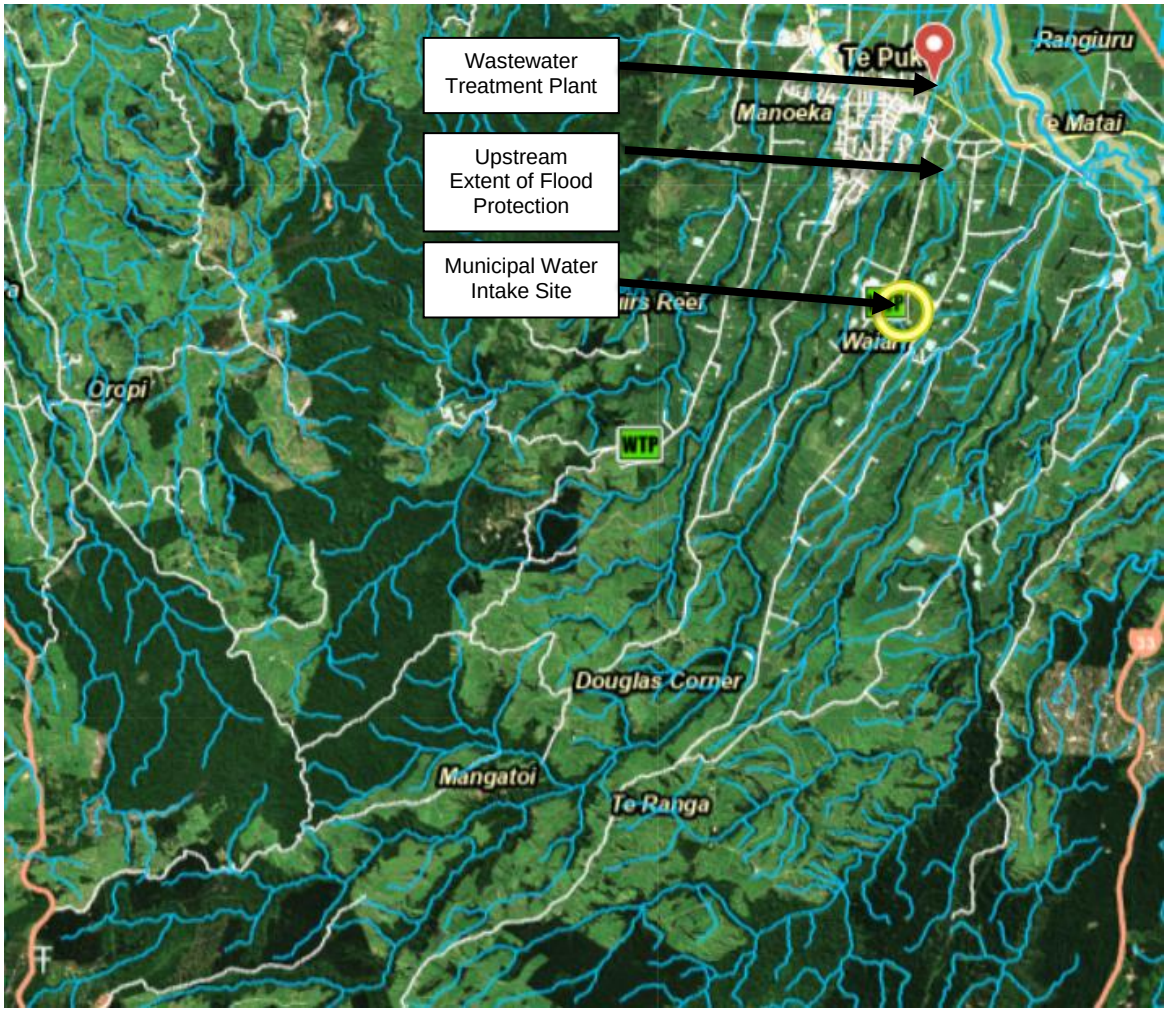


Figure 1 – Waiari Stream catchment features

2 Water Quality

Water quality sampling in 2017[1] at four sites on the Waiari Stream showed dissolved oxygen consistent with Attribute Band A[2]. The sampling sites are above and below the proposed water intake point for the municipal take and above and below the Te Puke wastewater treatment plant. pH at all four sites was above 7 and below 8 and turbidity was very low.

E. coli counts at the discharge from the wastewater treatment plant, prior to the artificial wetland, have been consistently low.

3 Ecological Values

In the NIWA 2002 report the Waiari Stream is described as:

> *The lower Waiari Stream has exceptionally high water clarity, even below the Te Puke sewage treatment plant discharge, and has high biodiversity for a lowland stream in a pastoral catchment. The aquatic plants are dominated by the relatively benign*

[1] Spyksma And Bennett, 4Sight (2017) Waiari Water Treatment Plant: Waiari Stream Baseline Monitoring Report 2017 (objective ref: A2595913)

[2] National Policy Statement for Freshwater Management Attribute Bands provide classification for rivers based on dissolved oxygen results ranging from A being no stress caused by low dissolved oxygen to D being significant, persistent stress on a range of organisms

> *oxygen weed Elodea canadensis, which occupies only the margins of the stream. This species provides good habitat for a wide range of aquatic life.*[3]

The conditions of consent for the TCC municipal supply require three years of baseline monitoring of the stream prior to abstraction starting. This resulted in baseline monitoring and reporting in 2010, 2011, 2012, 2017[4], 2019 and 2020. A technical audit of the 2017 baseline monitoring provides an overall summary of the findings for the reports that pre-date 2018.

Suren (May 2017) Technical Audit of Waiari Stream Baseline Monitoring Report (Objective ref: A2749577):

> *The results of their report clearly showed large differences in the invertebrate communities at the two sites in the upper Waiari (above and below the proposed water take), and the lower Waiari (above and below the Te Puke wastewater treatment plant (WWTP) discharge). Communities at the lower site were generally indicative of lower ecological condition than the upper site. These results were similar to those found previously by Bioresearchers in their surveys in 2010 - 2012. The Spyksma and Bennett report also highlighted differences in invertebrate community composition in sites above and below the Te Puke WWTP, with an increase in the relative abundance of true flies at the lower site, and a decrease in the relative abundance of snails.*
>
> *There were also differences in the fish community composition at the upper and lower sites. For example, more Inanga were found at the sites near Te Puke, most likely reflecting the fact that the site is closer to the coast and therefore more likely to have high numbers of Inanga, which normally do not penetrate far inland. Sites in the upper Waiari contained high numbers of redfin bully, whereas sites near Te Puke supported high numbers of unidentified bullies. It is likely that these unidentified bullies may have been small redfin bullies, which were slowly migrating upstream.*
>
> *The report also highlighted large differences in the aquatic plants communities between the two locations, with macrophytes such as Elodea covering a large amount of the stream bed at the sites near Te Puke, while aquatic plants at the upper sites were dominated by filamentous green algae.*
>
> *A search of the New Zealand Freshwater Fish Database (NZFFD) revealed 20 separate records for the Waiari Stream, collected between 1980 and 2011, and included the previous baseline monitoring programme carried out between 2010 and 2011. The records from the 2012 monitoring were not included in the NZFFD but have been incorporated into the findings presented in this report (Table 4). Common bully and longfin eel were the most commonly recorded species (13 records for each), while redfin bully (12 records), inanga (11 records) and shortfin eel (10 records) were also common. The NZFFD also revealed five records for rainbow trout (Onchorhynchus mykiss). Rainbow trout have been observed near the WTP intake site on previous survey occasions (Bioresearches, 2012; Geoff Mutton, pers. comm.) but were not observed during the 2017 survey.*

[3] Ray, Collier, Wells, Bowman NIWA (2002) Proposed abstraction from Waiari Stream: potential effects on stream ecology, prepared for Tauranga City Council (Objective ref: A229829)

[4] Spyksma And Bennett 4Sight (2017) Waiari Water Treatment Plant: Waiari Stream Baseline Monitoring Report 2017 (objective ref: A2595913)

Macroinvertebrates

Macroinvertebrate sampling has been undertaken as part of the baseline reports referenced above. Applying the results of that sampling to the Attribute Table for Macroinvertebrates of the National Policy Statement for Freshwater Management 2020, gives the following results.

Site	**Attribute band[5]**		
	Feb 2017	**Feb 2019**	**Feb 2020**
1	B to C	C to D	C and D
2	C to D	C to D	C and D
3	D	B	D
4	D	C and A	D

Table 1 – Macroinvertebrate attribute bands from baseline monitoring data[6]

Regional Council's own sampling data for macroinvertebrates at the state highway bridge suggests a very gradual decline in macroinvertebrate ecological health indicators.

Fish

From the 2017 baseline monitoring report is the following summary of fish observed in the stream.

> *A total of seven native fish species were recorded within the Waiari Stream during the 2017 survey (Table 3). At Sites 1 and 2 five native fish species were observed including;*
>
> - *longfin eel (Anguilla dieffenbachii),*
> - *inanga (Galaxias maculatus),*
> - *giant kokopu (G. argenteus),*
> - *redfin bully (Gobiomorphus huttoni) and*
> - *common smelt (Retropinna retropinna).*
> - *A few very small, juvenile bullies (species unidentified) were also recorded, and were likely to be redfin bully.*
>
> *Longfin eel, inanga, redfin bully and common bully (Gobiomorphus cotidianus) were also recorded at Sites 3 and 4, upstream and downstream of the WWTP respectively. Large numbers of inanga were also observed schooling along the edges of the macrophyte beds at both sites. Two very small elver or juvenile eels (Anguilla sp.), were captured, while a mullet (likely a grey mullet, Mugil cephalus) was observed darting away from the area at Site 4.*
>
> *The Fish QIBI for all sites was indicative of 'excellent' habitat quality or connectivity for fish migrations at all sites.[7]*

From the various reports, the total number of fish observed during the baseline monitoring is shown in the table below.

[5] Attribute bands are graded from A being indicative of pristine conditions, B being indicative of mild organic pollution or nutrient enrichment, C being indicative of moderate organic pollution or nutrient enrichment and D being severe organic pollution or nutrient enrichment below the national bottom line. Table 14 of the NPS-FM

[6] The attribute band data needs to be interpreted by an experienced ecologist as many different factors can affect the score, such as the naturally sandy bottom of the stream.

[7] Spyksma And Bennett 4Sight (2017) Waiari Water Treatment Plant: Waiari Stream Baseline Monitoring Report 2017 (objective ref: A2595913)

	Total Number of Fish					
	2010	**2011**	**2012**	**2017**	**2019**	**2020**
Site 1	10	14	8	10	11	10
Site 2	10	11	5	21	13	88
Site 3	128+	18+	16+	28+	44+	62+
Site 4	53+	29	8+	20+	153+	40+

Table 2 – Total fish observed during baseline monitoring

Macrophytes

Information on macrophytes is collected during the baseline monitoring. The following graph is taken from the Waiari Water Treatment Plant: Waiari Stream Monitoring Report 2020 and shows the composition and cover of macrophytes in the stream at the four monitoring sites. Sites 1 and 2 are upstream of the wastewater treatment plant and sites 3 and 4 are downstream of the treatment plant.

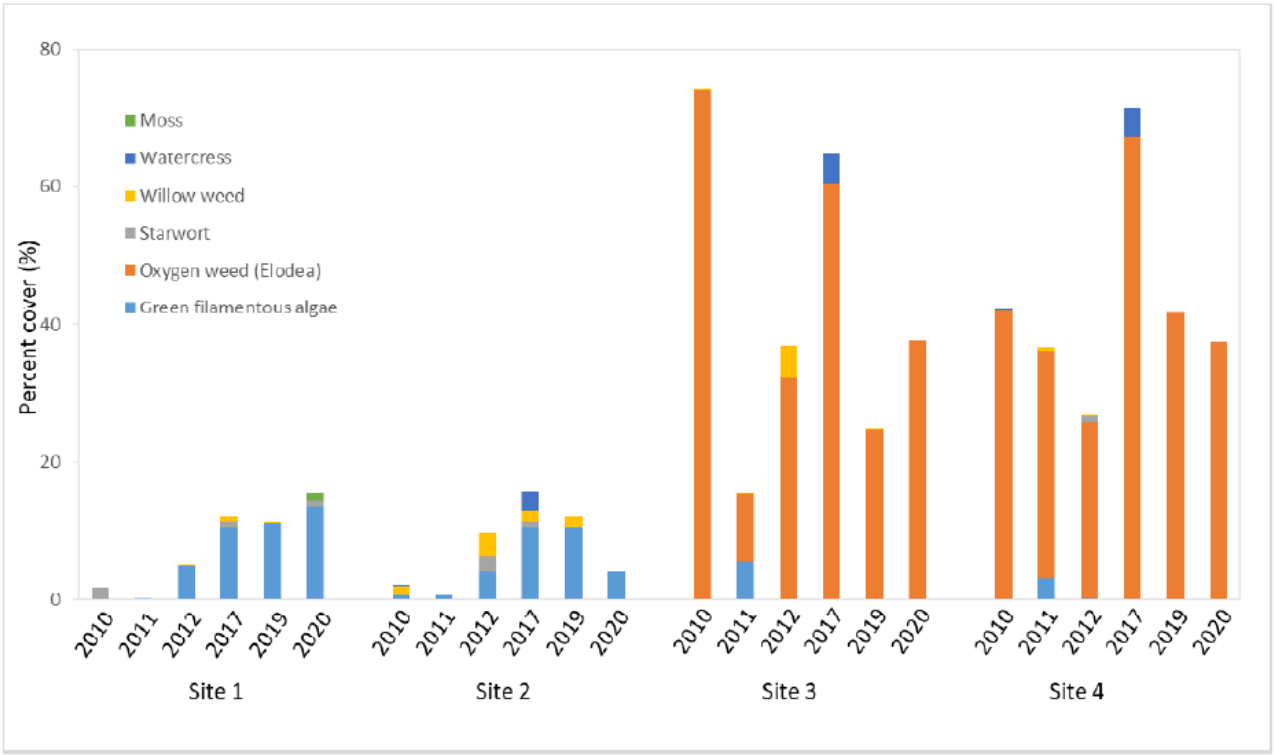
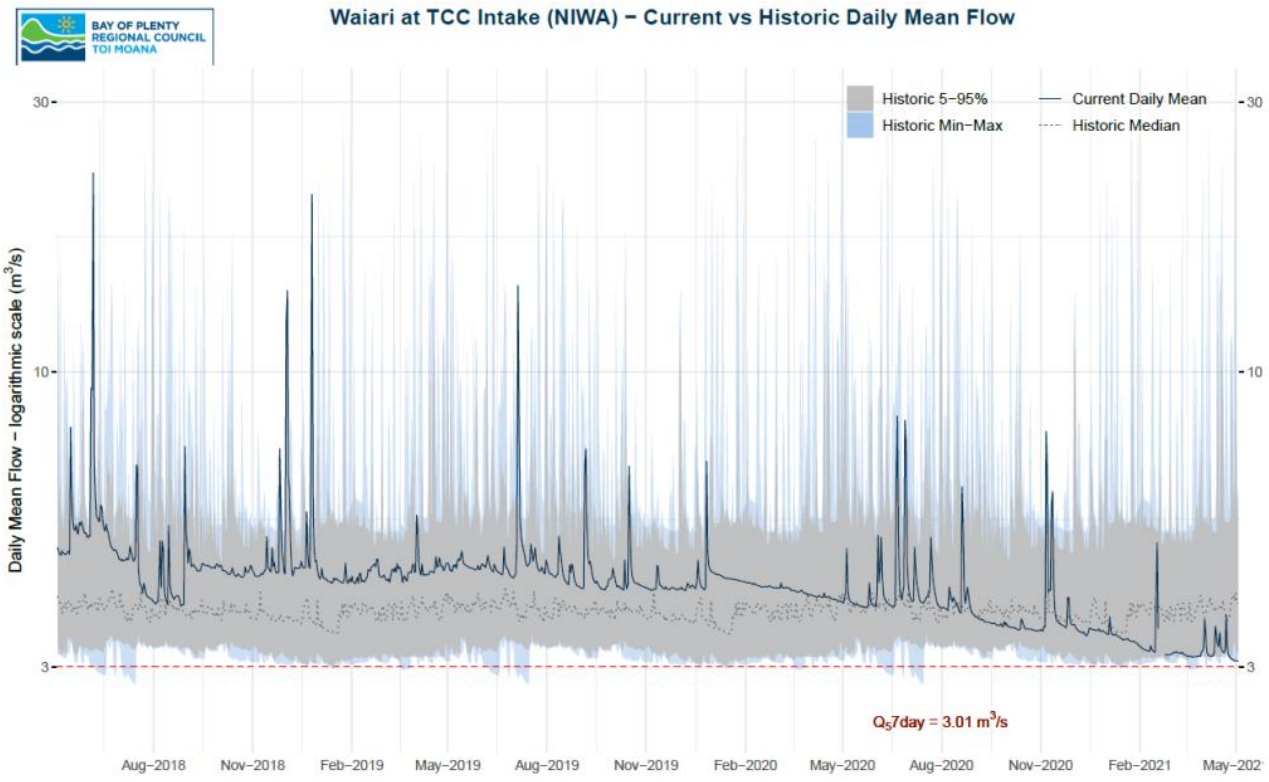


Figure 2 – Macrophyte community composition and percent stream cover, Bennett and Dudley (2020) Waiari Water Treatment Plant: Waiari Stream Monitoring Report

4 Stream Flow

Flow data on the Waiari Stream is collected by NIWA on behalf of TCC at five-minute intervals via an automated flow meter located opposite the proposed TCC intake site. The summers of 2020 and 2021 were particularly dry and yet the stream flow was sustained above 3,000 L/s during this period. The resource consent application for the municipal take included stream flow data and the instream Q_5 7 day low flow was estimated at 3,140 L/s. An assessment of the instream ecological effects was undertaken which was used to derive

an Instream Minimum Flow Requirement (IMFR)[8]. The IMFR was determined to be 1,100 L/s, providing for up to 2,040 L/s to be allocated for use. The consent holder is required to give notice to the Kaitiaki Advisory Group if the stream flow reduces to 2,800 L/s.



Site	Q5 7day	Latest Date	Latest Discharge	Latest Discharge (% of Q5)	Lowest Discharge	Lowest Discharge Date	Lowest Discharge (% of Q5)
Waiari at TCC Intake (NIWA)	3.01	2021−05−02	3.07	102	3.07	2021−05−02	102

Figure 3 – Stream Flow May 2018 – May 2021

5 Te Puke Wastewater Treatment Plant

The Te Puke wastewater treatment plant is located near the Waiari Stream. The treatment plant consists of the following, with eventual discharge through seeps to the stream:

- Rotary inlet screen;
- Activated Sludge Aeration Tanks;
- Primary and Secondary Clarifiers;
- An equalisation structure (splitter box);
- Digester and centrifuge;
- Brush Clarifier;
- Ultraviolet (UV) disinfection;
- Subsurface artificial wetland; and
- Riparian Wetland

The consent for the wastewater treatment plant discharge will expire in April 2054 and conditions require additional riparian planting, water quality standards and monitoring, a reduction in total nitrogen discharged by May 2025, instream monitoring, an ecological monitoring plan, investigation into alternative disposal options and provision of an associated report by the end of 2023, and establishment of a Kaitiaki Group with regular meetings (Obj ref: A3241420).

[8] Jowett (2008) Effect of water abstraction on the Waiari Stream (Objective ref: A229847)

6 Resource Consents to Take Water from Waiari Stream

With the addition of the municipal take, the Waiari Stream is now fully allocated. All consents for taking water from the Waiari Stream are shown in the following table. Metering is required under national regulations for all water takes that have an instantaneous rate of take of 5 L/s or more. Approvals granted prior to the Resource Management Act 1991 will expire in October 2026.

Consent Holder	Consent #	Purpose	Litres / second	Monitoring	Expiry Date
TCC/WBOPDC	65637	Municipal and dust suppression	694.00	Telemetry required	2044
Lothlorien Trust and Hawkey FT	20678	Irrigation	8.53	Telemetered	1 Oct 2026
Williamson	21480	Irrigation	1.62		1 Oct 2026
Sukha Orchards	67791	Irrigation and frost protection	14.00	metered	31 Mar 2024
Reid and Smith	20333	Irrigation	3.18		1 Oct 2026
Pencam	20433	Irrigation and frost protection	2.65		1 Oct 2026
Williamson	20501	Irrigation	0.79		1 Oct 2026
Persey	21459	Irrigation and frost protection	7.50	Metered	1 Oct 2026
Te Matai Water Scheme	21685	Scheme supply for orchard irrigation, domestic and stock water	40.00	Telemetered	1 Oct 2026

7 Groundwater

Groundwater availability in the Bay of Plenty is currently based on a mass water balance calculated by GNS Science, Te Pū Ao. This approach means that the groundwater volume required to maintain base flow in rivers and streams is protected and not available for allocation.

The catchment for the stream does not translate directly to the underlying groundwater zones. Within the stream catchment area there is the deeper Wai3 groundwater zone and the shallower Lower Kaituna Hills and Lower Kaituna Plains groundwater zones. All three groundwater zones are considered to either be near full allocation or over-allocated. The municipal take for Western Bay of Plenty District Council (RM21-0054 for 5,361,120 m3/year) is from the Wai3 Ignimbrite groundwater zone and accounts for approximately 87% of the consented allocation. Actual water use is currently significantly less than the consented allocation.

The existing allocation framework is an interim and conservative system which is expected to be replaced with a different framework. A plan change is due to be notified in 2024 to

give effect to the National Policy Statement for Freshwater Management 2020. As part of the plan change process the Regional Council has commissioned additional work on groundwater resources and have started engaging with Iwi and Hapū. The Regional Council is soon to establish Nga Kaitohutohu, a Te Ao Maori-RMA technical group with members from across the region with skills in both Te Ao Maori and resource management planning. More information on the plan change process can be found on our Essential Freshwater webpage https://www.boprc.govt.nz/our-projects/essential-freshwater.

Applications for groundwater takes are required to assess the effects of the activity against the allocation, neighbouring bores, surface water, cultural values and the risk of saltwater intrusion. New applications to take water from an over-allocated groundwater zone are likely to be publicly notified.

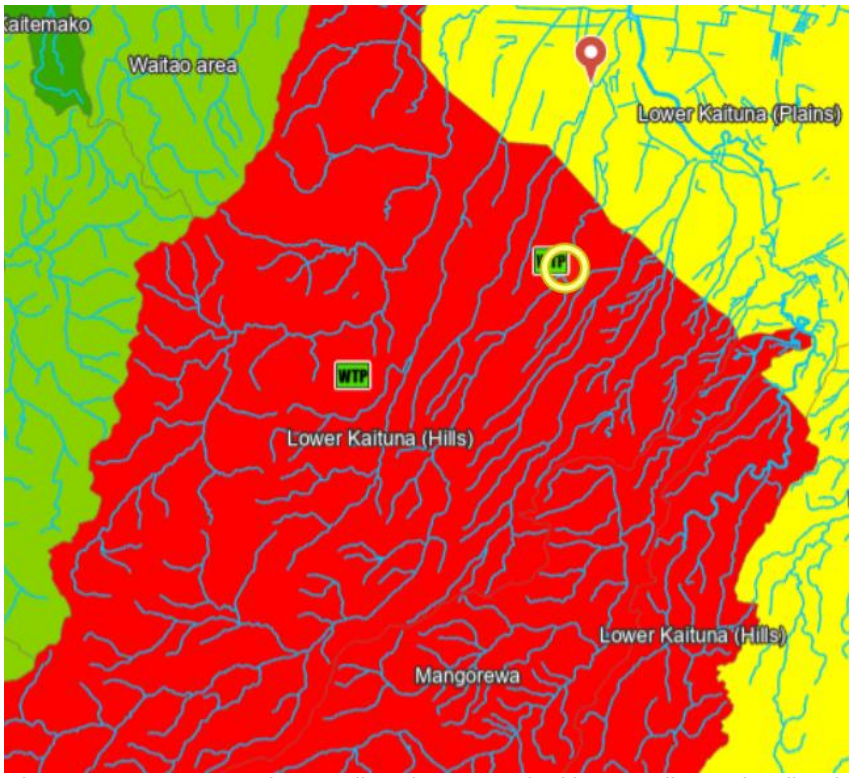


Figure 4 – Upper Groundwater Allocation Zones (red is over-allocated, yellow is nearing full allocation)

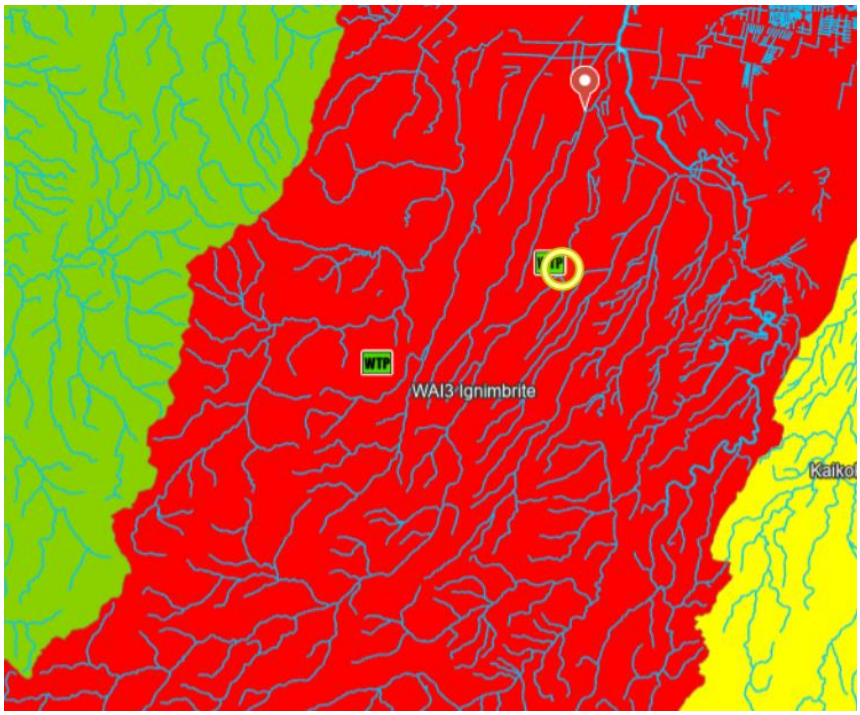


Figure 5 – Lower Groundwater Allocation Zones

8 Bores and Unconsented Takes

Drilling of new bores is a controlled activity under the Regional Natural Resources Plan (RNRP), which means that consent must be granted. Taking water from a bore is a permitted activity under the RNRP if the daily volume is no more than 35m^3/day. Similarly, taking up to 15m^3/day of water from surface water is a permitted activity (other conditions apply also). Furthermore, the Resource Management Act 1991 (RMA) excludes takes for reasonable domestic and stock water purposes from needing resource consent.

Currently, permitted and excluded takes are not required to record their water use and so how much water is taken is not fully known. Modelling of the potential scale of permitted and excluded takes was undertaken in 2009 by GNS and a field assessment for the Lower Kaituna catchment was undertaken in 2013[9]. The field assessment found that there was a negligible amount of water taken from surface water and that bores were providing domestic and stock water where roof-collected rainwater was not in use. The field assessment concluded that for the total number of properties in the catchment, approximately 20% take groundwater under the RMA exclusions, 0.4% take surface water under the RMA exclusions, no groundwater was taken under the RNRP 35m^3/day rule and 0.14% use surface water under the RNRP 15m^3/day rule.

The Waiari Stream upper reaches are generally in plantation forestry with little demand for water. Immediately downstream of the forestry is farmland and orchards dominant the final portion of the catchment. The number of bores (and consents to take water) in the area generally increases with distance downstream. When compared to the wider Lower Kaituna catchment, the number of bores in the Waiari Stream catchment is low. Given the land use and relative abundance of bores, the amount of permitted and excluded takes may be lower in the Waiari Stream catchment than reported for the Lower Kaituna catchment.

[9] Barber (2013) Lower Kaituna Permitted Takes Survey (Objective ref: A1849306)

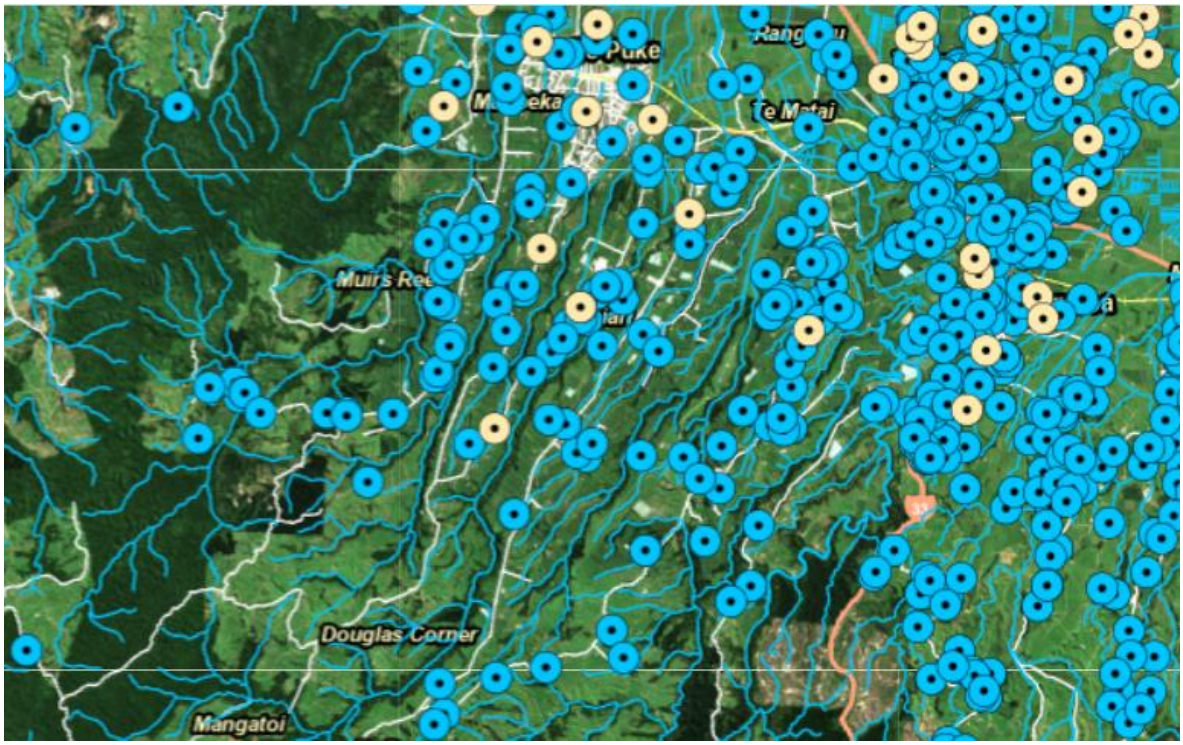


Figure 6 – Bores

9 The Resource Consent Process

Any applicants for consents to take water (either surface water or groundwater) are required to consider cultural effects, and are encouraged to engage directly with iwi and hapū with interests in specific areas. More information on the consent process can be found on the Bay of Plenty Regional Council website.

Information on existing resource consents can also be found on this website, along with associated documentation. Information about consents in process will be available shortly. Staff in the consents team are also available to discuss consents or applications, and can be contacted on consents.queries@boprc.govt.nz or on 0800 884 880.