

2022/23 Groundwater quality monitoring



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For the latest available results go to the [Greater Wellington environmental data hub](#).

This report may be cited as: GW 2023. 2022/23 Groundwater quality monitoring report. Greater Wellington.

Programme overview

Groundwater in the Wellington region is used extensively for drinking water, stock supply, irrigation and industry. Groundwater also provides baseflow to rivers, streams and wetlands, or forms natural springs or seeps where it discharges at the ground's surface. The protection of these surface water ecosystems requires careful management of the quality and quantity of the underlying groundwater.

To assist with the sustainable management of groundwater resources in the Wellington region, Greater Wellington conducts regular monitoring of groundwater quality at 83 sites across the region, shown on the map below. Key indicators of groundwater contamination (typically arising from land use intensification and/or on-site wastewater disposal systems), along with general chemistry results, are presented in this report:

- [Nitrate-nitrogen](#) - a key indicator of groundwater contamination typically arising from land use intensification and/or on-site wastewater disposal systems. Nitrate in groundwater can affect its quality for drinking-water supply. The Drinking Water Standards for New Zealand (DWSNZ) sets a Maximum Acceptable Value (MAV) for nitrate at 50 mg/L (equivalent to nitrate-nitrogen of 11.3 mg/L), based on a risk to bottle-fed babies ([Water Services \(Drinking Water Standards for New Zealand\) Regulations 2022](#)).
- [E. coli bacteria](#) - a key indicator of groundwater contamination by microorganisms, some of which can cause diseases. Faecal bacteria from livestock, onsite wastewater discharges, stormwater and other sources can contaminate groundwater. Any detection of 1 cfu/100 ml exceeds the [DWSNZ](#).
- [Saline intrusion](#) - a key indicator for seawater contamination in coastal wells. The difference in conductivity between seawater and fresh groundwater is very marked, making it a useful indicator.
- [Dissolved reactive phosphorus](#) - Dissolved reactive phosphorus is a nutrient that can affect surface water quality.
- [Dissolved metals](#) - Dissolved metals can affect the quality of groundwater for drinking-water supply and can be indicators of groundwater contamination by anthropogenic activities.
- [Chemistry](#) - Major ion chemistry can provide information about the recharge sources of the groundwater, residence time in the aquifer and groundwater flow patterns.

Monitoring network

Groundwater quality monitoring wells are spread across the region, with the total number of wells in each of the five Whaitua (main river) catchments listed below:

- Ruamāhanga - 49 (2 of which are not included in this report due to 3-yearly sampling).
- Kāpiti Coast - 15.
- Te Whanganui-a-Tara (Wellington and Hutt Valley) - 15.
- Wairarapa Coast - 1.
- Te Awarua-o-Porirua - 0.

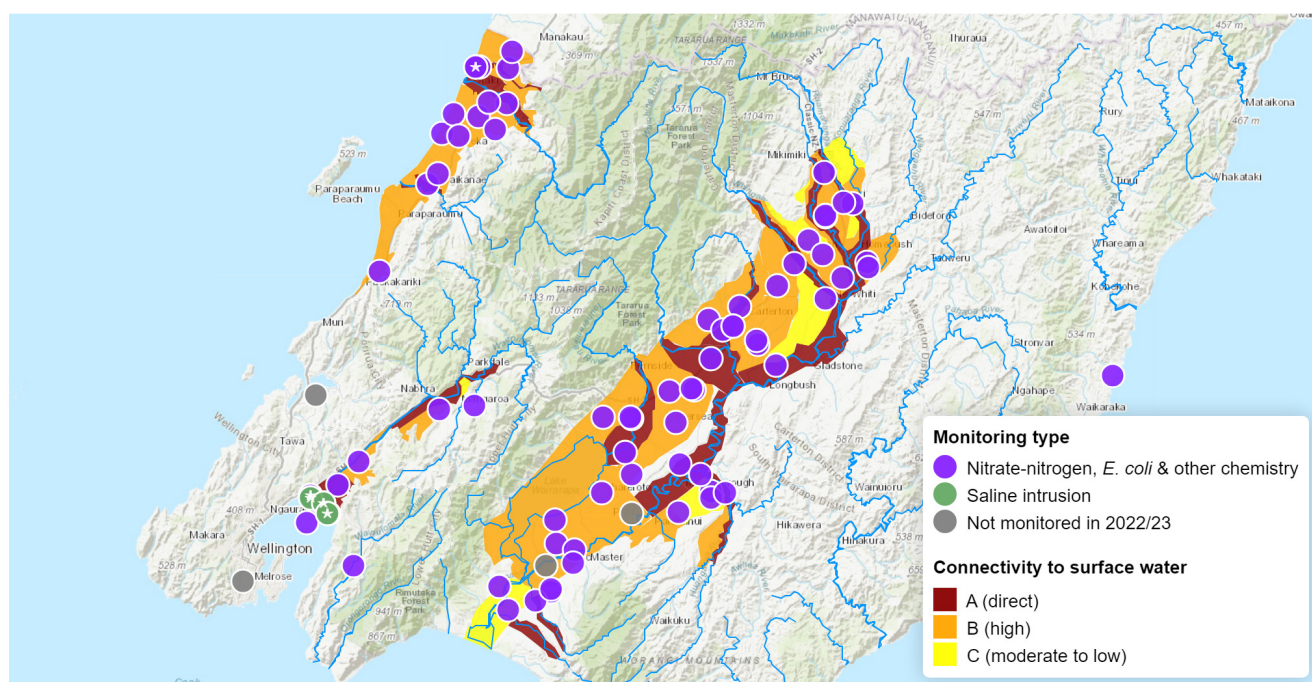


Figure 1: Locations of groundwater quality monitoring sites. See the [methods](#) section for more information on the monitoring network and each “Connectivity to surface water” category. *Note: circles marked with a star (★) have two bores in the same location at different depths.*

More information on each site including bore depth and monitoring frequency can be found in the [Appendix Monitoring details](#) table.

Monitoring data

Full monitoring data is downloadable in the [Resources](#) section and additional information for each nitrate-nitrogen, *E. coli* and dissolved reactive phosphorus site is available at [Land and Water Aotearoa \(LAWA\)](#). The video at this link explains LAWA groundwater information further: <https://www.youtube.com/embed/dlg6s6tUAiA>.

Methods

Analytical methods

Table 1: Water quality sampling methods and detection limits.

Variable	Method	Detection limit
Nitrate + nitrite nitrogen	Total oxidised nitrogen. Automated cadmium reduction, Flow injection analyser. APHA 4500-NO3- I (Modified) 22nd Ed. 2012	0.001 mg/L
Nitrite nitrogen	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO3- I (Modified) 22nd Ed. 2012	0.002 mg/L
Nitrate nitrogen	Calculation: (Nitrate-N + Nitrite-N) - Nitrite-N	0.001 mg/L
E. coli	APHA 9222G 22nd Ed. 2012	1 cfu/100mL
Dissolved arsenic	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017	0.001 mg/L
Dissolved calcium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017	0.05 mg/L
Dissolved chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017	0.0005 mg/L
Dissolved iron	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017	0.02 mg/L
Dissolved manganese	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017	0.0005 mg/L
Dissolved magnesium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017	0.02 mg/L
Dissolved lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017	0.0001 mg/L
Dissolved potassium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017	0.05 mg/L
Dissolved reactive phosphorus	Filtered sample, Molybdenum blue colourimetry. Flow injection analyser. APHA 4500-P G (modified) 23rd ed. 2017	0.004 mg/L
Dissolved sodium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017	0.02 mg/L
Dissolved zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017	0.001 mg/L
Bicarbonate	Calculation: from alkalinity and pH. APHA 4500-CO2 D 23rd ed. 2017	1.0 mg/L
Chloride	Filtered sample, Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017	0.5 mg/L
Sulphate	Filtered sample, Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017	0.5 mg/L
pH	pH meter. APHA 4500-H+ B 23rd ed. 2017	0.1 pH units
Total alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. APHA 2320 B (modified for Alkalinity <20) 23rd ed. 2017	1.0 mg/L as CaCO ₃

Groundwater connectivity

The Greater Wellington [Natural Resources Plan](#) (Chapter 4) provides management categories for differing levels of hydraulic connectivity of groundwater to surface water (GW, 2023). See section 2.3 of [Wairarapa Valley groundwater resource investigation](#) for more detail (Hughes and Gyopari, 2011).

Category A: Direct hydraulic connectivity

Category A includes areas of the hydrogeological system which exhibit direct connectivity with surface water. Stream flow depletion occurs shortly following the commencement of groundwater abstraction with the depletion effect increasing to a level close to the overall pumping rate and dissipating quickly once pumping stops. As a consequence, a high proportion of the overall volume of groundwater pumped effectively represents induced flow loss from local surface waterways. Due to the immediacy of impact, groundwater abstraction from Category A aquifers can be considered analogous to direct surface water abstraction and managed in terms of the environmental flow and water level regimes established for hydraulically connected surface waterbodies.

Category B: High hydraulic connectivity

Category B includes those areas of the hydrogeological system where groundwater abstraction may potentially result in significant impacts on surface water but where pumping regulation does not always provide an effective option for mitigating direct stream depletion effects. Category B represents the transition between indirect and direct stream depletion effects where it may be appropriate to manage groundwater takes in terms of either surface water or groundwater allocation depending on localised factors (e.g. local aquifer hydraulic parameters, abstraction rate and location of pumping with respect to surface waterbodies).

Category C: Moderate to low hydraulic connectivity

Category C covers those areas of the hydrogeological system where groundwater abstraction may contribute to an overall reduction in baseflow discharge at a catchment scale but where active regulation of pumping does not provide effective mitigation of potential effects on surface water. Cumulatively, these takes are more appropriately managed at a catchment or sub-catchment scale through the establishment of volumetric abstraction limits.

Sampling notes

During the 2022/23 monitoring period, five wells had missed samples. Brief explanations are listed below:

- R27/1137: September 2022 - non-operational pump system requiring an upgrade
- S27/0495: annual sample not taken, sample point disconnected from bore
- S27/0607: annual sample not taken, no access to site as too wet
- BQ31/0047: annual sample not taken, no access to the pump
- BP32/0103: annual sample not taken, no access to the pump

One saline intrusion monitoring well was not monitored in the 2022/23 monitoring period.

- R27/7153: Conductivity sensor disconnected from service. Monitoring continued in new well BQ32/0611

Three wells have been added to the saline intrusion monitoring network:

- BQ32/0611, BQ32/0612 and BQ32/0613

Previous changes to Groundwater Quality State of the Environment (GQSoE) network and monitoring frequency:

- S27/0156 has been officially removed from the GQSoE network and replaced by BP33/0056 in 2021/22
- BP33/0056, BP33/0057, BP34/0229 and BP34/0236 were added to the network in 2021/22.
- BN32/0062, BN32/0063, and BN33/0032 were added to the GQSoE network in 2020/21.
- BQ31/0041 and BP32/0102 were added to the GQSoE network in 2019/20.
- The following ten wells have been reduced to annual sampling as they are in confined aquifers and have not shown seasonal variation or significant trends over an extended period: R25/5100, S25/5200, R25/5135, S26/0568, S27/0495, S27/0435, S27/0442, S27/0607, S27/0588, S27/0594.
- An additional ten wells have been reduced to three-yearly sampling as; they are in confined aquifers, have not shown seasonal variation, long term monitoring indicates that water quality at these bores is similar to annual/quarterly sites, and age dating suggests groundwater at these bores have mean residence times greater than 100 years: S27/0585, S27/0615, BQ33/0032, S27/0602, S27/0268, S27/0283, S27/0344, S26/0576, S27/0433, S26/0705.
- The following bores have been officially removed from the GQSoE network due to loss of access: Removed 2018/19 - R25/5164, S26/0756, S27/0846, S27/0614. S26/0824 was decommissioned and replaced with BP34/0216 in December 2019.

Results

Each results section presents maps of monitoring results benchmarked against groundwater quality guidelines where applicable. Full tabulated data for each guideline are available in the [Appendix data tables](#) section.

Groundwater nitrate-nitrogen concentrations

A key indicator of groundwater contamination typically arising from land use intensification and/or on-site wastewater disposal systems. Nitrate-nitrogen in groundwater can affect its quality for drinking-water supply. See the [LAWA nitrate factsheet](#) for more information.

Human health

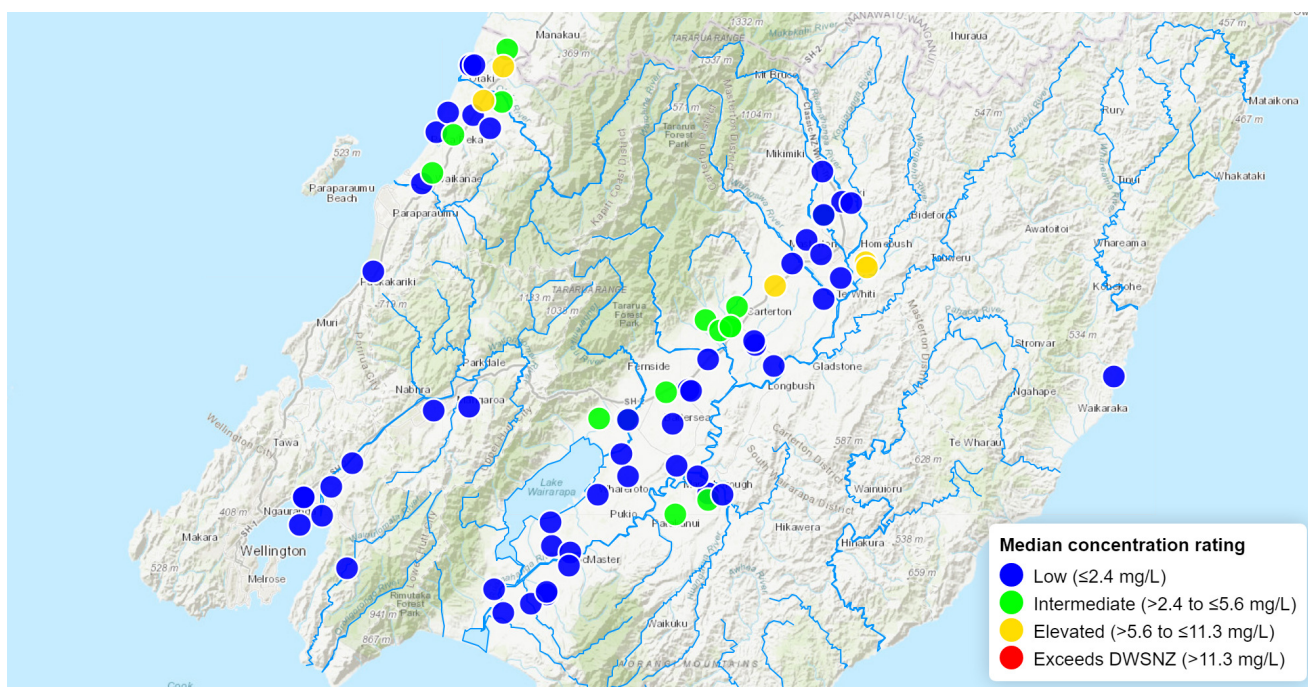


Figure 2: Groundwater nitrate-nitrogen concentrations are evaluated in terms of likely human influence, as excess concentrations can have negative health effects. Sites with annual median concentrations above the [Drinking Water Standards for New Zealand](#) Maximum Acceptable Value (MAV) of 11.3 mg/L nitrate-nitrogen are flagged as ‘Exceeds DWSNZ’, and concentrations above half of this MAV are highlighted as ‘Elevated’.

Table 2: Summary of nitrate-nitrogen concentration ratings.

Concentration rating	No. Sites
Elevated (> 5.6 to ≤ 11.3 mg/L)	5
Intermediate (> 2.4 to ≤ 5.6 mg/L)	15
Low (≤ 2.4 mg/L)	52

Ecosystem health

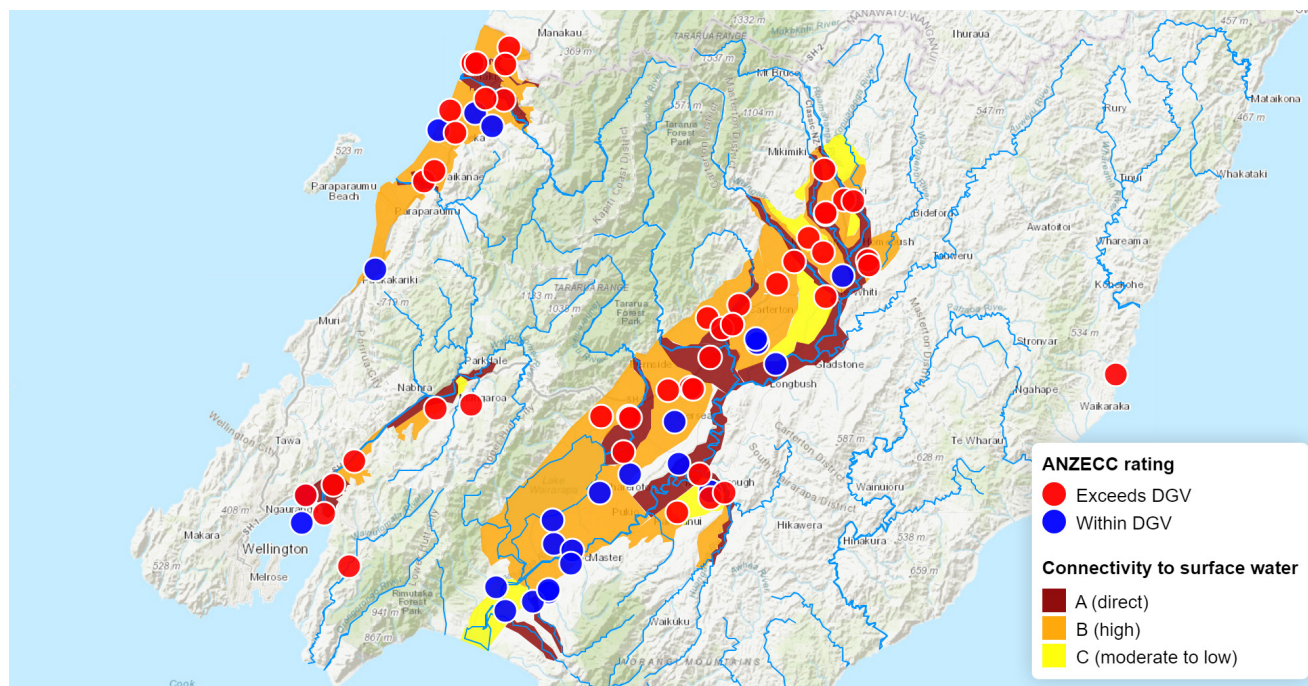


Figure 3: Groundwater discharges from aquifers into a number of surface water bodies throughout the region and there is the potential that groundwater high in nitrate-nitrogen could contribute to the decline of surface water quality. The [2000 Australia New Zealand Guidelines for Fresh and Marine Water Quality](#) (ANZECC) define default guideline values (DGVs) for the 80th percentile of nitrate-nitrogen based on second-level [River Environment Classification](#) (REC) class reference conditions. Annual median groundwater nitrate-nitrogen concentrations are evaluated against these DGVs. Shallow groundwater within Connectivity Category A (direct) poses a greater risk from groundwater nitrate-nitrogen to ecosystem health in the surface water system than groundwater within other Connectivity categories. See [groundwater connectivity](#) for more information on surface water connectivity categories.

Table 3: Summary of nitrate-nitrogen ANZECC ratings.

Connectivity	ANZECC rating	No. Sites
A (direct)	Exceeds DGV	11
A (direct)	Within DGV	3
B/C + unknown	Exceeds DGV	37
B/C + unknown	Within DGV	21
Total sites	Exceeds DGV	48
Total sites	Within DGV	24

Aquatic toxicity

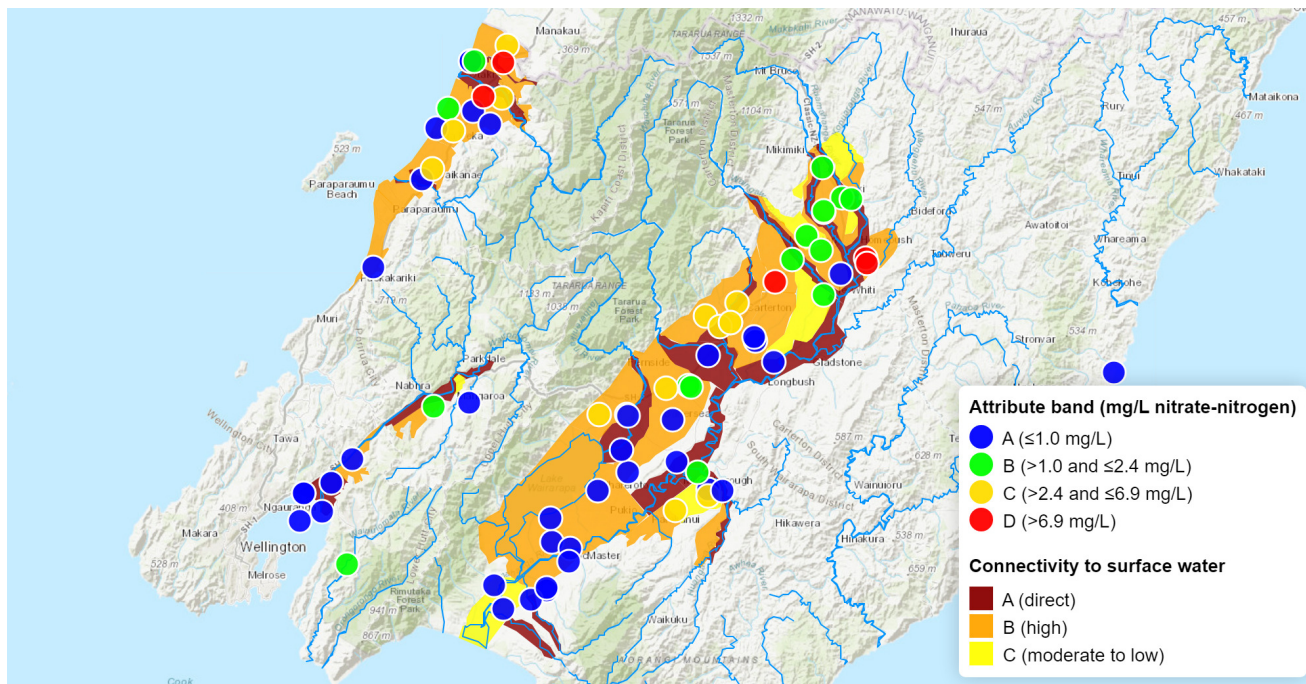


Figure 4: The [National Policy Statement on Freshwater Management \(NPS-FM\)](#) classes river water nitrate-nitrogen concentrations into four attribute bands based on nitrate toxicity effects on aquatic life (MfE 2023). The NPS-FM sets a National Bottom Line for nitrate toxicity of 2.4 mg/L nitrate-nitrogen. Annual median nitrate-nitrogen concentrations above this threshold (Bands C and D) are deemed a high risk to aquatic life. Median groundwater nitrate-nitrogen concentrations are evaluated against these bands. Shallow groundwater within Connectivity Category A (direct) poses a greater risk from groundwater nitrate-nitrogen to aquatic life in the surface water system than groundwater within other Connectivity categories. See [groundwater connectivity](#) for more information on surface water connectivity categories.

Table 4: Summary of nitrate-nitrogen toxicity attribute bands.

Connectivity	Attribute band	No. Sites
A (direct)	A/B (≤2.4 mg/L)	11
A (direct)	B/C (>2.4 mg/L)	3
B/C + unknown	A/B (≤2.4 mg/L)	41
B/C + unknown	B/C (>2.4 mg/L)	17
Total sites	A/B (≤2.4 mg/L)	52
Total sites	B/C (>2.4 mg/L)	20

Trends

Ten and fifteen year trends in nitrate-nitrogen concentrations are presented on the [LAWA](#) website. See the [LAWA trend factsheet](#) for details on how the trends are calculated.

Detection of *E. coli* bacteria

A key indicator of groundwater contamination by microorganisms, some of which can cause diseases. Faecal bacteria from livestock, onsite wastewater discharges, stormwater and other sources can contaminate groundwater. See the [LAWA factsheet](#) for more information.

Drinking Water Standards New Zealand

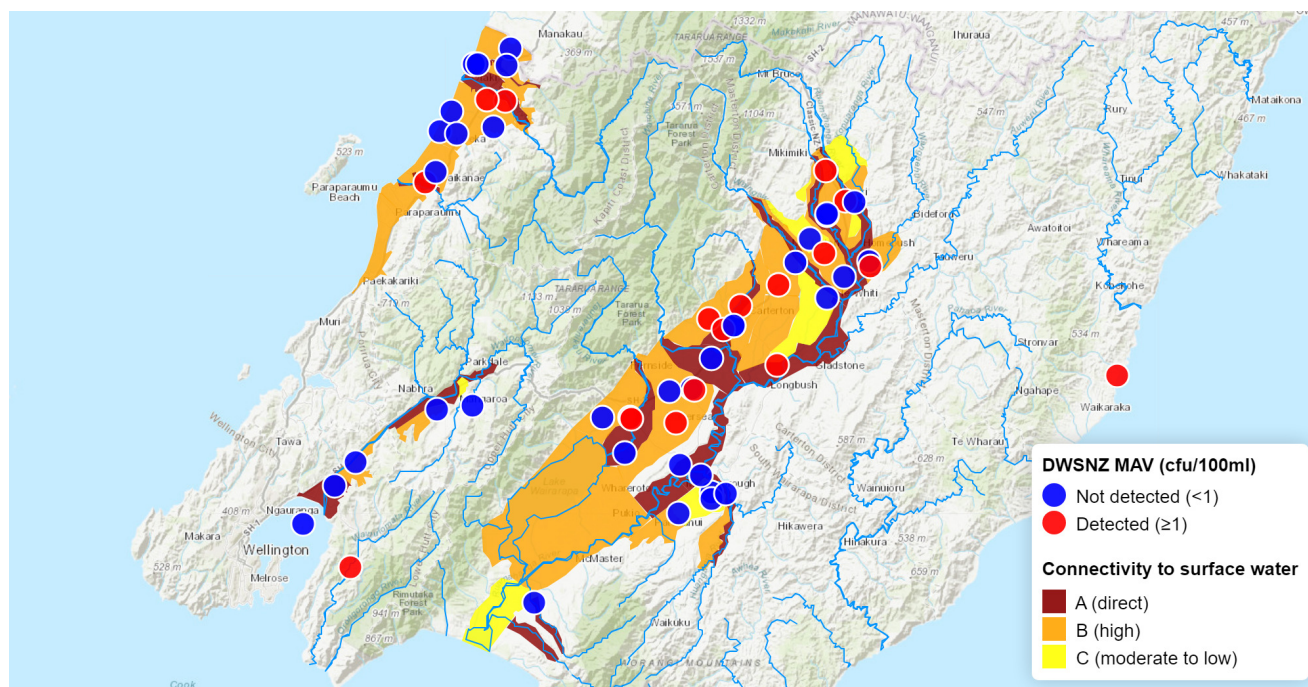


Figure 5: *E. coli* is an indicator of faecal contamination in drinking water. The [Drinking Water Standards for New Zealand \(DWSNZ\)](#) sets a Maximum Acceptable Value (MAV) for *E. coli* in drinking water supplies of less than 1 in 100 mL of sample. Shallow groundwater within Connectivity Category A (direct) poses a greater risk to water quality in the surface water system than groundwater within other Connectivity categories. See [groundwater connectivity](#) for more information on surface water connectivity categories.

Table 5: Summary of *E. coli* DWSNZ MAV ratings.

DWSNZ MAV (cfu/100mL)	No. Sites
Detected (≥1)	18
Not detected (<1)	37
Total sites	55

Saline intrusion

Conductivity is a key indicator for seawater contamination in coastal wells, as the difference in conductivity between seawater and fresh groundwater is very marked. See the [LAWA factsheet](#) for more information.

Greater Wellington and Wellington Water monitor the Waiwhetu Aquifer at three locations on the Petone foreshore; near to Petone wharf ('Tamatoa'), McEwan Park, and Port Road in Seaview. There is more than one monitoring bore at each of these sites because we monitor different depths in the aquifer. This is because saltwater is denser than freshwater, and may enter the aquifer near to its base. More information on the Petone Saline Intrusion Monitoring network can be found here: [Greater Wellington – Waiwhetu Aquifer](#).

The charts below show daily average conductivity in $\mu\text{S}/\text{cm}$ (—) with warning thresholds in dashed red (---) set by GWRC that may reflect the onset of saline intrusion. Thresholds have not yet been set for three new monitoring wells. See the [monitoring details](#) table for more information on the bores below. Gaps in the data are due to sensor faults and/or other maintenance.

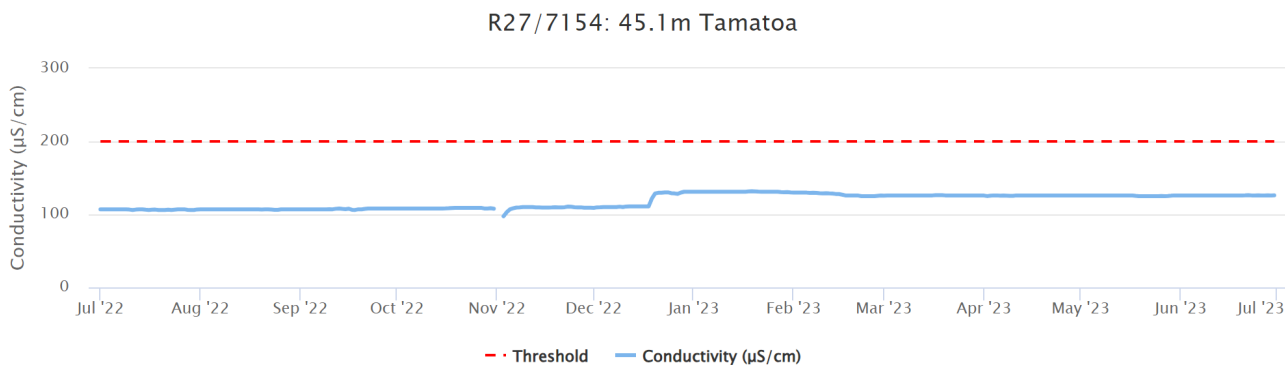


Figure 6: Saline intrusion results for Te Whanganui-a-Tara 45.1m deep groundwater bore R27/7154 at Tamatoa, the warning threshold is 200 $\mu\text{S}/\text{cm}$.

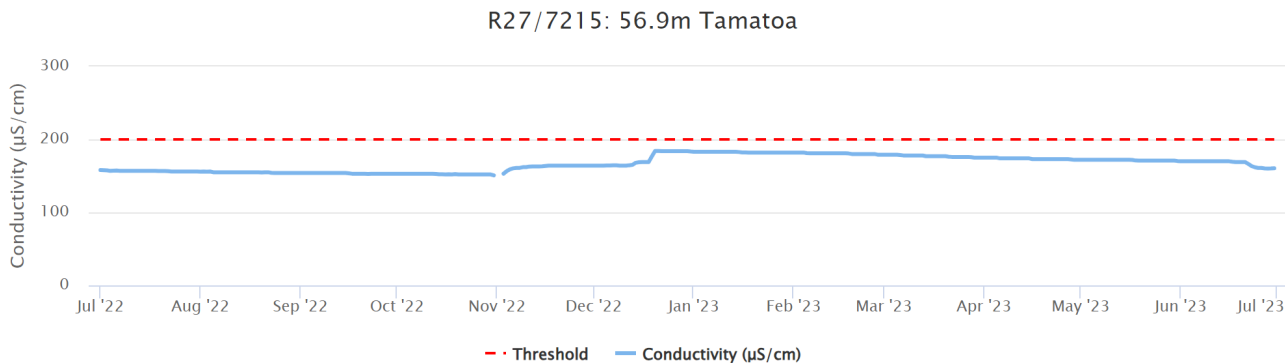


Figure 7: Saline intrusion results for Te Whanganui-a-Tara 56.9m deep groundwater bore R27/7215 at Tamatoa, the warning threshold is 200 µS/cm.

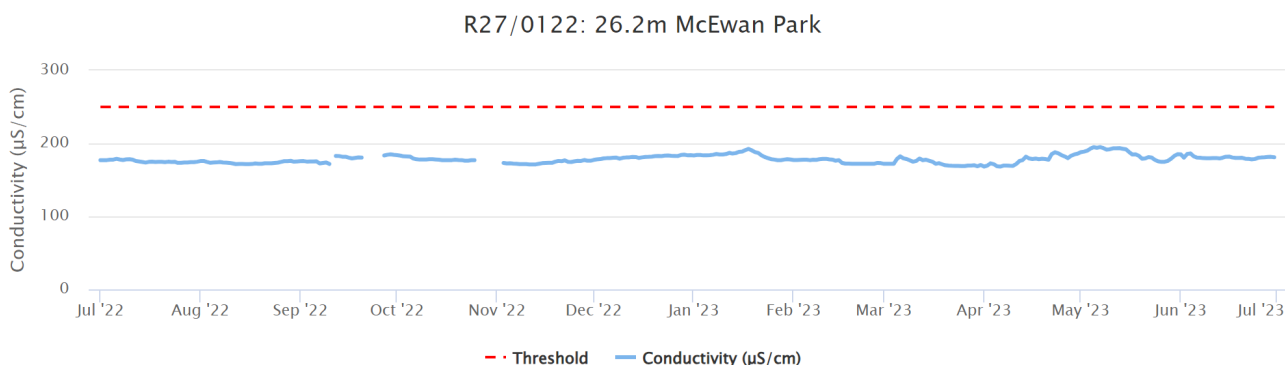


Figure 8: Saline intrusion results for Te Whanganui-a-Tara 26.2m deep groundwater bore R27/0122 at McEwen Park, the warning threshold is 250 µS/cm.

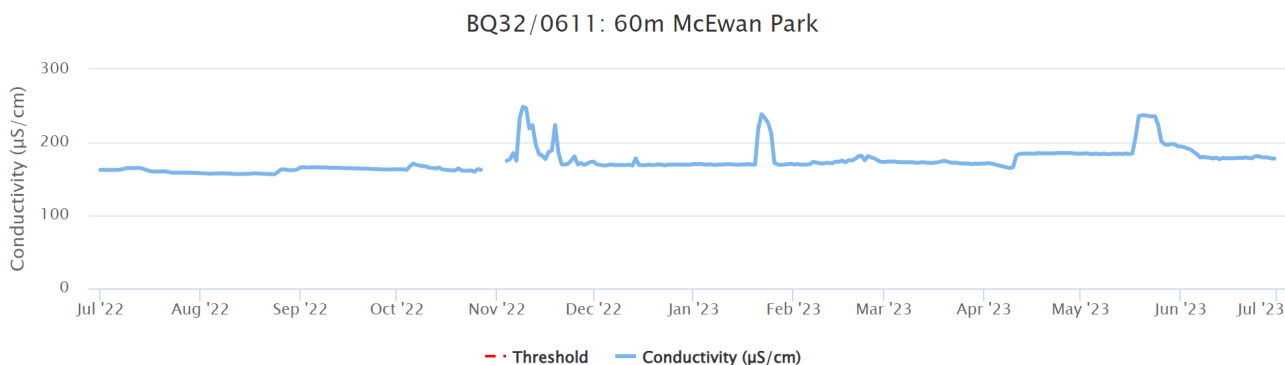


Figure 9: Saline intrusion results for Te Whanganui-a-Tara 60m deep groundwater bore BQ32/0611 at McEwen Park, no warning threshold has been set for this well.

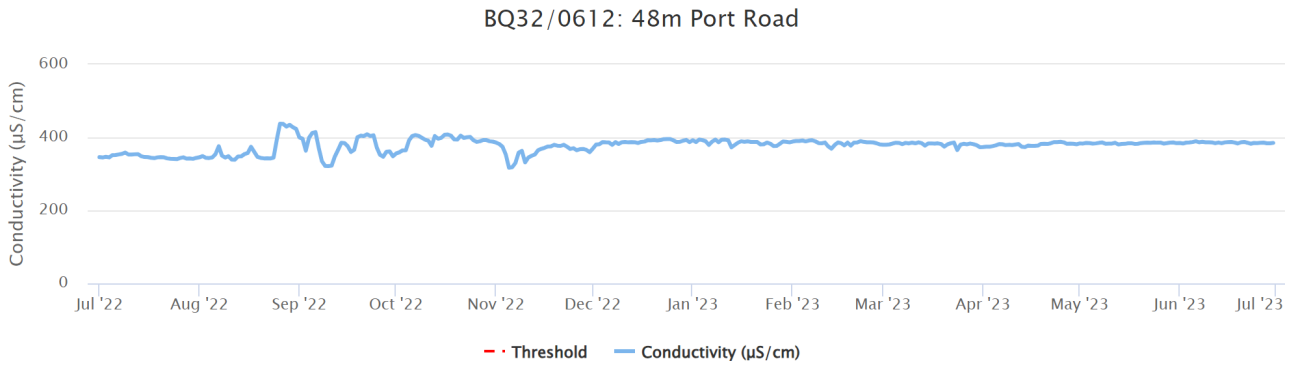


Figure 10: Saline intrusion results for Te Whanganui-a-Tara 48m deep groundwater bore BQ32/0612 at Port Road, no warning threshold has been set for this well.

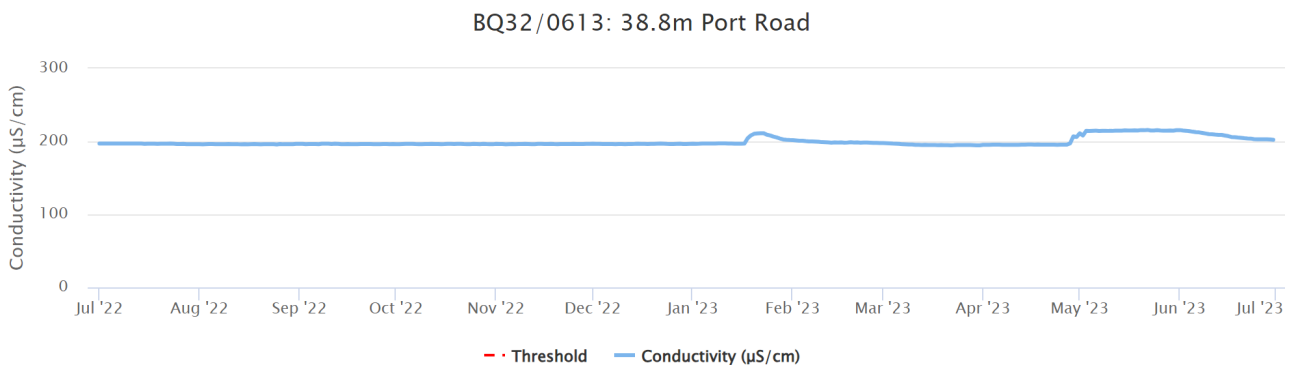


Figure 11: Saline intrusion results for Te Whanganui-a-Tara 38.8m deep groundwater bore BQ32/0613 at Port Road, no warning threshold has been set for this well.

Dissolved reactive phosphorus

Groundwater discharges from aquifers into a number of surface water bodies throughout the region and there is the potential that groundwater high in dissolved reactive phosphorus could contribute to the decline of surface water quality. Phosphorus may be derived from soil, rocks and minerals in the aquifer as water passes through them, as well as from anthropogenic sources including agricultural and industrial activities. See the [LAWA phosphorus factsheet](#) for more information.

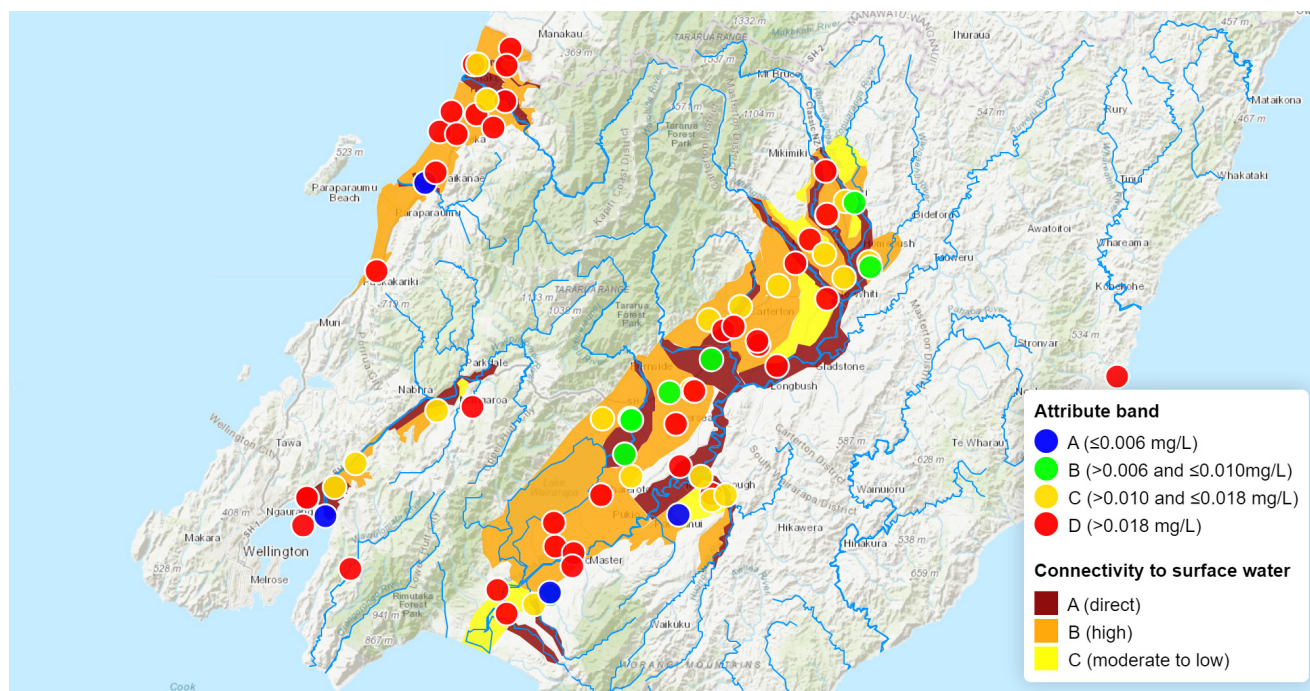


Figure 12: The [National Policy Statement on Freshwater Management \(NPS-FM\)](#) classes river water dissolved reactive phosphorus concentrations into four attribute bands based on river ecosystem health. Annual median groundwater dissolved reactive phosphorus concentrations are evaluated below against these bands. Shallow groundwater within Connectivity Category A (direct) poses a greater risk from groundwater dissolved reactive phosphorus to ecosystem health in the surface water system than groundwater within other Connectivity categories. See [groundwater connectivity](#) for more information on surface water connectivity categories.

Table 6: Summary of dissolved reactive phosphorus concentration attribute bands.

Connectivity	Attribute band	No. Sites
A (direct)	A (≤ 0.006 mg/L)	1
A (direct)	B (> 0.006 and ≤ 0.010 mg/L)	3
A (direct)	C (> 0.010 and ≤ 0.018 mg/L)	6
A (direct)	D (> 0.018 mg/L)	4
B/C + unknown	A (≤ 0.006 mg/L)	3
B/C + unknown	B (> 0.006 and ≤ 0.010 mg/L)	5
B/C + unknown	C (> 0.010 and ≤ 0.018 mg/L)	15
B/C + unknown	D (> 0.018 mg/L)	35
Total sites	A (≤ 0.006 mg/L)	4
Total sites	B (> 0.006 and ≤ 0.010 mg/L)	8
Total sites	C (> 0.010 and ≤ 0.018 mg/L)	21
Total sites	D (> 0.018 mg/L)	39

Dissolved metals

Several dissolved metals and heavy metals are monitored, all of which can affect the quality of groundwater for drinking-water supply. These metals may be derived from soil, rocks and minerals in the aquifer as water passes through them, as well as from anthropogenic sources including agricultural and industrial activities. Concentrations of many dissolved metals, for example iron and manganese, are controlled by the redox state of the water – when the concentration of dissolved oxygen in the water is low (often in older, more evolved groundwater) these metals tend to be more soluble.

Iron

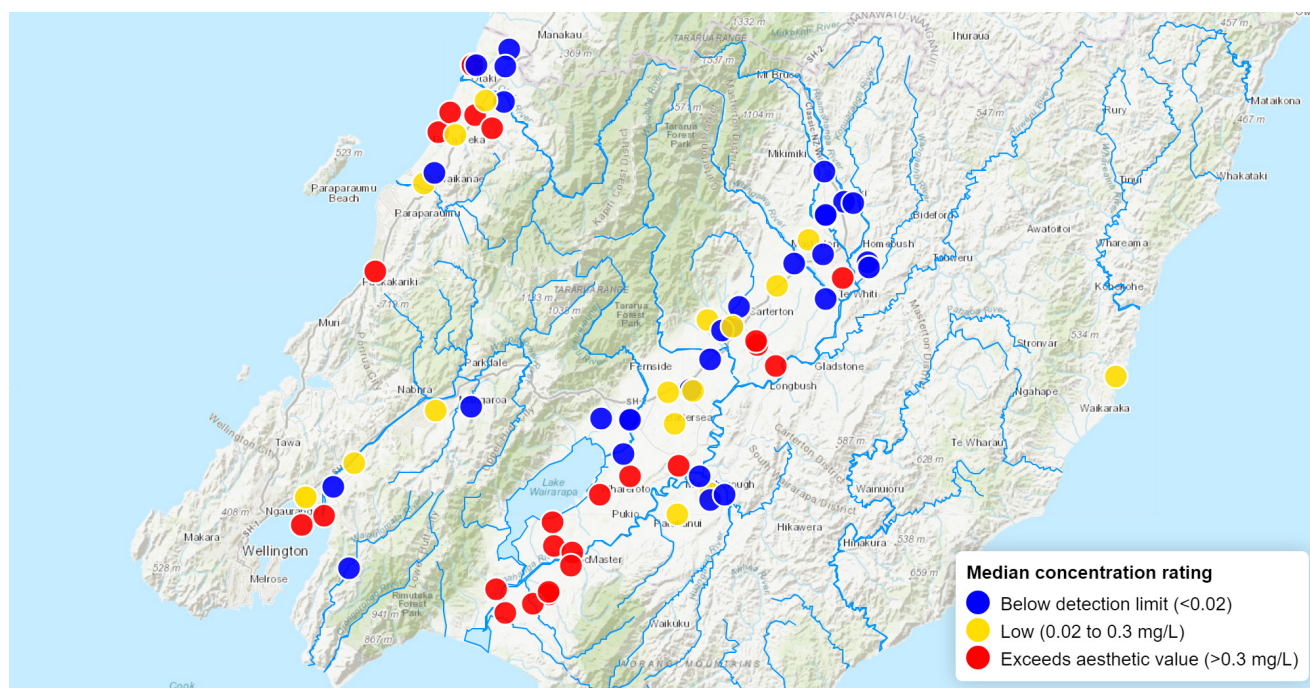


Figure 13: Groundwater dissolved iron concentrations are evaluated below in terms of the drinking water aesthetic value of 0.3 mg/L (Taumata Arowai, 2022). Concentrations above this may cause staining of laundry and sanitary ware. Sites with annual median concentrations above the aesthetic threshold value are flagged as ‘Exceeds aesthetic value’.

Table 7: Summary of dissolved iron concentration ratings.

Concentration rating	No. Sites
Below detection limit (<0.02)	31
Low (0.02 to 0.3 mg/L)	17
Exceeds aesthetic value (>0.3 mg/L)	24
Total sites	72

Manganese

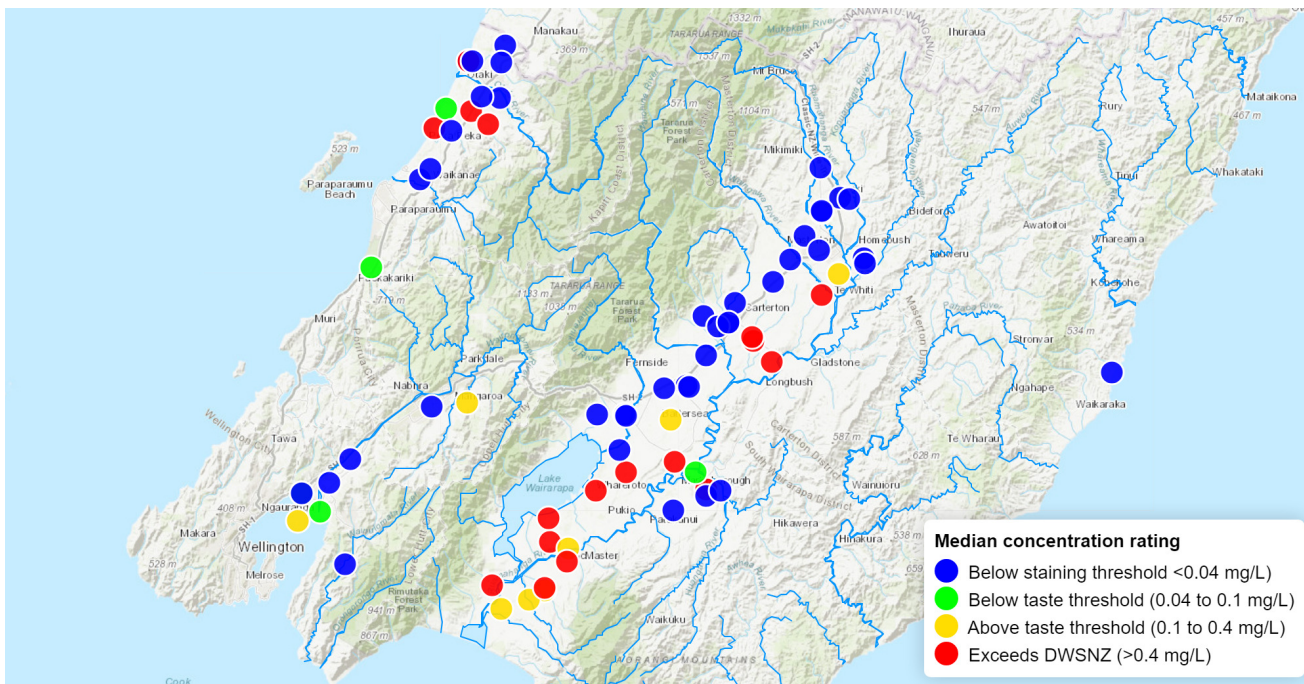


Figure 14: Groundwater dissolved manganese concentrations are evaluated below in terms of the Drinking Water Standards for New Zealand (DWSNZ), as excess concentrations can have negative health effects. Manganese concentrations are also assessed against aesthetic values of 0.04 for staining and 0.1 mg/L for taste (Taumata Arowai, 2022). Sites with annual median concentrations above the DWSNZ Maximum Acceptable Value (MAV) of 0.4 mg/L are flagged as ‘Exceeds DWSNZ’.

Table 8: Summary of dissolved manganese concentration ratings.

Concentration rating	No. Sites
Below staining threshold <0.04 mg/L)	42
Below taste threshold (0.04 to 0.1 mg/L)	5
Above taste threshold (0.1 to 0.4 mg/L)	8
Exceeds DWSNZ (>0.4 mg/L)	17
Total sites	72

Arsenic

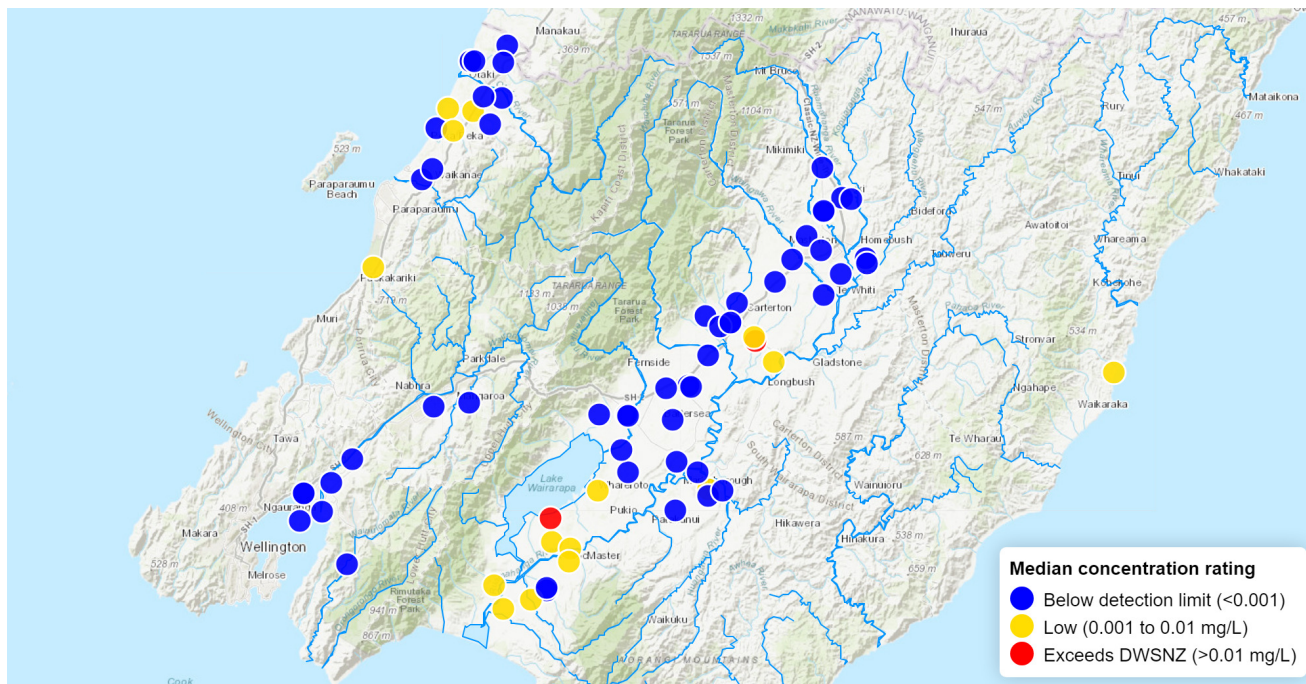


Figure 15: Groundwater dissolved arsenic concentrations are evaluated below in terms of the Drinking Water Standards for New Zealand (DWSNZ), as excess concentrations can have negative health effects. Sites with annual median concentrations above the DWSNZ Maximum Acceptable Value (MAV) of 0.01 mg/L are flagged as ‘Exceeds DWSNZ’.

Table 9: Summary of dissolved arsenic concentration ratings.

Concentration rating	No. Sites
Below detection limit (<0.001)	54
Low (0.001 to 0.01 mg/L)	16
Exceeds DWSNZ (>0.01 mg/L)	2
Total sites	72

Chromium

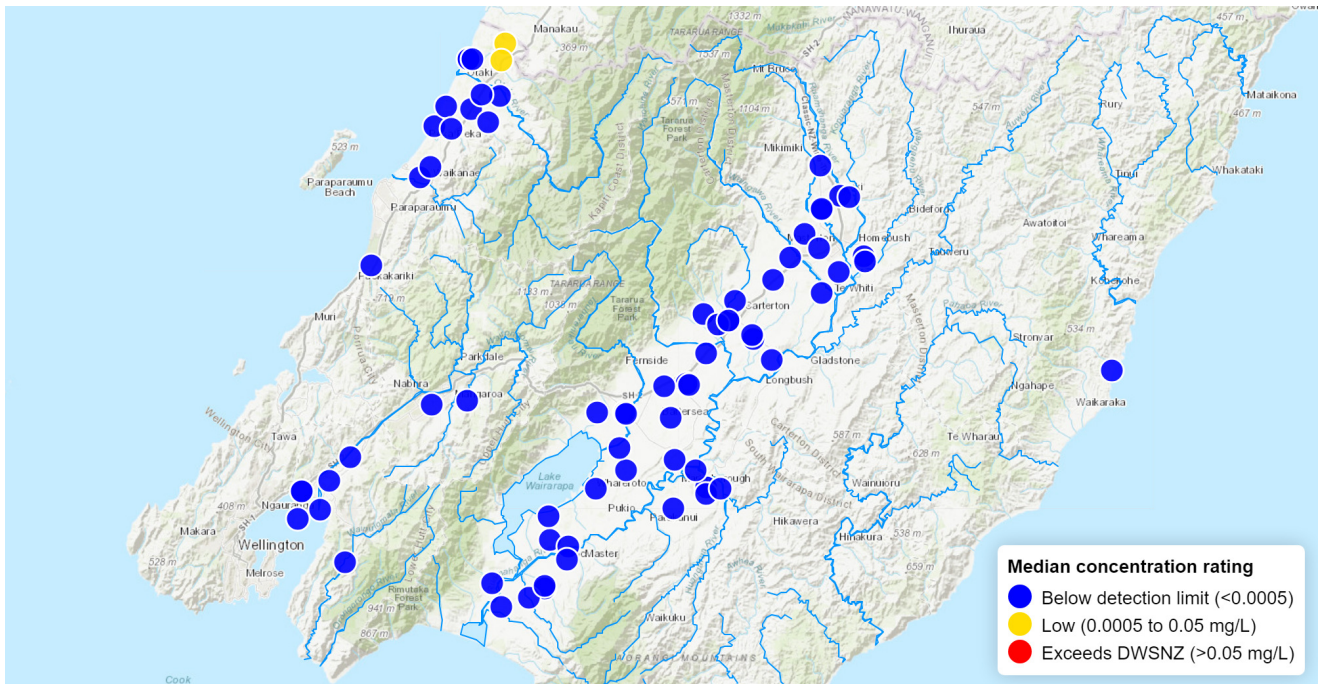


Figure 16: Groundwater dissolved chromium concentrations are evaluated below in terms of the Drinking Water Standards for New Zealand (DWSNZ), as excess concentrations can have negative health effects. Sites with annual median concentrations above the DWSNZ Maximum Acceptable Value (MAV) of 0.05 mg/L are flagged as ‘Exceeds DWSNZ’.

Table 10: Summary of dissolved chromium concentration ratings.

Concentration rating	No. Sites
Below detection limit (<0.0005)	70
Low (0.0005 to 0.05 mg/L)	2
Total sites	72

Lead

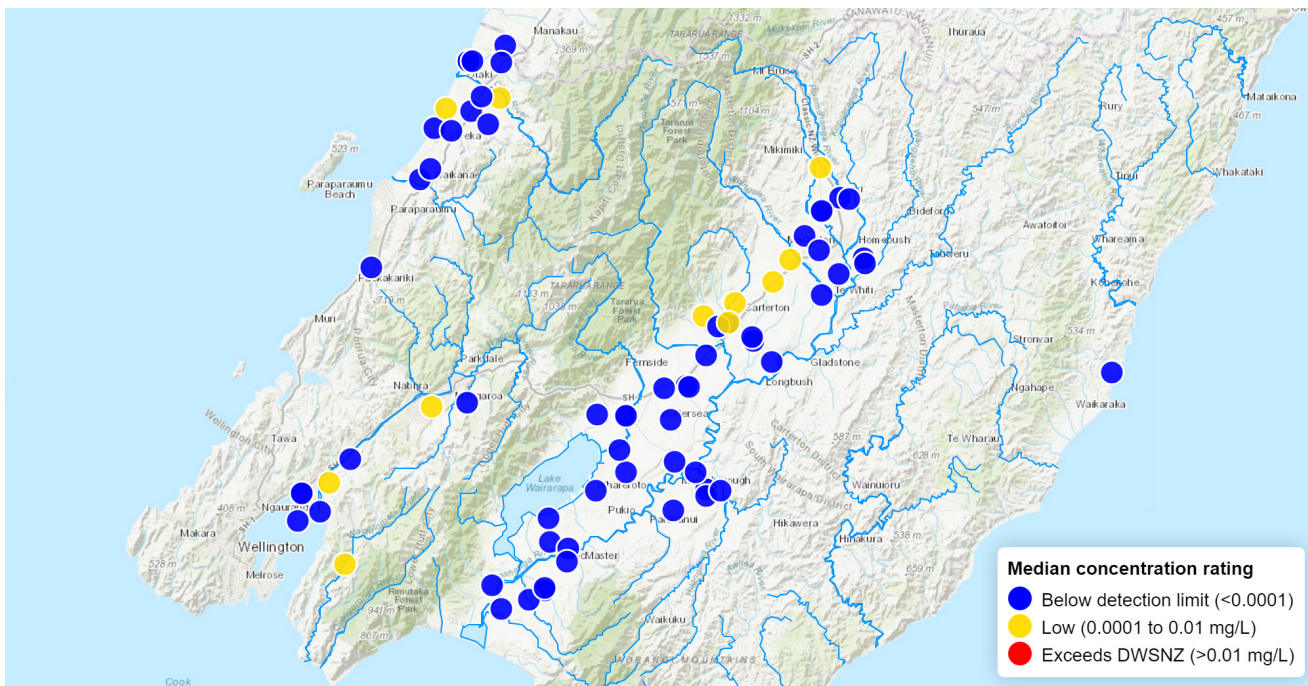


Figure 17: Groundwater dissolved lead concentrations are evaluated below in terms of the Drinking Water Standards for New Zealand (DWSNZ), as excess concentrations can have negative health effects. Sites with annual median concentrations above the DWSNZ Maximum Acceptable Value (MAV) of 0.01 mg/L are flagged as ‘Exceeds DWSNZ’.

Table 11: Summary of dissolved lead concentration ratings.

Concentration rating	No. Sites
Below detection limit (<0.0001)	61
Low (0.0001 to 0.01 mg/L)	11
Total sites	72

Zinc

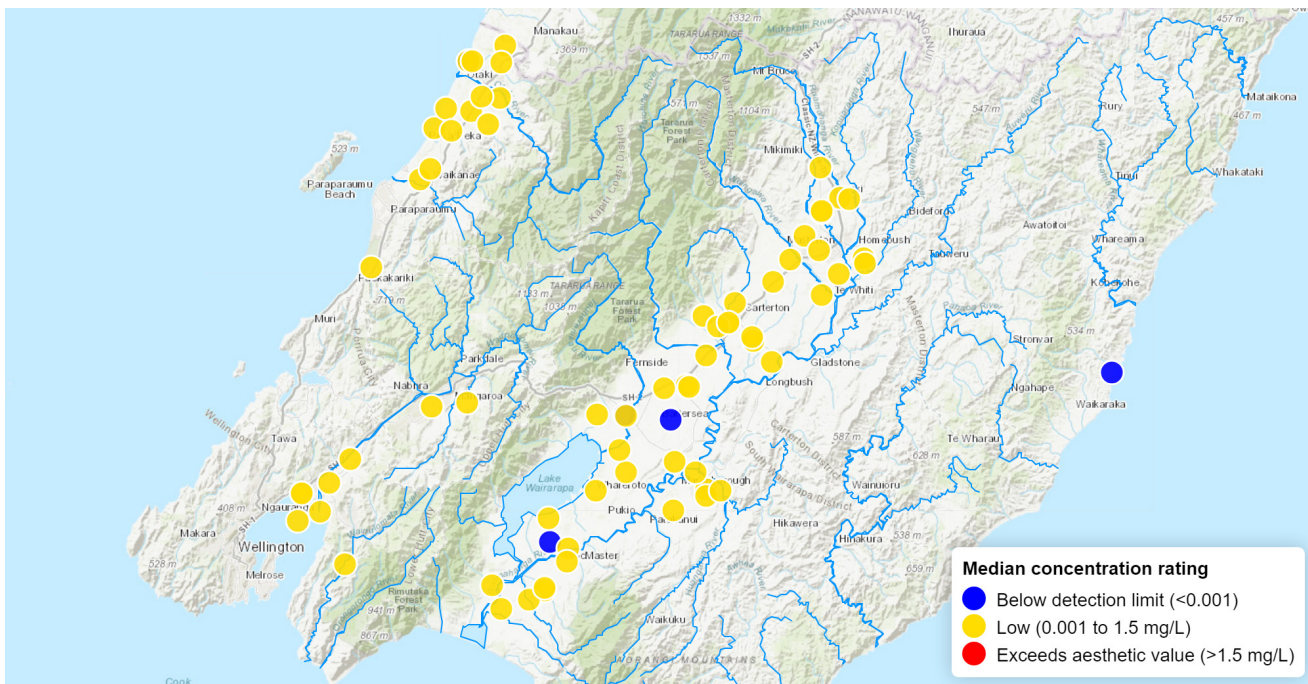


Figure 18: Groundwater dissolved zinc concentrations are evaluated below in terms of the drinking water aesthetic value of 1.5 mg/L (Taumata Arowai, 2022). Concentrations above this may have noticeable taste. Sites with annual median concentrations above the aesthetic threshold value are flagged as ‘Exceeds aesthetic value’.

Table 12: Summary of dissolved zinc concentration ratings.

Concentration rating	No. Sites
Below detection limit (<0.001)	5
Low (0.001 to 1.5 mg/L)	67
Total sites	72

Major ion chemistry

Groundwater chemistry is commonly dominated by the major cations calcium, magnesium, potassium and sodium, and the major anions bicarbonate, chloride and sulphate. These ions are derived from soil, rocks and minerals in the aquifer as water passes through them, as well as from anthropogenic sources such as fertilisers, and human and animal wastes.

Chloride has a drinking water aesthetic value of 250 mg/L, above which it may have noticeable taste ([Taumata Arowai, 2022](#)). See the [LAWA chloride factsheet](#) for more information. High chloride concentrations can also cause corrosion of metal water pipes and plumbing fittings. Sodium and sulphate have taste thresholds of 200 mg/L and 250 mg/L respectively ([Taumata Arowai, 2022](#)). Calcium and magnesium are the main components of water hardness. High hardness (<200 mg/L) can cause scale deposition in plumbing and pipe work, while low hardness (<100mg/L) can be a cause of corrosion. High hardness may also have noticeable taste.

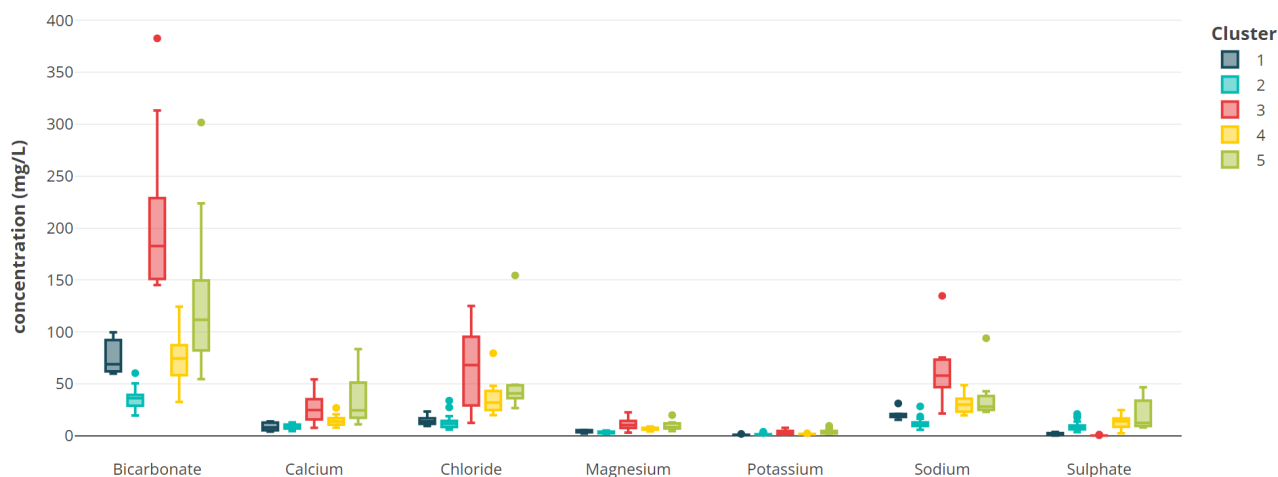


Figure 19: Using site median concentrations of these major ions, sites have been assigned into groups of similar chemical make-up using hierarchical cluster analysis (HCA). These groupings reflect recharge sources (river vs rain), land use, aquifer geology, location and the length of time the water has been underground. The range of concentrations for each group are shown in the box plot below. For a full description of the HCA technique and and more in-depth analysis of groundwater chemistry in the Wairarapa see [Daughney et al. \(2009\)](#).

Map of major ion chemistry

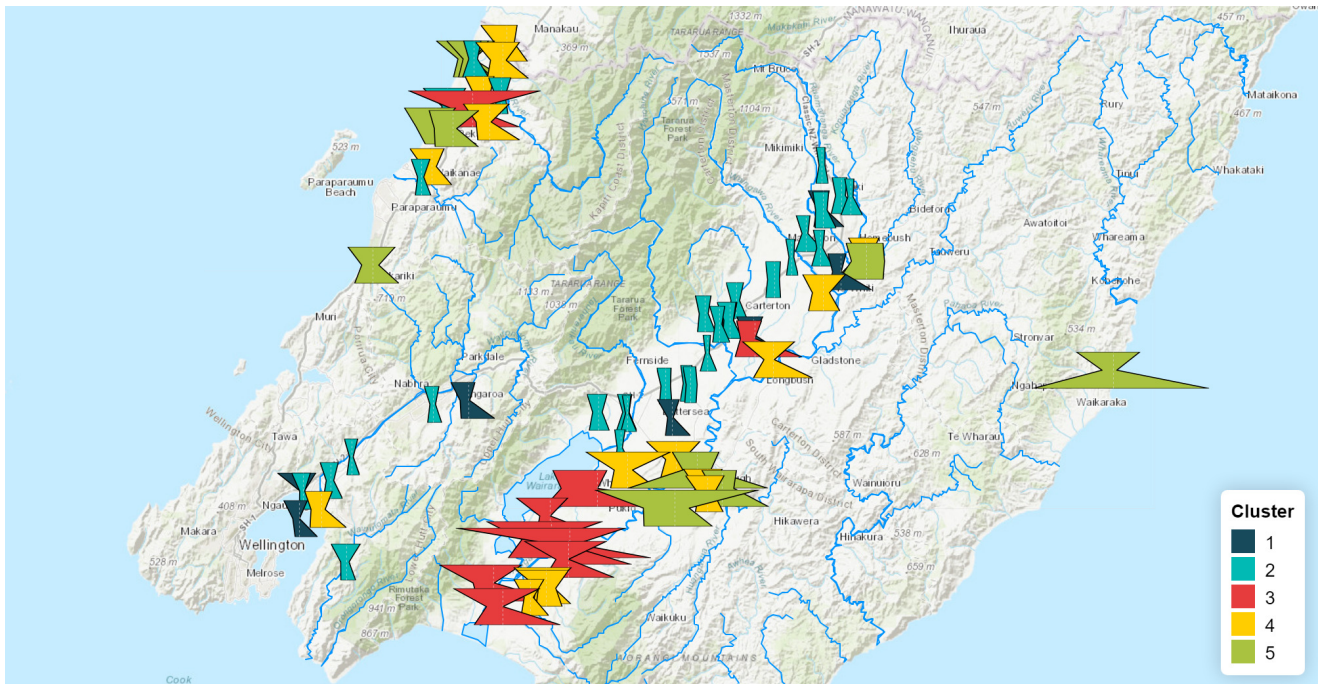


Figure 20: Sites on the map are presented in the form of Stiff plots, which are a graphical representation of the cation and anion make-up of the water sample. This allows quick assessment of similarities in groundwater chemistry across the region.

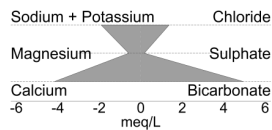


Figure 21: The shape of the plots are defined in milliequivalents per litre, which are a function of the concentrations, the molar mass of each component and their respective ionic charge.

Resources

Access to monitoring data

Full monitoring data for the latest monitoring season can be downloaded from the [latest Groundwater quality monitoring report](#) and data for other time periods can be accessed using the [GWRC live data viewer](#) or in [previous reports](#). Please read the [disclaimer](#) before using this information.

Useful links

- [Drinking Water Standards for New Zealand](#)
 - [Aesthetic Values for Drinking Water](#)
 - [National Environmental Monitoring Standards: Water Quality Part 1 - Sampling, Measuring, Processing and Archiving of Discrete Groundwater Quality Data](#)
 - [Australian and New Zealand Guidelines for Fresh and Marine Water Quality](#)
 - [Nitrate Toxicity Effects on Freshwater Aquatic Species](#)
 - [Land and Water Aotearoa \(LAWA\) Groundwater](#)
-

References

ANZECC 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1, The Guidelines*. Australian and New Zealand Environment and Conservation Council. Agriculture and Resource Management Councils of Australia and New Zealand, Canberra.

Daughney, C.J., Guggenmos, M., McAlister, D., Begg, J., Jackson, B. 2009. *Assessment of groundwater and surface water chemistry in the Upper and Lower Wairarapa Valley*. GNS Science Report 2009/21. 33p.

GW 2023. *Natural Resources Plan for the Wellington Region Greater Wellington*. <https://www.govt.nz/assets/Documents/2023/07/Natural-Resource-Plan-Operative-Version-2023-incl-maps-compressed.pdf>

Hughes, B., Gyopari, M. 2011. *Wairarapa Valley groundwater resource investigation – Proposed framework for conjunctive water management*. Greater Wellington report. 293p.

MfE 2023. *National Policy Statement for Freshwater Management 2020 (as amended February 2023)*. Ministry for the Environment, Wellington. <https://environment.govt.nz/acts-and-regulations>

[/national-policy-statements/national-policy-statement-freshwater-management/](#)

Taumata Arowai 2022. Aesthetic Values for Drinking Water Notice 2022. Taumata Arowai, Wellington. <https://www.taumataarowai.govt.nz/assets/Uploads/Rules-and-standards/Taumata-Arowai-Aesthetic-Values-for-Drinking-Water-2022.pdf>

Water Services (Drinking Water Standards for New Zealand) Regulations 2022. New Zealand Government, Wellington. <https://www.legislation.govt.nz/regulation/public/2022/0168/latest/whole.html>

Appendix

Monitoring details

Table A1: Monitoring site information.

Whaitua	Site code	Monitoring frequency	Groundwater connectivity	Depth
Ruamāhanga	BQ33/0032	3-yr	Unknown	71.5m
Kāpiti Coast	R25/5100	annual	B (high)	48.2m
Kāpiti Coast	R25/5135	annual	B (high)	93.27m
Kāpiti Coast	R25/5164	removed		N/A
Kāpiti Coast	R25/5165	quarterly	B (high)	8.0m
Kāpiti Coast	R25/5190	quarterly	B (high)	5.0m
Kāpiti Coast	R25/5233	quarterly	A (direct)	18.7m
Kāpiti Coast	R26/6503	quarterly	B (high)	14.8m
Kāpiti Coast	R26/6587	quarterly	A (direct)	12.96m
Kāpiti Coast	R26/6624	quarterly	B (high)	10.2m
Te Whanganui-a-Tara	R27/0122	continuous - conductivity	B (high)	26.2m
Te Whanganui-a-Tara	R27/0320	quarterly	B (high)	114.6m
Te Whanganui-a-Tara	R27/1137	quarterly	B (high)	20.4m
Te Whanganui-a-Tara	R27/1171	quarterly	B (high)	23.2m
Te Whanganui-a-Tara	R27/1180	quarterly	B (high)	39.0m
Te Whanganui-a-Tara	R27/1182	quarterly	B (high)	38.0m
Te Whanganui-a-Tara	R27/1183	quarterly	B (high)	25.0m
Te Whanganui-a-Tara	R27/1265	quarterly	B (high)	48.3m
Te Whanganui-a-Tara	R27/6418	quarterly	Unknown	8.0m
Te Whanganui-a-Tara	R27/6833	quarterly	Unknown	24.5m
Te Whanganui-a-Tara	R27/7153	continuous - conductivity	B (high)	34.0m
Te Whanganui-a-Tara	R27/7154	continuous - conductivity	B (high)	45.1m
Te Whanganui-a-Tara	R27/7215	continuous - conductivity	B (high)	56.9m
Kāpiti Coast	S25/5125	quarterly	A (direct)	10.0m
Kāpiti Coast	S25/5200	annual	B (high)	45.8m
Kāpiti Coast	S25/5256	quarterly	B (high)	30.78m
Kāpiti Coast	S25/5322	quarterly	B (high)	27.0m
Ruamāhanga	S26/0117	quarterly	A (direct)	4.1m
Ruamāhanga	S26/0223	quarterly	B (high)	9.92m
Ruamāhanga	S26/0299	quarterly	B (high)	8.1m
Ruamāhanga	S26/0439	quarterly	C (moderate to low)	11.5m
Ruamāhanga	S26/0457	quarterly	A (direct)	6.06m
Ruamāhanga	S26/0467	quarterly	A (direct)	6.2m
Ruamāhanga	S26/0568	annual	B (high)	45.0m
Ruamāhanga	S26/0576	3-yr	B (high)	31.0m
Ruamāhanga	S26/0705	3-yr	C (moderate to low)	27.4m
Ruamāhanga	S26/0756	removed		19.0m
Ruamāhanga	S26/0762	quarterly	A (direct)	9.5m
Ruamāhanga	S26/0824	removed		20.6m
Ruamāhanga	S26/0846	removed	A (direct)	39.3m
Ruamāhanga	S27/0009	quarterly	B (high)	10.5m
Ruamāhanga	S27/0070	quarterly	B (high)	14.6m

Whaitua	Site code	Monitoring frequency	Groundwater connectivity	Depth
Ruamāhanga	S27/0136	quarterly	B (high)	20.4m
Ruamāhanga	S27/0156	removed	B (high)	20.7m
Ruamāhanga	S27/0202	quarterly	B (high)	4.88m
Ruamāhanga	S27/0268	3-yr	C (moderate to low)	58.4m
Ruamāhanga	S27/0283	3-yr	B (high)	19.0m
Ruamāhanga	S27/0299	quarterly	A (direct)	17.4m
Ruamāhanga	S27/0344	3-yr	A (direct)	16.0m
Ruamāhanga	S27/0389	quarterly	C (moderate to low)	17.85m
Ruamāhanga	S27/0396	quarterly	A (direct)	17.0m
Ruamāhanga	S27/0433	3-yr	C (moderate to low)	44.6m
Ruamāhanga	S27/0435	annual	C (moderate to low)	44.0m
Ruamāhanga	S27/0442	annual	C (moderate to low)	177.7m
Ruamāhanga	S27/0495	annual	C (moderate to low)	37.5m
Ruamāhanga	S27/0522	quarterly	C (moderate to low)	21.0m
Ruamāhanga	S27/0571	quarterly	C (moderate to low)	32.0m
Ruamāhanga	S27/0585	3-yr	C (moderate to low)	42.0m
Ruamāhanga	S27/0588	annual	A (direct)	11.7m
Ruamāhanga	S27/0594	annual	C (moderate to low)	44.0m
Ruamāhanga	S27/0602	3-yr	C (moderate to low)	60.95m
Ruamāhanga	S27/0607	annual	C (moderate to low)	38.0m
Ruamāhanga	S27/0615	3-yr	Unknown	18.2m
Ruamāhanga	S27/0681	quarterly	A (direct)	5.0m
Ruamāhanga	T26/0003	quarterly	B (high)	5.5m
Ruamāhanga	T26/0087	quarterly	C (moderate to low)	36.0m
Ruamāhanga	T26/0099	quarterly	B (high)	15.0m
Ruamāhanga	T26/0206	quarterly	C (moderate to low)	28.7m
Ruamāhanga	T26/0259	quarterly	A (direct)	6.1m
Ruamāhanga	T26/0332	quarterly	C (moderate to low)	13.4m
Ruamāhanga	T26/0413	quarterly	C (moderate to low)	23.3m
Ruamāhanga	T26/0430	quarterly	B (high)	0m
Ruamāhanga	T26/0489	quarterly	B (high)	54.0m
Ruamāhanga	T26/0538	quarterly	B (high)	9.0m
Wairarapa Coast	T27/0063	quarterly	Unknown	3.6m
Kāpiti Coast	BN33/0032	quarterly	B (high)	12.0m
Kāpiti Coast	BN32/0063	quarterly	B (high)	30.0m
Kāpiti Coast	BN32/0062	quarterly	B (high)	5.0m
Ruamāhanga	BP34/0216	quarterly	B (high)	17.7m
Te Whanganui-a-Tara	BQ31/0047	annual	Unknown	48.0m
Te Awarua-o-Porirua	BP32/0103	annual	Unknown	49.0m
Ruamāhanga	BP33/0056	quarterly	B (high)	14.0m
Ruamāhanga	BP33/0057	quarterly	B (high)	8.2m
Ruamāhanga	BP34/0229	quarterly	A (direct)	8.5m
Ruamāhanga	BP34/0236	quarterly	B (high)	6.9m
Te Whanganui-a-Tara	BQ32/0611	continuous - conductivity	B (high)	60.0m
Te Whanganui-a-Tara	BQ32/0612	continuous - conductivity	B (high)	48.0m
Te Whanganui-a-Tara	BQ32/0613	continuous - conductivity	B (high)	38.8m

Data tables

See the respective [methods](#) and [results](#) sections for more information on guidelines and groundwater connectivity categories presented in the following tables.

Groundwater nitrate-nitrogen concentrations

Table A2: Nitrate-nitrogen results evaluated in terms of human health.

Whaitua	Site code	No. samples	Concentration rating	Median nitrate-nitrogen (mg/L)
Kāpiti Coast	BN32/0062	4	Low (≤ 2.4 mg/L)	0.875
Kāpiti Coast	BN32/0063	4	Low (≤ 2.4 mg/L)	0.533
Kāpiti Coast	BN33/0032	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	4.69
Ruamāhanga	BP33/0056	4	Low (≤ 2.4 mg/L)	<0.002
Ruamāhanga	BP33/0057	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	2.45
Ruamāhanga	BP34/0216	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	4.70
Ruamāhanga	BP34/0229	4	Low (≤ 2.4 mg/L)	2.29
Ruamāhanga	BP34/0236	4	Low (≤ 2.4 mg/L)	1.28
Ruamāhanga	BQ33/0032	1	Low (≤ 2.4 mg/L)	<0.002
Kāpiti Coast	R25/5100	1	Low (≤ 2.4 mg/L)	<0.002
Kāpiti Coast	R25/5135	1	Low (≤ 2.4 mg/L)	<0.02
Kāpiti Coast	R25/5165	4	Low (≤ 2.4 mg/L)	1.36
Kāpiti Coast	R25/5190	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	2.49
Kāpiti Coast	R25/5233	4	Low (≤ 2.4 mg/L)	1.72
Kāpiti Coast	R26/6503	4	Low (≤ 2.4 mg/L)	0.013
Kāpiti Coast	R26/6587	4	Low (≤ 2.4 mg/L)	0.719
Kāpiti Coast	R26/6624	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	2.63
Te Whanganui-a-Tara	R27/0320	4	Low (≤ 2.4 mg/L)	<0.002
Te Whanganui-a-Tara	R27/1137	3	Low (≤ 2.4 mg/L)	1.40
Te Whanganui-a-Tara	R27/1171	4	Low (≤ 2.4 mg/L)	<0.002
Te Whanganui-a-Tara	R27/1180	4	Low (≤ 2.4 mg/L)	0.930
Te Whanganui-a-Tara	R27/1182	4	Low (≤ 2.4 mg/L)	0.656
Te Whanganui-a-Tara	R27/1183	4	Low (≤ 2.4 mg/L)	0.191
Te Whanganui-a-Tara	R27/1265	4	Low (≤ 2.4 mg/L)	0.096
Te Whanganui-a-Tara	R27/6418	4	Low (≤ 2.4 mg/L)	1.41
Te Whanganui-a-Tara	R27/6833	4	Low (≤ 2.4 mg/L)	0.702
Kāpiti Coast	S25/5125	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	4.16
Kāpiti Coast	S25/5200	1	Low (≤ 2.4 mg/L)	0.003
Kāpiti Coast	S25/5256	4	Elevated (> 5.6 to ≤ 11.3 mg/L)	7.22
Kāpiti Coast	S25/5322	4	Elevated (> 5.6 to ≤ 11.3 mg/L)	8.26
Ruamāhanga	S26/0117	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	4.33
Ruamāhanga	S26/0223	4	Elevated (> 5.6 to ≤ 11.3 mg/L)	8.44
Ruamāhanga	S26/0299	4	Low (≤ 2.4 mg/L)	1.89
Ruamāhanga	S26/0439	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	2.90
Ruamāhanga	S26/0457	4	Low (≤ 2.4 mg/L)	0.742
Ruamāhanga	S26/0467	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	2.65

Whaitua	Site code	No. samples	Concentration rating	Median nitrate-nitrogen (mg/L)
Ruamāhanga	S26/0576	1	Low (≤ 2.4 mg/L)	0.003
Ruamāhanga	S26/0705	1	Intermediate (> 2.4 to ≤ 5.6 mg/L)	3.96
Ruamāhanga	S26/0762	4	Low (≤ 2.4 mg/L)	<0.002
Ruamāhanga	S27/0009	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	4.18
Ruamāhanga	S27/0070	4	Low (≤ 2.4 mg/L)	0.447
Ruamāhanga	S27/0136	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	2.99
Ruamāhanga	S27/0202	4	Low (≤ 2.4 mg/L)	1.59
Ruamāhanga	S27/0268	1	Low (≤ 2.4 mg/L)	<0.02
Ruamāhanga	S27/0283	1	Low (≤ 2.4 mg/L)	<0.02
Ruamāhanga	S27/0299	4	Low (≤ 2.4 mg/L)	0.517
Ruamāhanga	S27/0344	1	Low (≤ 2.4 mg/L)	<0.002
Ruamāhanga	S27/0389	4	Low (≤ 2.4 mg/L)	0.009
Ruamāhanga	S27/0396	4	Low (≤ 2.4 mg/L)	1.22
Ruamāhanga	S27/0433	1	Low (≤ 2.4 mg/L)	<0.02
Ruamāhanga	S27/0435	1	Low (≤ 2.4 mg/L)	<0.02
Ruamāhanga	S27/0442	1	Low (≤ 2.4 mg/L)	<0.002
Ruamāhanga	S27/0522	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	3.11
Ruamāhanga	S27/0571	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	4.13
Ruamāhanga	S27/0585	1	Low (≤ 2.4 mg/L)	<0.02
Ruamāhanga	S27/0588	1	Low (≤ 2.4 mg/L)	<0.002
Ruamāhanga	S27/0594	1	Low (≤ 2.4 mg/L)	<0.02
Ruamāhanga	S27/0602	1	Low (≤ 2.4 mg/L)	<0.02
Ruamāhanga	S27/0615	1	Low (≤ 2.4 mg/L)	0.003
Ruamāhanga	S27/0681	3	Low (≤ 2.4 mg/L)	0.581
Ruamāhanga	T26/0003	4	Low (≤ 2.4 mg/L)	2.10
Ruamāhanga	T26/0087	4	Low (≤ 2.4 mg/L)	1.43
Ruamāhanga	T26/0099	4	Intermediate (> 2.4 to ≤ 5.6 mg/L)	3.07
Ruamāhanga	T26/0206	4	Low (≤ 2.4 mg/L)	2.15
Ruamāhanga	T26/0259	4	Low (≤ 2.4 mg/L)	1.37
Ruamāhanga	T26/0332	4	Low (≤ 2.4 mg/L)	1.68
Ruamāhanga	T26/0413	4	Low (≤ 2.4 mg/L)	<0.002
Ruamāhanga	T26/0430	4	Low (≤ 2.4 mg/L)	1.98
Ruamāhanga	T26/0489	4	Elevated (> 5.6 to ≤ 11.3 mg/L)	8.72
Ruamāhanga	T26/0538	4	Elevated (> 5.6 to ≤ 11.3 mg/L)	8.58
Wairarapa Coast	T27/0063	4	Low (≤ 2.4 mg/L)	0.366

Table A3: Nitrate-nitrogen results evaluated in terms of ecosystem health.

Whaitua	Site code	Connectivity	No. samples	ANZECC rating	DGV (mg/L)	Median nitrate-nitrogen (mg/L)
Kāpiti Coast	BN32/0062	B (high)	4	Exceeds DGV	0.195	0.875
Kāpiti Coast	BN32/0063	B (high)	4	Exceeds DGV	0.195	0.533
Kāpiti Coast	BN33/0032	B (high)	4	Exceeds DGV	0.195	4.69
Ruamāhanga	BP33/0056	B (high)	4	Within DGV	0.195	<0.002
Ruamāhanga	BP33/0057	B (high)	4	Exceeds DGV	0.195	2.45
Ruamāhanga	BP34/0216	B (high)	4	Exceeds DGV	0.195	4.70
Ruamāhanga	BP34/0229	A (direct)	4	Exceeds DGV	0.265	2.29
Ruamāhanga	BP34/0236	B (high)	4	Exceeds DGV	0.195	1.28
Ruamāhanga	BQ33/0032	Unknown	1	Within DGV	0.265	<0.002
Kāpiti Coast	R25/5100	B (high)	1	Within DGV	0.195	<0.002
Kāpiti Coast	R25/5135	B (high)	1	Within DGV	0.195	<0.02
Kāpiti Coast	R25/5165	B (high)	4	Exceeds DGV	0.195	1.36
Kāpiti Coast	R25/5190	B (high)	4	Exceeds DGV	0.195	2.49
Kāpiti Coast	R25/5233	A (direct)	4	Exceeds DGV	0.195	1.72
Kāpiti Coast	R26/6503	B (high)	4	Within DGV	0.065	0.013
Kāpiti Coast	R26/6587	A (direct)	4	Exceeds DGV	0.195	0.719
Kāpiti Coast	R26/6624	B (high)	4	Exceeds DGV	0.065	2.63
Te Whanganui-a-Tara	R27/0320	B (high)	4	Within DGV	0.065	<0.002
Te Whanganui-a-Tara	R27/1137	B (high)	3	Exceeds DGV	0.065	1.40
Te Whanganui-a-Tara	R27/1171	B (high)	4	Within DGV	0.065	<0.002
Te Whanganui-a-Tara	R27/1180	B (high)	4	Exceeds DGV	0.065	0.930
Te Whanganui-a-Tara	R27/1182	B (high)	4	Exceeds DGV	0.065	0.656
Te Whanganui-a-Tara	R27/1183	B (high)	4	Exceeds DGV	0.065	0.191
Te Whanganui-a-Tara	R27/1265	B (high)	4	Exceeds DGV	0.065	0.096
Te Whanganui-a-Tara	R27/6418	Unknown	4	Exceeds DGV	0.170	1.41
Te Whanganui-a-Tara	R27/6833	Unknown	4	Exceeds DGV	0.170	0.702
Kāpiti Coast	S25/5125	A (direct)	4	Exceeds DGV	0.195	4.16
Kāpiti Coast	S25/5200	B (high)	1	Within DGV	0.170	0.003
Kāpiti Coast	S25/5256	B (high)	4	Exceeds DGV	0.195	7.22
Kāpiti Coast	S25/5322	B (high)	4	Exceeds DGV	0.195	8.26
Ruamāhanga	S26/0117	A (direct)	4	Exceeds DGV	0.170	4.33
Ruamāhanga	S26/0223	B (high)	4	Exceeds DGV	0.195	8.44
Ruamāhanga	S26/0299	B (high)	4	Exceeds DGV	0.195	1.89
Ruamāhanga	S26/0439	C (moderate to low)	4	Exceeds DGV	0.065	2.90
Ruamāhanga	S26/0457	A (direct)	4	Exceeds DGV	0.195	0.742
Ruamāhanga	S26/0467	A (direct)	4	Exceeds DGV	0.195	2.65
Ruamāhanga	S26/0568	B (high)	1	Within DGV	0.195	<0.002
Ruamāhanga	S26/0576	B (high)	1	Within DGV	0.195	0.003
Ruamāhanga	S26/0705	C (moderate to low)	1	Exceeds DGV	0.195	3.96
Ruamāhanga	S26/0762	A (direct)	4	Within DGV	0.195	<0.002
Ruamāhanga	S27/0009	B (high)	4	Exceeds DGV	0.065	4.18
Ruamāhanga	S27/0070	B (high)	4	Exceeds DGV	0.195	0.447
Ruamāhanga	S27/0136	B (high)	4	Exceeds DGV	0.195	2.99
Ruamāhanga	S27/0202	B (high)	4	Exceeds DGV	0.195	1.59
Ruamāhanga	S27/0268	C (moderate to low)	1	Within DGV	0.195	<0.02

Whaitua	Site code	Connectivity	No. samples	ANZECC rating	DGV (mg/L)	Median nitrate-nitrogen (mg/L)
Ruamāhanga	S27/0283	B (high)	1	Within DGV	0.195	<0.02
Ruamāhanga	S27/0299	A (direct)	4	Exceeds DGV	0.195	0.517
Ruamāhanga	S27/0344	A (direct)	1	Within DGV	0.195	<0.002
Ruamāhanga	S27/0389	C (moderate to low)	4	Within DGV	0.195	0.009
Ruamāhanga	S27/0396	A (direct)	4	Exceeds DGV	0.170	1.22
Ruamāhanga	S27/0433	C (moderate to low)	1	Within DGV	0.195	<0.02
Ruamāhanga	S27/0435	C (moderate to low)	1	Within DGV	0.195	<0.02
Ruamāhanga	S27/0442	C (moderate to low)	1	Within DGV	0.170	<0.002
Ruamāhanga	S27/0522	C (moderate to low)	4	Exceeds DGV	0.195	3.11
Ruamāhanga	S27/0571	C (moderate to low)	4	Exceeds DGV	0.195	4.13
Ruamāhanga	S27/0585	C (moderate to low)	1	Within DGV	0.195	<0.02
Ruamāhanga	S27/0588	A (direct)	1	Within DGV	0.087	<0.002
Ruamāhanga	S27/0594	C (moderate to low)	1	Within DGV	0.195	<0.02
Ruamāhanga	S27/0602	C (moderate to low)	1	Within DGV	0.195	<0.02
Ruamāhanga	S27/0615	Unknown	1	Within DGV	0.195	0.003
Ruamāhanga	S27/0681	A (direct)	3	Exceeds DGV	0.265	0.581
Ruamāhanga	T26/0003	B (high)	4	Exceeds DGV	0.265	2.10
Ruamāhanga	T26/0087	C (moderate to low)	4	Exceeds DGV	0.195	1.43
Ruamāhanga	T26/0099	B (high)	4	Exceeds DGV	0.195	3.07
Ruamāhanga	T26/0206	C (moderate to low)	4	Exceeds DGV	0.195	2.15
Ruamāhanga	T26/0259	A (direct)	4	Exceeds DGV	0.265	1.37
Ruamāhanga	T26/0332	C (moderate to low)	4	Exceeds DGV	0.195	1.68
Ruamāhanga	T26/0413	C (moderate to low)	4	Within DGV	0.195	<0.002
Ruamāhanga	T26/0430	B (high)	4	Exceeds DGV	0.195	1.98
Ruamāhanga	T26/0489	B (high)	4	Exceeds DGV	0.195	8.72
Ruamāhanga	T26/0538	B (high)	4	Exceeds DGV	0.195	8.58
Wairarapa Coast	T27/0063	Unknown	4	Exceeds DGV	0.195	0.366

Table A4: Nitrate-nitrogen results evaluated in terms of of NPS-FM attribute bands for aquatic toxicity.

Whaitua	Site code	Connectivity	No. samples	Attribute band	Median nitrate-nitrogen (mg/L)
Kāpiti Coast	BN32/0062	B (high)	4	A (≤ 1.0 mg/L)	0.875
Kāpiti Coast	BN32/0063	B (high)	4	A (≤ 1.0 mg/L)	0.533
Kāpiti Coast	BN33/0032	B (high)	4	C (> 2.4 and ≤ 6.9 mg/L)	4.69
Ruamāhanga	BP33/0056	B (high)	4	A (≤ 1.0 mg/L)	<0.002
Ruamāhanga	BP33/0057	B (high)	4	C (> 2.4 and ≤ 6.9 mg/L)	2.45
Ruamāhanga	BP34/0216	B (high)	4	C (> 2.4 and ≤ 6.9 mg/L)	4.70
Ruamāhanga	BP34/0229	A (direct)	4	B (> 1.0 and ≤ 2.4 mg/L)	2.29
Ruamāhanga	BP34/0236	B (high)	4	B (> 1.0 and ≤ 2.4 mg/L)	1.28
Ruamāhanga	BQ33/0032	Unknown	1	A (≤ 1.0 mg/L)	<0.002
Kāpiti Coast	R25/5100	B (high)	1	A (≤ 1.0 mg/L)	<0.002
Kāpiti Coast	R25/5135	B (high)	1	A (≤ 1.0 mg/L)	<0.02
Kāpiti Coast	R25/5165	B (high)	4	B (> 1.0 and ≤ 2.4 mg/L)	1.36
Kāpiti Coast	R25/5190	B (high)	4	C (> 2.4 and ≤ 6.9 mg/L)	2.49
Kāpiti Coast	R25/5233	A (direct)	4	B (> 1.0 and ≤ 2.4 mg/L)	1.72
Kāpiti Coast	R26/6503	B (high)	4	A (≤ 1.0 mg/L)	0.013
Kāpiti Coast	R26/6587	A (direct)	4	A (≤ 1.0 mg/L)	0.719
Kāpiti Coast	R26/6624	B (high)	4	C (> 2.4 and ≤ 6.9 mg/L)	2.63
Te Whanganui-a-Tara	R27/0320	B (high)	4	A (≤ 1.0 mg/L)	<0.002
Te Whanganui-a-Tara	R27/1137	B (high)	3	B (> 1.0 and ≤ 2.4 mg/L)	1.40
Te Whanganui-a-Tara	R27/1171	B (high)	4	A (≤ 1.0 mg/L)	<0.002
Te Whanganui-a-Tara	R27/1180	B (high)	4	A (≤ 1.0 mg/L)	0.930
Te Whanganui-a-Tara	R27/1182	B (high)	4	A (≤ 1.0 mg/L)	0.656
Te Whanganui-a-Tara	R27/1183	B (high)	4	A (≤ 1.0 mg/L)	0.191
Te Whanganui-a-Tara	R27/1265	B (high)	4	A (≤ 1.0 mg/L)	0.096
Te Whanganui-a-Tara	R27/6418	Unknown	4	B (> 1.0 and ≤ 2.4 mg/L)	1.41
Te Whanganui-a-Tara	R27/6833	Unknown	4	A (≤ 1.0 mg/L)	0.702
Kāpiti Coast	S25/5125	A (direct)	4	C (> 2.4 and ≤ 6.9 mg/L)	4.16
Kāpiti Coast	S25/5200	B (high)	1	A (≤ 1.0 mg/L)	0.003
Kāpiti Coast	S25/5256	B (high)	4	D (> 6.9 mg/L)	7.22
Kāpiti Coast	S25/5322	B (high)	4	D (> 6.9 mg/L)	8.26
Ruamāhanga	S26/0117	A (direct)	4	C (> 2.4 and ≤ 6.9 mg/L)	4.33
Ruamāhanga	S26/0223	B (high)	4	D (> 6.9 mg/L)	8.44
Ruamāhanga	S26/0299	B (high)	4	B (> 1.0 and ≤ 2.4 mg/L)	1.89
Ruamāhanga	S26/0439	C (moderate to low)	4	C (> 2.4 and ≤ 6.9 mg/L)	2.90
Ruamāhanga	S26/0457	A (direct)	4	A (≤ 1.0 mg/L)	0.742
Ruamāhanga	S26/0467	A (direct)	4	C (> 2.4 and ≤ 6.9 mg/L)	2.65
Ruamāhanga	S26/0568	B (high)	1	A (≤ 1.0 mg/L)	<0.002
Ruamāhanga	S26/0576	B (high)	1	A (≤ 1.0 mg/L)	0.003
Ruamāhanga	S26/0705	C (moderate to low)	1	C (> 2.4 and ≤ 6.9 mg/L)	3.96
Ruamāhanga	S26/0762	A (direct)	4	A (≤ 1.0 mg/L)	<0.002
Ruamāhanga	S27/0009	B (high)	4	C (> 2.4 and ≤ 6.9 mg/L)	4.18
Ruamāhanga	S27/0070	B (high)	4	A (≤ 1.0 mg/L)	0.447
Ruamāhanga	S27/0136	B (high)	4	C (> 2.4 and ≤ 6.9 mg/L)	2.99

Whaitua	Site code	Connectivity	No. samples	Attribute band	Median nitrate-nitrogen (mg/L)
Ruamāhanga	S27/0268	C (moderate to low)	1	A (≤ 1.0 mg/L)	<0.02
Ruamāhanga	S27/0283	B (high)	1	A (≤ 1.0 mg/L)	<0.02
Ruamāhanga	S27/0299	A (direct)	4	A (≤ 1.0 mg/L)	0.517
Ruamāhanga	S27/0344	A (direct)	1	A (≤ 1.0 mg/L)	<0.002
Ruamāhanga	S27/0389	C (moderate to low)	4	A (≤ 1.0 mg/L)	0.009
Ruamāhanga	S27/0396	A (direct)	4	B (> 1.0 and ≤ 2.4 mg/L)	1.22
Ruamāhanga	S27/0433	C (moderate to low)	1	A (≤ 1.0 mg/L)	<0.02
Ruamāhanga	S27/0435	C (moderate to low)	1	A (≤ 1.0 mg/L)	<0.02
Ruamāhanga	S27/0442	C (moderate to low)	1	A (≤ 1.0 mg/L)	<0.002
Ruamāhanga	S27/0522	C (moderate to low)	4	C (> 2.4 and ≤ 6.9 mg/L)	3.11
Ruamāhanga	S27/0571	C (moderate to low)	4	C (> 2.4 and ≤ 6.9 mg/L)	4.13
Ruamāhanga	S27/0585	C (moderate to low)	1	A (≤ 1.0 mg/L)	<0.02
Ruamāhanga	S27/0588	A (direct)	1	A (≤ 1.0 mg/L)	<0.002
Ruamāhanga	S27/0594	C (moderate to low)	1	A (≤ 1.0 mg/L)	<0.02
Ruamāhanga	S27/0602	C (moderate to low)	1	A (≤ 1.0 mg/L)	<0.02
Ruamāhanga	S27/0615	Unknown	1	A (≤ 1.0 mg/L)	0.003
Ruamāhanga	S27/0681	A (direct)	3	A (≤ 1.0 mg/L)	0.581
Ruamāhanga	T26/0003	B (high)	4	B (> 1.0 and ≤ 2.4 mg/L)	2.10
Ruamāhanga	T26/0087	C (moderate to low)	4	B (> 1.0 and ≤ 2.4 mg/L)	1.43
Ruamāhanga	T26/0099	B (high)	4	C (> 2.4 and ≤ 6.9 mg/L)	3.07
Ruamāhanga	T26/0206	C (moderate to low)	4	B (> 1.0 and ≤ 2.4 mg/L)	2.15
Ruamāhanga	T26/0259	A (direct)	4	B (> 1.0 and ≤ 2.4 mg/L)	1.37
Ruamāhanga	T26/0332	C (moderate to low)	4	B (> 1.0 and ≤ 2.4 mg/L)	1.68
Ruamāhanga	T26/0413	C (moderate to low)	4	A (≤ 1.0 mg/L)	<0.002
Ruamāhanga	T26/0430	B (high)	4	B (> 1.0 and ≤ 2.4 mg/L)	1.98
Ruamāhanga	T26/0489	B (high)	4	D (> 6.9 mg/L)	8.72
Ruamāhanga	T26/0538	B (high)	4	D (> 6.9 mg/L)	8.58
Wairarapa Coast	T27/0063	Unknown	4	A (≤ 1.0 mg/L)	0.366

Detection of *E. coli* bacteria

Table A5: *E. coli* bacteria results benchmarked against Drinking Water Standards for New Zealand guidelines.

Whaitua	Site code	Connectivity	No. samples	DWSNZ MAV	No. ≥ 1 cfu/100ml	Max cfu/100ml
Kāpiti Coast	BN32/0062	B (high)	4	Not detected (<1)	0	<1.0
Kāpiti Coast	BN32/0063	B (high)	4	Not detected (<1)	0	<1.0
Kāpiti Coast	BN33/0032	B (high)	4	Not detected (<1)	0	<1.0
Ruamāhanga	BP33/0056	B (high)	4	Detected (≥ 1)	1	2.0
Ruamāhanga	BP33/0057	B (high)	4	Detected (≥ 1)	2	2.0
Ruamāhanga	BP34/0216	B (high)	4	Not detected (<1)	0	<1.0
Ruamāhanga	BP34/0229	A (direct)	4	Detected (≥ 1)	3	18.0
Ruamāhanga	BP34/0236	B (high)	4	Not detected (<1)	0	<1.0
Kāpiti Coast	R25/5100	B (high)	1	Not detected (<1)	0	<1.0
Kāpiti Coast	R25/5165	B (high)	4	Not detected (<1)	0	<1.0
Kāpiti Coast	R25/5190	B (high)	4	Not detected (<1)	0	<1.0
Kāpiti Coast	R25/5233	A (direct)	4	Not detected (<1)	0	<1.0
Kāpiti Coast	R26/6587	A (direct)	4	Detected (≥ 1)	2	2.0
Kāpiti Coast	R26/6624	B (high)	4	Not detected (<1)	0	<1.0
Te Whanganui-a-Tara	R27/1137	B (high)	3	Not detected (<1)	0	<1.0
Te Whanganui-a-Tara	R27/1171	B (high)	4	Not detected (<1)	0	<1.0
Te Whanganui-a-Tara	R27/1180	B (high)	4	Not detected (<1)	0	<1.0
Te Whanganui-a-Tara	R27/1183	B (high)	4	Not detected (<1)	0	<1.0
Te Whanganui-a-Tara	R27/6418	Unknown	4	Detected (≥ 1)	4	260.0
Te Whanganui-a-Tara	R27/6833	Unknown	4	Not detected (<1)	0	<1.0
Kāpiti Coast	S25/5125	A (direct)	4	Detected (≥ 1)	4	590.0
Kāpiti Coast	S25/5200	B (high)	1	Not detected (<1)	0	<1.0
Kāpiti Coast	S25/5256	B (high)	4	Detected (≥ 1)	1	1.0
Kāpiti Coast	S25/5322	B (high)	4	Not detected (<1)	0	<1.0
Ruamāhanga	S26/0117	A (direct)	4	Detected (≥ 1)	1	1.0
Ruamāhanga	S26/0223	B (high)	4	Detected (≥ 1)	2	26.0
Ruamāhanga	S26/0299	B (high)	4	Not detected (<1)	0	<1.0
Ruamāhanga	S26/0439	C (moderate to low)	4	Detected (≥ 1)	1	35.0
Ruamāhanga	S26/0457	A (direct)	4	Not detected (<1)	0	<1.0
Ruamāhanga	S26/0467	A (direct)	4	Detected (≥ 1)	1	1.0
Ruamāhanga	S26/0705	C (moderate to low)	1	Not detected (<1)	0	<1.0
Ruamāhanga	S26/0762	A (direct)	4	Detected (≥ 1)	1	1.0
Ruamāhanga	S27/0009	B (high)	4	Not detected (<1)	0	<1.0
Ruamāhanga	S27/0070	B (high)	4	Detected (≥ 1)	1	5.0
Ruamāhanga	S27/0136	B (high)	4	Not detected (<1)	0	<1.0
Ruamāhanga	S27/0202	B (high)	4	Detected (≥ 1)	3	210.0
Ruamāhanga	S27/0299	A (direct)	4	Not detected (<1)	0	<1.0
Ruamāhanga	S27/0344	A (direct)	1	Not detected (<1)	0	<1.0
Ruamāhanga	S27/0389	C (moderate to low)	4	Not detected (<1)	0	<1.0
Ruamāhanga	S27/0396	A (direct)	4	Not detected (<1)	0	<1.0

Whaitua	Site code	Connectivity	No. samples	DWSNZ MAV	No. ≥ 1 cfu/100ml	Max cfu/100ml
Ruamāhanga	S27/0571	C (moderate to low)	4	Not detected (<1)	0	<1.0
Ruamāhanga	S27/0588	A (direct)	1	Not detected (<1)	0	<1.0
Ruamāhanga	S27/0681	A (direct)	3	Not detected (<1)	0	<1.0
Ruamāhanga	T26/0003	B (high)	4	Detected (≥ 1)	1	3.0
Ruamāhanga	T26/0087	C (moderate to low)	4	Not detected (<1)	0	<1.0
Ruamāhanga	T26/0099	B (high)	4	Not detected (<1)	0	<1.0
Ruamāhanga	T26/0206	C (moderate to low)	4	Not detected (<1)	0	<1.0
Ruamāhanga	T26/0259	A (direct)	4	Not detected (<1)	0	<1.0
Ruamāhanga	T26/0332	C (moderate to low)	4	Not detected (<1)	0	<1.0
Ruamāhanga	T26/0413	C (moderate to low)	4	Not detected (<1)	0	<1.0
Ruamāhanga	T26/0430	B (high)	4	Detected (≥ 1)	4	14.0
Ruamāhanga	T26/0489	B (high)	4	Not detected (<1)	0	<1.0
Ruamāhanga	T26/0538	B (high)	4	Detected (≥ 1)	1	1.0
Wairarapa Coast	T27/0063	Unknown	4	Detected (≥ 1)	2	3.0

Saline intrusion

Monthly average saline intrusion results for six Te Whanganui-a-Tara groundwater bores.

Table A6: Shallow groundwater bore R27/0122, the warning threshold is 250 $\mu\text{S}/\text{cm}$.

Month	Mean conductivity ($\mu\text{S}/\text{cm}$)	# warning exceedances
2022-07	175.6	0
2022-08	173.6	0
2022-09	178.8	0
2022-10	178.6	0
2022-11	173.8	0
2022-12	181.4	0
2023-01	184.0	0
2023-02	175.2	0
2023-03	173.2	0
2023-04	177.2	0
2023-05	186.2	0
2023-06	180.9	0

Table A7: Shallow groundwater bore R27/7154, the warning threshold is 200 $\mu\text{S}/\text{cm}$.

Month	Mean conductivity ($\mu\text{S}/\text{cm}$)	# warning exceedances
2022-07	106.6	0
2022-08	106.9	0
2022-09	107.4	0
2022-10	108.4	0
2022-11	108.9	0
2022-12	118.2	0
2023-01	131.0	0
2023-02	127.5	0
2023-03	126.0	0
2023-04	125.9	0
2023-05	125.7	0
2023-06	126.0	0

Table A8: Deep groundwater bore R27/7215, the warning threshold is 200 $\mu\text{S}/\text{cm}$.

Month	Mean conductivity ($\mu\text{S}/\text{cm}$)	# warning exceedances
2022-07	156.8	0
2022-08	154.8	0
2022-09	153.5	0
2022-10	152.4	0
2022-11	162.5	0
2022-12	173.0	0
2023-01	182.5	0
2023-02	180.7	0
2023-03	177.1	0
2023-04	173.6	0
2023-05	171.5	0
2023-06	167.3	0

Table A9: Deep groundwater bore BQ32/0611, no warning threshold has been set for this well.

Month	Mean conductivity ($\mu\text{S}/\text{cm}$)	# warning exceedances
2022-07	161.3	
2022-08	158.3	
2022-09	164.6	
2022-10	164.1	
2022-11	190.1	
2022-12	169.7	
2023-01	179.0	
2023-02	174.0	
2023-03	172.4	
2023-04	179.4	
2023-05	199.1	
2023-06	181.2	

Table A10: Deep groundwater bore BQ32/0612, no warning threshold has been set for this well.

Month	Mean conductivity ($\mu\text{S/cm}$)	# warning exceedances
2022-07	347.0	
2022-08	366.7	
2022-09	373.7	
2022-10	392.2	
2022-11	362.3	
2022-12	387.8	
2023-01	386.5	
2023-02	385.2	
2023-03	381.6	
2023-04	380.2	
2023-05	384.1	
2023-06	385.7	

Table A11: Shallow groundwater bore BQ32/0613, no warning threshold has been set for this well.

Month	Mean conductivity ($\mu\text{S/cm}$)	# warning exceedances
2022-07	196.8	
2022-08	196.2	
2022-09	196.4	
2022-10	196.4	
2022-11	196.4	
2022-12	196.6	
2023-01	201.5	
2023-02	199.1	
2023-03	195.5	
2023-04	196.3	
2023-05	214.5	
2023-06	207.9	

Groundwater dissolved reactive phosphorus concentrations

Table A12: Dissolved reactive phosphorus results evaluated in terms of NPS-FM attribute bands for ecosystem health.

Whaitua	Site code	Connectivity	No. samples	Attribute band	Median dissolved reactive phosphorus (mg/L)
Kāpiti Coast	BN32/0062	B (high)	4	D (>0.018 mg/L)	0.0982
Kāpiti Coast	BN32/0063	B (high)	4	D (>0.018 mg/L)	0.0839
Kāpiti Coast	BN33/0032	B (high)	4	D (>0.018 mg/L)	0.0698
Ruamāhanga	BP33/0056	B (high)	4	D (>0.018 mg/L)	0.0705
Ruamāhanga	BP33/0057	B (high)	4	B (>0.006 and ≤0.010mg/L)	0.0089
Ruamāhanga	BP34/0216	B (high)	4	C (>0.010 and ≤0.018 mg/L)	0.0164
Ruamāhanga	BP34/0229	A (direct)	4	C (>0.010 and ≤0.018 mg/L)	0.0124
Ruamāhanga	BP34/0236	B (high)	4	C (>0.010 and ≤0.018 mg/L)	0.0119
Ruamāhanga	BQ33/0032	Unknown	1	B (>0.006 and ≤0.010mg/L)	0.0084
Kāpiti Coast	R25/5100	B (high)	1	D (>0.018 mg/L)	0.3152
Kāpiti Coast	R25/5135	B (high)	1	D (>0.018 mg/L)	0.1563
Kāpiti Coast	R25/5165	B (high)	4	D (>0.018 mg/L)	0.1672
Kāpiti Coast	R25/5190	B (high)	4	D (>0.018 mg/L)	0.0830
Kāpiti Coast	R25/5233	A (direct)	4	C (>0.010 and ≤0.018 mg/L)	0.0128
Kāpiti Coast	R26/6503	B (high)	4	D (>0.018 mg/L)	0.0626
Kāpiti Coast	R26/6587	A (direct)	4	A (≤0.006 mg/L)	<0.004
Kāpiti Coast	R26/6624	B (high)	4	D (>0.018 mg/L)	0.0224
Te Whanganui-a-Tara	R27/0320	B (high)	4	D (>0.018 mg/L)	0.1525
Te Whanganui-a-Tara	R27/1137	B (high)	3	C (>0.010 and ≤0.018 mg/L)	0.0113
Te Whanganui-a-Tara	R27/1171	B (high)	4	D (>0.018 mg/L)	0.2000
Te Whanganui-a-Tara	R27/1180	B (high)	4	C (>0.010 and ≤0.018 mg/L)	0.0106
Te Whanganui-a-Tara	R27/1182	B (high)	4	A (≤0.006 mg/L)	0.0041
Te Whanganui-a-Tara	R27/1183	B (high)	4	C (>0.010 and ≤0.018 mg/L)	0.0111
Te Whanganui-a-Tara	R27/1265	B (high)	4	D (>0.018 mg/L)	0.0245
Te Whanganui-a-Tara	R27/6418	Unknown	4	D (>0.018 mg/L)	0.0182
Te Whanganui-a-Tara	R27/6833	Unknown	4	D (>0.018 mg/L)	0.0514
Kāpiti Coast	S25/5125	A (direct)	4	D (>0.018 mg/L)	0.0290
Kāpiti Coast	S25/5200	B (high)	1	D (>0.018 mg/L)	0.1498
Kāpiti Coast	S25/5256	B (high)	4	C (>0.010 and ≤0.018 mg/L)	0.0151
Kāpiti Coast	S25/5322	B (high)	4	D (>0.018 mg/L)	0.0469
Ruamāhanga	S26/0117	A (direct)	4	C (>0.010 and ≤0.018 mg/L)	0.0157
Ruamāhanga	S26/0223	B (high)	4	C (>0.010 and ≤0.018 mg/L)	0.0166
Ruamāhanga	S26/0299	B (high)	4	D (>0.018 mg/L)	0.0233
Ruamāhanga	S26/0439	C (moderate to low)	4	C (>0.010 and ≤0.018 mg/L)	0.0145
Ruamāhanga	S26/0457	A (direct)	4	B (>0.006 and ≤0.010mg/L)	0.0082
Ruamāhanga	S26/0467	A (direct)	4	D (>0.018 mg/L)	0.0181
Ruamāhanga	S26/0568	B (high)	1	D (>0.018 mg/L)	0.7128
Ruamāhanga	S26/0576	B (high)	1	D (>0.018 mg/L)	0.4982

Whaitua	Site code	Connectivity	No. samples	Attribute band	Median dissolved reactive phosphorus (mg/L)
Ruamāhanga	S26/0762	A (direct)	4	D (>0.018 mg/L)	0.6437
Ruamāhanga	S27/0009	B (high)	4	C (>0.010 and ≤0.018 mg/L)	0.0124
Ruamāhanga	S27/0070	B (high)	4	B (>0.006 and ≤0.010mg/L)	0.0064
Ruamāhanga	S27/0136	B (high)	4	B (>0.006 and ≤0.010mg/L)	0.0075
Ruamāhanga	S27/0202	B (high)	4	D (>0.018 mg/L)	0.0228
Ruamāhanga	S27/0268	C (moderate to low)	1	D (>0.018 mg/L)	0.0200
Ruamāhanga	S27/0283	B (high)	1	C (>0.010 and ≤0.018 mg/L)	0.0154
Ruamāhanga	S27/0299	A (direct)	4	B (>0.006 and ≤0.010mg/L)	0.0073
Ruamāhanga	S27/0344	A (direct)	1	D (>0.018 mg/L)	0.0609
Ruamāhanga	S27/0389	C (moderate to low)	4	D (>0.018 mg/L)	0.6041
Ruamāhanga	S27/0396	A (direct)	4	C (>0.010 and ≤0.018 mg/L)	0.0173
Ruamāhanga	S27/0433	C (moderate to low)	1	D (>0.018 mg/L)	0.0200
Ruamāhanga	S27/0435	C (moderate to low)	1	D (>0.018 mg/L)	4.6895
Ruamāhanga	S27/0442	C (moderate to low)	1	D (>0.018 mg/L)	3.9041
Ruamāhanga	S27/0522	C (moderate to low)	4	A (≤0.006 mg/L)	<0.004
Ruamāhanga	S27/0571	C (moderate to low)	4	C (>0.010 and ≤0.018 mg/L)	0.0119
Ruamāhanga	S27/0585	C (moderate to low)	1	D (>0.018 mg/L)	0.1027
Ruamāhanga	S27/0588	A (direct)	1	C (>0.010 and ≤0.018 mg/L)	0.0122
Ruamāhanga	S27/0594	C (moderate to low)	1	D (>0.018 mg/L)	0.4669
Ruamāhanga	S27/0602	C (moderate to low)	1	D (>0.018 mg/L)	0.7168
Ruamāhanga	S27/0615	Unknown	1	A (≤0.006 mg/L)	0.0045
Ruamāhanga	S27/0681	A (direct)	3	C (>0.010 and ≤0.018 mg/L)	0.0153
Ruamāhanga	T26/0003	B (high)	4	D (>0.018 mg/L)	0.0192
Ruamāhanga	T26/0087	C (moderate to low)	4	D (>0.018 mg/L)	0.0251
Ruamāhanga	T26/0099	B (high)	4	C (>0.010 and ≤0.018 mg/L)	0.0171
Ruamāhanga	T26/0206	C (moderate to low)	4	D (>0.018 mg/L)	0.0581
Ruamāhanga	T26/0259	A (direct)	4	B (>0.006 and ≤0.010mg/L)	0.0086
Ruamāhanga	T26/0332	C (moderate to low)	4	D (>0.018 mg/L)	0.0366
Ruamāhanga	T26/0413	C (moderate to low)	4	C (>0.010 and ≤0.018 mg/L)	0.0116
Ruamāhanga	T26/0430	B (high)	4	C (>0.010 and ≤0.018 mg/L)	0.0126
Ruamāhanga	T26/0489	B (high)	4	C (>0.010 and ≤0.018 mg/L)	0.0160
Ruamāhanga	T26/0538	B (high)	4	B (>0.006 and ≤0.010mg/L)	0.0078
Wairarapa Coast	T27/0063	Unknown	4	D (>0.018 mg/L)	0.0960

Groundwater dissolved metal concentrations

Table A13: Dissolved iron results evaluated in terms of drinking water aesthetic values.

Whaitua	Site code	No. samples	Concentration rating	Median dissolved iron (mg/L)
Kāpiti Coast	BN32/0062	4	Below detection limit (<0.02)	<0.02
Kāpiti Coast	BN32/0063	4	Exceeds aesthetic value (>0.3 mg/L)	3.11
Kāpiti Coast	BN33/0032	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	BP33/0056	4	Low (0.02 to 0.3 mg/L)	0.149
Ruamāhanga	BP33/0057	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	BP34/0216	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	BP34/0229	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	BP34/0236	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	BQ33/0032	1	Exceeds aesthetic value (>0.3 mg/L)	4.16
Kāpiti Coast	R25/5100	1	Exceeds aesthetic value (>0.3 mg/L)	1.10
Kāpiti Coast	R25/5135	1	Exceeds aesthetic value (>0.3 mg/L)	1.18
Kāpiti Coast	R25/5165	4	Exceeds aesthetic value (>0.3 mg/L)	2.21
Kāpiti Coast	R25/5190	4	Low (0.02 to 0.3 mg/L)	0.024
Kāpiti Coast	R25/5233	4	Below detection limit (<0.02)	<0.02
Kāpiti Coast	R26/6503	4	Exceeds aesthetic value (>0.3 mg/L)	1.89
Kāpiti Coast	R26/6587	4	Low (0.02 to 0.3 mg/L)	0.049
Kāpiti Coast	R26/6624	4	Below detection limit (<0.02)	<0.02
Te Whanganui-a-Tara	R27/0320	4	Low (0.02 to 0.3 mg/L)	0.102
Te Whanganui-a-Tara	R27/1137	3	Low (0.02 to 0.3 mg/L)	0.037
Te Whanganui-a-Tara	R27/1171	4	Exceeds aesthetic value (>0.3 mg/L)	1.19
Te Whanganui-a-Tara	R27/1180	4	Below detection limit (<0.02)	<0.02
Te Whanganui-a-Tara	R27/1182	4	Exceeds aesthetic value (>0.3 mg/L)	0.853
Te Whanganui-a-Tara	R27/1183	4	Low (0.02 to 0.3 mg/L)	0.032
Te Whanganui-a-Tara	R27/1265	4	Low (0.02 to 0.3 mg/L)	0.289
Te Whanganui-a-Tara	R27/6418	4	Below detection limit (<0.02)	<0.02
Te Whanganui-a-Tara	R27/6833	4	Below detection limit (<0.02)	<0.02
Kāpiti Coast	S25/5125	4	Below detection limit (<0.02)	<0.02
Kāpiti Coast	S25/5200	1	Exceeds aesthetic value (>0.3 mg/L)	0.464
Kāpiti Coast	S25/5256	4	Low (0.02 to 0.3 mg/L)	0.165
Kāpiti Coast	S25/5322	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	S26/0117	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	S26/0223	4	Low (0.02 to 0.3 mg/L)	0.023
Ruamāhanga	S26/0299	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	S26/0439	4	Low (0.02 to 0.3 mg/L)	0.031
Ruamāhanga	S26/0457	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	S26/0467	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	S26/0568	1	Exceeds aesthetic value (>0.3 mg/L)	3.36
Ruamāhanga	S26/0576	1	Exceeds aesthetic value (>0.3 mg/L)	1.63
Ruamāhanga	S26/0705	1	Low (0.02 to 0.3 mg/L)	0.150
Ruamāhanga	S26/0762	4	Exceeds aesthetic value (>0.3 mg/L)	6.94
Ruamāhanga	S27/0009	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	S27/0070	4	Below detection limit (<0.02)	<0.02

Whaitua	Site code	No. samples	Concentration rating	Median dissolved iron (mg/L)
Ruamāhanga	S27/0136	4	Low (0.02 to 0.3 mg/L)	0.087
Ruamāhanga	S27/0202	4	Low (0.02 to 0.3 mg/L)	0.064
Ruamāhanga	S27/0268	1	Exceeds aesthetic value (>0.3 mg/L)	6.66
Ruamāhanga	S27/0283	1	Exceeds aesthetic value (>0.3 mg/L)	10.6
Ruamāhanga	S27/0299	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	S27/0344	1	Exceeds aesthetic value (>0.3 mg/L)	0.863
Ruamāhanga	S27/0389	4	Low (0.02 to 0.3 mg/L)	0.087
Ruamāhanga	S27/0396	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	S27/0433	1	Exceeds aesthetic value (>0.3 mg/L)	11.6
Ruamāhanga	S27/0435	1	Exceeds aesthetic value (>0.3 mg/L)	7.16
Ruamāhanga	S27/0442	1	Exceeds aesthetic value (>0.3 mg/L)	0.966
Ruamāhanga	S27/0522	4	Low (0.02 to 0.3 mg/L)	0.099
Ruamāhanga	S27/0571	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	S27/0585	1	Exceeds aesthetic value (>0.3 mg/L)	1.66
Ruamāhanga	S27/0588	1	Exceeds aesthetic value (>0.3 mg/L)	4.81
Ruamāhanga	S27/0594	1	Exceeds aesthetic value (>0.3 mg/L)	1.79
Ruamāhanga	S27/0602	1	Exceeds aesthetic value (>0.3 mg/L)	3.45
Ruamāhanga	S27/0615	1	Exceeds aesthetic value (>0.3 mg/L)	7.00
Ruamāhanga	S27/0681	3	Below detection limit (<0.02)	<0.02
Ruamāhanga	T26/0003	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	T26/0087	4	Low (0.02 to 0.3 mg/L)	0.040
Ruamāhanga	T26/0099	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	T26/0206	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	T26/0259	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	T26/0332	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	T26/0413	4	Exceeds aesthetic value (>0.3 mg/L)	0.449
Ruamāhanga	T26/0430	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	T26/0489	4	Below detection limit (<0.02)	<0.02
Ruamāhanga	T26/0538	4	Below detection limit (<0.02)	<0.02
Wairarapa Coast	T27/0063	4	Low (0.02 to 0.3 mg/L)	0.028

Table A14: Dissolved manganese results evaluated against Drinking Water Standards New Zealand guidelines.

Whaitua	Site code	No. samples	Concentration rating	Median dissolved manganese (mg/L)
Kāpiti Coast	BN32/0062	4	Below staining threshold <0.04 mg/L)	0.00174
Kāpiti Coast	BN32/0063	4	Exceeds DWSNZ (>0.4 mg/L)	0.414
Kāpiti Coast	BN33/0032	4	Below staining threshold <0.04 mg/L)	0.00154
Ruamāhanga	BP33/0056	4	Above taste threshold (0.1 to 0.4 mg/L)	0.328
Ruamāhanga	BP33/0057	4	Below staining threshold <0.04 mg/L)	<0.0005
Ruamāhanga	BP34/0216	4	Below staining threshold <0.04 mg/L)	0.00434
Ruamāhanga	BP34/0229	4	Below staining threshold <0.04 mg/L)	0.0012
Ruamāhanga	BP34/0236	4	Below staining threshold <0.04 mg/L)	0.00565
Ruamāhanga	BQ33/0032	1	Above taste threshold (0.1 to 0.4 mg/L)	0.263
Kāpiti Coast	R25/5100	1	Exceeds DWSNZ (>0.4 mg/L)	1.51
Kāpiti Coast	R25/5135	1	Exceeds DWSNZ (>0.4 mg/L)	0.834
Kāpiti Coast	R25/5165	4	Below taste threshold (0.04 to 0.1 mg/L)	0.0817
Kāpiti Coast	R25/5190	4	Below staining threshold <0.04 mg/L)	0.0305
Kāpiti Coast	R25/5233	4	Below staining threshold <0.04 mg/L)	0.0007
Kāpiti Coast	R26/6503	4	Below taste threshold (0.04 to 0.1 mg/L)	0.0811
Kāpiti Coast	R26/6587	4	Below staining threshold <0.04 mg/L)	0.00179
Kāpiti Coast	R26/6624	4	Below staining threshold <0.04 mg/L)	<0.0005
Te Whanganui-a-Tara	R27/0320	4	Below taste threshold (0.04 to 0.1 mg/L)	0.058
Te Whanganui-a-Tara	R27/1137	3	Below staining threshold <0.04 mg/L)	0.0019
Te Whanganui-a-Tara	R27/1171	4	Above taste threshold (0.1 to 0.4 mg/L)	0.223
Te Whanganui-a-Tara	R27/1180	4	Below staining threshold <0.04 mg/L)	0.00245
Te Whanganui-a-Tara	R27/1182	4	Below taste threshold (0.04 to 0.1 mg/L)	0.0636
Te Whanganui-a-Tara	R27/1183	4	Below staining threshold <0.04 mg/L)	0.00334
Te Whanganui-a-Tara	R27/1265	4	Below staining threshold <0.04 mg/L)	0.0208
Te Whanganui-a-Tara	R27/6418	4	Below staining threshold <0.04 mg/L)	0.00169
Te Whanganui-a-Tara	R27/6833	4	Above taste threshold (0.1 to 0.4 mg/L)	0.349
Kāpiti Coast	S25/5125	4	Below staining threshold <0.04 mg/L)	0.00172
Kāpiti Coast	S25/5200	1	Exceeds DWSNZ (>0.4 mg/L)	0.941
Kāpiti Coast	S25/5256	4	Below staining threshold <0.04 mg/L)	0.00514
Kāpiti Coast	S25/5322	4	Below staining threshold <0.04 mg/L)	0.00052
Ruamāhanga	S26/0117	4	Below staining threshold <0.04 mg/L)	0.00349
Ruamāhanga	S26/0223	4	Below staining threshold <0.04 mg/L)	0.00205
Ruamāhanga	S26/0299	4	Below staining threshold <0.04 mg/L)	0.00225
Ruamāhanga	S26/0439	4	Below staining threshold <0.04 mg/L)	0.0159
Ruamāhanga	S26/0457	4	Below staining threshold <0.04 mg/L)	0.00138
Ruamāhanga	S26/0467	4	Below staining threshold <0.04 mg/L)	0.00203
Ruamāhanga	S26/0568	1	Exceeds DWSNZ (>0.4 mg/L)	0.798
Ruamāhanga	S26/0576	1	Exceeds DWSNZ (>0.4 mg/L)	0.557
Ruamāhanga	S26/0705	1	Below staining threshold <0.04 mg/L)	0.00222
Ruamāhanga	S26/0762	4	Exceeds DWSNZ (>0.4 mg/L)	0.83
Ruamāhanga	S27/0009	4	Below staining threshold <0.04 mg/L)	0.00118
Ruamāhanga	S27/0070	4	Below staining threshold <0.04 mg/L)	0.00097
Ruamāhanga	S27/0136	4	Below staining threshold <0.04 mg/L)	0.0326

Whaitua	Site code	No. samples	Concentration rating	Median dissolved manganese (mg/L)
Ruamāhanga	S27/0268	1	Exceeds DWSNZ (>0.4 mg/L)	1.43
Ruamāhanga	S27/0283	1	Exceeds DWSNZ (>0.4 mg/L)	0.662
Ruamāhanga	S27/0299	4	Below staining threshold <0.04 mg/L)	0.00143
Ruamāhanga	S27/0344	1	Exceeds DWSNZ (>0.4 mg/L)	0.438
Ruamāhanga	S27/0389	4	Exceeds DWSNZ (>0.4 mg/L)	0.507
Ruamāhanga	S27/0396	4	Below taste threshold (0.04 to 0.1 mg/L)	0.0947
Ruamāhanga	S27/0433	1	Exceeds DWSNZ (>0.4 mg/L)	1.48
Ruamāhanga	S27/0435	1	Exceeds DWSNZ (>0.4 mg/L)	0.543
Ruamāhanga	S27/0442	1	Above taste threshold (0.1 to 0.4 mg/L)	0.165
Ruamāhanga	S27/0522	4	Below staining threshold <0.04 mg/L)	0.00209
Ruamāhanga	S27/0571	4	Below staining threshold <0.04 mg/L)	0.00205
Ruamāhanga	S27/0585	1	Exceeds DWSNZ (>0.4 mg/L)	1.42
Ruamāhanga	S27/0588	1	Above taste threshold (0.1 to 0.4 mg/L)	0.14
Ruamāhanga	S27/0594	1	Above taste threshold (0.1 to 0.4 mg/L)	0.236
Ruamāhanga	S27/0602	1	Exceeds DWSNZ (>0.4 mg/L)	0.622
Ruamāhanga	S27/0615	1	Exceeds DWSNZ (>0.4 mg/L)	0.504
Ruamāhanga	S27/0681	3	Below staining threshold <0.04 mg/L)	0.00159
Ruamāhanga	T26/0003	4	Below staining threshold <0.04 mg/L)	0.00159
Ruamāhanga	T26/0087	4	Below staining threshold <0.04 mg/L)	0.00352
Ruamāhanga	T26/0099	4	Below staining threshold <0.04 mg/L)	0.00133
Ruamāhanga	T26/0206	4	Below staining threshold <0.04 mg/L)	0.0107
Ruamāhanga	T26/0259	4	Below staining threshold <0.04 mg/L)	0.00164
Ruamāhanga	T26/0332	4	Exceeds DWSNZ (>0.4 mg/L)	1.67
Ruamāhanga	T26/0413	4	Above taste threshold (0.1 to 0.4 mg/L)	0.295
Ruamāhanga	T26/0430	4	Below staining threshold <0.04 mg/L)	0.00114
Ruamāhanga	T26/0489	4	Below staining threshold <0.04 mg/L)	0.00163
Ruamāhanga	T26/0538	4	Below staining threshold <0.04 mg/L)	0.0145
Wairarapa Coast	T27/0063	4	Below staining threshold <0.04 mg/L)	0.00203

Table A15: Dissolved arsenic results evaluated against Drinking Water Standards for New Zealand guidelines.

Whaitua	Site code	No. samples	Concentration rating	Median dissolved arsenic (mg/L)
Kāpiti Coast	BN32/0062	4	Low (0.001 to 0.01 mg/L)	0.00241
Kāpiti Coast	BN32/0063	4	Below detection limit (<0.001)	<0.001
Kāpiti Coast	BN33/0032	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	BP33/0056	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	BP33/0057	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	BP34/0216	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	BP34/0229	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	BP34/0236	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	BQ33/0032	1	Below detection limit (<0.001)	<0.001
Kāpiti Coast	R25/5100	1	Below detection limit (<0.001)	<0.001
Kāpiti Coast	R25/5135	1	Low (0.001 to 0.01 mg/L)	0.00479
Kāpiti Coast	R25/5165	4	Low (0.001 to 0.01 mg/L)	0.00358
Kāpiti Coast	R25/5190	4	Low (0.001 to 0.01 mg/L)	0.00104
Kāpiti Coast	R25/5233	4	Below detection limit (<0.001)	<0.001
Kāpiti Coast	R26/6503	4	Low (0.001 to 0.01 mg/L)	0.00977
Kāpiti Coast	R26/6587	4	Below detection limit (<0.001)	<0.001
Kāpiti Coast	R26/6624	4	Below detection limit (<0.001)	<0.001
Te Whanganui-a-Tara	R27/0320	4	Below detection limit (<0.001)	<0.001
Te Whanganui-a-Tara	R27/1137	3	Below detection limit (<0.001)	<0.001
Te Whanganui-a-Tara	R27/1171	4	Below detection limit (<0.001)	<0.001
Te Whanganui-a-Tara	R27/1180	4	Below detection limit (<0.001)	<0.001
Te Whanganui-a-Tara	R27/1182	4	Below detection limit (<0.001)	<0.001
Te Whanganui-a-Tara	R27/1183	4	Below detection limit (<0.001)	<0.001
Te Whanganui-a-Tara	R27/1265	4	Below detection limit (<0.001)	<0.001
Te Whanganui-a-Tara	R27/6418	4	Below detection limit (<0.001)	<0.001
Te Whanganui-a-Tara	R27/6833	4	Below detection limit (<0.001)	<0.001
Kāpiti Coast	S25/5125	4	Below detection limit (<0.001)	<0.001
Kāpiti Coast	S25/5200	1	Below detection limit (<0.001)	<0.001
Kāpiti Coast	S25/5256	4	Below detection limit (<0.001)	<0.001
Kāpiti Coast	S25/5322	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S26/0117	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S26/0223	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S26/0299	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S26/0439	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S26/0457	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S26/0467	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S26/0568	1	Exceeds DWSNZ (>0.01 mg/L)	0.0242
Ruamāhanga	S26/0576	1	Low (0.001 to 0.01 mg/L)	0.00193
Ruamāhanga	S26/0705	1	Below detection limit (<0.001)	<0.001
Ruamāhanga	S26/0762	4	Low (0.001 to 0.01 mg/L)	0.00109
Ruamāhanga	S27/0009	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S27/0070	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S27/0136	4	Below detection limit (<0.001)	<0.001

Whaitua	Site code	No. samples	Concentration rating	Median dissolved arsenic (mg/L)
Ruamāhanga	S27/0268	1	Low (0.001 to 0.01 mg/L)	0.0014
Ruamāhanga	S27/0283	1	Below detection limit (<0.001)	<0.001
Ruamāhanga	S27/0299	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S27/0344	1	Below detection limit (<0.001)	<0.001
Ruamāhanga	S27/0389	4	Low (0.001 to 0.01 mg/L)	0.00225
Ruamāhanga	S27/0396	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S27/0433	1	Low (0.001 to 0.01 mg/L)	0.00701
Ruamāhanga	S27/0435	1	Exceeds DWSNZ (>0.01 mg/L)	0.0231
Ruamāhanga	S27/0442	1	Low (0.001 to 0.01 mg/L)	0.00727
Ruamāhanga	S27/0522	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S27/0571	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	S27/0585	1	Low (0.001 to 0.01 mg/L)	0.00337
Ruamāhanga	S27/0588	1	Low (0.001 to 0.01 mg/L)	0.00183
Ruamāhanga	S27/0594	1	Low (0.001 to 0.01 mg/L)	0.00181
Ruamāhanga	S27/0602	1	Low (0.001 to 0.01 mg/L)	0.00175
Ruamāhanga	S27/0615	1	Below detection limit (<0.001)	<0.001
Ruamāhanga	S27/0681	3	Below detection limit (<0.001)	<0.001
Ruamāhanga	T26/0003	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	T26/0087	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	T26/0099	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	T26/0206	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	T26/0259	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	T26/0332	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	T26/0413	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	T26/0430	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	T26/0489	4	Below detection limit (<0.001)	<0.001
Ruamāhanga	T26/0538	4	Below detection limit (<0.001)	<0.001
Wairarapa Coast	T27/0063	4	Low (0.001 to 0.01 mg/L)	0.00224

Table A16: Dissolved chromium results evaluated against Drinking Water Standards for New Zealand guidelines.

Whaitua	Site code	No. samples	Concentration rating	Median dissolved chromium (mg/L)
Kāpiti Coast	BN32/0062	4	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	BN32/0063	4	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	BN33/0032	4	Low (0.0005 to 0.05 mg/L)	0.00354
Ruamāhanga	BP33/0056	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	BP33/0057	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	BP34/0216	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	BP34/0229	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	BP34/0236	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	BQ33/0032	1	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	R25/5100	1	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	R25/5135	1	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	R25/5165	4	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	R25/5190	4	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	R25/5233	4	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	R26/6503	4	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	R26/6587	4	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	R26/6624	4	Below detection limit (<0.0005)	<0.0005
Te Whanganui-a-Tara	R27/0320	4	Below detection limit (<0.0005)	<0.0005
Te Whanganui-a-Tara	R27/1137	3	Below detection limit (<0.0005)	<0.0005
Te Whanganui-a-Tara	R27/1171	4	Below detection limit (<0.0005)	<0.0005
Te Whanganui-a-Tara	R27/1180	4	Below detection limit (<0.0005)	<0.0005
Te Whanganui-a-Tara	R27/1182	4	Below detection limit (<0.0005)	<0.0005
Te Whanganui-a-Tara	R27/1183	4	Below detection limit (<0.0005)	<0.0005
Te Whanganui-a-Tara	R27/1265	4	Below detection limit (<0.0005)	<0.0005
Te Whanganui-a-Tara	R27/6418	4	Below detection limit (<0.0005)	<0.0005
Te Whanganui-a-Tara	R27/6833	4	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	S25/5125	4	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	S25/5200	1	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	S25/5256	4	Below detection limit (<0.0005)	<0.0005
Kāpiti Coast	S25/5322	4	Low (0.0005 to 0.05 mg/L)	0.00598
Ruamāhanga	S26/0117	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S26/0223	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S26/0299	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S26/0439	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S26/0457	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S26/0467	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S26/0568	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S26/0576	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S26/0705	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S26/0762	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0009	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0070	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0136	4	Below detection limit (<0.0005)	<0.0005

Whaitua	Site code	No. samples	Concentration rating	Median dissolved chromium (mg/L)
Ruamāhanga	S27/0268	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0283	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0299	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0344	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0389	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0396	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0433	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0435	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0442	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0522	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0571	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0585	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0588	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0594	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0602	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0615	1	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	S27/0681	3	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	T26/0003	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	T26/0087	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	T26/0099	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	T26/0206	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	T26/0259	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	T26/0332	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	T26/0413	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	T26/0430	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	T26/0489	4	Below detection limit (<0.0005)	<0.0005
Ruamāhanga	T26/0538	4	Below detection limit (<0.0005)	<0.0005
Wairarapa Coast	T27/0063	4	Below detection limit (<0.0005)	<0.0005

Table A17: Dissolved lead results evaluated against Drinking Water Standards for New Zealand guidelines.

Whaitua	Site code	No. samples	Concentration rating	Median dissolved lead (mg/L)
Kāpiti Coast	BN32/0062	4	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	BN32/0063	4	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	BN33/0032	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	BP33/0056	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	BP33/0057	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	BP34/0216	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	BP34/0229	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	BP34/0236	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	BQ33/0032	1	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	R25/5100	1	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	R25/5135	1	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	R25/5165	4	Low (0.0001 to 0.01 mg/L)	0.000529
Kāpiti Coast	R25/5190	4	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	R25/5233	4	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	R26/6503	4	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	R26/6587	4	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	R26/6624	4	Below detection limit (<0.0001)	<0.0001
Te Whanganui-a-Tara	R27/0320	4	Below detection limit (<0.0001)	<0.0001
Te Whanganui-a-Tara	R27/1137	3	Low (0.0001 to 0.01 mg/L)	0.000867
Te Whanganui-a-Tara	R27/1171	4	Below detection limit (<0.0001)	<0.0001
Te Whanganui-a-Tara	R27/1180	4	Low (0.0001 to 0.01 mg/L)	0.000303
Te Whanganui-a-Tara	R27/1182	4	Below detection limit (<0.0001)	<0.0001
Te Whanganui-a-Tara	R27/1183	4	Below detection limit (<0.0001)	<0.0001
Te Whanganui-a-Tara	R27/1265	4	Below detection limit (<0.0001)	<0.0001
Te Whanganui-a-Tara	R27/6418	4	Low (0.0001 to 0.01 mg/L)	0.000128
Te Whanganui-a-Tara	R27/6833	4	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	S25/5125	4	Low (0.0001 to 0.01 mg/L)	0.000162
Kāpiti Coast	S25/5200	1	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	S25/5256	4	Below detection limit (<0.0001)	<0.0001
Kāpiti Coast	S25/5322	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S26/0117	4	Low (0.0001 to 0.01 mg/L)	0.00031
Ruamāhanga	S26/0223	4	Low (0.0001 to 0.01 mg/L)	0.00233
Ruamāhanga	S26/0299	4	Low (0.0001 to 0.01 mg/L)	0.000266
Ruamāhanga	S26/0439	4	Low (0.0001 to 0.01 mg/L)	0.000612
Ruamāhanga	S26/0457	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S26/0467	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S26/0568	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S26/0576	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S26/0705	1	Low (0.0001 to 0.01 mg/L)	0.00014
Ruamāhanga	S26/0762	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0009	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0070	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0136	4	Below detection limit (<0.0001)	<0.0001

Whaitua	Site code	No. samples	Concentration rating	Median dissolved lead (mg/L)
Ruamāhanga	S27/0268	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0283	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0299	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0344	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0389	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0396	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0433	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0435	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0442	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0522	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0571	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0585	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0588	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0594	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0602	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0615	1	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	S27/0681	3	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	T26/0003	4	Low (0.0001 to 0.01 mg/L)	0.000193
Ruamāhanga	T26/0087	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	T26/0099	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	T26/0206	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	T26/0259	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	T26/0332	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	T26/0413	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	T26/0430	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	T26/0489	4	Below detection limit (<0.0001)	<0.0001
Ruamāhanga	T26/0538	4	Below detection limit (<0.0001)	<0.0001
Wairarapa Coast	T27/0063	4	Below detection limit (<0.0001)	<0.0001

Table A18: Dissolved zinc results evaluated in terms of drinking water aesthetic values.

Whaitua	Site code	No. samples	Concentration rating	Median dissolved zinc (mg/L)
Kāpiti Coast	BN32/0062	4	Below detection limit (<0.001)	0.0005
Kāpiti Coast	BN32/0063	4	Low (0.001 to 1.5 mg/L)	0.00178
Kāpiti Coast	BN33/0032	4	Low (0.001 to 1.5 mg/L)	0.00246
Ruamāhanga	BP33/0056	4	Below detection limit (<0.001)	0.0005
Ruamāhanga	BP33/0057	4	Below detection limit (<0.001)	0.00081
Ruamāhanga	BP34/0216	4	Low (0.001 to 1.5 mg/L)	0.0131
Ruamāhanga	BP34/0229	4	Low (0.001 to 1.5 mg/L)	0.00148
Ruamāhanga	BP34/0236	4	Low (0.001 to 1.5 mg/L)	0.00155
Ruamāhanga	BQ33/0032	1	Low (0.001 to 1.5 mg/L)	0.00176
Kāpiti Coast	R25/5100	1	Low (0.001 to 1.5 mg/L)	0.00269
Kāpiti Coast	R25/5135	1	Low (0.001 to 1.5 mg/L)	0.00847
Kāpiti Coast	R25/5165	4	Low (0.001 to 1.5 mg/L)	0.00748
Kāpiti Coast	R25/5190	4	Low (0.001 to 1.5 mg/L)	0.00336
Kāpiti Coast	R25/5233	4	Low (0.001 to 1.5 mg/L)	0.00316
Kāpiti Coast	R26/6503	4	Low (0.001 to 1.5 mg/L)	0.003
Kāpiti Coast	R26/6587	4	Low (0.001 to 1.5 mg/L)	0.0154
Kāpiti Coast	R26/6624	4	Low (0.001 to 1.5 mg/L)	0.00261
Te Whanganui-a-Tara	R27/0320	4	Low (0.001 to 1.5 mg/L)	0.002
Te Whanganui-a-Tara	R27/1137	3	Low (0.001 to 1.5 mg/L)	0.00783
Te Whanganui-a-Tara	R27/1171	4	Low (0.001 to 1.5 mg/L)	0.00284
Te Whanganui-a-Tara	R27/1180	4	Low (0.001 to 1.5 mg/L)	0.00528
Te Whanganui-a-Tara	R27/1182	4	Low (0.001 to 1.5 mg/L)	0.1
Te Whanganui-a-Tara	R27/1183	4	Low (0.001 to 1.5 mg/L)	0.00405
Te Whanganui-a-Tara	R27/1265	4	Low (0.001 to 1.5 mg/L)	0.00584
Te Whanganui-a-Tara	R27/6418	4	Low (0.001 to 1.5 mg/L)	0.00536
Te Whanganui-a-Tara	R27/6833	4	Low (0.001 to 1.5 mg/L)	0.00506
Kāpiti Coast	S25/5125	4	Low (0.001 to 1.5 mg/L)	0.00524
Kāpiti Coast	S25/5200	1	Low (0.001 to 1.5 mg/L)	0.022
Kāpiti Coast	S25/5256	4	Low (0.001 to 1.5 mg/L)	0.0615
Kāpiti Coast	S25/5322	4	Low (0.001 to 1.5 mg/L)	0.00171
Ruamāhanga	S26/0117	4	Low (0.001 to 1.5 mg/L)	0.00746
Ruamāhanga	S26/0223	4	Low (0.001 to 1.5 mg/L)	0.0113
Ruamāhanga	S26/0299	4	Low (0.001 to 1.5 mg/L)	0.00542
Ruamāhanga	S26/0439	4	Low (0.001 to 1.5 mg/L)	0.0461
Ruamāhanga	S26/0457	4	Low (0.001 to 1.5 mg/L)	0.00467
Ruamāhanga	S26/0467	4	Low (0.001 to 1.5 mg/L)	0.00179
Ruamāhanga	S26/0568	1	Low (0.001 to 1.5 mg/L)	0.00121
Ruamāhanga	S26/0576	1	Low (0.001 to 1.5 mg/L)	0.104
Ruamāhanga	S26/0705	1	Low (0.001 to 1.5 mg/L)	0.00871
Ruamāhanga	S26/0762	4	Low (0.001 to 1.5 mg/L)	0.00232
Ruamāhanga	S27/0009	4	Low (0.001 to 1.5 mg/L)	0.00288
Ruamāhanga	S27/0070	4	Low (0.001 to 1.5 mg/L)	0.00388
Ruamāhanga	S27/0136	4	Low (0.001 to 1.5 mg/L)	0.00272
Ruamāhanga	S27/0202	4	Low (0.001 to 1.5 mg/L)	0.0107
Ruamāhanga	S27/0268	1	Low (0.001 to 1.5 mg/L)	0.00113

Whaitua	Site code	No. samples	Concentration rating	Median dissolved zinc (mg/L)
Ruamāhanga	S27/0283	1	Low (0.001 to 1.5 mg/L)	0.0222
Ruamāhanga	S27/0299	4	Low (0.001 to 1.5 mg/L)	0.00386
Ruamāhanga	S27/0344	1	Low (0.001 to 1.5 mg/L)	0.00283
Ruamāhanga	S27/0389	4	Low (0.001 to 1.5 mg/L)	0.00797
Ruamāhanga	S27/0396	4	Low (0.001 to 1.5 mg/L)	0.00627
Ruamāhanga	S27/0433	1	Below detection limit (<0.001)	0.0005
Ruamāhanga	S27/0435	1	Low (0.001 to 1.5 mg/L)	0.004
Ruamāhanga	S27/0442	1	Low (0.001 to 1.5 mg/L)	0.0023
Ruamāhanga	S27/0522	4	Low (0.001 to 1.5 mg/L)	0.0025
Ruamāhanga	S27/0571	4	Low (0.001 to 1.5 mg/L)	0.00586
Ruamāhanga	S27/0585	1	Low (0.001 to 1.5 mg/L)	0.00306
Ruamāhanga	S27/0588	1	Low (0.001 to 1.5 mg/L)	0.00321
Ruamāhanga	S27/0594	1	Low (0.001 to 1.5 mg/L)	0.0198
Ruamāhanga	S27/0602	1	Low (0.001 to 1.5 mg/L)	0.00151
Ruamāhanga	S27/0615	1	Low (0.001 to 1.5 mg/L)	0.00539
Ruamāhanga	S27/0681	3	Low (0.001 to 1.5 mg/L)	0.00827
Ruamāhanga	T26/0003	4	Low (0.001 to 1.5 mg/L)	0.00966
Ruamāhanga	T26/0087	4	Low (0.001 to 1.5 mg/L)	0.00237
Ruamāhanga	T26/0099	4	Low (0.001 to 1.5 mg/L)	0.0015
Ruamāhanga	T26/0206	4	Low (0.001 to 1.5 mg/L)	0.00167
Ruamāhanga	T26/0259	4	Low (0.001 to 1.5 mg/L)	0.00465
Ruamāhanga	T26/0332	4	Low (0.001 to 1.5 mg/L)	0.0021
Ruamāhanga	T26/0413	4	Low (0.001 to 1.5 mg/L)	0.00473
Ruamāhanga	T26/0430	4	Low (0.001 to 1.5 mg/L)	0.00173
Ruamāhanga	T26/0489	4	Low (0.001 to 1.5 mg/L)	0.00733
Ruamāhanga	T26/0538	4	Low (0.001 to 1.5 mg/L)	0.00231
Wairarapa Coast	T27/0063	4	Below detection limit (<0.001)	0.000834

Groundwater chemistry: major ion concentrations

Table A19: Median concentrations for the 2022/23 year, HCA clusters and water types. The water type describes the dominant ionic constituents of the groundwater at each site.

Site code	Median Bicarbonate (mg/L)	Median Calcium (mg/L)	Median Chloride (mg/L)	Median Magnesium (mg/L)	Median Potassium (mg/L)	Median Sodium (mg/L)	Median Sulphate (mg/L)	Cluster	Watertype
BN32/0062	104.0	17.4	45.6	7.68	4.64	38.3	8.37	5	Na-Ca-HCO3-Cl
BN32/0063	72.4	12.6	36.2	4.60	3.84	27.5	9.76	5	Na-Ca-HCO3-Cl
BN33/0032	68.7	7.93	20.0	7.85	0.996	32.2	19.4	4	Na-Mg-HCO3-Cl
BP33/0056	62.3	7.58	13.9	3.15	0.833	18.8	2.63	1	Na-Ca-HCO3-Cl
BP33/0057	38.2	11.6	11.5	2.61	1.73	11.1	7.9	2	Ca-Na-HCO3-Cl
BP34/0216	37.0	9.36	13.5	4.81	1.17	14.1	9.18	2	Na-Ca-Mg-HCO3-Cl
BP34/0229	50.6	11.9	10.6	4.19	1.34	11.7	10.5	2	Ca-Na-Mg-HCO3-Cl
BP34/0236	28.9	9.67	8.1	3.57	1.35	9.5	21	2	Ca-Na-Mg-HCO3-SO4
BQ33/0032	52.5	11.1	43.3	5.10	1.88	36.4	24.8	4	Na-Ca-Cl-HCO3
R25/5100	130.5	11.1	37.0	13.01	9.66	32.5	10.2	5	Na-Mg-HCO3-Cl
R25/5135	148.0	32.2	125.0	12.95	1.43	75.5	0.504	3	Na-Ca-Cl-HCO3
R25/5165	33.4	7.85	33.8	3.69	3.07	28.4	17.6	2	Na-Ca-Cl-HCO3
R25/5190	82.2	19	49.2	12.00	6.98	25.0	9.43	5	Na-Mg-Ca-Cl-HCO3
R25/5233	50.2	13	14.2	3.60	1.68	12.6	9.48	2	Ca-Na-Mg-HCO3-Cl
R26/6503	83.7	19.2	41.5	7.14	3.88	27.9	14.9	5	Na-Ca-Mg-HCO3-Cl
R26/6587	32.4	6.96	17.0	2.69	1.13	12.9	6.2	2	Na-Ca-HCO3-Cl
R26/6624	64.9	9.3	23.3	6.12	1.56	26.6	11.1	4	Na-Mg-Ca-HCO3-Cl
R27/0320	62.1	3.98	23.4	2.10	0.738	31.2	2.5	1	Na-HCO3-Cl
R27/1137	29.6	6.51	11.7	2.40	1.34	11.4	6.11	2	Na-Ca-HCO3-Cl
R27/1171	59.8	4.51	15.1	4.28	1.78	18.2	<0.5	1	Na-Mg-HCO3-Cl
R27/1180	39.4	8.33	14.4	3.11	1.21	12.9	7.47	2	Na-Ca-Mg-HCO3-Cl
R27/1182	81.1	12.5	20.2	6.93	1.84	19.7	8.82	4	Na-Ca-Mg-HCO3-Cl
R27/1183	26.8	5.61	11.7	1.65	0.893	9.4	3.52	2	Na-Ca-HCO3-Cl
R27/1265	37.6	4.47	14.4	2.53	0.911	14.8	4.06	2	Na-Ca-HCO3-Cl
R27/6418	30.7	6.43	27.3	4.01	2.56	18.7	6.51	2	Na-Mg-Ca-Cl-HCO3
R27/6833	84.6	8.06	11.7	5.58	0.801	21.2	2.53	1	Na-Mg-Ca-HCO3
S25/5125	22.4	6.1	18.9	4.26	3.97	15.1	10.1	2	Na-Mg-Ca-Cl-HCO3
S25/5200	99.3	12.9	37.7	8.93	1.32	32.0	3.61	4	Na-Mg-Ca-HCO3-Cl
S25/5256	32.5	10.1	20.3	5.97	1.5	21.4	17.7	4	Na-Ca-Mg-Cl-HCO3-SO4
S25/5322	83.1	16.5	31.6	7.96	2.21	32.2	8.54	4	Na-Ca-Mg-HCO3-Cl
S26/0117	38.3	10.9	14.8	4.03	3.07	12.6	8.61	2	Na-Ca-Mg-HCO3-Cl
S26/0223	21.7	10.8	12.1	5.17	1.15	12.0	13.8	2	Ca-Na-Mg-HCO3-Cl-SO4
S26/0299	25.1	6.68	6.7	2.13	0.952	8.0	6.52	2	Na-Ca-Mg-HCO3-Cl
S26/0439	35.5	8.41	11.7	3.99	1.05	11.9	8.37	2	Na-Ca-Mg-HCO3-Cl
S26/0457	34.3	9.17	6.0	1.75	1.02	5.7	4.87	2	Ca-Na-HCO3
S26/0467	38.3	8.17	11.1	3.34	2.11	12.4	6.65	2	Na-Ca-Mg-HCO3-Cl
S26/0568	152.1	21	12.5	9.31	1.18	21.5	<0.5	3	Ca-Na-Mg-HCO3
S26/0576	94.8	13.9	17.6	5.55	1	20.5	2.02	1	Na-Ca-Mg-HCO3-Cl
S26/0705	41.4	8.62	11.9	4.18	1.11	16.4	9.06	2	Na-Ca-Mg-HCO3-Cl

Site code	Median Bicarbonate (mg/L)	Median Calcium (mg/L)	Median Chloride (mg/L)	Median Magnesium (mg/L)	Median Potassium (mg/L)	Median Sodium (mg/L)	Median Sulphate (mg/L)	Cluster	Watertype
S26/0762	124.4	20.8	39.7	5.93	1.93	36.0	2.5	4	Na-Ca-HCO3-Cl
S27/0009	37.4	11	17.3	4.31	1.5	14.9	9.75	2	Na-Ca-Mg-HCO3-Cl
S27/0070	32.8	8.03	6.7	1.55	0.927	6.7	3.87	2	Ca-Na-HCO3-Cl
S27/0136	21.1	7.07	10.6	3.22	1.12	11.1	13	2	Na-Ca-Mg-HCO3-Cl-SO4
S27/0202	19.6	7	10.4	3.23	1.18	10.0	18.6	2	Na-Ca-Mg-SO4-HCO3-Cl
S27/0268	382.7	54.3	17.5	22.63	2.23	51.4	<0.5	3	Ca-Na-Mg-HCO3
S27/0283	91.5	17.7	79.5	8.47	2.24	48.8	12.4	4	Na-Ca-Cl-HCO3
S27/0299	38.6	7.29	8.8	2.86	0.834	8.3	3.85	2	Ca-Na-Mg-HCO3-Cl
S27/0344	81.1	16.4	44.8	6.75	1.74	35.6	17.1	4	Na-Ca-HCO3-Cl
S27/0389	112.0	19.9	26.9	7.61	1.54	28.2	14.3	4	Na-Ca-Mg-HCO3-Cl
S27/0396	223.9	71.8	40.0	8.98	2.38	28.4	33.9	5	Ca-Na-HCO3-Cl
S27/0433	313.2	44.5	93.1	18.52	7.68	72.6	<0.5	3	Na-Ca-Mg-HCO3-Cl
S27/0435	155.2	14.4	33.2	6.59	4.4	38.5	<0.5	3	Na-Ca-HCO3-Cl
S27/0442	193.8	7.78	102.1	3.13	0.985	134.8	<0.5	3	Na-HCO3-Cl
S27/0522	119.3	32.1	154.5	19.87	2.31	94.0	35.8	5	Na-Mg-Ca-Cl-HCO3
S27/0571	52.2	13.6	32.4	6.16	1.61	27.4	16.3	4	Na-Ca-Mg-Cl-HCO3
S27/0585	200.8	16.3	52.5	13.08	1.73	64.6	1.27	3	Na-Mg-HCO3-Cl
S27/0588	62.6	10.4	27.0	4.25	1.59	20.4	7.48	4	Na-Ca-HCO3-Cl
S27/0594	182.7	29.8	68.2	10.35	2.44	57.9	<0.5	3	Na-Ca-HCO3-Cl
S27/0602	145.1	24.8	70.2	7.94	5.63	49.7	<0.5	3	Na-Ca-HCO3-Cl
S27/0615	80.4	14.3	48.1	6.06	2.48	38.9	14	4	Na-Ca-Cl-HCO3
S27/0681	149.6	51.3	26.7	6.15	1.94	23.6	29.5	5	Ca-Na-HCO3
T26/0003	25.7	7.66	6.9	2.26	0.899	7.8	9.28	2	Ca-Na-Mg-HCO3-Cl-SO4
T26/0087	60.4	11.8	7.3	2.75	1.18	11.7	4.57	2	Ca-Na-HCO3
T26/0099	43.2	8.81	10.4	5.11	1.15	12.4	9.93	2	Na-Ca-Mg-HCO3-Cl
T26/0206	68.9	10.1	11.5	4.19	0.849	18.2	3.67	1	Na-Ca-Mg-HCO3-Cl
T26/0259	41.9	11.5	6.4	2.10	1.01	7.5	6.22	2	Ca-Na-HCO3
T26/0332	55.4	16.1	43.1	7.21	1.28	25.1	16.4	4	Na-Ca-Mg-Cl-HCO3
T26/0413	99.6	13.8	9.5	5.40	0.947	15.5	0.789	1	Ca-Na-Mg-HCO3
T26/0430	42.6	10.6	8.5	2.73	1.47	9.0	6.28	2	Ca-Na-HCO3-Cl
T26/0489	61.6	26.9	26.3	4.50	1.65	19.9	14.4	4	Ca-Na-HCO3-Cl
T26/0538	54.6	29.9	31.5	10.00	3.92	23.1	46.6	5	Ca-Na-Mg-SO4-HCO3-Cl
T27/0063	301.7	83.5	48.5	7.10	1.94	42.9	8.05	5	Ca-Na-HCO3-Cl