

2020 Soil quality monitoring – cropping & market garden



Contents

- [2020 Soil quality monitoring – cropping & market garden](#)
 - [Contents](#)
- [Disclaimer](#)
- [Overview](#)
 - [Monitoring sites and indicator breaches](#)
- [Methods](#)
 - [Analytical methods](#)
 - [Benchmarking](#)
- [Soil chemistry & fertility results](#)
 - [Organic resources](#)
 - [Acidity - soil pH](#)
 - [Fertility - Olsen P](#)
 - [Trace elements](#)
- [Physical condition results](#)
 - [Bulk density](#)
 - [Macroporosity](#)
- [Resources](#)
 - [Useful links for managing soil quality](#)
 - [References](#)
- [Appendix 1: Monitoring site information](#)
- [Appendix 2: Data tables](#)
 - [Total carbon \(C\)](#)
 - [Mineralisable nitrogen \(N\)](#)
 - [Acidity - soil pH](#)
 - [Fertility - Olsen P](#)
 - [Arsenic \(As\)](#)
 - [Cadmium \(Cd\)](#)
 - [Chromium \(Cr\)](#)
 - [Copper \(Cu\)](#)
 - [Lead \(Pb\)](#)
 - [Nickel \(Ni\)](#)
 - [Zinc \(Zn\)](#)
 - [Bulk density](#)
 - [Macroporosity](#)

Disclaimer

This report has been prepared by Environmental Science staff of Greater Wellington (GW) and as such does not constitute Council policy.

In preparing this report, the authors have used the best currently available data and have exercised all reasonable skill and care in presenting and interpreting these data. Nevertheless, GW does not accept any liability, whether direct, indirect, or consequential, arising out of the provision of the data and associated information within this report. Furthermore, as GW endeavours to continuously improve data quality, amendments to data included in, or used in the preparation of, this report may occur without notice at any time.

GW requests that if excerpts or inferences are drawn from this report for further use, due care should be taken to ensure the appropriate context is preserved and is accurately reflected and referenced in subsequent written or verbal communications. Any use of the data and information enclosed in this report, for example, by inclusion in a subsequent report or media release, should be accompanied by an acknowledgement of the source.

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

Overview

Greater Wellington (GW) monitors soil quality as part of its State of the Environment programme, to meet the requirements of section 35 of the Resource Management Act (1991) and to provide information to measure Regional Plan policy effectiveness.

The soil quality monitoring programme consists of approximately 100 monitoring sites on a range of soils across the region under different land uses. The frequency of sampling is dependent on the intensity of the land use; dairying, cropping and market garden sites are sampled every 3-4 years, dry stock, horticulture and exotic forestry sites are sampled every 5-7 years, while indigenous vegetation sites are sampled every 10 years. This years' report summarises monitoring results for cropping and market garden sites.

Monitoring objectives

1. Provide information on the physical, chemical and biological properties of soils;
2. Provide an early-warning system to identify the effects of primary land uses on long-term soil productivity and the environment;
3. Track specific, identified issues relating to the effects of land use on long-term soil productivity;
4. Assist in the detection of spatial and temporal changes in soil quality; and
5. Provide information required to determine the effectiveness of regional policies and plans.

Monitoring indicators

Monitoring indicators are used to assess soil chemistry and fertility, and to understand soil physical condition. The indicators used are as follows:

- [Soil chemistry and fertility](#) - total carbon (C), anaerobic mineralisable nitrogen, soil pH, Olsen phosphorus (P), and total recoverable trace elements.
- [Physical condition](#) - bulk density and macroporosity.

Measured indicator values at each monitoring site are benchmarked against relevant guidelines for monitoring soil health. See the [methods page](#) for more information.

Monitoring sites and indicator breaches

Each monitoring site is shown by the map circles below, with the total number of indicators breached during the for the 2020 monitoring season displayed by colour of the circle.

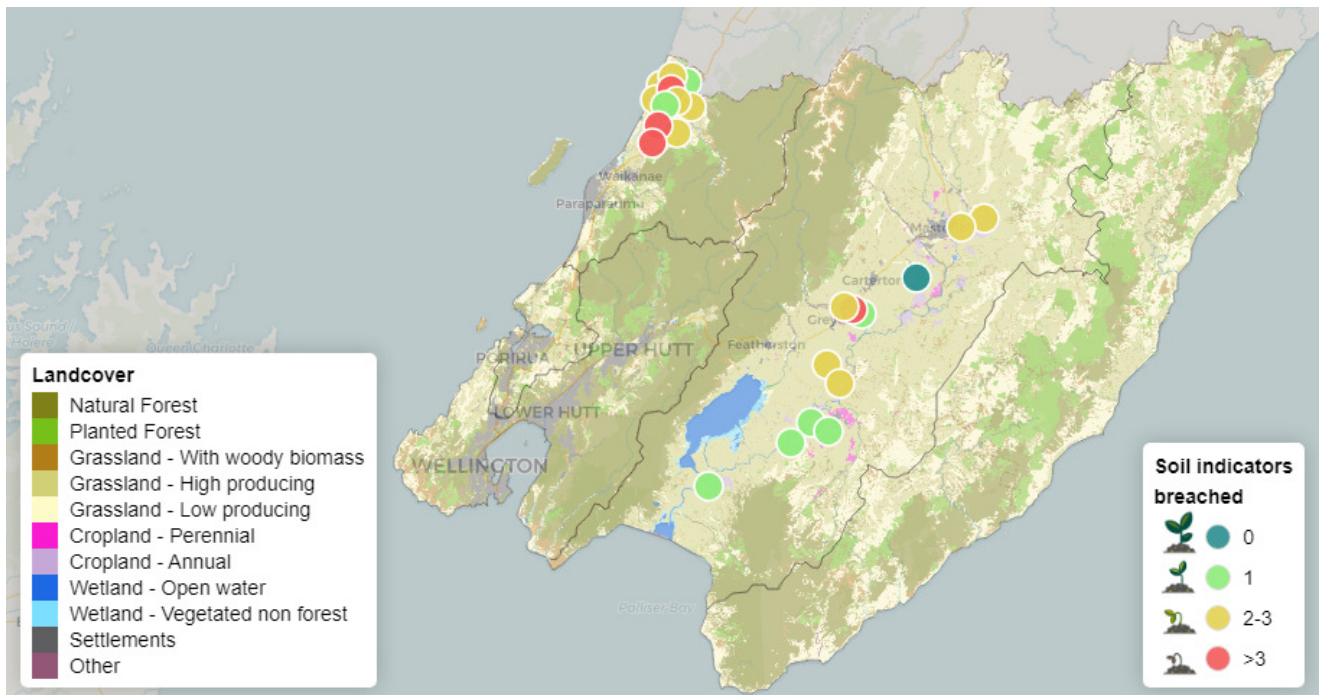


Figure 1: Soil quality monitoring sites rated by the total number of soil quality indicators breached. See the results sections for which indicators were breached, and [LUCAS 16 landcover](#) for more information on the classifications shown. Waitua (main river catchments) are outlined by thin grey lines.

Note that site coordinates have been moved slightly throughout the report for visualisation and confidentiality purposes.

Proportion of total sites that breached indicators

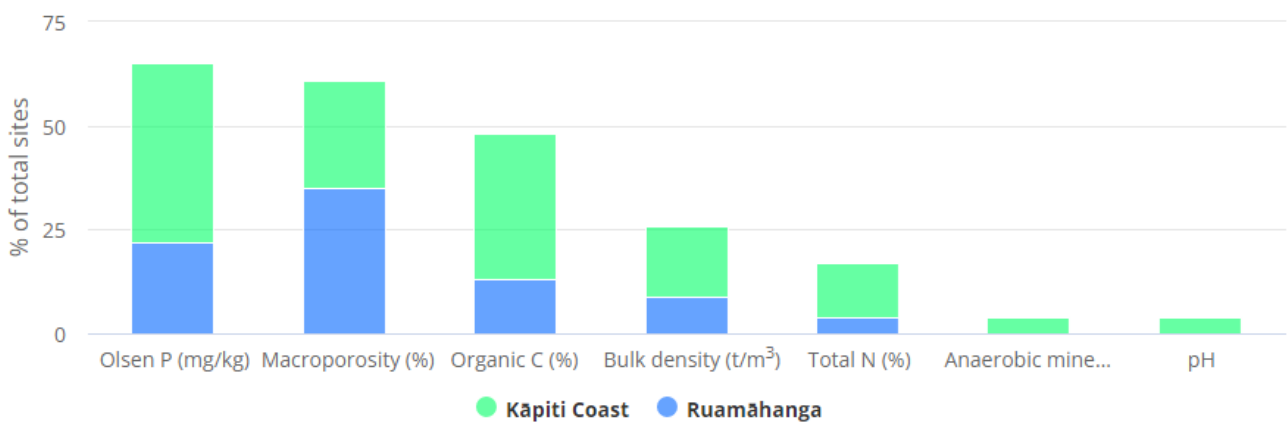


Figure 2: Percentage of total soil quality monitoring sites that breached each soil quality indicator, coloured by Waitua.

Methods

Analytical methods

Analyses of the soil chemistry and soil physics indicators were completed at the Landcare Research laboratory. Trace element analyses were undertaken at Hill Laboratories in Hamilton. Where necessary, samples were stored at 4°C until analysis.

Soil macroporosity was determined at the Landcare Research soil physics laboratory in Hamilton. The Land Monitoring Forum specifies that macroporosity should be measured at a matric potential of -10 kPa. Macroporosity is the percentage of pores > 30 microns in diameter, when measured at -10 kPa. Ambiguity may arise with other terms (e.g. air-filled porosity) or macroporosity measured at other matric potentials (Drewry et al. 2008; 2015).

Olsen P measurements analysed at Landcare Research were undertaken using a gravimetric (weight) method to avoid the influence of soil bulk density. In New Zealand several large commercial laboratories measure soil received in the laboratory by volume prior to Olsen P chemical extraction. The fertiliser industry guidelines for Olsen P measurement are based on a volumetric method. Further information and explanation is available from Drewry et al. (2013; 2015).

Indicator	Method
Bulk density	Measured on a sub-sampled core dried at 105°C.
Total-C content	Dry combustion method. Using air-dried, finely ground soils using a Leco 2000 CNS analyser.
Total-N content	Dry combustion method. Using air-dried, finely ground soils using a Leco 2000 CNS analyser.
Mineralisable-N	Waterlogged incubation method. Increase in NH_4^+ concentration was measured after incubation for 7 days at 40°C and extraction in 2M KCl.
Soil pH	Measured in water using glass electrodes and a 2.5:1 water-to-soil ratio.
Olsen P	Bicarbonate extraction method. Extracting <2mm air dried soils for 30 minutes with 0.5M NaHCO_3 at pH 8.5 and measuring the PO_4^{3-} concentration by the molybdenum blue method.
Trace elements	Total recoverable digestion. Nitric/hydrochloric acid digestion, USEPA 2002.

Benchmarking

Green shaded columns indicate **soil quality target ranges**, follow the referenced links for more information.

Bulk density (t/m³)

Table 1: Target range is 'Loose' to 'Compact' ([Hill and Sparling, 2009](#)).

Soil order	Very loose	Loose	Adequate	Compact	Very compact
Semi-arid, pallic and recent	≤0.40	>0.40-0.90	>0.90-1.25	>1.25-1.40	>1.40
Allophanic	≤0.30	>0.30-0.60	>0.60-0.90	>0.90-1.30	>1.30
Organic	≤0.20	>0.20-0.40	>0.40-0.60	>0.60-1.00	>1.00
All other	≤0.70	>0.70-0.80	>0.80-1.20	>1.20-1.40	>1.40

Macroporosity (% v/v at -10kPa)

Table 2: Target range is 'Adequate' ([Hill and Sparling, 2009](#)).

Land use	Very low	Low	Adequate	High
Pastures, cropping and horticulture	≤6	>6-10	>10-30	>30
Forestry	≤8	>8-10	>10-30	>30

Total Carbon (% w/w)

Table 3: Target range is 'Depleted' to 'Ample' (modified from [Hill and Sparling, 2009](#) to have no upper bound on the ample category). *Organic soils excluded as by definition these soils have ample total carbon content.

Soil order	Very depleted	Depleted	Normal	Ample
Semi-arid, pallic and recent	≤2	>2-3	>3-5	>5
Allophanic	≤3	>3-4	>4-9	>9
Organic*				
All other	≤3	>3-4	>4-7	>7

Total nitrogen (% w/w)

Table 4: Target range is 'Depleted' to 'Ample', ([Hill and Sparling, 2009](#)). *Cropping and horticulture excluded as ranges would depend on specific crops grown.

Land use	Very depleted	Depleted	Normal	Ample	High
Pasture	≤0.25	>0.25-0.35	>0.35-0.65	>0.65-0.70	>0.70
Forestry	≤0.10	>0.10-0.20	>0.20-0.60	>0.60-0.70	>0.70

Mineralisable nitrogen (mg/kg)

Table 5: Target range is 'Low' to 'High' ([Hill and Sparling 2009](#)).

Land use	Very low	Low	Adequate	Ample	High	Excessive
Pasture	≤50	>50-100	>100-200	>200-200	>200-250	>250
Cropping and horticulture	≤20	>20-100	>100-150	>150-150	>150-200	>200
Forestry	≤20	>20-40	>40-120	>120-150	>150-175	>175

Soil pH

Table 6: Target range is 'Slightly-acidic' to 'Optimal' ([Hill and Sparling, 2009](#)). *Forestry on organic soils excluded as this combination is unlikely in real life due to windthrow.

Land use & soil order	Very acidic	Slightly acidic	Optimal	Sub-optimal	Very alkaline
Pastures on all except Organic	>4-5	>5-6	>6-6	>6-7	>7-9
Pastures on Organic	>4-5	>5-5	>5-6	>6-7	>7
Cropping & horticulture on all except Organic	>4-5	>5-6	>6-7	>7-8	>8-9
Cropping & horticulture on Organic	>4-5	>5-5	>5-7	>7-8	>8
Forestry on all except Organic	≤4	>4-4	>4-7	>7-8	>8
Forestry on organic soils*					

Olsen P (mg/kg)

Table 7: Target ranges are set for different land use and soil orders (see the revised targets of [McKay et al. 2013](#)). Note that 'Market gardening' refers to the cropping of Celery, Leeks, Winter Lettuce, Onions, Early Potatoes, and Winter Spinach. Note also that lifestyle blocks are included in 'Pastures, [other] cropping, and horticulture'.

Land use	Soil order	Range
Forestry	All Soils	>5-50
Indigenous	All Soils	>0-50
Market gardening	Recent and Pallic Soils	>45-55
Market gardening	Brown, Gley, Melanic, Organic, Pumice, Semi arid and Ultic Soils	>55-75
Market gardening	Allophanic, Granular and Oxidic Soils	>75-90
Pasture, cropping and horticulture	Andisols	>35-60
Pasture, cropping and horticulture	Pumice Soils	>35-60
Pasture, cropping and horticulture	Organic Soils	>35-50
Pasture, cropping and horticulture	Recent Soils and Podzols	>20-50
Pasture, cropping and horticulture	Raw Soils	>10-25
Pasture, cropping and horticulture	Other Soils	>25-50

Trace elements - draft eco-soil guidelines (mg/kg)

Table 8: Target range is less than the soil guideline value ([Cavanagh, 2019](#)). Note: Other values may apply for non-agricultural land uses, soils and circumstances.

Trace element	Guideline (mg/kg)	Soil orders rated
Arsenic (mg/kg)	<20	All soil
Cadmium (mg/kg)	<1.5	All soil
Chromium (mg/kg)	<300	All soil
Copper (mg/kg)	<150	Sensitive soil
Copper (mg/kg)	<340	Tolerant soil
Copper (mg/kg)	<220	Typical soil
Lead (mg/kg)	<530	All soil
Nickel (Ni)	Not determined	
Zinc (mg/kg)	<130	Sensitive soil
Zinc (mg/kg)	<265	Tolerant soil
Zinc (mg/kg)	<190	Typical soil

Trace elements - adapted from NZWWA (mg/kg)

Table 9: Target range is less than the soil limit value ([NZWWA, 2003](#)). Note: the suggested values by [Alloway \(2008\)](#) suggested for copper deficiency (≤ 5 mg/kg) and zinc deficiency (≤ 10 mg/kg) may be of interest depending on circumstances and type of farm production.

Trace element	Soil limit (mg/kg)
Arsenic (mg/kg)	<20
Cadmium (mg/kg)	<1
Chromium (mg/kg)	<600
Copper (mg/kg)	<100
Lead (mg/kg)	<300
Nickel (mg/kg)	<60
Zinc (mg/kg)	<300

Cadmium - Tiered Fertiliser Management System (mg/kg)

Table 10: Target ranges depend on the choice and rate of phosphate fertiliser application, see the [Fertiliser Association Tiered Fertiliser Management System for Soil Cadmium](#) for more detail.

Tier	Concentration (mg/kg)
0	>0.0-0.6
1	>0.6-1.0
2	>1.0-1.4
3	>1.4-1.8
4	>1.8

Soil chemistry & fertility results

The following sections present maps of soil quality monitoring results benchmarked against relevant indicator guidelines, see Appendix 2: Data tables for tabulated results.

Organic resources

Total carbon (C)

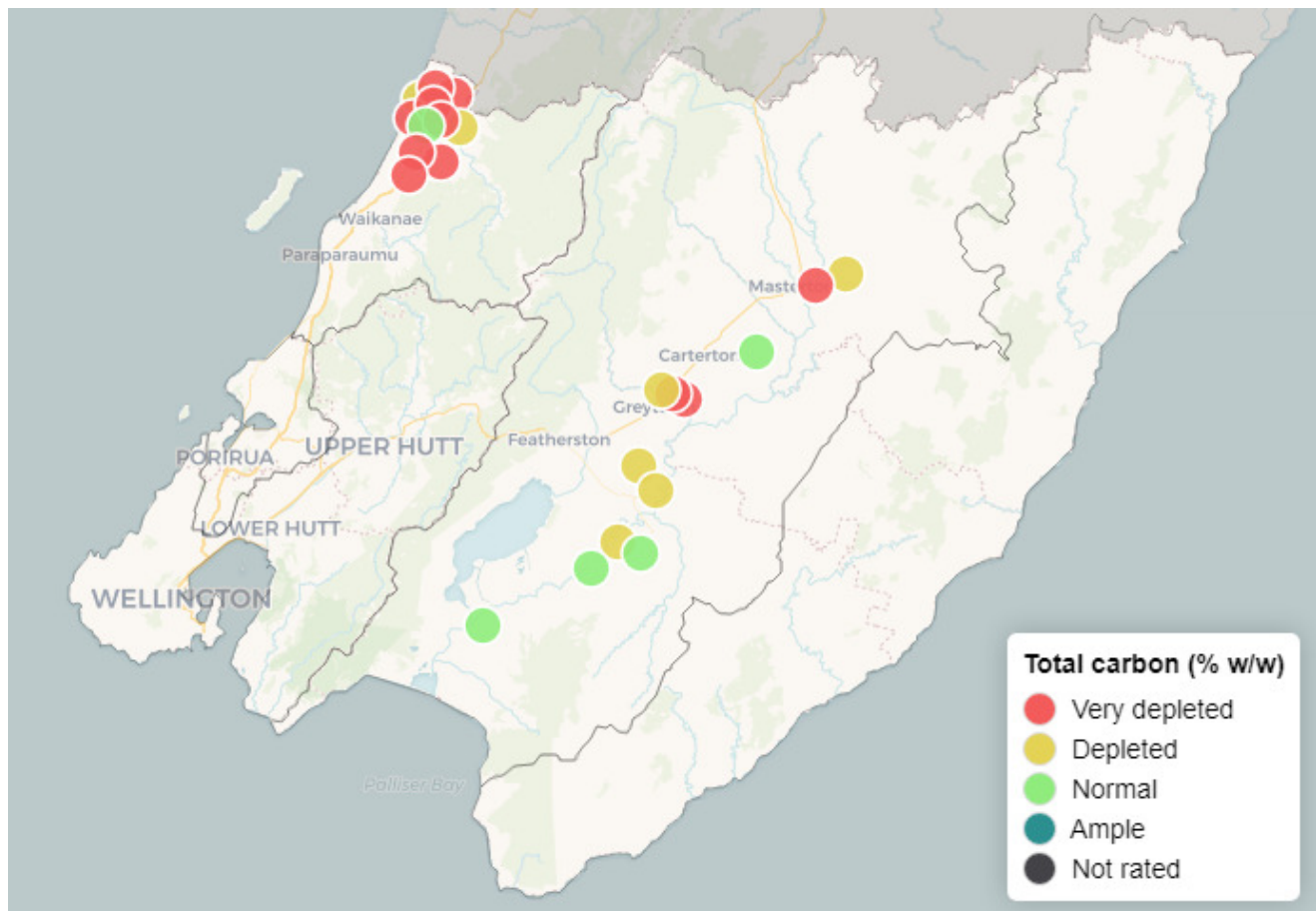


Figure 3: Total carbon is an estimate of the amount of organic matter. Organic matter helps soils retain moisture and nutrients, and gives good soil structure for water movement and root growth. It can be used to address the issue of organic matter depletion and carbon loss from the soil. The target range is '**Depleted**' to '**Ample**', see benchmarking for more information.

Mineralisable nitrogen (N)

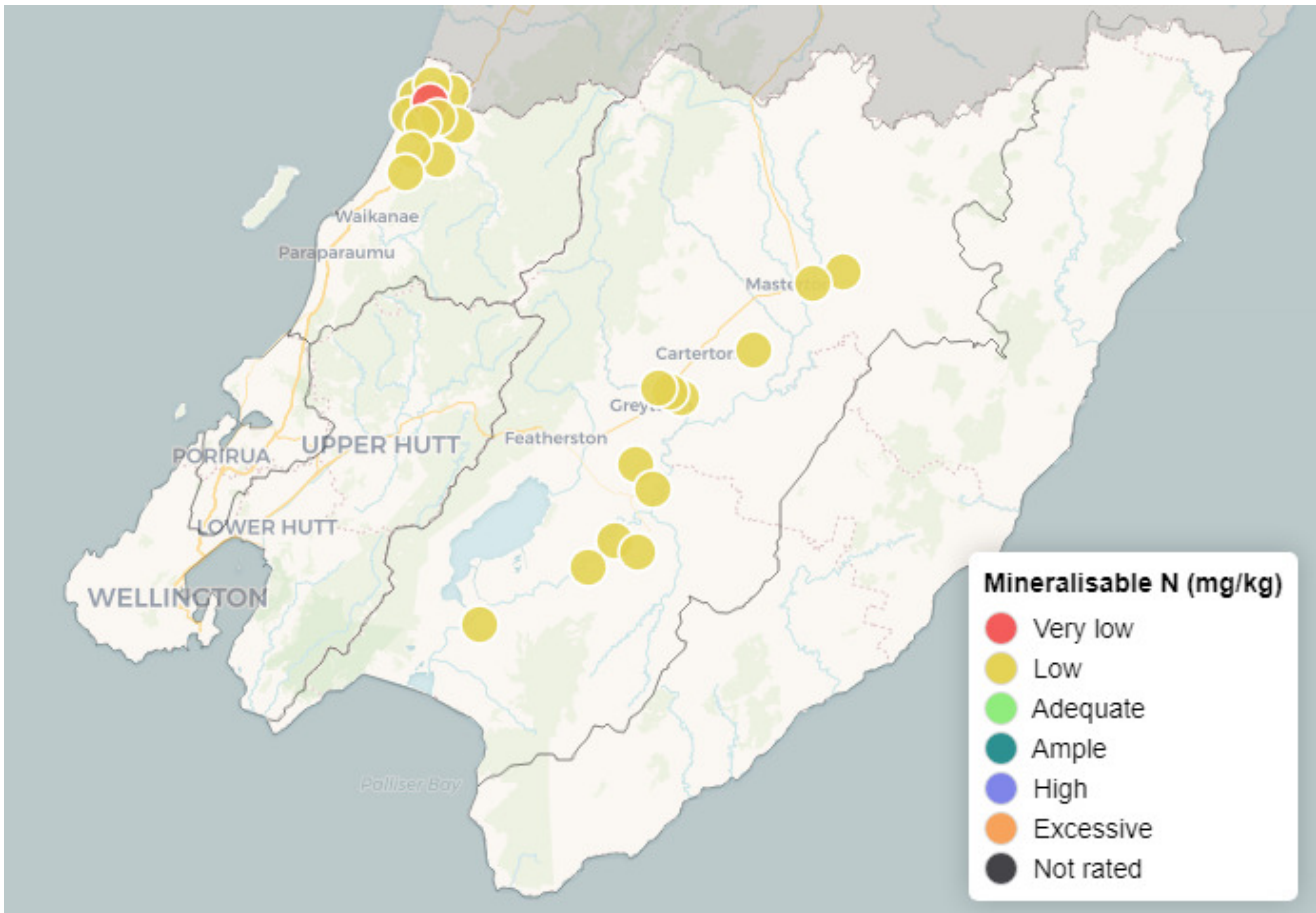


Figure 4: Not all nitrogen can be used by plants; soil organisms change nitrogen to forms that plants can use. Mineralisable N gives a measure of how much organic nitrogen is available to plants, and the potential for nitrogen leaching at times of low plant demand. Mineralisable nitrogen is also used as a surrogate measure of the microbial biomass. The target range is ‘**Low**’ to ‘**High**’, see [benchmarking](#) for more information.

Acidity - soil pH

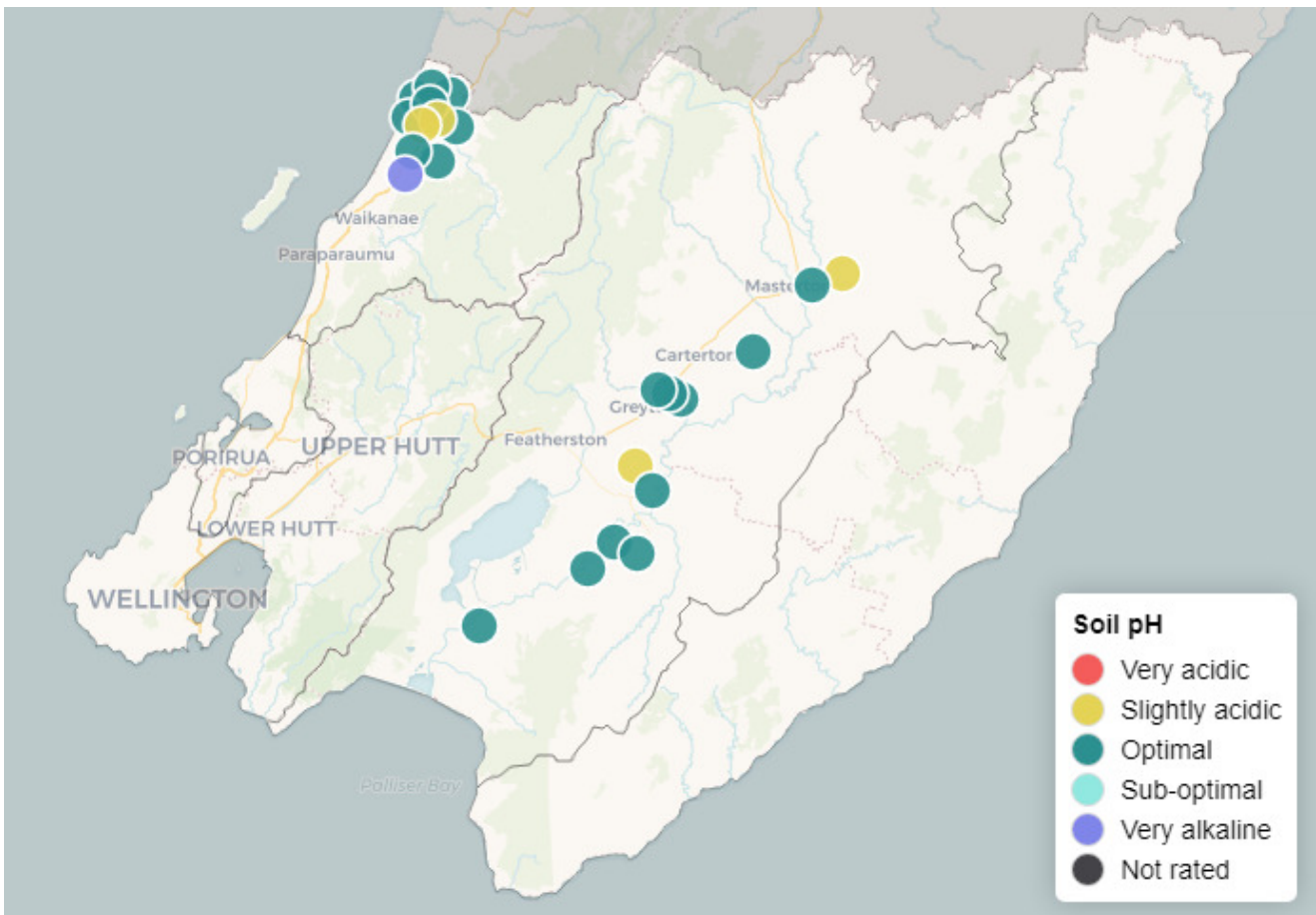


Figure 5: Most plants have an optimal pH range for growth. The pH of a soil influences the availability of many nutrients to plants and the solubility of some trace elements. Soil pH is influenced by the application of lime and some fertilisers. The target range is **‘Slightly-acidic’** to **‘Optimal’**, see [benchmarking](#) for more information.

Fertility - Olsen P

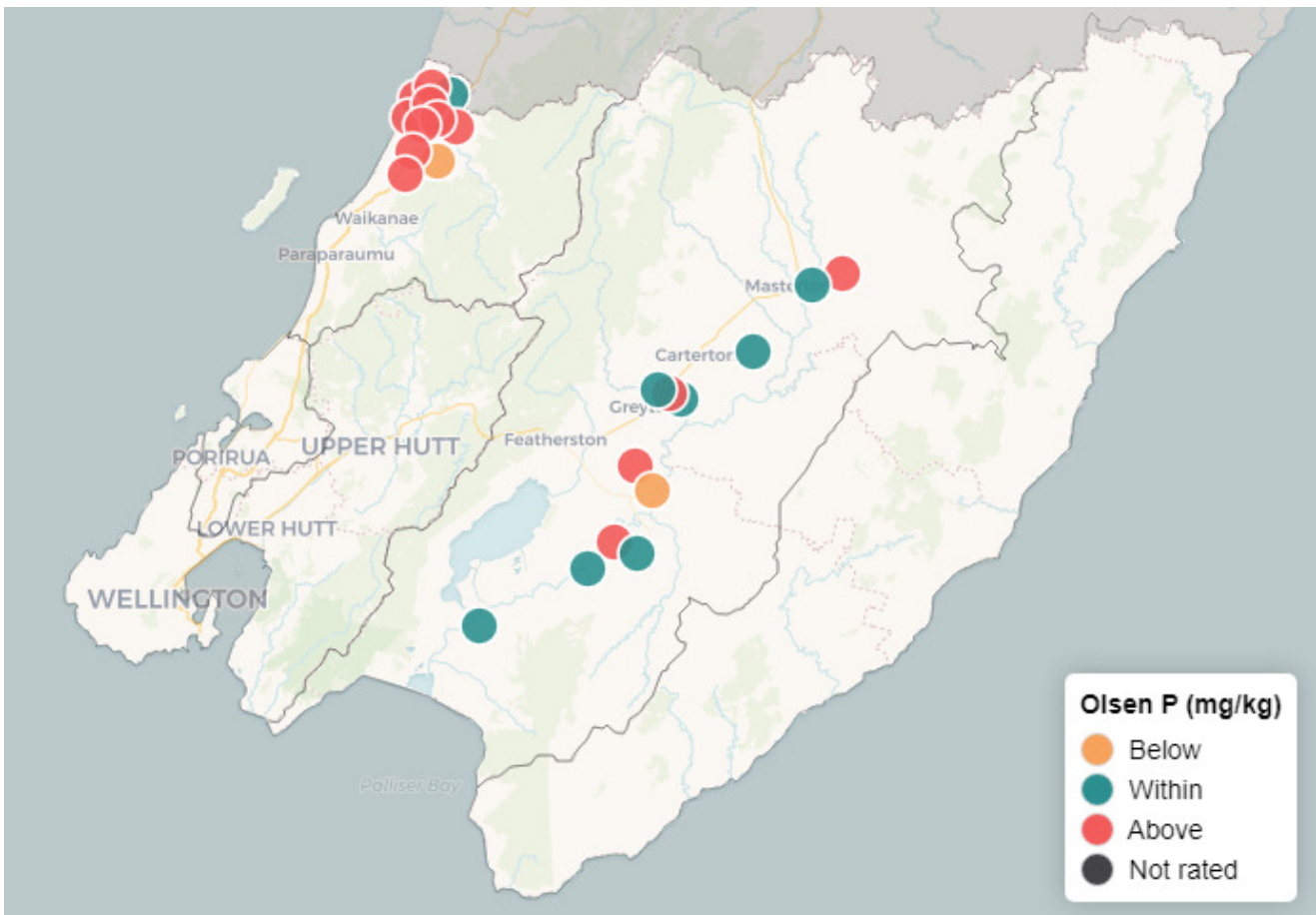


Figure 6: Phosphorus (P) is an essential nutrient for plants and animals. Olsen P is a measure of the amount of phosphorus that is available to plants. Levels of P greater than agronomic requirements can increase P losses to waterways, and therefore contribute to eutrophication (nutrient enrichment). The target range is determined by land use and soil order, see [benchmarking](#) for more information.

Trace elements

Some trace elements are essential micro-nutrients for plants and animals. Both essential and non-essential trace elements can become toxic at high concentrations. Trace elements can accumulate in the soil from various common agricultural and horticultural land use practices.

Arsenic (As)

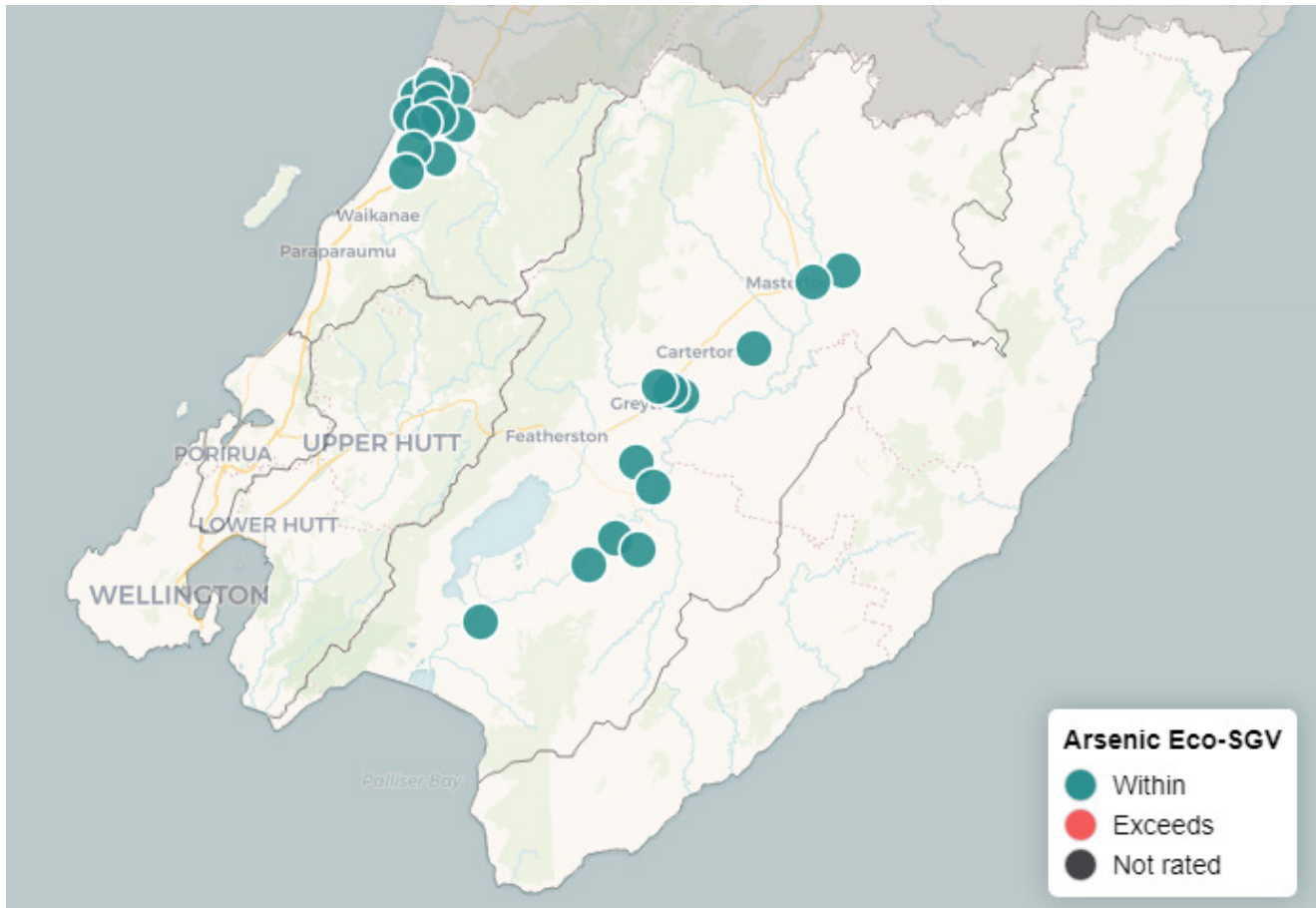


Figure 7: Arsenic results are compared against draft eco-soil guideline values (Eco-SGVs), see [benchmarking](#) for more information.

Cadmium (Cd)

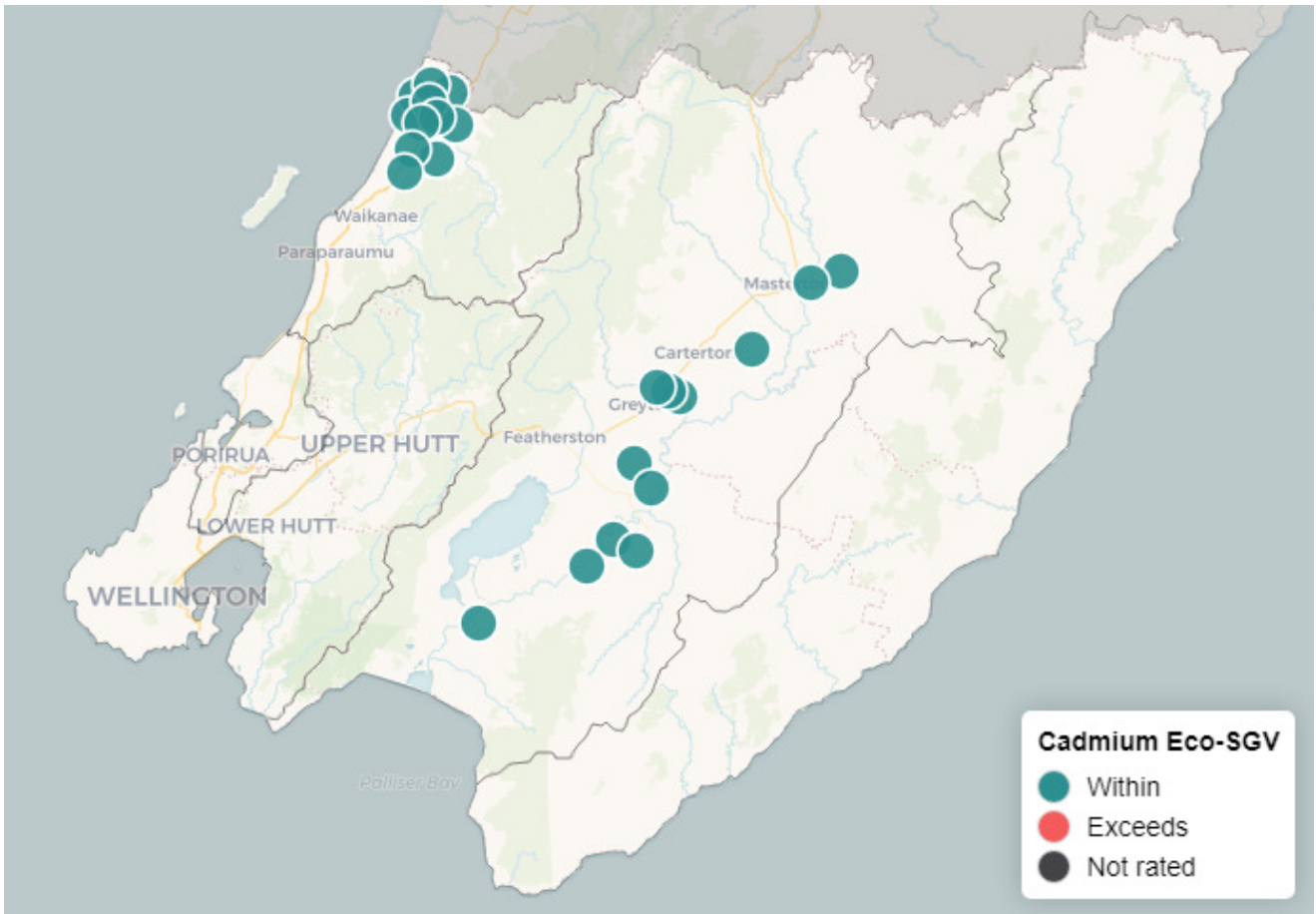


Figure 8: Cadmium results are compared against draft eco-soil guideline values (Eco-SGVs) on the map and trigger values from the tiered fertiliser management system (TFMS) also in the table, see [benchmarking](#) for more information.

Chromium (Cr)

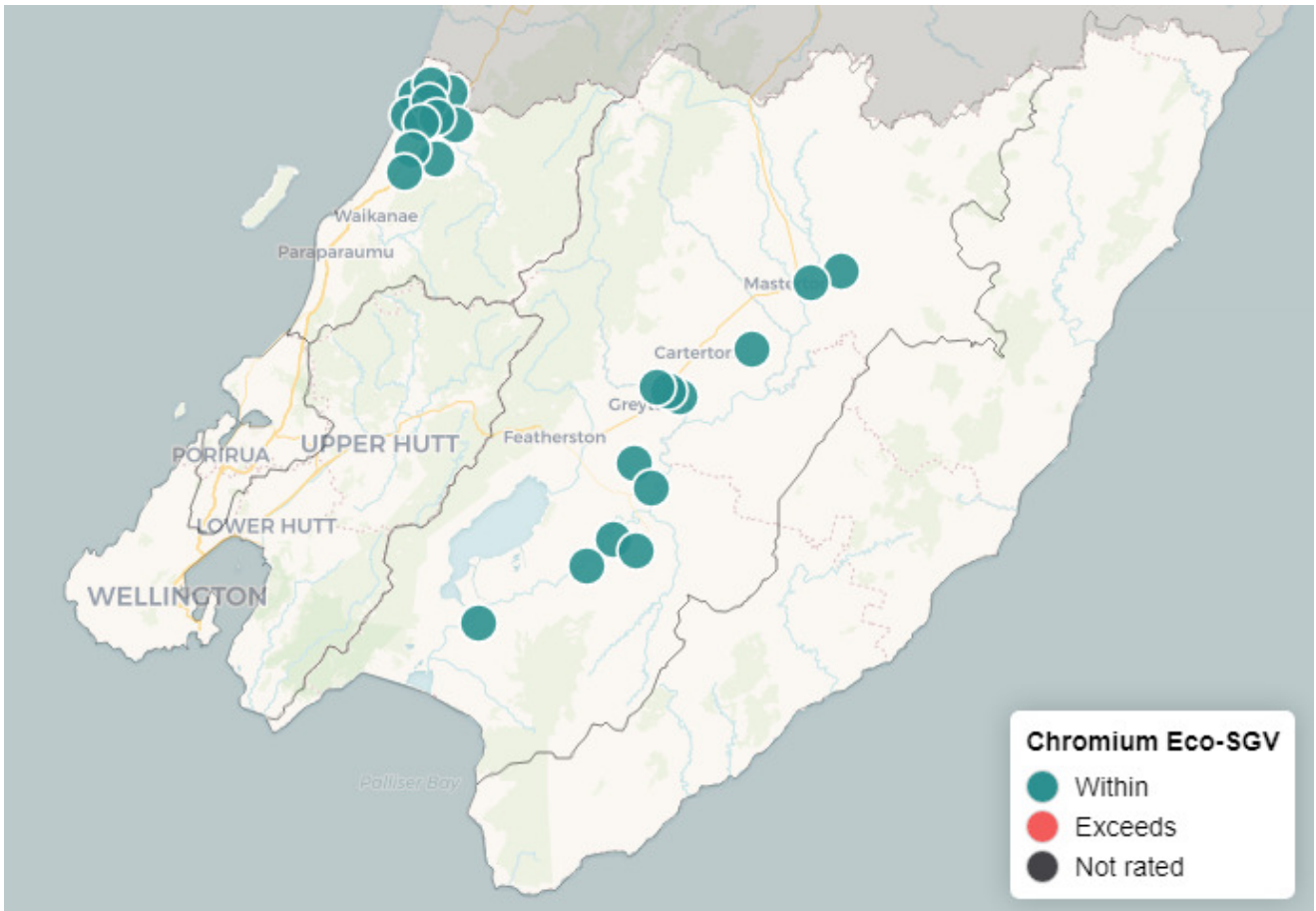


Figure 9: Chromium results are compared against draft eco-soil guideline values (Eco-SGVs), see [benchmarking](#) for more information.

Copper (Cu)

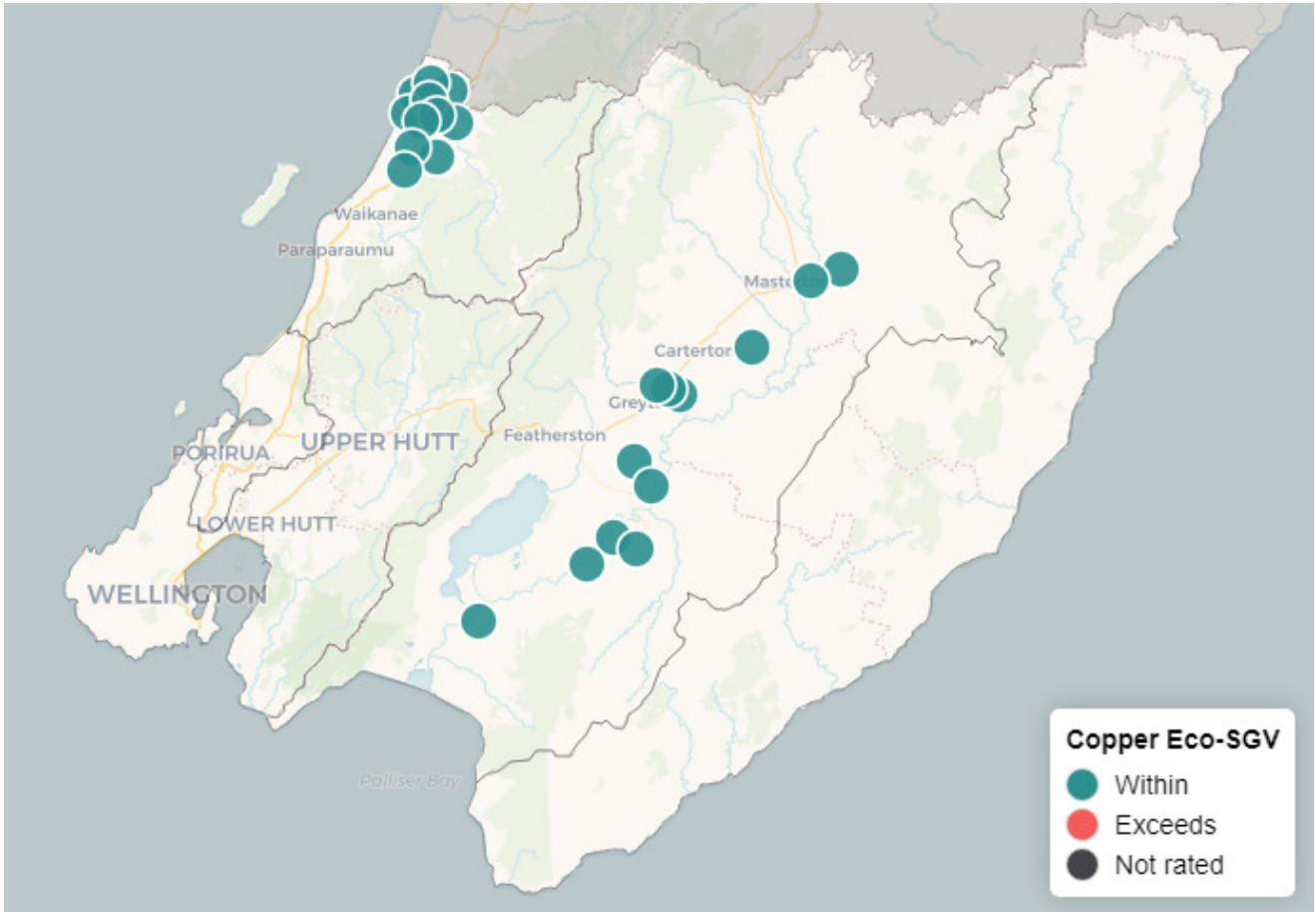


Figure 10: Copper results are compared against draft eco-soil guideline values (Eco-SGVs), see [benchmarking](#) for more information.

Lead (Pb)

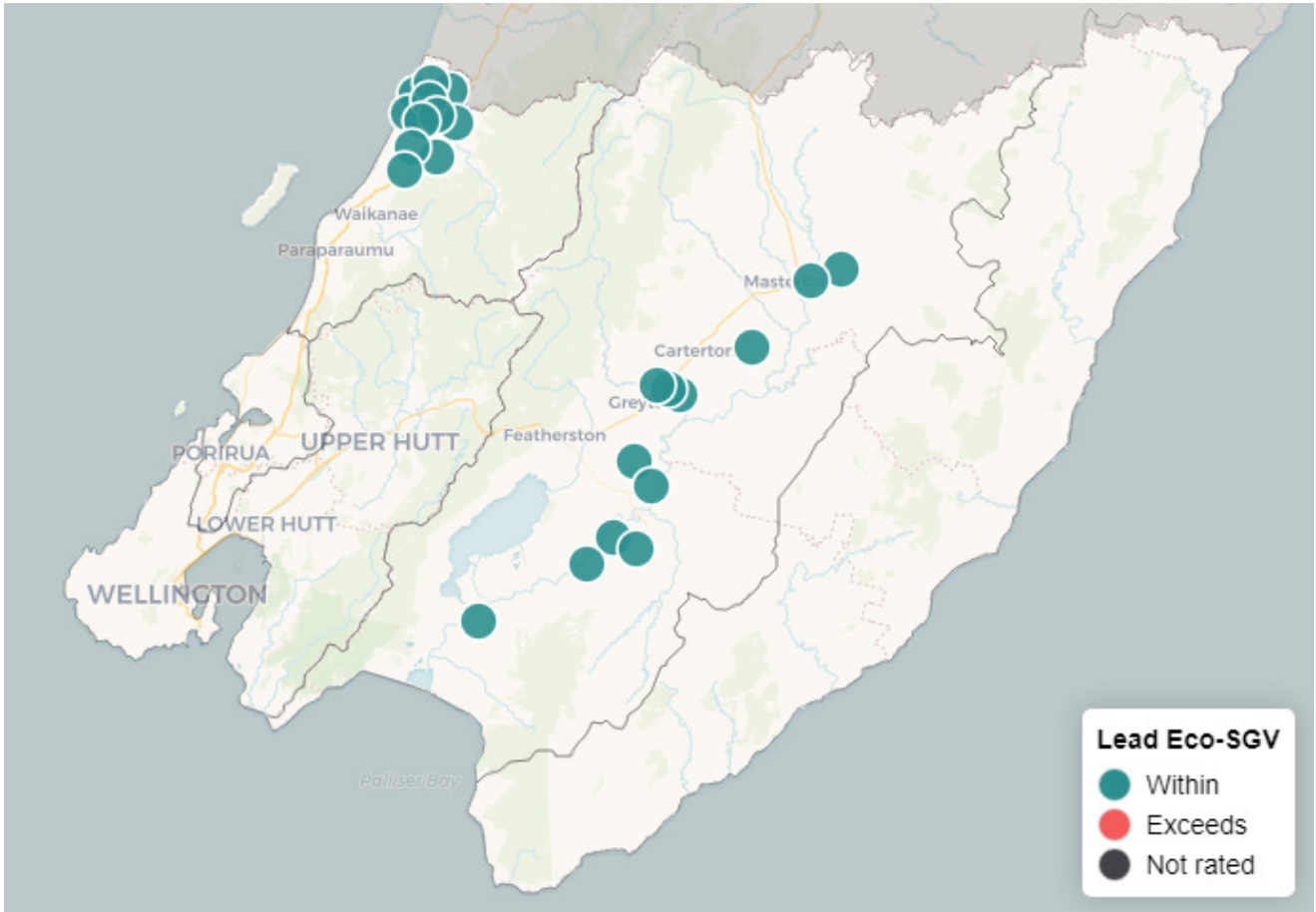


Figure 11: Lead results are compared against draft eco-soil guideline values (Eco-SGVs), see [benchmarking](#) for more information.

Nickel (Ni)

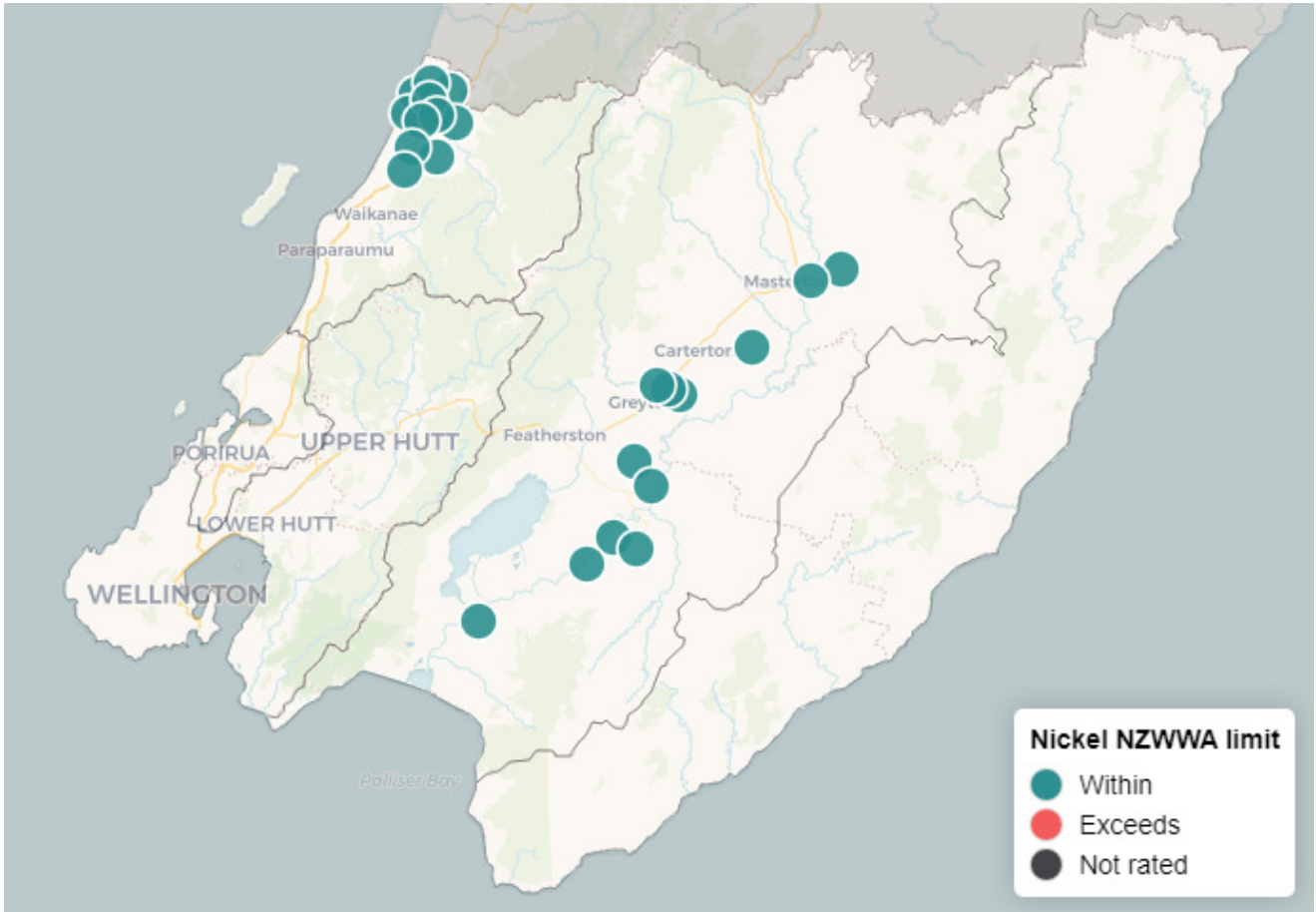


Figure 12: Nickel results are compared against New Zealand Water and Wastes Association (NZWWA) limits, see [benchmarking](#) for more information.

Zinc (Zn)

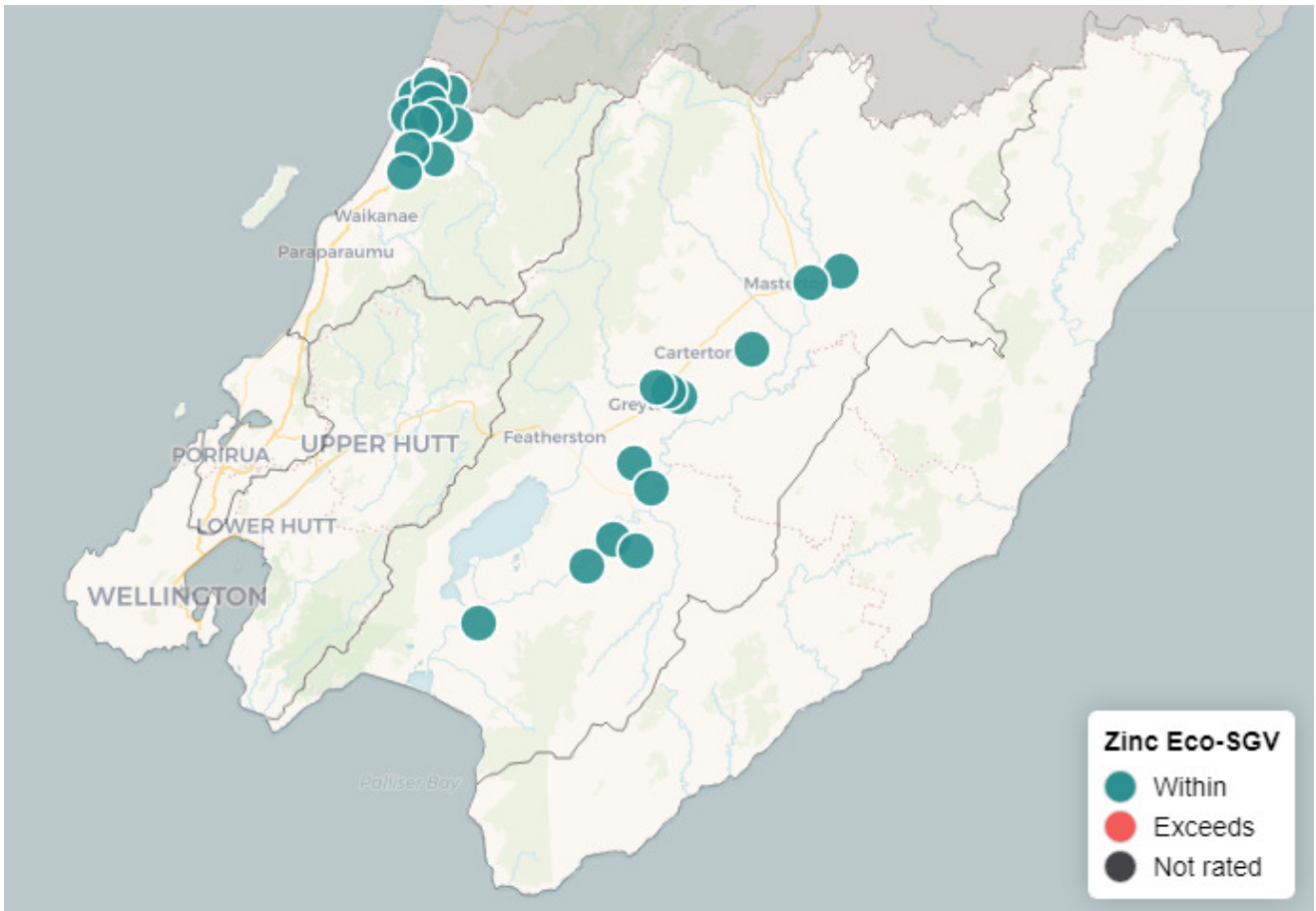


Figure 13: Zinc results are compared against draft eco-soil guideline values (Eco-SGVs), see [benchmarking](#) for more information.

Physical condition results

The following sections present maps of soil quality monitoring results benchmarked against relevant indicator guidelines, see Appendix 2: Data tables for tabulated results.

Bulk density

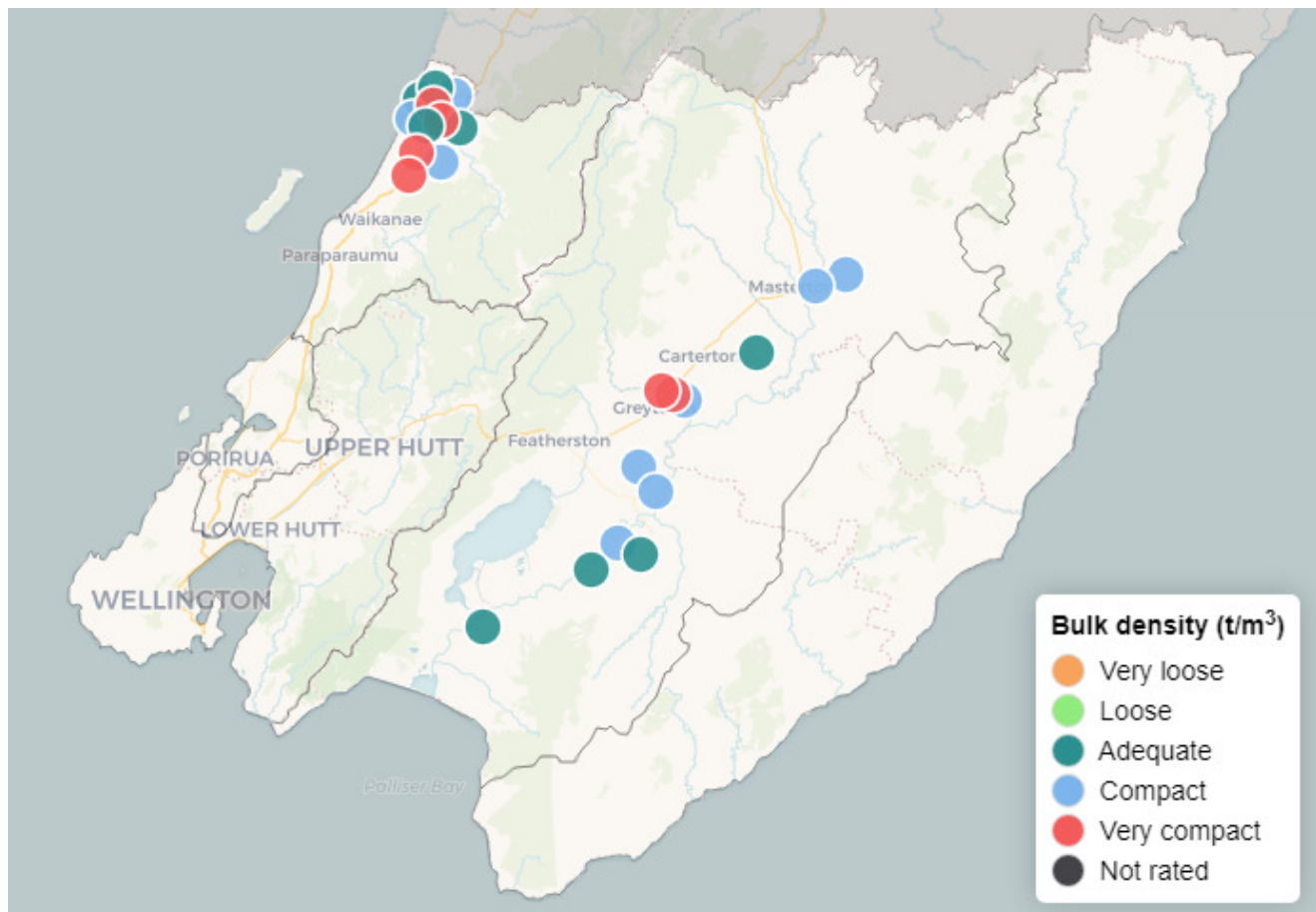


Figure 14: Bulk density is a measure of soil density. A high bulk density indicates a compacted or dense soil. Movement of water and air through soil pores is reduced in compacted soils. High soil bulk density can restrict root growth and adversely affect plant growth. There is also potential for increased run-off and nutrient loss to surface waters in compacted soils. The target range is 'Loose' to 'Compact', see benchmarking for more information.

Macroporosity

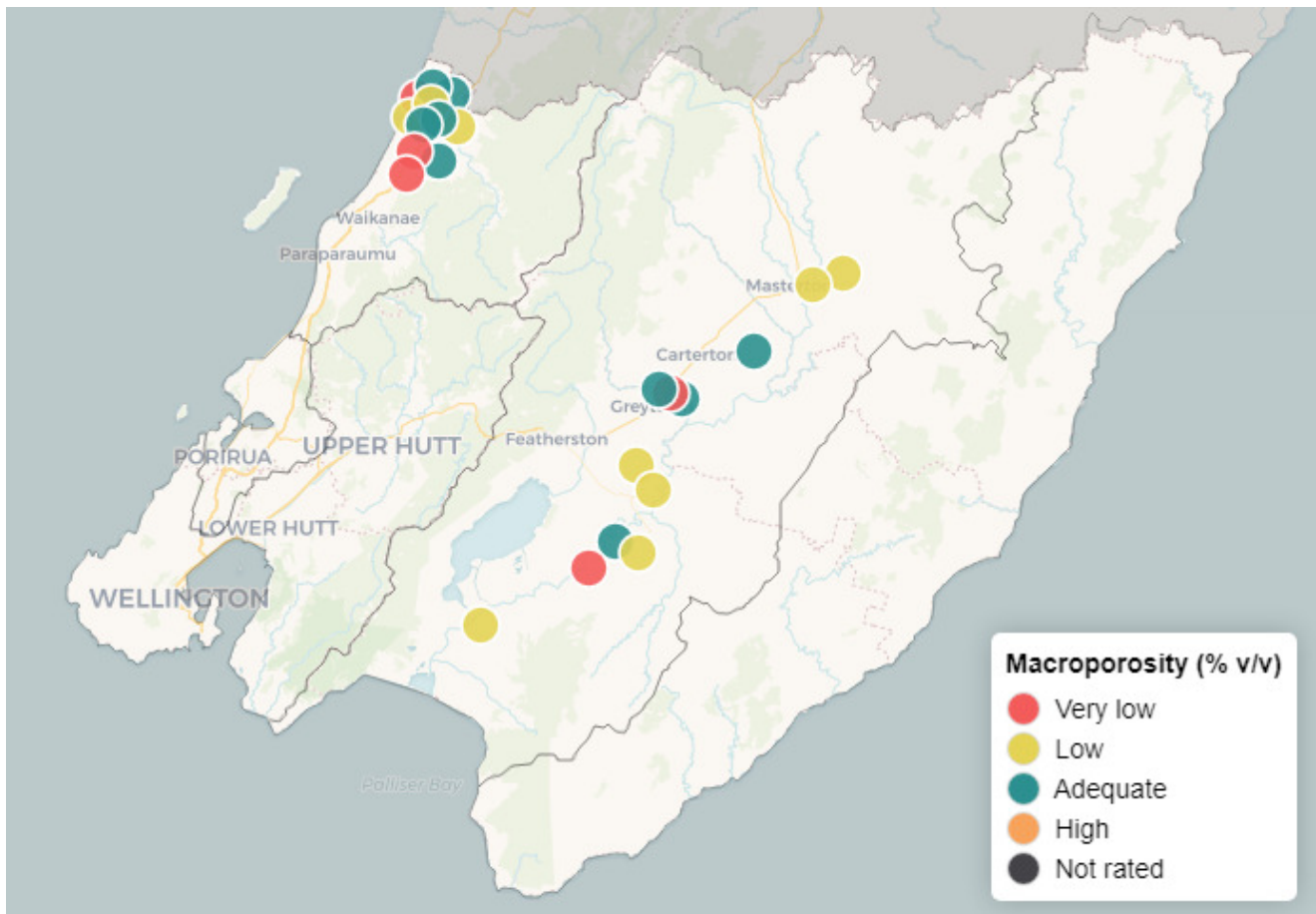


Figure 15: Macropores are important for soil air movement and drainage. Large soil pores are the most susceptible to collapse when soil is compacted. Low macroporosity adversely affects plant growth due to poor root environment, restricted air movement and N-fixation by clover roots. It also infers poor drainage and infiltration. The target is 'Adequate', see [benchmarking](#) for more information.

Resources

Useful links for managing soil quality

- [Reducing the impacts of winter grazing on soil and water quality](#)
- [Soil compaction and pugging on farms](#)
- [Limiting Pugging and Compaction Damage](#)
- [Soil Fertility for Pasture](#)
- [Nitrogen Fertiliser](#)
- [Nutrient Management](#)
- [Beef and Lamb - Successful soil and fertiliser management](#)
- [Soil Characteristics Important to Management](#)
- [Managing our soils](#)
- [New Zealand Landcare Trust](#)
- [Soil Quality Indicators - A web-based tool designed to help you interpret the quality or health of a soil you have sampled](#)

References

- Alloway, B.J. 2008. *Copper and zinc in soils: too little or too much?* In: (Ed N. Kim) New Zealand Trace Elements Group conference. Hamilton. 10 p.
- Cavanagh J. 2019. *UPDATED User Guide: Background soil concentrations and soil guideline values for the protection of ecological receptors (Eco-SGVs) – Consultation draft*. Envirolink Tools Grant: C09X1402. Prepared for Regional Waste and Contaminated Land Forum, Land Monitoring Forum and Land Managers Group. Update prepared for: Gisborne District Council. Landcare Research.
- Drewry J., Cameron K. and Buchan G. 2008. *Pasture yields and soil physical property responses to soil compaction from treading and grazing: A review*. Australian Journal of Soil Research, 46: 237-256.
- Drewry J., Taylor M., Curran-Cournane F., Gray C. and McDowell R. 2013. *Olsen P methods and soil quality monitoring: are we comparing ‘apples with apples’? Accurate and efficient use of nutrients on farms. (Eds LD Currie and CL Christensen)*. Occasional Report No. 26. Fertilizer and Lime Research Centre, Fertilizer and Lime Research Centre, Massey University.
- Drewry, J., Curran-Cournane, F., Taylor, M., and Lynch, B. 2015. *Soil quality monitoring across land uses in four regions: implications for reducing nutrient losses and for national reporting*. In: Moving farm systems to improved nutrient attenuation. (Eds LD Currie and LL Burkitt). Occasional Report No. 28. Fertilizer and Lime Research Centre, Massey University.
- Hill R. and Sparling G. 2009. *Soil quality monitoring. Land and soil monitoring: A guide for SoE and regional council reporting*. Land Monitoring Forum, New Zealand, pp. 27-86. Soil Quality SoE monitoring programme: Annual data report 2017/18 PAGE 23 OF 39
- Mackay A., Dominati E., and Taylor M. 2013. *Soil quality indicators: the next generation*. Report prepared for Land Monitoring Forum of Regional Councils. AgResearch.
- NZWWA. 2003. *Guidelines for the safe application of biosolids to land in New Zealand*. New Zealand Water and Wastes Association, Wellington.

Appendix 1: Monitoring site information

Table A1.1: 2020 cropping and market gardening monitoring sites with LUCAS 16 landcover classifications.

Whaitua	Site code	Land use	Soil order	Soil subgroup	Soil type	Landcover
Ruamāhanga	GW016	Cropping	Gley	Typic Recent Gley	Ahikouka clay loam	Cropland - Annual
Ruamāhanga	GW017	Pasture	Pallic	Argillic Perch-gley Pallic	Kokotau silt loam	Cropland - Annual
Ruamāhanga	GW021	Cropping	Gley	Typic Recent Gley	Ahikouka clay loam	Cropland - Annual
Ruamāhanga	GW022	Cropping	Recent	Acidic-weathered Fluvial Recent	Greytown silt loam	Cropland - Annual
Kāpiti Coast	GW027	Pasture	Recent	Acidic-weathered Fluvial Recent	Manawatu very fine sandy loam	Grassland - High producing
Ruamāhanga	GW031	Pasture	Pallic	Mottled Immature Pallic	Martinborough loam	Grassland - High producing
Kāpiti Coast	GW044	Cropping	Brown	Mottled Orthic Brown	Rahui silt loam	Grassland - High producing
Ruamāhanga	GW071	Cropping	Gley	Recent Gley	Ahikouka silt loam	Cropland - Annual
Ruamāhanga	GW075	Market Gardening	Recent	Weathered Fluvial Recent	Greytown silt loam	Grassland - Low producing
Ruamāhanga	GW079	Cropping	Gley	Recent Gley	Ahikouka silt loam	Cropland - Annual
Ruamāhanga	GW080	Pasture	Recent	Weathered Fluvial Recent	Greytown silt loam	Grassland - High producing
Ruamāhanga	GW082	Cropping	Gley	Typic Recent Gley	Otukura stony silt loam	Grassland - High producing
Ruamāhanga	GW085	Pasture	Gley	Recent Gley	Ahikouka silt loam	Grassland - High producing
Ruamāhanga	GW086	Cropping	Gley	Recent Gley	Ahikouka silt loam	Cropland - Annual
Kāpiti Coast	GW087	Pasture	Recent	Weathered Fluvial Recent	Manawatu silt loam	Grassland - High producing
Kāpiti Coast	GW090	Market Gardening	Brown	Typic Orthic Brown	Te Horo silt loam	Cropland - Annual
Kāpiti Coast	GW092	Cropping	Gley	Typic Orthic Gley	Kairanga silt loam	Cropland - Annual
Kāpiti Coast	GW093	Market Gardening	Recent	Weathered Fluvial Recent	Manawatu Silt loam	Grassland - High producing
Kāpiti Coast	GW094	Pasture	Recent	Weathered Fluvial Recent	Manawatu Silt loam	Cropland - Annual
Kāpiti Coast	GW107	Market Gardening	Recent	Weathered Orthic Recent	Manawatu Silt loam	Cropland - Annual
Kāpiti Coast	GW108	Market Gardening	Gley	Typic Orthic Gley	Kairanga clay loam	Cropland - Annual
Kāpiti Coast	GW111	Cropping	Brown	Typic Orthic Brown	Hautere clay loam	Cropland - Annual
Kāpiti Coast	GW112	Pasture	Pallic	Typic Immature Pallic	Shannon silt loam	Cropland - Annual

Appendix 2: Data tables

Total carbon (C)

Table A2.1: Total carbon results benchmarked against the target range of ‘**Depleted**’ to ‘**Ample**’, see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Soil order	Rating	Total carbon (%)
Ruamāhanga	GW016	Cropping	All other	Very depleted	2.11
Ruamāhanga	GW017	Pasture	Semi-arid, pallic and recent	Normal	3.36
Ruamāhanga	GW021	Cropping	All other	Normal	3.83
Ruamāhanga	GW022	Cropping	Semi-arid, pallic and recent	Depleted	2.26
Kāpiti Coast	GW027	Pasture	Semi-arid, pallic and recent	Depleted	2.85
Ruamāhanga	GW031	Pasture	Semi-arid, pallic and recent	Normal	3.57
Kāpiti Coast	GW044	Cropping	Allophanic	Very depleted	2.88
Ruamāhanga	GW071	Cropping	All other	Depleted	3.28
Ruamāhanga	GW075	Market Gardening	Semi-arid, pallic and recent	Very depleted	1.99
Ruamāhanga	GW079	Cropping	All other	Very depleted	2.43
Ruamāhanga	GW080	Pasture	Semi-arid, pallic and recent	Depleted	2.18
Ruamāhanga	GW082	Cropping	All other	Depleted	3.27
Ruamāhanga	GW085	Pasture	All other	Normal	4.19
Ruamāhanga	GW086	Cropping	All other	Depleted	2.84
Kāpiti Coast	GW087	Pasture	Semi-arid, pallic and recent	Depleted	2.45
Kāpiti Coast	GW090	Market Gardening	Allophanic	Very depleted	2.76
Kāpiti Coast	GW092	Cropping	All other	Very depleted	2.40
Kāpiti Coast	GW093	Market Gardening	Semi-arid, pallic and recent	Very depleted	1.72
Kāpiti Coast	GW094	Pasture	Semi-arid, pallic and recent	Very depleted	1.57
Kāpiti Coast	GW107	Market Gardening	Semi-arid, pallic and recent	Very depleted	1.48
Kāpiti Coast	GW108	Market Gardening	All other	Normal	4.79
Kāpiti Coast	GW111	Cropping	Allophanic	Very depleted	1.84
Kāpiti Coast	GW112	Pasture	Semi-arid, pallic and recent	Very depleted	1.51

Mineralisable nitrogen (N)

Table A2.2: Mineralisable nitrogen results benchmarked against the target range of 'Low' to 'High', see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Rating land use	Rating	Mineralisable N (mg/kg)
Ruamāhanga	GW016	Cropping	Cropping and horticulture	Low	42.0
Ruamāhanga	GW017	Pasture	Pasture	Low	99.2
Ruamāhanga	GW021	Cropping	Cropping and horticulture	Low	92.3
Ruamāhanga	GW022	Cropping	Cropping and horticulture	Low	60.5
Kāpiti Coast	GW027	Pasture	Pasture	Low	82.4
Ruamāhanga	GW031	Pasture	Pasture	Low	88.6
Kāpiti Coast	GW044	Cropping	Cropping and horticulture	Low	76.3
Ruamāhanga	GW071	Cropping	Cropping and horticulture	Low	52.0
Ruamāhanga	GW075	Market Gardening	Cropping and horticulture	Low	63.9
Ruamāhanga	GW079	Cropping	Cropping and horticulture	Low	75.4
Ruamāhanga	GW080	Pasture	Pasture	Low	61.6
Ruamāhanga	GW082	Cropping	Cropping and horticulture	Low	60.4
Ruamāhanga	GW085	Pasture	Pasture	Low	85.6
Ruamāhanga	GW086	Cropping	Cropping and horticulture	Low	69.3
Kāpiti Coast	GW087	Pasture	Pasture	Low	97.6
Kāpiti Coast	GW090	Market Gardening	Cropping and horticulture	Low	58.4
Kāpiti Coast	GW092	Cropping	Cropping and horticulture	Low	55.3
Kāpiti Coast	GW093	Market Gardening	Cropping and horticulture	Low	26.0
Kāpiti Coast	GW094	Pasture	Pasture	Very low	43.6
Kāpiti Coast	GW107	Market Gardening	Cropping and horticulture	Low	23.3
Kāpiti Coast	GW108	Market Gardening	Cropping and horticulture	Low	38.3
Kāpiti Coast	GW111	Cropping	Cropping and horticulture	Low	41.1
Kāpiti Coast	GW112	Pasture	Pasture	Low	57.2

Acidity - soil pH

Table A2.3: Soil pH results benchmarked against the target range of **'Slightly-acidic'** to **'Optimal'**, see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Land use & soil order	Rating	Soil pH
Ruamāhanga	GW016	Cropping	Cropping & horticulture on all except Organic	Optimal	5.97
Ruamāhanga	GW017	Pasture	Pastures on all except Organic	Optimal	6.15
Ruamāhanga	GW021	Cropping	Cropping & horticulture on all except Organic	Optimal	5.92
Ruamāhanga	GW022	Cropping	Cropping & horticulture on all except Organic	Optimal	5.72
Kāpiti Coast	GW027	Pasture	Pastures on all except Organic	Optimal	5.94
Ruamāhanga	GW031	Pasture	Pastures on all except Organic	Optimal	5.73
Kāpiti Coast	GW044	Cropping	Cropping & horticulture on all except Organic	Optimal	5.65
Ruamāhanga	GW071	Cropping	Cropping & horticulture on all except Organic	Slightly acidic	5.38
Ruamāhanga	GW075	Market Gardening	Cropping & horticulture on all except Organic	Optimal	5.74
Ruamāhanga	GW079	Cropping	Cropping & horticulture on all except Organic	Optimal	6.40
Ruamāhanga	GW080	Pasture	Pastures on all except Organic	Optimal	6.01
Ruamāhanga	GW082	Cropping	Cropping & horticulture on all except Organic	Slightly acidic	5.42
Ruamāhanga	GW085	Pasture	Pastures on all except Organic	Optimal	5.74
Ruamāhanga	GW086	Cropping	Cropping & horticulture on all except Organic	Optimal	5.99
Kāpiti Coast	GW087	Pasture	Pastures on all except Organic	Optimal	5.71
Kāpiti Coast	GW090	Market Gardening	Cropping & horticulture on all except Organic	Optimal	6.53
Kāpiti Coast	GW092	Cropping	Cropping & horticulture on all except Organic	Optimal	6.75
Kāpiti Coast	GW093	Market Gardening	Cropping & horticulture on all except Organic	Optimal	6.49
Kāpiti Coast	GW094	Pasture	Pastures on all except Organic	Optimal	6.09
Kāpiti Coast	GW107	Market Gardening	Cropping & horticulture on all except Organic	Slightly acidic	5.36
Kāpiti Coast	GW108	Market Gardening	Cropping & horticulture on all except Organic	Slightly acidic	5.20
Kāpiti Coast	GW111	Cropping	Cropping & horticulture on all except Organic	Optimal	5.52
Kāpiti Coast	GW112	Pasture	Pastures on all except Organic	Very alkaline	7.18

Fertility - Olsen P

Table A2.4: Phosphorus (P) results benchmarked against target ranges, see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Soil order	Rating soil order	Rating	Olsen P (mg/kg)
Ruamāhanga	GW016	Cropping	Gley	Other Soils	Within	31.22
Ruamāhanga	GW017	Pasture	Pallic	Other Soils	Within	36.74
Ruamāhanga	GW021	Cropping	Gley	Other Soils	Within	38.43
Ruamāhanga	GW022	Cropping	Recent	Recent Soils and Podzols	Above	51.60
Kāpiti Coast	GW027	Pasture	Recent	Recent Soils and Podzols	Above	96.33
Ruamāhanga	GW031	Pasture	Pallic	Other Soils	Within	39.23
Kāpiti Coast	GW044	Cropping	Brown	Other Soils	Within	34.62
Ruamāhanga	GW071	Cropping	Gley	Other Soils	Above	87.30
Ruamāhanga	GW075	Market Gardening	Recent	Recent and Pallic Soils	Within	54.82
Ruamāhanga	GW079	Cropping	Gley	Other Soils	Above	51.49
Ruamāhanga	GW080	Pasture	Recent	Recent Soils and Podzols	Within	20.96
Ruamāhanga	GW082	Cropping	Gley	Other Soils	Above	68.54
Ruamāhanga	GW085	Pasture	Gley	Other Soils	Within	35.20
Ruamāhanga	GW086	Cropping	Gley	Other Soils	Below	22.72
Kāpiti Coast	GW087	Pasture	Recent	Recent Soils and Podzols	Above	114.81
Kāpiti Coast	GW090	Market Gardening	Brown	Brown, Gley, Melanic, Or...	Below	40.34
Kāpiti Coast	GW092	Cropping	Gley	Other Soils	Above	131.75
Kāpiti Coast	GW093	Market Gardening	Recent	Recent and Pallic Soils	Above	139.88
Kāpiti Coast	GW094	Pasture	Recent	Recent Soils and Podzols	Above	183.25
Kāpiti Coast	GW107	Market Gardening	Recent	Recent and Pallic Soils	Above	234.80
Kāpiti Coast	GW108	Market Gardening	Gley	Brown, Gley, Melanic, Or...	Above	191.69
Kāpiti Coast	GW111	Cropping	Brown	Other Soils	Above	161.17
Kāpiti Coast	GW112	Pasture	Pallic	Other Soils	Above	161.77

Arsenic (As)

Table A2.5: Arsenic results are compared against draft eco-soil guideline values (Eco-SGVs), see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Soil order	Eco-SGV	Arsenic (mg/kg)
Ruamāhanga	GW016	Cropping	Gley	Within	10.3
Ruamāhanga	GW017	Pasture	Pallic	Within	2.9
Ruamāhanga	GW021	Cropping	Gley	Within	3.4
Ruamāhanga	GW022	Cropping	Recent	Within	5.6
Kāpiti Coast	GW027	Pasture	Recent	Within	9.6
Ruamāhanga	GW031	Pasture	Pallic	Within	1.7
Kāpiti Coast	GW044	Cropping	Brown	Within	6.7
Ruamāhanga	GW071	Cropping	Gley	Within	2.6
Ruamāhanga	GW075	Market Gardening	Recent	Within	4.4
Ruamāhanga	GW079	Cropping	Gley	Within	9.1
Ruamāhanga	GW080	Pasture	Recent	Within	7.5
Ruamāhanga	GW082	Cropping	Gley	Within	4.1
Ruamāhanga	GW085	Pasture	Gley	Within	6.5
Ruamāhanga	GW086	Cropping	Gley	Within	3.9
Kāpiti Coast	GW087	Pasture	Recent	Within	7.6
Kāpiti Coast	GW090	Market Gardening	Brown	Within	4.8
Kāpiti Coast	GW092	Cropping	Gley	Within	10.8
Kāpiti Coast	GW093	Market Gardening	Recent	Within	10.4
Kāpiti Coast	GW094	Pasture	Recent	Within	9.5
Kāpiti Coast	GW107	Market Gardening	Recent	Within	13.4
Kāpiti Coast	GW108	Market Gardening	Gley	Within	4.6
Kāpiti Coast	GW111	Cropping	Brown	Within	3.8
Kāpiti Coast	GW112	Pasture	Pallic	Within	3.1

Cadmium (Cd)

Table A2.6: Cadmium results are compared against draft eco-soil guideline values (Eco-SGVs) on the map and trigger values from the tiered fertiliser management system (TFMS) also in the table, see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Soil order	Eco-SGV	Cadmium (mg/kg)
Ruamāhanga	GW016	Cropping	Gley	Within	0.24
Ruamāhanga	GW017	Pasture	Pallic	Within	0.19
Ruamāhanga	GW021	Cropping	Gley	Within	0.18
Ruamāhanga	GW022	Cropping	Recent	Within	0.19
Kāpiti Coast	GW027	Pasture	Recent	Within	0.27
Ruamāhanga	GW031	Pasture	Pallic	Within	0.22
Kāpiti Coast	GW044	Cropping	Brown	Within	0.17
Ruamāhanga	GW071	Cropping	Gley	Within	0.23
Ruamāhanga	GW075	Market Gardening	Recent	Within	0.09
Ruamāhanga	GW079	Cropping	Gley	Within	0.28
Ruamāhanga	GW080	Pasture	Recent	Within	0.12
Ruamāhanga	GW082	Cropping	Gley	Within	0.16
Ruamāhanga	GW085	Pasture	Gley	Within	0.19
Ruamāhanga	GW086	Cropping	Gley	Within	0.17
Kāpiti Coast	GW087	Pasture	Recent	Within	0.36
Kāpiti Coast	GW090	Market Gardening	Brown	Within	0.35
Kāpiti Coast	GW092	Cropping	Gley	Within	0.28
Kāpiti Coast	GW093	Market Gardening	Recent	Within	0.28
Kāpiti Coast	GW094	Pasture	Recent	Within	0.33
Kāpiti Coast	GW107	Market Gardening	Recent	Within	0.40
Kāpiti Coast	GW108	Market Gardening	Gley	Within	0.25
Kāpiti Coast	GW111	Cropping	Brown	Within	0.27
Kāpiti Coast	GW112	Pasture	Pallic	Within	0.15

Chromium (Cr)

Table A2.7: Chromium results are compared against draft eco-soil guideline values (Eco-SGVs), see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Soil order	Eco-SGV	Chromium (mg/kg)
Ruamāhanga	GW016	Cropping	Gley	Within	24
Ruamāhanga	GW017	Pasture	Pallic	Within	11
Ruamāhanga	GW021	Cropping	Gley	Within	22
Ruamāhanga	GW022	Cropping	Recent	Within	20
Kāpiti Coast	GW027	Pasture	Recent	Within	19
Ruamāhanga	GW031	Pasture	Pallic	Within	9
Kāpiti Coast	GW044	Cropping	Brown	Within	20
Ruamāhanga	GW071	Cropping	Gley	Within	20
Ruamāhanga	GW075	Market Gardening	Recent	Within	19
Ruamāhanga	GW079	Cropping	Gley	Within	24
Ruamāhanga	GW080	Pasture	Recent	Within	22
Ruamāhanga	GW082	Cropping	Gley	Within	11
Ruamāhanga	GW085	Pasture	Gley	Within	22
Ruamāhanga	GW086	Cropping	Gley	Within	20
Kāpiti Coast	GW087	Pasture	Recent	Within	18
Kāpiti Coast	GW090	Market Gardening	Brown	Within	23
Kāpiti Coast	GW092	Cropping	Gley	Within	24
Kāpiti Coast	GW093	Market Gardening	Recent	Within	20
Kāpiti Coast	GW094	Pasture	Recent	Within	22
Kāpiti Coast	GW107	Market Gardening	Recent	Within	21
Kāpiti Coast	GW108	Market Gardening	Gley	Within	18
Kāpiti Coast	GW111	Cropping	Brown	Within	19
Kāpiti Coast	GW112	Pasture	Pallic	Within	13

Copper (Cu)

Table A2.8: Copper results are compared against draft eco-soil guideline values (Eco-SGVs), see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Soil order	Eco-SGV	Copper (mg/kg)
Ruamāhanga	GW016	Cropping	Gley	Within sensitive limits	19
Ruamāhanga	GW017	Pasture	Pallic	Within sensitive limits	6
Ruamāhanga	GW021	Cropping	Gley	Within sensitive limits	14
Ruamāhanga	GW022	Cropping	Recent	Within sensitive limits	16
Kāpiti Coast	GW027	Pasture	Recent	Within sensitive limits	35
Ruamāhanga	GW031	Pasture	Pallic	Within sensitive limits	4
Kāpiti Coast	GW044	Cropping	Brown	Within sensitive limits	15
Ruamāhanga	GW071	Cropping	Gley	Within sensitive limits	8
Ruamāhanga	GW075	Market Gardening	Recent	Within sensitive limits	14
Ruamāhanga	GW079	Cropping	Gley	Within sensitive limits	20
Ruamāhanga	GW080	Pasture	Recent	Within sensitive limits	18
Ruamāhanga	GW082	Cropping	Gley	Within sensitive limits	3
Ruamāhanga	GW085	Pasture	Gley	Within sensitive limits	18
Ruamāhanga	GW086	Cropping	Gley	Within sensitive limits	11
Kāpiti Coast	GW087	Pasture	Recent	Within sensitive limits	70
Kāpiti Coast	GW090	Market Gardening	Brown	Within sensitive limits	19
Kāpiti Coast	GW092	Cropping	Gley	Within sensitive limits	25
Kāpiti Coast	GW093	Market Gardening	Recent	Within sensitive limits	61
Kāpiti Coast	GW094	Pasture	Recent	Within sensitive limits	108
Kāpiti Coast	GW107	Market Gardening	Recent	Within sensitive limits	96
Kāpiti Coast	GW108	Market Gardening	Gley	Within sensitive limits	36
Kāpiti Coast	GW111	Cropping	Brown	Within sensitive limits	23
Kāpiti Coast	GW112	Pasture	Pallic	Within sensitive limits	36

Lead (Pb)

Table A2.9: Lead results are compared against draft eco-soil guideline values (Eco-SGVs), see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Soil order	Eco-SGV	Lead (mg/kg)
Ruamāhanga	GW016	Cropping	Gley	Within	26.0
Ruamāhanga	GW017	Pasture	Pallic	Within	9.4
Ruamāhanga	GW021	Cropping	Gley	Within	18.5
Ruamāhanga	GW022	Cropping	Recent	Within	15.2
Kāpiti Coast	GW027	Pasture	Recent	Within	25.0
Ruamāhanga	GW031	Pasture	Pallic	Within	6.9
Kāpiti Coast	GW044	Cropping	Brown	Within	16.8
Ruamāhanga	GW071	Cropping	Gley	Within	10.0
Ruamāhanga	GW075	Market Gardening	Recent	Within	13.5
Ruamāhanga	GW079	Cropping	Gley	Within	25.0
Ruamāhanga	GW080	Pasture	Recent	Within	23.0
Ruamāhanga	GW082	Cropping	Gley	Within	16.2
Ruamāhanga	GW085	Pasture	Gley	Within	19.9
Ruamāhanga	GW086	Cropping	Gley	Within	15.8
Kāpiti Coast	GW087	Pasture	Recent	Within	22.0
Kāpiti Coast	GW090	Market Gardening	Brown	Within	17.7
Kāpiti Coast	GW092	Cropping	Gley	Within	32.0
Kāpiti Coast	GW093	Market Gardening	Recent	Within	37.0
Kāpiti Coast	GW094	Pasture	Recent	Within	32.0
Kāpiti Coast	GW107	Market Gardening	Recent	Within	35.0
Kāpiti Coast	GW108	Market Gardening	Gley	Within	24.0
Kāpiti Coast	GW111	Cropping	Brown	Within	14.8
Kāpiti Coast	GW112	Pasture	Pallic	Within	10.7

Nickel (Ni)

Table A2.10: Nickel results are compared against New Zealand Water and Wastes Association (NZWWA) limits, see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Soil order	NZWWA limit	Nickel (mg/kg)
Ruamāhanga	GW016	Cropping	Gley	Within	23.0
Ruamāhanga	GW017	Pasture	Pallic	Within	5.8
Ruamāhanga	GW021	Cropping	Gley	Within	17.0
Ruamāhanga	GW022	Cropping	Recent	Within	19.9
Kāpiti Coast	GW027	Pasture	Recent	Within	18.6
Ruamāhanga	GW031	Pasture	Pallic	Within	6.7
Kāpiti Coast	GW044	Cropping	Brown	Within	16.1
Ruamāhanga	GW071	Cropping	Gley	Within	16.1
Ruamāhanga	GW075	Market Gardening	Recent	Within	16.1
Ruamāhanga	GW079	Cropping	Gley	Within	22.0
Ruamāhanga	GW080	Pasture	Recent	Within	21.0
Ruamāhanga	GW082	Cropping	Gley	Within	4.6
Ruamāhanga	GW085	Pasture	Gley	Within	19.9
Ruamāhanga	GW086	Cropping	Gley	Within	17.6
Kāpiti Coast	GW087	Pasture	Recent	Within	18.0
Kāpiti Coast	GW090	Market Gardening	Brown	Within	17.1
Kāpiti Coast	GW092	Cropping	Gley	Within	18.9
Kāpiti Coast	GW093	Market Gardening	Recent	Within	18.9
Kāpiti Coast	GW094	Pasture	Recent	Within	19.1
Kāpiti Coast	GW107	Market Gardening	Recent	Within	18.2
Kāpiti Coast	GW108	Market Gardening	Gley	Within	11.8
Kāpiti Coast	GW111	Cropping	Brown	Within	13.7
Kāpiti Coast	GW112	Pasture	Pallic	Within	7.5

Zinc (Zn)

Table A2.11: Zinc results are compared against draft eco-soil guideline values (Eco-SGVs), see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Soil order	Eco-SGV	Zinc (mg/kg)
Ruamāhanga	GW016	Cropping	Gley	Within sensitive limits	100
Ruamāhanga	GW017	Pasture	Pallic	Within sensitive limits	34
Ruamāhanga	GW021	Cropping	Gley	Within sensitive limits	89
Ruamāhanga	GW022	Cropping	Recent	Within sensitive limits	84
Kāpiti Coast	GW027	Pasture	Recent	Within sensitive limits	106
Ruamāhanga	GW031	Pasture	Pallic	Within sensitive limits	44
Kāpiti Coast	GW044	Cropping	Brown	Within sensitive limits	89
Ruamāhanga	GW071	Cropping	Gley	Within sensitive limits	67
Ruamāhanga	GW075	Market Gardening	Recent	Within sensitive limits	69
Ruamāhanga	GW079	Cropping	Gley	Within sensitive limits	96
Ruamāhanga	GW080	Pasture	Recent	Within sensitive limits	93
Ruamāhanga	GW082	Cropping	Gley	Within sensitive limits	33
Ruamāhanga	GW085	Pasture	Gley	Within sensitive limits	97
Ruamāhanga	GW086	Cropping	Gley	Within sensitive limits	92
Kāpiti Coast	GW087	Pasture	Recent	Within sensitive limits	102
Kāpiti Coast	GW090	Market Gardening	Brown	Within sensitive limits	102
Kāpiti Coast	GW092	Cropping	Gley	Within sensitive limits	112
Kāpiti Coast	GW093	Market Gardening	Recent	Within sensitive limits	110
Kāpiti Coast	GW094	Pasture	Recent	Within sensitive limits	118
Kāpiti Coast	GW107	Market Gardening	Recent	Within sensitive limits	128
Kāpiti Coast	GW108	Market Gardening	Gley	Within sensitive limits	86
Kāpiti Coast	GW111	Cropping	Brown	Within sensitive limits	87
Kāpiti Coast	GW112	Pasture	Pallic	Within sensitive limits	56

Bulk density

Table A2.12: Bulk density results benchmarked against the target range of 'Loose' to 'Compact', see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Soil order	Rating	Bulk density (t/m ³)
Ruamāhanga	GW016	Cropping	All other	Compact	1.23
Ruamāhanga	GW017	Pasture	Semi-arid, pallic and recent	Adequate	1.14
Ruamāhanga	GW021	Cropping	All other	Adequate	1.06
Ruamāhanga	GW022	Cropping	Semi-arid, pallic and recent	Compact	1.26
Kāpiti Coast	GW027	Pasture	Semi-arid, pallic and recent	Adequate	1.20
Ruamāhanga	GW031	Pasture	Semi-arid, pallic and recent	Adequate	1.25
Kāpiti Coast	GW044	Cropping	Allophanic	Compact	1.16
Ruamāhanga	GW071	Cropping	All other	Compact	1.26
Ruamāhanga	GW075	Market Gardening	Semi-arid, pallic and recent	Compact	1.35
Ruamāhanga	GW079	Cropping	All other	Very compact	1.47
Ruamāhanga	GW080	Pasture	Semi-arid, pallic and recent	Very compact	1.41
Ruamāhanga	GW082	Cropping	All other	Compact	1.31
Ruamāhanga	GW085	Pasture	All other	Adequate	1.19
Ruamāhanga	GW086	Cropping	All other	Compact	1.32
Kāpiti Coast	GW087	Pasture	Semi-arid, pallic and recent	Adequate	1.25
Kāpiti Coast	GW090	Market Gardening	Allophanic	Compact	1.10
Kāpiti Coast	GW092	Cropping	All other	Compact	1.29
Kāpiti Coast	GW093	Market Gardening	Semi-arid, pallic and recent	Adequate	1.22
Kāpiti Coast	GW094	Pasture	Semi-arid, pallic and recent	Very compact	1.44
Kāpiti Coast	GW107	Market Gardening	Semi-arid, pallic and recent	Very compact	1.41
Kāpiti Coast	GW108	Market Gardening	All other	Adequate	1.04
Kāpiti Coast	GW111	Cropping	Allophanic	Very compact	1.51
Kāpiti Coast	GW112	Pasture	Semi-arid, pallic and recent	Very compact	1.62

Macroporosity

Table A2.13: Macroporosity results benchmarked against the target range of 'Adequate', see [benchmarking](#) for more information.

Whaitua	Site code	Land use	Rating land use	Rating	Macroporosity (% v/v)
Ruamāhanga	GW016	Cropping	Pastures, cropping and horticulture	Adequate	14.5
Ruamāhanga	GW017	Pasture	Pastures, cropping and horticulture	Adequate	14.0
Ruamāhanga	GW021	Cropping	Pastures, cropping and horticulture	Low	9.7
Ruamāhanga	GW022	Cropping	Pastures, cropping and horticulture	Adequate	10.1
Kāpiti Coast	GW027	Pasture	Pastures, cropping and horticulture	Very low	3.6
Ruamāhanga	GW031	Pasture	Pastures, cropping and horticulture	Low	6.7
Kāpiti Coast	GW044	Cropping	Pastures, cropping and horticulture	Adequate	13.0
Ruamāhanga	GW071	Cropping	Pastures, cropping and horticulture	Low	7.3
Ruamāhanga	GW075	Market Gardening	Pastures, cropping and horticulture	Low	7.9
Ruamāhanga	GW079	Cropping	Pastures, cropping and horticulture	Very low	5.3
Ruamāhanga	GW080	Pasture	Pastures, cropping and horticulture	Adequate	15.2
Ruamāhanga	GW082	Cropping	Pastures, cropping and horticulture	Low	9.7
Ruamāhanga	GW085	Pasture	Pastures, cropping and horticulture	Very low	5.3
Ruamāhanga	GW086	Cropping	Pastures, cropping and horticulture	Low	6.7
Kāpiti Coast	GW087	Pasture	Pastures, cropping and horticulture	Low	8.3
Kāpiti Coast	GW090	Market Gardening	Pastures, cropping and horticulture	Adequate	20.3
Kāpiti Coast	GW092	Cropping	Pastures, cropping and horticulture	Low	6.2
Kāpiti Coast	GW093	Market Gardening	Pastures, cropping and horticulture	Adequate	21.9
Kāpiti Coast	GW094	Pasture	Pastures, cropping and horticulture	Low	7.7
Kāpiti Coast	GW107	Market Gardening	Pastures, cropping and horticulture	Adequate	17.8
Kāpiti Coast	GW108	Market Gardening	Pastures, cropping and horticulture	Adequate	20.5
Kāpiti Coast	GW111	Cropping	Pastures, cropping and horticulture	Very low	4.6
Kāpiti Coast	GW112	Pasture	Pastures, cropping and horticulture	Very low	3.4