



RUAMĀHANGA

GREATER WELLINGTON
REGIONAL COUNCIL
ENVIRONMENT REPORT CARDS
2016/17



SOIL QUALITY



Why do we monitor soil quality?

Greater Wellington Regional Council monitors soil quality to identify the effect of different land uses on soil and the environment.

This information helps landowners make good management decisions so we protect the life-supporting capacity of soil for future generations. It also helps determine the effectiveness of our regional policies and plans.

What did the 2016/17 results show?

2016/17 soil quality grades

This year we monitored nine market garden or cropping sites, two drystock sites and one dairy site. Three of these sites are graded A, five are graded B, three are graded C and one is graded D.

These results are very similar to the 2013/14 results, when these sites were last sampled.



3 SITES = GRADE A
All 8 indicators meet target range



5 SITES = GRADE B
7 out of 8 indicators meet target range



3 SITES = GRADE C
5 or 6 out of 8 indicators meet target range



1 SITE = GRADE D
Less than 5 indicators meet target range

Some of the sites in this area are showing signs of soil compaction. Soil compaction happens when the spaces within the soil are reduced or compressed. It is undesirable because it can cause waterlogging, increased surface runoff, reduced pasture production and ultimately degrade the soil structure itself.

The chemical condition of the soil at these sites is generally quite good. The main issues are depleted soil organic matter (as indicated by low total carbon values at three sites) and elevated phosphorus levels (as indicated by high Olsen P values at six sites).



Did you know that healthy soils provide the largest store of terrestrial carbon?

If we don't manage soils properly, carbon (in the form of CO₂) can be released into the atmosphere and contribute to climate change.

Olsen P

Olsen P is a measure of phosphorus, an essential nutrient for plant growth. Unlike nitrogen which leaches easily out of soil, phosphorus is very sticky and tends to bind strongly to soil particles. This means that any sediment from soil erosion is likely to be carrying phosphorus and contributing to nutrient enrichment of the surrounding waterways.

2016/17 soil quality monitoring results

| Site Name | Soil Order | Land Use | Bulk density (Mg/m ³) | Macro-porosity (%) | pH | Total Carbon (%) | Total Nitrogen (%) | AM ¹ Nitrogen (mg/kg) | Olsen P ² (mg/kg) | Trace elements ³ | Site grade |
|---|------------|---------------|-----------------------------------|--------------------|--------------|------------------|--------------------|----------------------------------|------------------------------|-----------------------------|------------|
| GW016 | Gley | Cropping | 1.22 | 10.3 | 6.2 | 2.4 | 0.25 | 50 | 31 | 0 | B |
| GW017 | Pallic | Cropping | 1.1 | 15.7 | 6.4 | 3.4 | 0.33 | 75 | 59 | 0 | B |
| GW021 | Gley | Drystock | 0.89 | 14.8 | 6.1 | 4.3 | 0.41 | 101 | 40 | 0 | A |
| GW022 | Recent | Cropping | 1.43 | 3.2 | 5.9 | 2.4 | 0.26 | 59 | 47 | 0 | C |
| GW031 | Pallic | Drystock | 1.22 | 13.6 | 5.8 | 3.1 | 0.29 | 58 | 35 | 0 | A |
| GW071 | Gley | Cropping | 1.28 | 9 | 6.2 | 3.1 | 0.32 | 46 | 76 | 0 | C |
| GW075 | Recent | Market Garden | 1.31 | 17 | 5.7 | 2 | 0.19 | 39 | 44 | 0 | B |
| GW079 | Gley | Cropping | 1.44 | 5.4 | 7 | 1.8 | 0.18 | 34 | 62 | 0 | D |
| GW080 | Recent | Cropping | 1.44 | 6.7 | 6.7 | 1.6 | 0.17 | 37 | 28 | 0 | C |
| GW082 | Gley | Cropping | 1.15 | 21.7 | 5.6 | 3.8 | 0.36 | 76 | 74 | 0 | B |
| GW085 | Gley | Dairy | 1.29 | 2.7 | 6 | 3.2 | 0.33 | 56 | 28 | 0 | B |
| GW86 | Gley | Cropping | 1.1 | 18.2 | 6.1 | 2.8 | 0.3 | 54 | 24 | 0 | A |
| Target Range | | | 0.4-1.4 | 10-30 | 5-7.6 | 2.5-12* | 0.25-0.70** | >20 | 20-40 | 0 | |
| No. sites meeting target range | | | 9 | 7 | 12 | 9 | 12 | 12 | 6 | 12 | |
| No. sites not meeting target range | | | 3 | 5 | 0 | 3 | 0 | 0 | 6 | 0 | |

1 Stands for 'anaerobic mineralisable' nitrogen

2 Olsen P is a measure of phosphorus

3 Number of trace elements (out of 7) that were outside of target range

* Note the target range for recent soils is 2-12

** Target range does not apply to Market Garden or Cropping sites

High levels of phosphorus continue to be the main soil quality issue at these sites with six out of twelve sites exceeding the upper limit of the target range for Olsen P

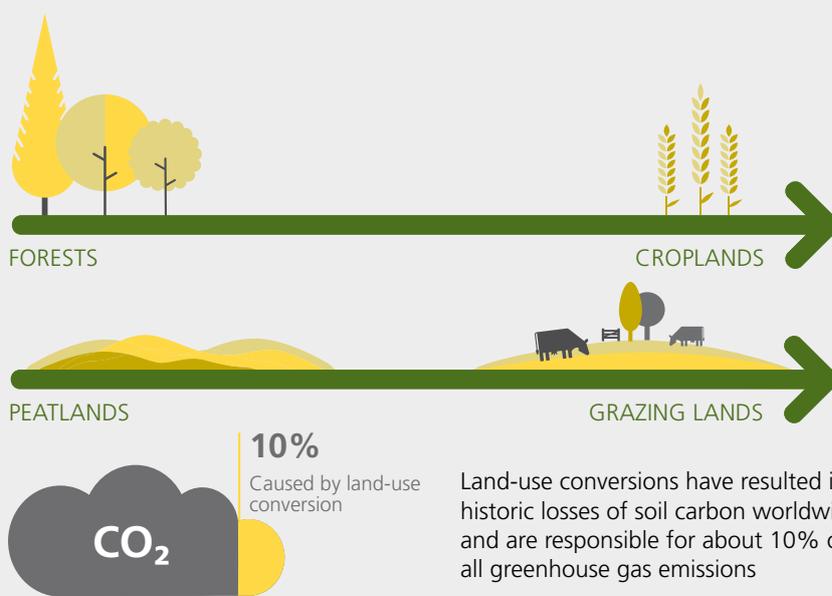
Physical Properties: Three sites failed to meet the target ranges for both bulk density and macroporosity, and a further two sites failed to meet the target range for macroporosity.

Chemical Properties: All sites met the target ranges for pH, total nitrogen and anaerobic mineralisable nitrogen (that's the amount of nitrogen available for uptake by plants).

Of note is that three of the nine market garden or cropping sites have low total carbon levels, which is fairly common when land is intensively cultivated.

Soil carbon is important for retaining moisture, nutrients and good soil structure.

Trace elements: All sites met the target range (drawn from national guidelines) for all trace elements measured. These trace elements are arsenic, cadmium, chromium, copper, lead, nickel and zinc measured.



For further information:

Full details of the 2016/17 monitoring results can be found in our Soil Quality Annual Data Report published online at www.gw.govt.nz/Annual-monitoring-reports

To view or download environmental monitoring data go to <http://graphs.gw.govt.nz>