'Since 1995, the Council has monitored the soil quality of different soils used for different purposes in the Taranaki region.'

Soil health

Taranaki has very few long-term issues with soil health. Soil quality monitoring aims to track any changes in the region's soils, allowing land users to make well-informed decisions to prevent or minimise the effect of their land use on soil health.

Since 1995, the Council has monitored the quality of different soils used for different purposes in the Taranaki region. Monitoring was initially conducted as part of the nationwide 500 Soils Project and subsequently, through a more extensive region-specific programme. As part of the State of the Environment monitoring programme, soil quality monitoring is now conducted once every five years.

In October to November 2012, the third round of soil quality monitoring was carried out at 20 selected sites around the region. The objective of the programme is to compare soil quality with land use and identify the extent and direction of any changes in relation to samples previously analysed from these sites.

Soil quality

The 20 sites surveyed during October–November 2012 comprised three plantation forests, seven dairy pastures, six dry stock pastures (pasture grazed predominantly by sheep and beef), two cropping/market garden sites, and two native bush sites.

Seven primary soil properties were measured to assess soil quality—total carbon (TC), total nitrogen (TN), anaerobically mineralisable nitrogen (AMN), pH levels, Olsen phosphorus, bulk density and macroporosity (the soil's ability to retain water and nutrients). Biological functioning to assess the soil's ability to sustain healthy organisms was also measured. To maintain consistency and standards, protocols and analysis of soil samples were based on the protocols established in the 500 Soils Project.

What's the story?

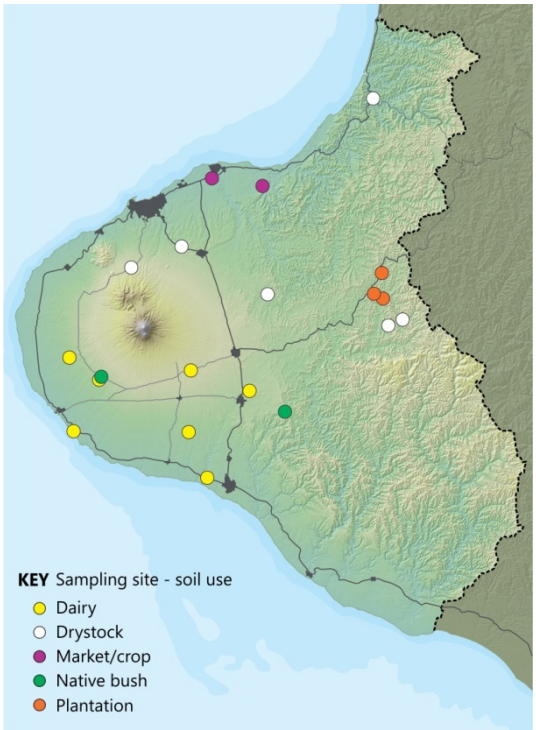
Results from the 2012 survey found that overall, the majority of soil samples met target ranges for soil productivity and health. The number of soil quality indicators meeting targets improved by 3%, from 78% in 2007 to 81% in 2012.

More sites than in the previous survey had only one or no indicators outside of target values. On a site basis, 11% of sites met all targets, 50% missed the target range for only one indicator and 39% missed the target range for two or more indicators.

By comparison, in the 2007 survey, only 45% either met the target range or missed the target range for only one indicator.

Biological functioning in most soils was consistent across the region, with evidence of decreased ecology found only in those soils used for cropping.

Testing for the trace element cadmium was also carried out in the 2012 survey. Generally, cadmium levels were highest on grazed pastures, but there was little distinction in levels between pastoral soils, market gardening soils, and cropping soils.



Location of soil quality monitoring sites in Taranaki.

Cadmium levels were lowest within plantation forestry and native bush forestry soils. However, all sites were found to be below 1.4 mg kg^{-1} for cadmium. This is at least two tiers below the levels deemed to be of immediate concern in the Tiered Fertiliser Management System criteria released by the national Cadmium Working Group (2011). Importantly, there was no sign of any increase in cadmium levels in relation to previous surveys.

The survey identified a few regional issues. These include compaction of soils subject to animal grazing, higher than target nitrogen levels in dairy soils, and low nutrient levels or low fertility in the hill country. While it is important to recognise these as issues, they are also aspects of soil quality that can generally be reversed with appropriate soil and land use management.

'Survey found 81% of soil samples met target ranges for soil productivity and health. '

When considering the nine sites that have been sampled three times since 1995, the most noticeable trend is a decrease in macroporosity (low macroporosity accounts for 50% of all the indicators that were outside target ranges). Reduced macroporosity can indicate soil compaction, especially in dairying soils where stock treading can compact soil. Decreased macroporosity levels are a concern, especially as a trend. However, it should be noted that Council completes sampling in spring, when compaction is at its worst and most aspects of poor soil quality can generally be reversed with appropriate management.

National comparison

The general patterns in soil quality for Taranaki are similar to those in other regions.

A Council Technical Officer collects soil samples at one of 20 sites in the region.

Our responses

Regional Soil Plan for Taranaki

The Council addresses soil health through the *Regional Soil Plan for Taranaki*. The objectives, policies and methods contained within the *Regional Soil Plan* focus on non-regulatory solutions for managing soil health. A current review of the plan will consider the 2012 soil quality survey recommendations and suggestions in relation to soil compaction in pasture, high nitrogen levels in dairy soils, and low nutrient levels in hillcountry and forestry soils. The review is expected to be completed in 2016/2017.

Resource consent management

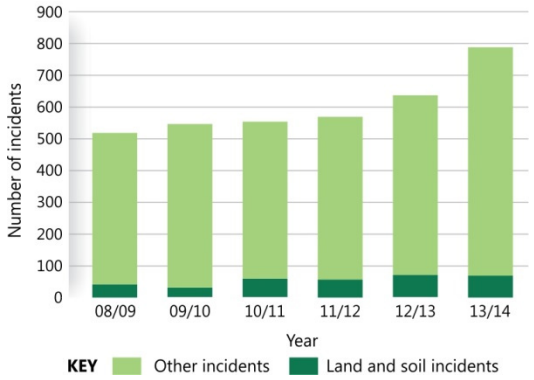
At the end of June 2014, there were 1,560 resource consents granted for discharges to land and land/water. About 61% (950) of those consents were for discharges of effluent on dairy farms. Hydrocarbon exploration and servicing facilities were the second largest activity, with 20% (318 consents). A total of 224 consents were for discharges of stormwater to land.

Resource consent monitoring

When the Council grants consent for a significant activity, it implements an annual compliance monitoring programme to ensure the consent holders meet the conditions set out in the consent. As of June 2014, there are 16 consent monitoring programmes that have a soil health or soil quality monitoring component.

Incidents investigated

The number of incidents reported related to land is a small percentage of the total number of incidents reported each year. Over the past six years, the number of incidents reported related to land and soil has increased slightly (mostly related to effluent on dairy farms). Investigation of these reports does not always mean action is required. It can sometimes confirm there is no issue, or that the issue is the result of natural processes.



Between 2008 and 2014, only a very small proportion of all incidents reported each year were related to land.

Information, education and advice

The Council responds to all requests from the public for information on soil health. The Council's provision of information and advice helps raise awareness of issues and problems, provides simple cost-effective solutions, and enables land users to make well-informed decisions to prevent or minimise the effect of their land use on soil health.

Find out more

Earthworms, soil microbes and drilling waste muds (Landcare Research 2014, prefaced by TRC memo) tinyurl.com/TRC2i

Soil quality in the Taranaki region 2012, (Landcare Research) tinyurl.com/TRC2j