

# Raw Soil

## New Zealand Soil Classification (NZSC) orders



Otago  
Regional  
Council

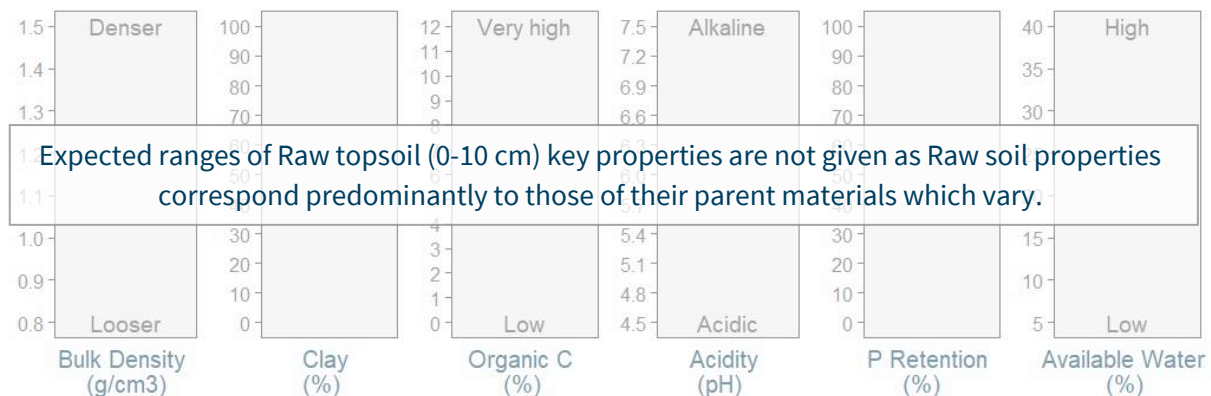
### Description

As their name suggests, Raw soils have minimal soil development and are primarily made up of parent materials. They are the youngest of all soils and either lack a topsoil entirely or it is less than 5 cm thick and have no B horizon. They are associated with some of Otago’s most beautiful landscapes – braided rivers, rocky alpine areas, beaches, estuaries.

**They make up 3% of soils in Otago.**

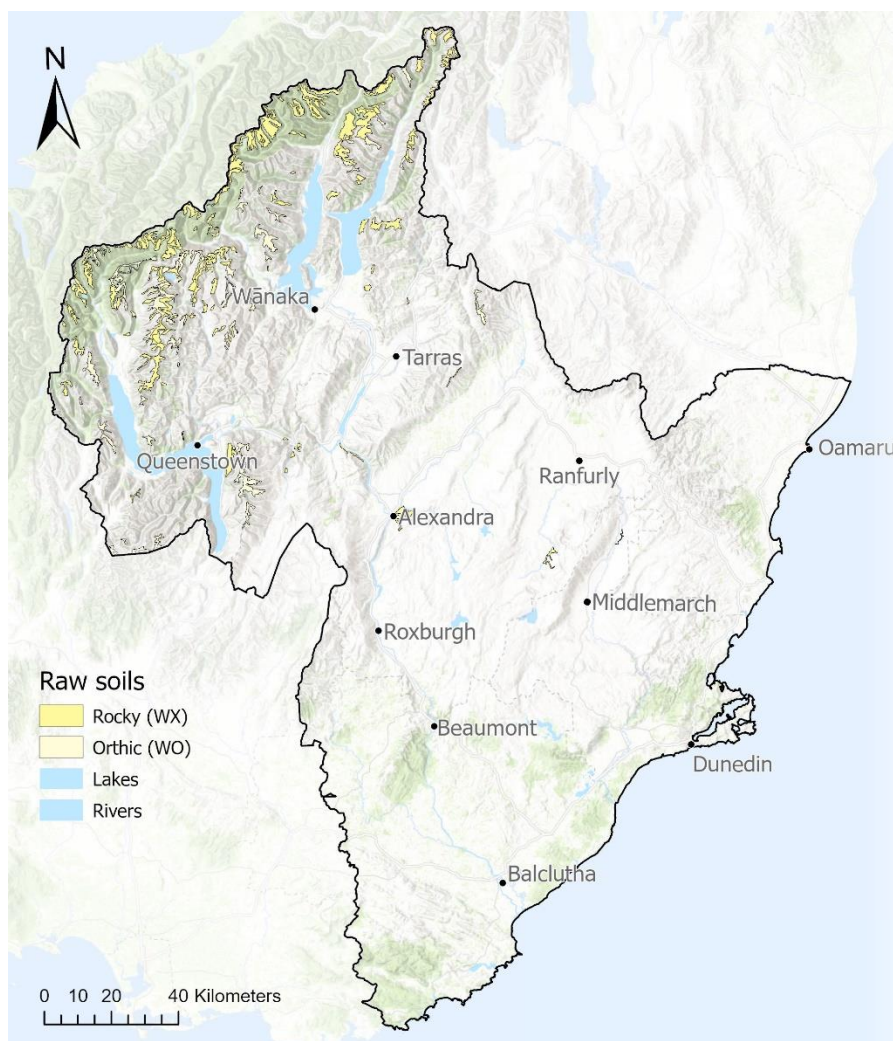
### Key characteristics

- ▶ **Parent material** Sand, rock schist, greywacke, sandstone
- ▶ **Drainage** Poorly to well
- ▶ **Fertility** Low
- ▶ **Rooting depth** Varies



### Vulnerabilities

▶ <b>Structural damage</b>	<b>High</b>	Unless rocky, Raw soil has no inherent resilience to structural damage due to the lack of soil development and vegetation.
▶ <b>Nutrient loss</b>	<b>Low</b>	Naturally very low in nutrients.
▶ <b>Erosion</b>	<b>High</b>	The lack of structure, the unconsolidated nature and absence of (substantial) vegetation make these soils extremely mobile and erosion prone.
▶ <b>Waterlogging</b>	<b>Variable</b>	Raw soils are highly variable. Gley Raw soil will be frequently waterlogged, while Sandy and Fluvial Raw soil is inherently free draining.



## Occurrence

Raw Soils occur where soil development is prevented by rockiness, active erosion, deposition and movement of parent material (dunes, screes, estuaries, lagoons, river beds, landslides).

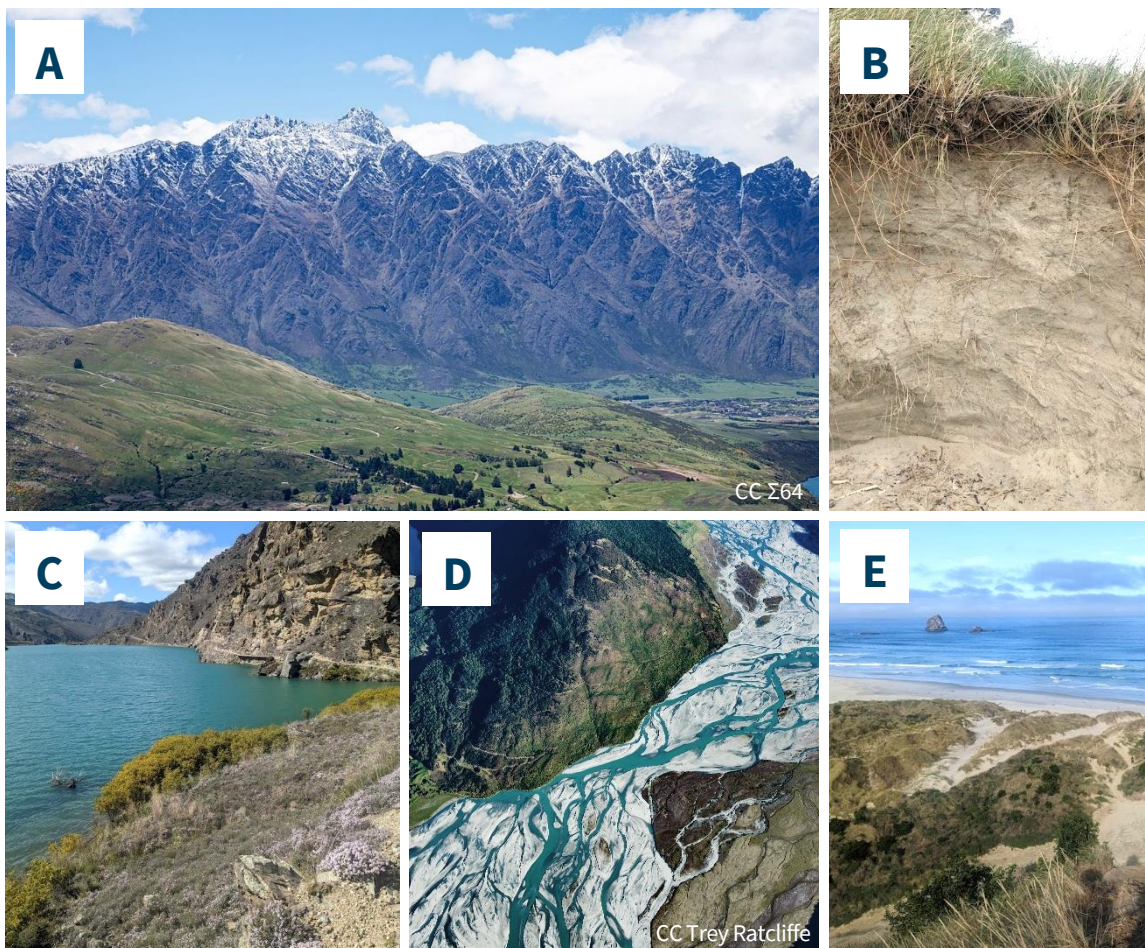
The map shows the regional extent of the different NZSC groups of Raw soil. For more detailed mapping see page 4.

*N.B. Raw soils are not well mapped due to their dynamic nature at small scales.*

NZSC group	Description <sup>2</sup>	Management considerations <sup>2</sup>
Rocky	On rock outcrops subject to erosion. The soil volume available to roots is severely restricted.	Mostly found under conservation management to preserve fauna and flora and protect from hazards.
Orthic	On eroded land including landslide scars, on rock outcrops, or on redeposited products of erosion such as landslide runout deposits	Where rapid erosion (i.e., landslide) has occurred, sites can be rehabilitated by re-establishing vegetation using seed and fertiliser.

## In the region

In Otago, most Raw soils are found in the highly erosive Southern Alps, where braided rivers, landslides, rocky alpine areas and scree slopes are common. Along the East Coast of Otago some Sandy and Gley Raw soils are found under beaches, sand dunes, tidal estuaries and lagoons, such as on the Otago Peninsula. Where vegetation grows on Raw soils it is generally sparse and/or patchy and characterised by colonising species that are adapted to the low nutrient status and high disturbance. Raw soils may naturally become Recent soils and further develop to become other soil orders over time if the site stabilises (e.g., following a landslide or major flood).



**A** The rocky peaks of the Remarkables by Queenstown are perfect examples of Rocky Raw soils. **B** Sandy beach Raw soil showing limited topsoil development and the lack of a B horizon. **C** Rocky and Orthic Raw soil with sparse vegetation along lake Dunstan. **D** The braided Dart river with its Fluvial Raw soil. **E** Sandy Raw soil under dunes at Sandfly Bay on the Otago Peninsula.

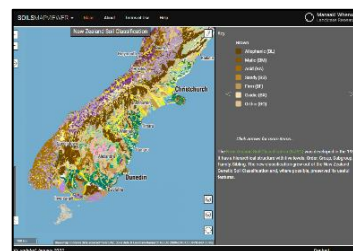
## Sustainable management

▶ <b>Erosion &amp; Structure</b>	Maintain vegetation cover, no-till crop establishment and wind breaks can reduce erosion. Avoid working and grazing (or only lightly) when the soil is wet and build organic matter.
▶ <b>Nutrients</b>	It is recommended to always work with the 4Rs for fertiliser management: <i>right place, right time, right rate and right product</i> . Find out more information on fertiliser management <a href="#">here</a> .
▶ <b>General</b>	For general guidelines on sustainable soil management you can find some useful links <a href="#">here</a> .

## Soil maps

### ► Fundamental Soil Layer

Owner	Manaaki Whenua Landcare Research
Recommended use	Use at larger scales for general overview
Coverage	100%
Scale	1:50,000
Soil naming	NZSC
Development	Will be replaced by S-map
Link	<a href="https://soils-maps.landcareresearch.co.nz">soils-maps.landcareresearch.co.nz</a>



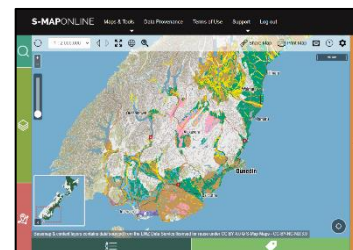
### ► growOTAGO

Owner	Otago Regional Council
Recommended use	Only use where S-map not available
Coverage	100% Otago (by lowland and upland)
Scale	1:50,000
Soil naming	Old regional soil series names
Development	Not planned
Link	<a href="https://maps.orc.govt.nz/OtagoMaps/">maps.orc.govt.nz/OtagoMaps/</a>



### ► S-map

Owner	Manaaki Whenua Landcare Research
Recommended use	Best available map. Use where present
Coverage	~30% of Otago
Scale	1:50,000
Soil naming	New S-map series names and NZSC
Development	Mapping ongoing
Link	<a href="https://smap.landcareresearch.co.nz/">smap.landcareresearch.co.nz/</a>



For the te ao Māori of oneone (soil), including kaupapa Māori, history, and soil names, you can find more information [here](#).

## Contact

For any questions you may have contact: [science.enquiries@orc.govt.nz](mailto:science.enquiries@orc.govt.nz)

**Note** - This Infosheet generalises typical average properties of the specified soil order and groups. It has been prepared in good faith by trained staff within time and budgetary limits. However, no responsibility or liability can be taken for the accuracy of the information and interpretations. Expert advice should be sought before making decisions on individual farms. The characteristics of the soil at a specific location may differ from those described here. The vulnerability ratings given in the table on page 1 are generalised and should not be taken as absolutes for this soil in all situations. The actual risk depends on the environmental and management conditions prevailing at a particular place and time.

## References

- [1] Manaaki Whenua - Landcare Research 2023. The New Zealand SoilsMapViewer. [https://doi.org/10.26060/9vfz\\_hw43](https://doi.org/10.26060/9vfz_hw43). Photos reproduced with permission.
- [2] Hewitt, A.E., Balks, M. R., and Lowe, D.J., 2021. The Soils of Aotearoa New Zealand. Chapter 13 Raw Soils. Springer International Publishing.

