

## Soil name: **Orawia**

### Overview

Orawia soils occupy about 3,200 ha on dissected rolling and hilly land in the Eastern Bush – Merrivale district of Western Southland. They are formed from calcareous sandstones and siltstones mixed with a variable depth of wind blown loess. Soils are moderately well drained, have moderately high water holding capacity and slightly deep to deep rooting depth, depending on the depth to the underlying bedrock. Present use is pastoral grazing with sheep, beef cattle and some deer. Regular summer rain occurs and soils seldom dry out.

### Physical properties

Orawia soils have a slightly deep rooting depth and moderately high plant available water, which is restricted by the bedrock between 45–90cm depth. The soils are moderately well to well drained with permeability that may be restricted in the subsoil by the bedrock. Textures are heavy silt loams, with topsoil clay content of 30–35%, grading to silty clay in the subsoil where weathered bedrock is present. The deep phases generally have no bedrock within 90cm depth, and will have a deep rooting depth and high water holding capacity.



*Orawia profile*

### Fertility properties

Topsoil organic matter levels are about 7%; P-retention 45–60%, with pH moderate (high 5s). Cation exchange and base saturation are moderate throughout the profile. Available calcium is moderate and magnesium and potassium levels low. Reserves of phosphorus are low. Micronutrient levels are generally adequate.

### Associated and similar soils

Some soils that commonly occur in association with Orawia soils are:

- Kauana: shallow soil forming onto limestone bedrock
- Mangapiri: poorly drained soil forming into soft mudstone and weathered terrace gravels
- Papatotara: moderately deep to deep soil, forming into moderately weathered loamy alluvium derived from basic igneous and metamorphic rocks as well as from greywacke; occurs on low terraces.
- Makarewa: poorly drained soil on the floodplain

Some soils that have similar properties to Orawia soils are:

- Lyoncross: well drained deep soil formed into loess over terrace gravels. Most likely to be similar to the deep phases of the Orawia soils
- Hazlett: imperfectly drained, moderately to strongly leached soil forming from banded tertiary sandstone and mudstone
- Haycocks: well drained, moderately to strongly leached soil forming from banded tertiary sandstone and mudstone
- Lillburn: well, drained moderately to strongly leached soil forming mainly from soft Tertiary siltstone and sandstone with some mudstone and loose sand in the Lillburn and lower Waiau valleys

## Sustainable management indicators

**Note:** the vulnerability ratings given in the table below are generalised and should not be taken as absolutes for this soil type in all situations. The actual risk depends on the environmental and management conditions prevailing at a particular place and time. Specialist advice should be sought before making management decisions that may have environmental impacts. Where vulnerability ratings of Moderate to Very severe are indicated, advice may be sought from Environment Southland or a farm management consultant.

Vulnerability factor	Rating	Vulnerability compared to other Southland soils
<b>Structural compaction</b>	slight	These soils have a slight vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage, moderate clay, P-retention and organic matter levels.
<b>Nutrient leaching</b>	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the good drainage, offset by the moderately high water holding capacity and slow permeability.
<b>Topsoil erodibility by water</b>	slight	Due to the moderate clay and organic matter levels, topsoil erodibility in these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
<b>Organic matter loss</b>	minimal	Vulnerability to long-term decline in soil organic matter levels is partly dependent on soil properties and highly dependent on management practices (e.g., crop residue management and cultivation practices).
<b>Waterlogging</b>	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage, but slow permeability.

## General landuse versatility ratings

**Note:** The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive land use. These ratings differ from those used in the past in that sustainability factors are incorporated in the classification. Refer to the Topoclimate district soil map or property soil map to determine which of the soil symbols listed below are applicable, then check the versatility ratings for that symbol in the appropriate table.

### OwH1 (Orawia hilly deep) and OwH2 (Orawia hilly moderately deep)

Versatility evaluation for soil OwH1, OwH2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Moderate	Hilly slopes; moderately deep soils have limited versatility due to the restricted rooting depth.

### OwR1 (Orawia rolling deep)

Versatility evaluation for soil OwR1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Risk of short-term waterlogging after heavy rain
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Vulnerability to leaching to groundwater; rolling slopes
Forestry	High	No major limitation

### OwR2 (Orawia rolling moderately deep)

Versatility evaluation for soil OwR2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Restricted rooting depth.
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Vulnerability to leaching to groundwater; rolling slopes
Forestry	Limited	Restricted rooting depth.

**OwU1 (Orawia undulating deep)** has high versatility for forestry (no major limitation) and moderate versatility for other landuses. Risk of short-term waterlogging after heavy rain is the main limitation for other landuses, but intensive pasture landuse is also vulnerable to nutrient leaching to groundwater.

### Management practices that may improve soil versatility

- Careful management after heavy rain and wet periods will reduce the impact of short-term waterlogging. Intensive stocking, cultivation and heavy vehicular traffic should be minimised during these periods.
- Management of nutrient applications to minimise leaching losses.