

## Soil name: **Warepa**

### Overview

Warepa soils occupy about 2,600 ha on rolling downlands and hills in eastern Southland and west and south Otago. These soils also occur in south Otago on areas not surveyed by Topoclimate. They are formed in deep wind-deposited loess derived from greywacke and schist rocks. They have silty textures and are imperfectly drained, with a dense fragipan at a depth of about 50cm which restricts water drainage. These soils respond well to mole and tile drainage and are used for sheep and dairy production, with some cropping. Climate is cool temperate with regular rain, though soils can be seasonally dry during some summers.



*Warepa profile*

### Physical properties

Warepa soils have a slightly deep potential rooting depth that is severely restricted by the fragipan at 45–60 cm depth. Plant available water is typically moderately high, but the soils are imperfectly drained, with slow permeability in the subsoil and limited aeration during sustained wet periods. Textures are typically silt loams, and topsoil clay content is typically 20–30%, and stone free.

### Fertility properties

Topsoil organic matter levels are 4–8%; P-retention 15–30% and topsoil pH moderate (low 6s). Subsoil pH levels are lower at 5.5–5.7. Cation exchange values are moderate and base saturation high. Available calcium levels are high with magnesium and potassium levels low. Soil reserve phosphorus levels are low. Micronutrient levels are generally adequate, although molybdenum responses in legumes and boron responses in brassics can occur.

### Associated and similar soils

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

- Jacobstown: moderately deep to deep poorly drained floodplain soil
- Glenure: deep poorly drained soil formed into loess without a fragipan within 90cm depth

Some soils that have similar properties to Warepa soils are:

- Waikoikoi: poorly drained equivalent of the Warepa soil
- Aparima: imperfectly drained Brown soil with a fragipan
- Arthurton: imperfectly drained Brown soil without a fragipan

## 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>	severe	These soils have a severe vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the imperfect drainage, but low organic matter, clay content and P-retention.
<b>Nutrient leaching</b>	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the imperfect drainage, slow permeability and moderately high water holding capacity.
<b>Topsoil erodibility by water</b>	moderate	Due to the moderate to low organic matter and clay content, topsoil erodibility in these soils is moderate. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
<b>Organic matter loss</b>	slight	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>	moderate	These soils have a moderate vulnerability to waterlogging during wet periods. This rating reflects the imperfect drainage and slowly permeable subsoil.

## 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.

### WrU1 (Warepa undulating deep)

Versatility evaluation for soil WrU1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Risk of short-term waterlogging after heavy rain; restricted rooting depth.
Arable	Limited	Restricted aeration; risk of short-term waterlogging
Intensive pasture	Limited	Risk of short-term waterlogging
Forestry	Limited	Restricted rooting depth.

### WrR1 (Warepa rolling deep)

Versatility evaluation for soil WrR1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Risk of short-term waterlogging after heavy rain; restricted rooting depth.
Arable	Limited	Rolling slopes; risk of short-term waterlogging
Intensive pasture	Limited	Risk of short-term waterlogging
Forestry	Limited	Restricted rooting depth.

**WrH1 (Warepa hilly deep)** and **WrS1 (Warepa steep deep)** are unsuitable for non-arable and arable horticulture and have limited versatility for intensive pasture and forestry due mainly to limitations of hilly or steep slopes. Intensive pastoral farming is also at risk to short-term waterlogging and forestry is limited by restricted rooting depth

### 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 use should be minimised during these periods.
- Installation and maintenance of subsurface mole and tile drains will reduce the risk of short-term waterlogging.
- If compaction occurs, aeration at the correct soil moisture content and depth can be of benefit.