

This Technical Data Sheet describes the *typical average properties* of the specified soil.

It is essentially a summary of information obtained from one or more profiles of this soil that were examined and described during the Topoclimate survey or previous surveys. 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. Advise should be sought from soil and landuse experts before making landuse decisions on individual farms and paddocks. The characteristics of the soil at a specific location may differ in some details from those described here. No warranties are expressed or implied unless stated.

## Soil name: Waituna

### Overview

Waituna soils occur in the The Key district of northern Southland on young fans from the Takitimu Mountains. They are formed into alluvium derived from tuffaceous greywacke and basic volcanic rocks. Soils have a slightly deep to shallow rooting depth, limited by the graveliness of the subsoil, and moderate to low plant available water. Present use is pastoral farming with sheep, deer and beef cattle. Climate is cold in the winter with warm summers. Regular rainfall occurs though some summers can be seasonally dry.

### Soil classification

#### NZ Soil Classification (NZSC):

Typic Allophanic Brown; rounded-stony, tuffaceous sandstone; silty

#### Previous NZ Genetic Classification:

Moderately to strongly leached yellow-brown earth.

### Classification explanation

The NZSC of Waituna soils is consistent with the previous classification. The soils are typically old enough to have significant B horizon development, and reflect the strong influence of the volcanic parent material with P-retention of >85%. The soils typically have silt loam texture, and tuffaceous sandstone gravels occur within 45cm depth.

### Soil phases and variants

Identified units in the Waituna soils are:

- Waituna undulating shallow (WiU3): has gravel within 45cm depth; occurs on slopes of 0–7°
- Waituna undulating shallow, recent variant (WiU3vr): formed in very young alluvium, and have no subsoil development; has gravel within 45cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Waituna undulating shallow (WiU3). Values for other phases and variants can be taken as being similar. Where they differ significantly they are recorded with a separate versatility rating.

### Associated soils

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

- Princhester: moderately deep to deep soils that occur on fans of the same age.
- Mararoa: moderately deep to deep soils that occur on fans of the same age, but are not allophanic and have P-retention of <85%

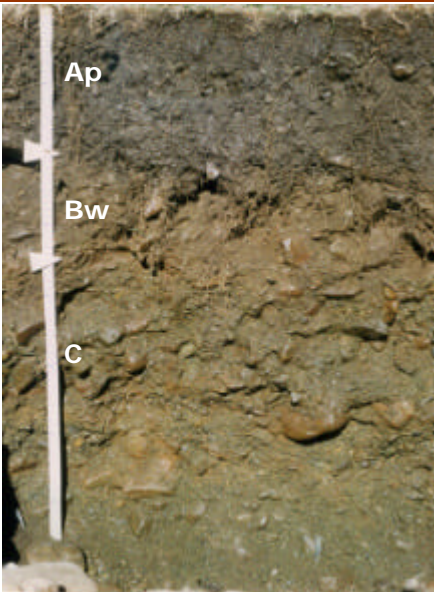
## Similar soils

Some soils that have similar properties to Waituna soils are:

- Lintley: formed on fans from greywacke bedrock
- Dome: young, recent soil formed on the floodplain of fans from greywacke bedrock
- Monowai: formed on intermediate to high terraces

## Typical profile features

The following is a 'generic' or composite profile description representing the most common combination of characteristics for this soil type. The actual profiles for which descriptions and data are available are listed at the end of this Technical Data Sheet.

Waituna profile	Horizon	Depth (cm)	Description
	Ap	0–19	Brownish black slightly gravelly silt loam; weak soil strength; strongly developed very fine polyhedral structure; abundant roots.
	Bw	19–35	Dark brown very gravelly silt loam; few wormcasts; dense particle packing; weakly developed extremely fine polyhedral structure; gravels are slightly weathered and subangular; abundant roots.
	C	35–76+	Olive brown extremely gravelly sand; compact particle packing; single grain; gravels are fresh and subangular; no roots.

## Key profile features

Waituna topsoils are about 19cm deep with a strongly developed fine structure. Subsoils have a weakly developed structure, and become structureless as the gravel content increases.

## Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–19	—	<i>Rapid</i>	Silt loam	Slightly gravelly
Bw	19–35	—	<i>Rapid</i>	Silt loam	Very gravelly
C	35–76	—	<i>Rapid</i>	Sand	Extremely gravelly

**Profile drainage:** Well  
**Plant readily available water:** *Moderate*  
**Potential rooting depth:** Slightly deep  
**Rooting restriction:** Gravelly subsoil

## Key physical properties

Waituna soils have a slightly deep to shallow (30–60cm) rooting depth that is restricted by the subsoil gravelliness. The rooting depth is shallow in recent variant soils. Plant available water is moderate to low, with good aeration and rapid permeability. Texture is silt loam grading to sand below 35cm depth. Topsoil clay content is about 20%. Soils are very gravelly throughout the profile.

## Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–19	Moderate	High	High	Moderate	High	Low	High	Low
Bw	19–35	Moderate	Very high	Moderate	Low	Low	Very low	Very low	Low
C	35–76	—	—	—	—	—	—	—	—

## Key chemical properties

Topsoil organic matter content is about 20%, P-retention 80–90% and pH moderate (high 5s). Cation exchange values are high and base saturation moderate. Available calcium and potassium levels are high and magnesium levels low. Soil reserve phosphorus levels are low. Micronutrient levels are generally adequate.

## Vulnerability to environmental degradation

**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>	moderate	These soils have a moderate vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage, with high P-retention and moderate clay content. The recent variant is likely to have severe vulnerability.
<b>Nutrient leaching</b>	very severe	These soils have a very severe vulnerability to leaching to groundwater. This rating reflects the good drainage, moderate to low water-holding capacity and rapid permeability.
<b>Topsoil erodibility by water</b>	slight	Due to the moderate clay and organic matter content, topsoil erodibility in these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover. The recent variant is likely to have moderate vulnerability.
<b>Organic matter loss</b>	moderate	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). The recent variant is likely to have severe vulnerability.
<b>Waterlogging</b>	nil	These soils have a nil vulnerability to waterlogging during wet periods. This rating reflects the rapid permeability and the well drained nature of the soil.

## General landuse versatility ratings for Waituna soils

**Note:** The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive landuse. 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.

### WiU3 (Waituna undulating shallow)

### WiU3vr (Waituna undulating shallow, recent variant)

Versatility evaluation for soil WiU3, WiU3vr		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Vulnerability to leaching to groundwater; restricted rooting depth.
Arable	Limited	Vulnerability to leaching to groundwater; topsoil stoniness
Intensive pasture	Limited	Vulnerability to leaching to groundwater.
Forestry	Limited	Subsoil stoniness; restricted rooting depth.

### Management practices that may improve soil versatility

- Management of fertiliser nutrient applications that minimise leaching losses should be adopted. High application rates of fertiliser can be split into at least two applications; avoid applying very soluble fertilisers such as nitrogen if soils are excessively wet.

## Soil profiles available for Waituna soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
WiU3	KT3	5	✓	✓	✓	✓
WiU3vr	KT10	5	✓	✓	✓	✓

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