

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: **Waiau**

Overview

Waiau soils occupy about 7,200 ha on the slowly accumulating flood plains and low terraces of the Waiau and Aparima river valleys. They are formed into gravelly alluvium derived from the Fiordland, Takitimu, and Livingstone Mountains. Waiau soils are shallow (<45cm to gravel) and free-draining and are still occasionally flooded. They are moderately fertile, with silty to sandy texture, but the rooting depth and water capacity is limited by the gravel. Present use is pastoral farming with sheep and beef cattle. Climate is cool temperate with regular rain though more inland soils can be seasonally dry.

Soil classification

NZ Soil Classification (NZSC): Typic Fluvial Recent; rounded stony, granitic; silty.

Previous NZ Genetic Classification: Recent

Classification explanation

The NZSC of Waiau soils is consistent with previous classifications. The soils are formed in mixed fluvial sediments dominated by granitic gravels (tuffaceous greywacke in the Mararoa, Wairaki and Aparima rivers). Waiau soils are well drained, with good topsoil development but no B horizon has developed in the subsoil. Gravel occurs at between 0 and 45cm depth, with silty textures above the gravel.

Soil phases and variants

Identified units in the Waiau soils are:

- Waiau undulating shallow (WaU3): 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, Waiau undulating shallow (WaU3). 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 Waiau soils are:

- Tuatapere: moderately deep to deep well drained soil; slightly older soil with more profile development
- Manapouri: moderately deep to deep poorly drained soil

Similar soils

Some soils that have similar properties to Waiiau soils are:

- Upukerora: occurs on the active floodplain
- Glenelg: moderately to strongly leached Brown soil that occurs on intermediate to high terraces
- Monowai: strongly leached Brown soil that occurs on intermediate to high terraces
- Riversdale: formed in mixed greywacke and schist gravels of the Matura and Oreti rivers

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.

Waiiau profile	Horizon	Depth (cm)	Description
	Ap	0–28	Greyish yellow-brown slightly gravelly silt loam; weak soil strength; strongly developed very fine and medium to coarse polyhedral structure; gravels slightly weathered and rounded; abundant roots
	BC	28–58	Dull yellow very gravelly loamy sand; very weak soil strength; single grain structure; gravels slightly weathered and rounded; common roots
	C	58–90+	Yellowish brown loamy sand; very weak soil strength; single grain structure; no roots

Key profile features

Waiiau soils have a topsoil 15–30cm deep, with moderately developed structure. Subsoil development is limited. Pasture roots extend to about 50cm with very few at lower depths, depending on the amount of gravel.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–28	Moderate	<i>Rapid</i>	Silt loam	Slightly gravelly
BC	28–58	—	<i>Rapid</i>	Loamy sand	Very gravelly
C	58–90+	—	<i>Rapid</i>	Loamy sand	Extremely gravelly

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

Key physical properties

Waiau soils have a moderate to slightly deep rooting depth, depending on the graveliness of the subsoil. Plant available water will vary from moderate to low depending on the amount of gravel present. The soils are well drained (sometimes excessively) and aerated. Textures are usually silt loams to sandy loams in the topsoil, grading to sand in deeper horizons, with topsoil clay content of 20–28%. Topsoils often are slightly to moderately gravelly, and moderately to extremely gravelly below.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–28	Moderate	Moderate	Moderate	High	High	Moderate	Very low	Low
BC	28–58	Moderate	Low	Very low	Low	Very low	Very low	Very low	Very low
C	58–90+	Moderate	Low	Very low	Low	Very low	Very low	Very low	Very low

Key chemical properties

Topsoil organic matter content is 8–13%, P-retention 40–70% and pH moderate (high 5s). Cation exchange levels are moderate, but low in the subsoil, with base saturation levels similar. Reserve calcium levels are high, magnesium levels moderate and potassium levels low. Soil reserve phosphate and sulphur 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
Structural compaction	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 moderate clay and P-retention levels.
Nutrient leaching	very severe	These soils have a very severe vulnerability to leaching to groundwater. This rating reflects the good drainage, moderate–low water holding capacity, and rapid permeability.
Topsoil erodibility by water	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.
Organic matter loss	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).
Waterlogging	nil	These soils have a nil vulnerability to waterlogging during wet periods. This rating reflects the good drainage and rapid permeability.

General landuse versatility ratings for Waiau 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.

WaU3 (Waiau undulating shallow)

Versatility evaluation for soil WaU3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Vulnerability to leaching to groundwater; restricted rooting depth.
Arable	Limited	Vulnerability to leaching to groundwater
Intensive pasture	Limited	Vulnerability to leaching to groundwater
Forestry	Limited	Potential flood risk; restricted rooting depth.

Management practices that may improve soil versatility

- Management of nutrient applications so as to minimise leaching losses
- Long-term cultivation should be carefully managed to minimise structural degradation
- Organic matter levels should be carefully maintained and enhanced

Soil profiles available for Waiau soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
WaU3`	CLT5	17	✓	✓	✓	✓
WaU3	KT9	5	✓	✓	✓	✓
WaU3	MT9	7	✓	✓	✓	✓
WaU3	PT3	38	✓	✓	✓	✓
Wau3	YT16	9	✓	✓	✓	✓
Wau3	SB7737	39	✓	✓	✓	

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