

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: Gore

Overview

Gore soils occupy 17,800 ha on the low terraces of the Mataura and Oreti rivers. They are formed in gravelly alluvium containing stones derived from schist and greywacke rock. Gore soils are well drained, with silt loam topsoil texture. Gore soils are stony in both the topsoil and subsoil, which limits the rooting depth and water-holding capacity. They are suitable for pasture and some cropping, being presently used mostly for sheep and dairy production. In northern Southland they can be seasonally dry.

Soil classification

NZ Soil Classification (NZSC):

Acidic Orthic Brown; rounded stoney; hard sandstone; silty

Previous NZ Genetic Classification:

Strongly leached yellow-brown earth

Classification explanation

The NZSC of Gore soils is similar to previous classifications. Gore soils have a moderately developed B horizon with a pH of less than 5.5, and no firm root restricting layer. Gore soils have silty textures, and gravel within 45cm depth.

Soil phases and variants

Identified units in the Gore soils are:

- Gore undulating shallow (GeU3): has gravel within 45cm depth and slopes of 0–7°
- Gore undulating shallow, imperfectly drained variant (GeU3vi): has gravel within 45cm depth, imperfect drainage, and slopes of 0–7°
- Gore undulating shallow, humose subsoil variant (GeU3vh): has gravel within 45cm depth, significant amounts of organic matter coatings on subsoil stones, and slopes of 0–7°
- Gore undulating shallow, bouldery phase (GeU3b): has gravel within 45cm depth, surface boulders, and slopes of 0–7°.

The soil properties described in this Technical Data Sheet are based on the most common phase, Gore undulating shallow (GeU3). Values for other phases and variants can be taken as being similar.

Associated soils

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

- Mataura: well drained, deep or moderately deep recent soils found on the accumulating floodplain
- Ardlussa: well drained, deep or moderately deep, found on similar landforms as the Gore soils
- Jacobstown: poorly drained due to high groundwater; deep to moderately deep; silty textures.
- Lumsden: poorly drained; gravel within 45cm depth

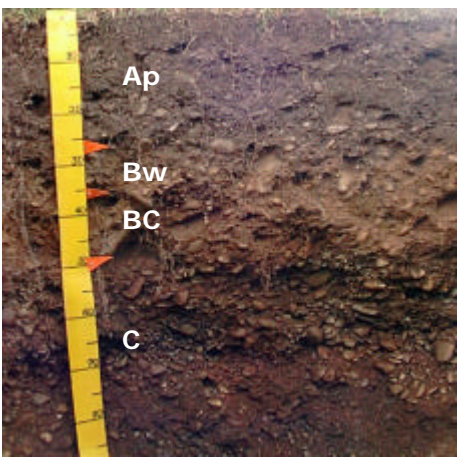
Similar soils

Some soils that have similar properties to Gore soils are:

- Riversdale: Recent soils on the accumulating floodplain
- Oreti: Brown soil with cemented subsoil pan on intermediate terraces
- Waiau: Recent soil on floodplains and low terraces of the Aparima and Waiau Rivers and their tributaries.

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.

Gore profile	Horizon	Depth (cm)	Description
	Ap	0–22	Dark greyish brown moderately gravelly silt loam; slightly firm soil strength; moderately developed fine polyhedral structure; gravel rounded and unweathered; abundant roots
	Bw	22–36	Yellowish-brown very gravelly silt loam; slightly firm soil strength; weakly developed fine polyhedral structure; gravel rounded and slightly weathered; common roots
	BC	36–85	Olive grey very gravelly loamy sand; loose particle packing; single grain structure; gravel rounded and slightly weathered; few roots
	C	85–100	Grey extremely gravelly loamy sand; loose particle packing; single grain structure; gravel rounded and slightly weathered; no roots

Key profile features

Gore soils have a topsoil 20–27cm deep, with moderately developed structure. Subsoils have a yellowish brown B horizon, with weak to moderate structure. Stones occur throughout the profile. Roots extend to about 50cm, but become limited by the gravel.

Typical physical properties

Note: values in Italics are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–22	Moderate	<i>Rapid</i>	Silt loam	Very slightly gravelly
Bw	22–36	N/A	<i>Rapid</i>	Silt loam	Moderately gravelly
BC	36–85	N/A	<i>Rapid</i>	Loamy sand	Very gravelly
C	85–100	N/A	<i>Rapid</i>	Loamy sand	Extremely gravelly

Profile drainage:	Well drained
Plant readily available water:	<i>Moderate</i>
Potential rooting depth:	Slightly deep
Rooting restriction:	Extremely gravelly subsoil

Key physical properties

Gore soils have slightly deep rooting depth, with gravel restricting deep rooting. The soils are well drained, with good aeration, and moderate plant available water. Textures are silt loams in the topsoil grading to sandy textures in the subsoil. Topsoil clay content is 20–30%, and typically contains gravel. Subsoils are commonly very to extremely gravelly from 30cm depth.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–22	Moderate	Moderate	Moderate	Low	Low	Very low	Very low	Low
Bw	22–36	Moderate	Moderate	Low	Low	Very low	Very low	Very low	Very low
BC	36–85	Moderate	Low	Very low	Very low	Very low	Very low	Very low	Very low
C	85–100	Moderate	Low	Very low	Very low	Very low	Very low	Very low	Very low

Additional chemical properties (as a profile average)

Reserve potassium and sulphate sulphur levels are low.

Key chemical properties

Topsoil organic matter levels are 6–8%; P-retention values 30–40%; pH values are moderate and tend to increase down the profile. Cation exchange values are moderate in the topsoil but low in the subsoil, with base saturation following the same pattern. Available cation values for calcium, magnesium, and potassium are very low. Soils respond well to phosphate and potassium fertilisers. Minor nutrient 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 and compaction by intensive stocking and vehicles.
Nutrient leaching	Very Severe	These soils have a very severe vulnerability to leaching to groundwater. This reflects the moderate water holding capacity and rapid permeability.
Topsoil erodibility by water	Minimal	Due to the moderate clay and organic matter content, the topsoil erodibility of these soils is minimal. 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 dependant on soil properties and highly dependent on management practices (e.g., cultivation practices and crop residue management)
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 Gore soils

Note: The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive land use. These rating 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.

GeU3 (Gore undulating shallow)

GeU3vi (Gore undulating shallow imperfectly drained variant)

GeU3vh (Gore undulating shallow humose subsoil variant)

GeU3b (Gore undulating shallow bouldery phase)

Versatility evaluation for soil GeU3, GeU3vi, GeU3vh, GeU3b

Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Rooting depth and vulnerability to leaching to groundwater
Arable	Limited	Vulnerability to leaching to groundwater
Intensive pasture	Limited	Vulnerability to leaching to groundwater
Forestry	Limited	Rooting depth

Management practices that may improve soil versatility

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

Soil profiles available for Gore soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
GeU3vh	WT6	24	✓	✓	✓	✓
GeU3	M597	26	✓	✓	✓	
GeU3	GT1	4	✓	✓	✓	✓
GeU3	G616	26	✓	✓		
GEU3	GG/GW94	1	✓	✓		
GeU3vh	GT2	4	✓	✓	✓	✓
GeU3vi	GMT6	27	✓	✓	✓	✓
GeU3	G524	4	✓	✓		
GeU3	G353	4	✓	✓		
GeU3	YT3	9	✓	✓	✓	✓
Geu3	B3	12	✓	✓	✓	✓
GeU3	DT2	37	✓	✓	✓	✓
GeU3	FT17	15	✓	✓	✓	✓
GeU3	FT8	15	✓	✓	✓	✓
GeU3	MWT4	28B	✓	✓	✓	✓

Published by Crops for Southland with financial support from Environment Southland.

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