

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: Lumsden

Overview

Lumsden soils occupy about 2800 ha on the floodplains of major streams and rivers in northern and central Southland and in west Otago. They are formed in shallow fine alluvium overlying gravels from greywacke and schist rocks. They are shallow, silty, poorly drained soils that have a high water table. Present use is pastoral farming with sheep, deer, beef cattle and dairy, with some cropping. Climate is cool temperate with warm summers in northern Southland. Soils seldom dry out.

Soil classification

NZ Soil Classification (NZSC):

Typic Orthic Gley; rounded-stony, hard sandstone; silty

Previous NZ Genetic Classification:

Gley recent

Classification explanation

The NZSC for Lumsden soils is consistent with the previous classification. The soils are poorly drained due to a high groundwater table, and accumulation of sediment is sufficiently slow that subsoils show structural development. They have silty textures and are shallow, with less than 45cm to gravel.

Soil phases and variants

Identified units in the Lumsden soils are:

- Lumsden undulating shallow (LmU3): 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, Lumsden undulating shallow (LmU3). 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 Lumsden soils are:

- Jacobstown: moderately deep to deep Gley soil
- Riversdale: well drained, shallow Recent soil
- Howe: variable depth, well drained accumulating Recent soil of the active floodplain

Similar soils

Some soils that have similar properties to Lumsden soils are:

- Caroline: shallow to moderately deep, with a thick cemented ironpan
- McLeish: forming in tuffaceous greywacke alluvium, and has clayey textures
- Otepunu: forming predominantly into quartz gravels on stream floodplains of the Southland Plain

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.

Lumsden profile	Horizon	Depth (cm)	Description
	Ap	0–16	Greyish yellow-brown slightly gravelly silt loam; weak soil strength; moderately developed extremely fine to fine polyhedral structure; gravels fresh and rounded; abundant roots
	Ap/Bg	16–25	Greyish yellow very gravelly silt loam; few bright brown mottles; many worm casts; weak soil strength; strongly developed extremely fine to fine polyhedral structure; gravels fresh and rounded; abundant roots
	Bg	25–44	Dull yellow very gravelly silt loam; common bright brown mottles; weak soil strength; moderately developed extremely fine to medium blocky and polyhedral structure; gravels fresh and subrounded; many roots
	Cr	44–90+	Light grey extremely gravelly sandy loam; few orange mottles; weak soil strength; massive structure; gravels fresh and subrounded; many roots

Key profile features

Lumsden topsoils vary in depth from 16 to 34cm and have moderate structure. Subsoil structural development is also moderate, but grades to a massive structure at depth. The dominance of grey colours throughout the subsoil reflects the poor drainage of the soils.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–16	Moderate	<i>Moderate</i>	Silt loam	Slightly gravelly
Ap/Bg	16–25	—	<i>Moderate</i>	Silt loam	Very gravelly
Bg	25–44	—	<i>Slow</i>	Silt loam	Very gravelly
Cr	44–90+	—	<i>Slow</i>	Sandy loam	Extremely gravelly

Profile drainage: Poor
Plant readily available water: *Moderate*
Potential rooting depth: Shallow
Rooting restriction: Extremely gravelly subsoil

Key physical properties

Lumsden soils have a shallow rooting depth and moderate plant available water that is limited by the subsoil gravelliness. Permeability is slow, with poor aeration due to the high water table. Textures are silt loams grading to coarser loamy sands at depth. Topsoil clay content is 25–35%, with a slight to moderate gravel content. Subsoils are very to extremely gravelly.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–16	Moderate	Low	High	Low	Moderate	Low	Very low	Very low
Ap/Bg	16–25	Moderate	Moderate	Moderate	Low	Moderate	Very low	Very low	Very low
Bg	25–44	Moderate	Moderate	Low	Low	Low	Very low	Very low	Low
Cr	44–90+	Moderate	Low	Moderate	Low	Low	Very low	Very low	Low

Key chemical properties

Topsoil organic matter content is 6–7%; P-retention 20–45% and pH moderate (mid/high 5s). Cation exchange is high and base saturation low. Available calcium levels are moderate and magnesium and potassium levels low. Reserve phosphorus and sulphur levels are also low. Micronutrient levels are generally adequate although molybdenum responses in legumes and boron responses in brassicas can be expected.

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	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 poor drainage and low P-retention.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the slow permeability and poor drainage, but only moderate water holding capacity.
Topsoil erodibility by water	slight	Due to the moderate organic matter and clay content, topsoil erodibility in these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	severe	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	severe	These soils have a severe vulnerability to waterlogging during wet periods. This rating reflects the poor drainage and slow permeability.

General landuse versatility ratings for Lumsden 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.

LmU3 (Lumsden undulating shallow)

Versatility evaluation for soil LmU3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; restricted rooting depth
Arable	Limited	Inadequate aeration during wet periods; short-term waterlogging after heavy rain
Intensive pasture	Limited	Short-term waterlogging after heavy rain
Forestry	Limited	Inadequate aeration during wet periods; flooding risk

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 vehicle use should be minimised during these periods.
- Installation of subsurface tile drains and ditches will reduce the risk of short-term waterlogging.
- If compaction occurs, aeration at the correct moisture condition and depth can be of benefit
- Organic matter levels should be carefully maintained and enhanced

Soil profiles available for Lumsden soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
LmU3	FT21	15	✓	✓	✓	✓
LmU3	DT01	37	✓	✓	✓	✓
LmU3	B2	12	✓	✓	✓	✓

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