Soil name: Otakau

Overview

Otakau soils occupy 960 ha on the coastal flood basin of the Oreti river south of Wallacetown. They are formed in fine alluvium derived from greywacke rock. Soils are poorly drained, with silty overlying sandy textured subsoil below about 50cm. Present use is pastoral farming with sheep and beef cattle. Climate is cool temperate with regular rain during the year.

Soil classification

NZ Soil Classification (NZSC): Acidic Recent Gley; stoneless, silty over sandy.
Previous NZ Genetic Classification: Gley Recent

Classification explanation

The NZSC for Otakau soils is consistent with the previous classification. The soils are poorly drained due to a high groundwater table, and young enough to show limited profile development. The soils are typically stone free, have silty overlying sandy textures, and acidic subsoils with pH of less than 5.5.

Soil phases and variants

Identified units in the Otakau soils are:

- Otakau undulating deep (OcU1): has no gravel within 90cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Otakau undulating deep (OcU1). 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 Otakau soils are:

- Grasmere: poorly drained accumulating soil of the coastal Oreti River flood basin; has clayey over silty textures and acidic subsoils
- Makarewa: poorly drained slowly accumulating soil of river and stream floodplains throughout Southland; typically has clayey textures
- Titipua: poorly drained floodplain soil with over-thickened slightly peaty topsoils
- Invercargill: very poorly drained soil formed in peat

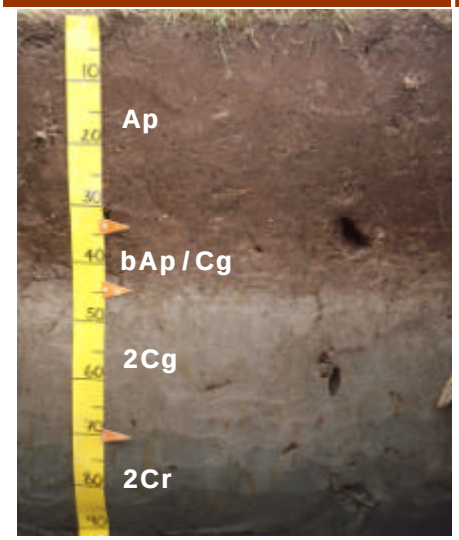
Similar soils

Some soils that have similar properties to Otakau soils are:

- Otaitai: poorly drained soil forming in interdune hollows and flats of the coastal sand dunes; has sandy textures throughout
- Dacre: poorly drained accumulating soil of river and minor stream floodplains throughout southern Southland; typically has silty textures

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.

Otakau profile	Horizon	Depth (cm)	Description
	Ap	0–34	Brownish black loamy silt; weak soil strength; weakly developed very fine to coarse polyhedral structure; abundant roots.
	bAp/Cg	34–45	Brownish black loamy silt; many brownish grey mottles; few worm casts; weak soil strength; massive structure; many roots
	2Cg	45–70	Grey sand; common bright brown mottles; weak soil strength; single grain structure; many roots.
	2Cr	70–90	Grey sand; few bright brown mottles; weak soil strength; single grain structure; many roots

Key profile features

Otakau soils have a deep topsoil (about 25–35cm) that has a weakly developed structure. Subsoils have little structural development and are dominated by grey colours, reflecting the poor drainage caused by the high water table. The soil is characterised by two distinct layers, the silty overthickened A horiozn, and the sandy subsoil.

Typical physical properties

Note: values in Italics are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–34	Low – Moderate	*Moderate*	Loamy silt	Gravel free
bAp/Cg	34–45	Moderate – High	*Moderate*	Loamy silt	Gravel free
2Cg	45–70	Moderate – High	*Rapid*	Sand	Gravel free
2Cr	70–90+	Moderate – High	*Rapid*	Sand	Gravel free

Profile drainage: Poor

Plant readily available water: *High*

Potential rooting depth: Deep

Rooting restriction: Subsoil aeration may be limiting in some soils

Key physical properties

Otakau soils have a deep rooting depth and high plant available water. These may be limited by the poor aeration for periods of the year. Permeability is moderate to slow in the upper silty textured horizons, changing to rapid in the sandy lower subsoil. Topsoil clay content is about 15%. The soils are stone free.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–34	Low	Moderate	High	Low	Moderate	Moderate	Very low	Low
bAp/Cg	34–45	Low	Low	Moderate	Low	Low	Low	Very low	Low
2Cg	45–70	Moderate	Very low	Very low	Moderate	Very low	Low	Very low	Very low
2Cr	70–90+	Very low	Very low	Very low	Moderate	Very low	Low	Very low	Very low

Additional chemical properties (as a profile average)
Electrical conductivity very low in all horizons

Key chemical properties

Topsoil organic matter levels are variable (up to 28%) and influenced by the degree to which topsoils are accumulating, and occurrence of slightly peaty inclusions. P-retention values are about 30–50%, but are very low in the sandy subsoil (<10%). Soil pH levels are low in all horizons (<5.5). Cation exchange and base saturation are moderate in the topsoil but very low in the subsoil. Available calcium and magnesium levels are moderate in the topsoil and potassium levels are low. All nutrient levels are low in the sandy subsoil. Micronutrient levels are generally adequate. The soils appear to be non-saline.

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 high organic matter content and moderate P-retention but is off-set by poor drainage.
Nutrient leaching	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the poor drainage and high water holding capacity.
Topsoil erodibility by water	slight	Due to the high organic matter content, topsoil erodibility in these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	minimal	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.

General landuse versatility ratings for Otakau 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.

OcU1 (Otakau undulating deep)

Versatility evaluation for soil OcU1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Limited	Inadequate aeration during wet periods; potential flood risk.
Arable	Limited	Inadequate aeration during wet periods; potential flood risk.
Intensive pasture	Moderate	Inadequate aeration during wet periods; potential flood risk.
Forestry	Limited	Inadequate aeration during wet periods; potential flood 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 vehicular traffic should be minimised during these periods.
- Installation of drainage ditches may lower the water table, reducing the risk of aeration limitations and short-term waterlogging.

Soil profiles available for Otakau soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
OcU1`	JT2	21	✓	✓	✓	✓

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