

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: **Kakapo**

### Overview

Kakapo soils occupy about 100 ha in hollows and depressions on glacial moraine surfaces of the Te Anau basin. Significant areas of this soil also occur as complexes with the Te Anau soils. They are formed into moderately deep silty loess overlying glacial moraine. The soils are poorly drained, with a slightly deep rooting depth and high plant available water capacity. Present use is pastoral grazing with sheep, deer and beef cattle. Climate is cold in the winter with moderate temperatures over the summer when soils are occasionally seasonally dry.

### Soil classification

**NZ Soil Classification (NZSC):**

Typic Orthic Gley; soils with stones; silty over skeletal.

**Previous NZ Genetic Classification:**

Moderate to strongly gleyed yellow-brown earth.

### Classification explanation

Kakapo soils have been reclassified in this survey as the soil properties are consistent with Gley soils. This is because the poor drainage of Kakapo soils is due to water perching on the dense glacial moraine, that occurs at greater than 100cm depth. Kakapo soils have subsoils that show structural development, typically have gravel at between 45 and 90cm depth, and heavy silt loam textures.

### Soil phases and variants

Identified units in the Kakapo soils are:

- Kakapo undulating moderately deep (KaU2): has gravel between 45 and 90cm depth; occurs on slopes of 0–7°
- Kakapo rolling moderately deep (KaR2): has gravel between 45 and 90cm depth; occurs on slopes of 7–15°

The soil properties described in this Technical Data Sheet are based on the most common phase, Kakapo undulating moderately deep (KaU2). 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 Kakapo soils are:

- Te Anau: well drained shallow soil formed on glacial moraines
- Excelsior: well drained soil formed in moderately deep to deep loess with a fragipan
- Otanomomo: very poorly drained soil, formed in deep peat

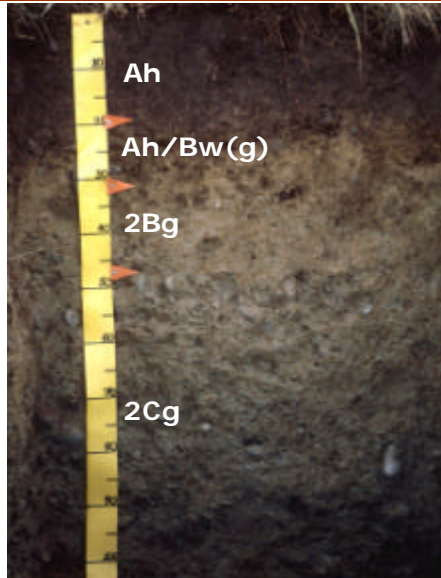
## Similar soils

Some soils that have similar properties to Kakapo soils are:

- Otahu: poorly drained soil formed in moderately deep to deep loess with a fragipan

## 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.

Kakapo profile	Horizon	Depth (cm)	Description
	Ah	0–20	Brownish black very slightly gravelly silt loam; weak soil strength; weakly developed extremely fine to fine polyhedral structure; slightly weathered and subrounded gravels; abundant roots.
	Ah/Bw(g)	20–31	Dull yellow-orange slightly gravelly silt loam; few greyish yellow and few bright brown mottles; few wormcasts; weak soil strength; weakly developed fine to medium polyhedral structure; slightly weathered and subrounded gravel; abundant roots.
	2Bg	31–47	Greyish olive moderately gravelly loamy silt; common bright brown and few dull yellow-orange mottles; moderately developed fine to medium polyhedral structure; slightly weathered and subrounded gravel; many roots.
	2Bg	47–90+	Greyish olive very gravelly loamy silt; common red and few dull yellowish brown mottles; slightly firm soil strength; compact particle packing; slightly weathered and subrounded gravel; few roots.
	2Cg		

## Key profile features

Kakapo topsoils are about 20cm deep with a weakly developed structure. Subsoil structure is moderately developed. Gravel content increases with 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
Ah	0–20	Low – Moderate	<i>Moderate</i>	Silt loam	Very slightly gravelly
Ah/Bw(g)	20–31	—	<i>Moderate</i>	Silt loam	Slightly gravelly
2Bg	31–47	—	<i>Slow</i>	Loamy silt	Moderately gravelly
2Cg	47–90+	—	<i>Slow</i>	Loamy silt	Very gravelly

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

## Key physical properties

Kakapo soils have a slightly deep rooting depth and high plant available water that is limited to the underlying glacial moraine gravels. The soils are poorly drained due to the slow permeability of the lower subsoil. Textures are silt loam in the topsoil and loamy silts in the subsoil. Topsoil clay content is about 24%. Gravel content increases with depth.

## Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ah	0–20	Moderate	Moderate	Moderate	Low	Moderate	Low	High	Very low
Ah/Bw(g)	20–31	Moderate	High	Moderate	Very low	Very low	Very low	Moderate	Very low
2Bg	31–47	Moderate	Moderate	Low	Very low	Very low	Very low	Very low	Low
2Cg	47–90+	Moderate	Moderate	Low	Low	Very low	Very low	Very low	Very low

## Key chemical properties

Topsoil organic matter levels are about 14%; P-retention 40–80% and pH moderate (mid 5s). Cation exchange levels are moderate and base saturation low. Topsoil available calcium and potassium levels are moderate to high and magnesium levels low. Subsoil available cations are all very 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>	slight	These soils have a slight vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the high organic matter content and P-retention values.
<b>Nutrient leaching</b>	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the poor drainage, high water-holding capacity and slow permeability.
<b>Topsoil erodibility by water</b>	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.
<b>Organic matter loss</b>	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).
<b>Waterlogging</b>	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 Kakapo 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.

### KaU2 (Kakapo undulating moderately deep)

### KaR2 (Kakapo rolling moderately deep)

Versatility evaluation for soil KaU2, KaR2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Arable	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Intensive pasture	Limited	Risk of short-term waterlogging after heavy rain.
Forestry	Limited	Inadequate aeration during wet periods; restricted rooting depth

### 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.
- Drainage with open ditches and tiles can be of considerable benefit.

## Soil profiles available for Kakapo soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
KaR2	AT6	39	✓	✓	✓	✓

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