

This Information 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. Advice 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.

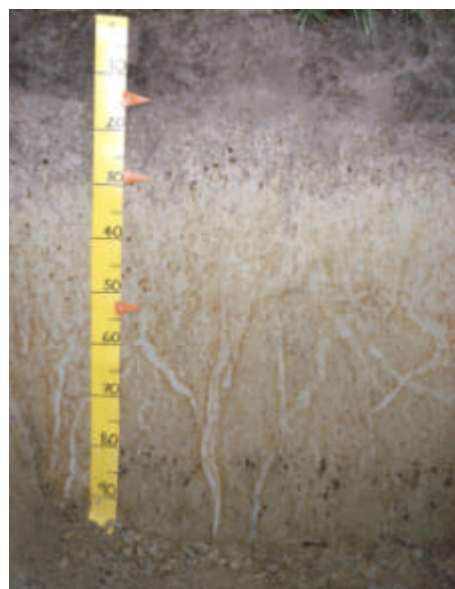
## Soil name: **Waikoikoi**

### Overview

Waikoikoi soils occupy about 62,600 ha on terraces and downlands in the Gore, northern Southland, west and south Otago areas. They are formed in deep wind-deposited loess derived from greywacke and schist rocks. They have silty textures and are poorly drained, with a dense fragipan at a depth of about 50cm which restricts water drainage. These soils respond well to mole and tile drainage and are used for sheep and dairy production, with some cropping. Regular summer rain occurs and soils are seldom dry.

### Physical properties

Waikoikoi soils have a slightly deep potential rooting depth that is severely restricted by the fragipan at 45–60 cm depth. The soils are poorly drained, with very slow permeability in the subsoil and limited aeration during sustained wet periods. Textures are typically silt loams, but range between loamy silt and heavy silt loam (15–30% clay). Topsoil clay content is typically 20–25%, and stone free. The moderately deep variants have gravels between 45 and 90cm depth.



*Waikoikoi profile*

### Fertility properties

Topsoil organic matter levels are 5–7%; P-retention values mostly under 30%; pH values are moderate and tend to decrease down the profile. Cation exchange values are moderate to low and base saturation values moderate. Available calcium magnesium and potassium levels are usually low. Reserves of phosphorus are low and there is some increase in sulphate sulphur levels in the subsoil. Micro-nutrient levels are generally adequate, although boron responses in brassicas and molybdenum responses in legumes can be expected.

### Associated and similar soils

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

- Arthurton: imperfectly drained Brown soil that is associated with Pallic soils of northern Southland and west Otago.
- Crookston: well drained Brown soil, that is associated with Pallic soils of northern Southland and west Otago
- Jacobstown: poorly drained soil formed in alluvium; on floodplains with high groundwater
- Benio: shallow soil formed in old weathered gravely alluvium.

Some soils that have similar properties to Waikoikoi soils are:

- Warepa: imperfectly drained equivalent of the Waikoikoi soil
- Athol: has perch-gley properties, but occurs where the fragipan is not within 90cm depth
- Glenure: poorly drained gley soils on terraces and downlands
- Pukemutu: have silty clay subsoil, and fragipan occurs below 60cm depth and does not have prismatic structure
- Hokonui: has clayey textures, and is formed in mixed loess and alluvium on fans from the Hokonui hills.

## Sustainable management indicators

**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>	Very severe	These soils have a very severe vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the poor drainage, low clay and P-retention in the topsoil that results in low structural stability.
<b>Nutrient leaching</b>	Slight	These soils have a slight vulnerability of leaching to groundwater. This rating reflects the moderately high water-holding capacity and slow permeability of the fragipan, but leaching risk can be increased by lateral mole and tile drains.
<b>Topsoil erodibility by water</b>	Moderate	Due to the low clay content, the topsoil erodibility of these soils is moderate. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
<b>Organic matter loss</b>	Slight	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 of the subsoil.

## General landuse versatility ratings

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

### WqR1 (Waikoikoi rolling deep)

### WqR2vg (Waikoikoi rolling moderately deep gravelly subsoil variant)

Versatility evaluation for soil WqR1, WqR2vg		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; restricted rooting depth.
Arable	Limited	Inadequate aeration during wet periods; rolling slopes
Intensive pasture	Limited	Risk of short-term waterlogging after heavy rain; rolling slopes
Forestry	Limited	Inadequate aeration during wet periods; restricted rooting depth.

### WqU1 (Waikoikoi undulating deep); WqU1vj (Waikoikoi undulating deep argillic variant)

**WqU2vg (Waikoikoi undulating moderately deep gravelly subsoil variant):** versatility ratings as above, but restricted rooting depth rather than rolling slopes affects arable crops, and under intensive pasture topsoils are vulnerable to structural degradation by cultivation and compaction.

**WqU1vi (Waikoikoi undulating moderately deep imperfectly drained variant):** versatility ratings as above; vulnerability of topsoil to structural degradation and susceptibility to waterlogging are main limitations.

### WqH1 (Waikoikoi hilly deep); WqS1 (Waikoikoi steep deep)

Versatility evaluation for soil WqH1, WqS1.		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly to steep slopes
Arable	Unsuitable	Hilly to steep slopes
Intensive pasture	Limited	Vulnerability of topsoil to structural degradation by cultivation and compaction.
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.
- Installation and maintenance of sub-surface mole and tile drains will reduce the effects of short-term waterlogging, but may increase the risk of nutrient leaching to groundwater.
- If compaction occurs, aeration at the correct depth and soil moisture can be of benefit.

Copyright © 2002, Crops for Southland

[www.cropssouthland.co.nz](http://www.cropssouthland.co.nz)

This Information Sheet may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made. Crops for Southland and Environment Southland would appreciate receiving a copy of any publication that uses this Information Sheet as a source. No use of this Information Sheet may be made for resale or for any other commercial purpose whatsoever without prior permission in writing from Crops for Southland.