

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: **Kaiwera**

### Overview

Kaiwera soils occupy about 4,500 ha on rolling to steep slopes of the Hokonui Hills and the Kaiwera district, at altitudes of up to 600m. They are formed in stony colluvium from tuffaceous greywacke, and minor additions of windblown loess. Kaiwera soils are well drained, with a slightly deep root depth and moderate water-holding capacity, that is limited by gravelliness and/or presence of bedrock. Kaiwera soils are strongly leached, with P-retention of >85% and a pH of <5.5 typical in the subsoil. They are used for extensive pastoral grazing with sheep and beef cattle. Climate is cool temperate with regular rain.



*Kaiwera profile*

### Physical properties

Kaiwera soils have moderate available water and a slightly deep rooting depth that is restricted by the gravelliness and bedrock in the subsoil. These soils are well drained, with good aeration and moderate permeability throughout the soil. Textures are typically silty clay to loamy clay, with topsoil clay content of 40%. The soils are gravelly throughout, and typically have at least 35% gravel within 45cm depth.

### Fertility properties

Topsoil organic matter levels are 8–11%; P-retention 60–70% in the topsoil, increasing to >85% in the subsoil. pH is moderate, but lower in the subsoil – commonly below 5.5. Cation exchange values are high to moderate, with base saturation low in the subsoil. Available cations are at moderate or high levels in the topsoil but low in the subsoil. Soil reserves of phosphorus are low. Micro-nutrient levels are generally adequate for pasture but may be deficient in cobalt for sheep and copper for deer and cattle over summer.

### Associated and similar soils

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

- Rosemarkie: formed in deep loess on rolling upland basins.
- Otaraia: moderately leached Brown soil formed in deep loess
- Craigdale: moderately leached Brown soil formed in moderately deep loess overlying tuffaceous greywacke bedrock.

Some soils that have similar properties to Kaiwera soils are:

- Venlaw: strongly leached Allophanic soil; upland equivalent of the Kaiwera soil
- Pukerau: strongly leached Allophanic soil; consistently has bedrock within 45cm depth
- Kuriwao: moderately leached Brown soil equivalent of the Kaiwera series; has P-retention of 60–80% and pH of less than 5.5
- Waiarikiki: moderately deep equivalent of the Kaiwera soil; formed in gravelly colluvium, but the very gravelly horizon with >35% gravel occurs deeper, at between 45 and 90cm depth
- Tyneholm: moderately leached Brown soil with tuffaceous greywacke bedrock within 45cm depth.

## 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>	minimal	These soils have a minimal vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage, moderate clay and organic matter levels.
<b>Nutrient leaching</b>	severe	These soils have a severe vulnerability to leaching to groundwater. This rating reflects the good drainage, moderate permeability, and moderate water-holding capacity.
<b>Topsoil erodibility by water</b>	minimal	Due to the loamy clay texture, topsoil erodibility in these soils is minimal. 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>	nil	These soils have a nil vulnerability to waterlogging during wet periods. This rating is indicated by the good drainage, moderate permeability, and the rolling to steep slopes.

## 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.

### KwU3 (Kaiwera undulating shallow)

Versatility evaluation for soil KwU3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Restricted rooting depth
Arable	Moderate	Vulnerability to leaching; topsoil stoniness
Intensive pasture	Moderate	Vulnerability to leaching; restricted rooting depth
Forestry	Limited	Restricted rooting depth

### KwR3 (Kaiwera rolling shallow)

Versatility evaluation for soil KwR3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Restricted rooting depth
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Vulnerability to leaching; restricted rooting depth
Forestry	Limited	Restricted rooting depth

### KwH3 (Kaiwera hilly shallow)

Versatility evaluation for soil KwH3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slope
Arable	Unsuitable	Hilly slope
Intensive pasture	Limited	Hilly slope
Forestry	Limited	Restricted rooting depth

**KwS3 (Kaiwera steep shallow)** has the same versatility ratings as the hilly phase above, with steep slopes being the main limitation for all landuse categories, plus restricted rooting depth for forestry.

### Management practices that may improve soil versatility

- Management of nutrient applications so as to minimise leaching losses

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.