

## Soil name: **Ferndale**

### Overview

Ferndale soils occupy about 1550 ha on rolling land in the Kaiwera district of eastern Southland. They are formed in deep loess derived from greywacke, tuffaceous greywacke and schist rocks. Ferndale soils are imperfectly drained, have a deep rooting depth, high water-holding capacity, and have heavy silt loam textures with P-retention of 40–65%. They are primarily used for pastoral farming with sheep and beef cattle. Climate is cool temperate with regular rain throughout the year.

### Physical properties

Ferndale soils have a deep rooting depth and moderately high plant available water, meaning there is no major physical barrier to root growth. The compact subsoil is slowly permeable, and may cause short-term waterlogging and limit aeration after heavy rainfall. Texture is heavy silt loam in all horizons, with topsoil clay content of 25–30%, and the soils are typically stone free.



*Ferndale profile*

### Fertility properties

Topsoil organic matter levels are about 8%; P-retention 40–65%; soil pH is typically low throughout the profile (low 5s). Cation exchange levels are moderate but base saturation is low. Available calcium and magnesium levels are low, with potassium levels high. Micronutrient levels are generally adequate although molybdenum responses in legumes and boron responses in brassica can be expected.

### Associated and similar soils

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

- Kaiwera: shallow, well drained strongly leached soil forming into stony colluvium or bedrock; has P-retention of >85%
- Kuriwao: moderately leached equivalent of the Kaiwera series; has P-retention of 60–80% and pH of less than 5.5
- Craigdale: moderately leached soil formed in moderately deep loess overlying tuffaceous greywacke bedrock
- McNab: formed in moderately deep loess overlying weathered tuffaceous greywacke bedrock with a strongly acid subsoil (pH <4.9)

Some soils that have similar properties to Ferndale soils are:

- Otarua: well drained equivalent of the Ferndale soil
- Chaslands: occurs on hilly land south-east of Matura; typically does not have acidic subsoils
- Woodlands: occurs on terraces on the Southland plains; typically does not have acidic subsoils
- Arthurton: occurs on downlands in west Otago; has intergrade soil properties between Brown and Pallic soils

## 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>	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 imperfect drainage.
<b>Nutrient leaching</b>	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the imperfect drainage, moderately high water holding capacity, and slow permeability of the subsoil.
<b>Topsoil erodibility by water</b>	slight	Due to the moderate clay and organic matter levels, 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>	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>	moderate	These soils have a moderate vulnerability to waterlogging during wet periods. This rating reflects the imperfect drainage and slowly permeable 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.

### FrR1 (Ferndale rolling deep)

Versatility evaluation for soil FrR1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Inadequate aeration during wet periods; short-term waterlogging after heavy rain
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Inadequate aeration during wet periods; vulnerability to topsoil structural degradation by cultivation and compaction
Forestry	Moderate	Vulnerability to sustained waterlogging.

### FrU1 (Ferndale undulating deep)

Versatility evaluation for soil FrU1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Inadequate aeration during wet periods; short-term water logging after heavy rain
Arable	Moderate	Inadequate aeration during wet periods; vulnerability to topsoil structural degradation by cultivation and compaction
Intensive pasture	Moderate	Inadequate aeration during wet periods; vulnerability to topsoil structural degradation by cultivation and compaction
Forestry	Moderate	Vulnerability to sustained waterlogging

### 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 subsurface mole and tile drains will reduce the risk of short-term waterlogging.