

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: **Haldane**

Overview

Haldane soils occupy about 2300 ha on hilly and rolling land southeast of Waimahaka in southern Southland. They are formed in loess derived from greywacke and schist which overlays tuffaceous greywacke rock. Haldane soils are imperfectly drained, have a deep rooting depth, high water-holding capacity, and have heavy silt loam textures with P-retention of 50–85%. They generally occur above 100m altitude, in association with strongly leached soils with podzolised features. Present use is pastoral farming with sheep and beef cattle. Climate is moderate because of the close proximity to the coast, with high rainfall through the year.



Haldane profile

Physical properties

Haldane soils have a deep rooting depth and high plant available water, meaning there is no major physical barrier to root growth. The topsoil has a low bulk density with good aeration and permeability. This decreases down the profile, resulting in the soil being imperfectly drained. Texture is silt loam in all horizons, with topsoil clay content of 25–30%, and the soils are typically stone free.

Fertility properties

Topsoil organic matter levels are 13–16%; P-retention 60–75% and pH low–moderate (low–high 5s). Subsoil pH values are low. Cation exchange values are high but base saturation is low. Available magnesium levels are high but calcium and potassium levels are low. Reserve phosphorus levels are also low. Micronutrient levels are generally adequate.

Associated and similar soils

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

- Otarua: well drained with a firm structureless lower subsoil
- Scrubby Hill: occurs above 100m altitude in the hilly land southeast of Waimahaka, but is strongly leached and has podzolised and acidic properties, high P-retention and thin iron pans.
- Fortification: moderately deep on the underlying bedrock; strongly leached with P-retention of >85%.
- Pukerau: shallow to underlying bedrock; strongly leached soil with P-retention of >85%

Some soils that have similar properties to Haldane soils are:

- Chaslans: non-acidic (pH of >5.5) with a firm structureless lower subsoil; generally does not occur in complexes with the strongly leached profile forms
- Ferndale: also pH of less than 5.5 in the subsoil, but has a firm structureless lower subsoil; occurs in the rolling and hilly land between Mataura and Clinton
- Mokotua: are strongly mottled, with imperfect drainage tending towards being poorly drained; are associated with soils showing podzolised features on the southern Southland plains

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
Structural compaction	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 high organic matter content and P-retention.
Nutrient leaching	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the imperfect drainage, high water-holding capacity, and slow permeability.
Topsoil erodibility by water	minimal	Due to the high organic matter content, topsoil erodibility in these soils is minimal. 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	moderate	These soils have a moderate vulnerability to waterlogging during wet periods. This rating reflects the imperfect drainage and slow permeability.

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.

Haldane rolling deep (HaR1)

Versatility evaluation for soil HaR1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Forestry	Moderate	Vulnerability to sustained waterlogging

Haldane undulating deep (HaU1)

Versatility evaluation for soil HaU1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Arable	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Intensive pasture	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Forestry	Moderate	Vulnerability to sustained waterlogging

Haldane hilly deep (HaH1) and Haldane steep deep (HaS1): slope is the main limitation for all landuses; unsuitable for non-arable horticulture and arable landuse, and limited versatility for intensive pasture; for forestry, hilly phase has moderate versatility but steep phase has limited versatility.

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.

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