

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: Fortrose

### Overview

Fortrose soils occupy about 1,426 ha on terraces and downland mainly east of the Mataura River, south of the Fortrose township. They are formed in near-source wind deposited loess derived from greywacke and schist rock. Fortrose soils are imperfectly drained, have a deep rooting depth and high water-holding capacity, and have light silt loam to loamy silt textures with P-retentions of 60–85%. At present they are used for intensive sheep and some beef production. The climate is cool temperate with regular rain with exposure to the prevailing south-westerly weather.

### Soil classification

**NZ Soil Classification (NZSC):**

Mottled Firm Brown; stoneless; silty

**Previous NZ Genetic Classification:**

Strongly leached lowland yellow-brown earth

### Classification explanation

The NZSC of the Fortrose soils is consistent with the previous classification. Fortrose soils are imperfectly drained soils with yellow-brown subsoils, and rarely suffer from drought. There is a subsoil horizon that is structureless with slightly firm or greater soil strength that may limit root penetration.

### Soil phases and variants

Identified units in the Fortrose soils are:

- Fortrose undulating deep (FtU1): has no gravel within 90cm depth; occurs on slopes 0–7°
- Fortrose rolling deep (FtR1): has no gravel within 90cm depth; occurs on slopes 7–15°
- Fortrose hilly deep (FtH1): has no gravel within 90cm depth; occurs on slopes 15–25°

The soil properties described in this Technical Data Sheet are based on the most common phase, Fortrose undulating deep (FtU1). Values for other phases and variants can be taken as being similar. Where they differ significantly they are recorded with a separate versatility rating, e.g., Fortrose hilly deep (FtH1).

### Associated soils

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

- Waimahaka : well drained equivalent of the Fortrose soil
- Waipapa: occurs in a complex with Fortrose series, but is more leached and has podzolised properties with P-retention of greater than 85% and thin iron pans.
- Jacobstown: poorly drained floodplain soil, due to a high groundwater table

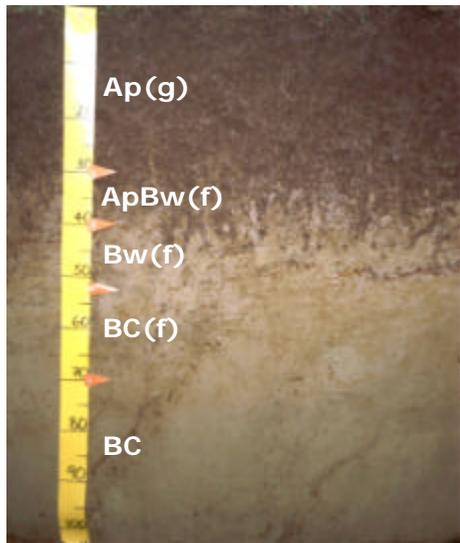
### Similar soils

Some soils that have similar properties to Fortrose soils are:

- Wyndham: occurs on similar landforms north of Waimahaka; is less weathered in subsoil, with P-retention of 25–60%, and is not associated with soils that have podzolised properties
- Woodlands: has yellow-brown colours and heavy silt loam subsoils throughout the profile
- Chaslands: Occurs on hilly to rolling land in more distant source loess; has yellow-brown colours and heavy silt loam texture throughout the profile.

## 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.

Fortrose profile	Horizon	Depth (cm)	Description
	Ap(g)	0–30	Brownish black silt loam; weak soil strength; strongly developed fine to very fine polyhedral structure; abundant roots.
	Ap/Bw(f)	30–40	Bright yellowish brown silt loam; few brown mottles; many worm casts; weak soil strength; strongly developed very fine to fine polyhedral structure; abundant roots
	Bw(f)		
	BC(f)	40–52	Yellowish brown silt loam; common brown mottles; few worm casts; slightly firm soil strength; moderately developed coarse platy and medium polyhedral structure; many roots
	BC(f)	52–70	Dull yellow silt loam; common reddish brown mottles; slightly firm soil strength; massive structure; common roots
	BC	70–90	Dull yellow loamy silt; few greyish yellow mottles; weak soil strength; massive structure; few roots

## Key profile features

Fortrose soils have a topsoil that is about 25–30cm deep and is strongly structured. Subsoils have moderate structure which grades to structureless below about 50cm. The upper subsoil is moderately weathered, with yellowish brown colour, and the lower subsoil is less weathered with dull yellow colours. The subsoil mottling reflects the imperfect drainage.

## Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap(g)	0–30	Moderate	<i>Moderate</i>	Silt loam	Gravel free
Ap/Bw(f)	30–40	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
Bw(f)	40–52	Moderate – High	<i>Slow</i>	Silt loam	Gravel free
BC(f)	52–70	Moderate – High	<i>Slow</i>	Silt loam	Gravel free
BC	70–90	Moderate – High	<i>Slow</i>	Loamy silt	Gravel free

**Profile drainage:** Imperfect  
**Plant readily available water:** *High*  
**Potential rooting depth:** Deep  
**Rooting restriction:** No major restriction

## Key physical properties

Fortrose soils have a deep rooting depth and high plant available water, meaning there is no major physical barrier to roots. The compact subsoil is slowly permeable, and may cause short-term waterlogging and limit aeration after heavy rainfall. Texture is light silt loam grading to loamy silt in the lower subsoil, with topsoil clay content of 20–25%, and stone free in all horizons.

## Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap(g)	0–30	Moderate	High	High	High	High	Moderate	Very low	Moderate
Ap/Bw(f)	30–40	Moderate	High	Moderate	Moderate	Moderate	Moderate	Very low	Moderate
Bw(f)	40–52	Moderate	High	Moderate	Low	Low	Low	Very low	Low
BC(f)	52–70	Moderate	High	Low	Low	Low	Very low	Very low	Low
BC	70–90	Moderate	High	Low	Low	Very low	Very low	Very low	Low

## Key chemical properties

Topsoil organic matter values are about 13%; P-retention 60%, increasing with depth to 85%; pH values are moderate and consistent down the profile. Cation exchange and base saturation values are high in the topsoil, and low in the subsoil. Available cations follow the same pattern, except potassium, which is very low throughout the profile. Natural reserves of phosphorus are low and sulphate sulphur levels high in the subsoil. Micro-nutrient levels are generally adequate and are likely to be influenced by the close proximity of these soils to the sea.

## 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 topsoil organic matter and P-retention.
<b>Nutrient leaching</b>	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the imperfect drainage, high water holding capacity and slow subsoil permeability.
<b>Topsoil erodibility by water</b>	moderate	Due to the light silt loam texture, 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>	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>	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 for Fortrose soils

**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.

### FtU1 (Fortrose undulating deep)

Versatility evaluation for soil FtU1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Inadequate aeration during wet periods; risk of short-term water logging 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	Risk of short-term waterlogging after heavy rain.

**FtR1 (Fortrose rolling deep)**

Versatility evaluation for soil FtR1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Inadequate aeration during wet periods; rolling slopes
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Forestry	Moderate	Risk of short-term waterlogging after heavy rain.

**FtH1 (Fortrose hilly deep)**

Versatility evaluation for soil FtH1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Moderate	Hilly slopes; risk of short-term waterlogging after heavy rain.

**Management practices that may improve soil versatility**

- Careful management after heavy rainfall and wet periods will reduce the impact of short-term waterlogging. Intensive stocking, cultivation and vehicular traffic should be minimised during these periods.
- Installation and maintenance of subsurface drainage with moles and tiles may reduce the risk of short-term waterlogging

**Soil profiles available for Fortrose soils**

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
FtU1	ST9	29	✓	✓	✓	✓

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