

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: Howe

Overview

Howe soils occupy about 800 ha of the rapidly accumulating floodplains of the Maitara and Oreti rivers and their major tributaries. They are formed in fine and gravelly alluvium from schist and greywacke rock and are still regularly flooded. Howe soils have variable textures, depths, stoniness and particle size distribution over short distances. The variability of this soil is due to the frequent flooding, accumulation of sediment and erosion, acting to change the soil pattern from year to year. Present use varies from pastoral grazing to unfarmed riverbed. Climate is variable depending on location, with shallow soils often drought affected in summer.

Soil classification

NZ Soil Classification (NZSC): Typic Fluvial Recent; loamy

Previous NZ Genetic Classification: Recent

Classification explanation

The NZSC of Howe soils is consistent with the previous classification. The soils are formed in fluvial sediments, with some topsoil development, but no B horizon is developed in the subsoil. In many situations it has not been possible to define a depth for Howe soils because of the active flooding. Howe soils also grade to Raw soils in the NZSC, due to the minimal topsoil development.

Soil phases and variants

Identified units in the Howe soils are:

- Howe undulating variable depth (HwU): has variable depth to gravels; occurs on slopes of 0–7°
- Howe undulating moderately deep (HwU2): has gravel between 45 and 90cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Howe undulating variable depth (HwU). Values for other phases and variants can be taken as being similar. Where they differ significantly they are recorded with a separate versatility rating.

Associated soils

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

- Jacobstown: moderately deep to deep poorly drained soil
- Lumsden: shallow poorly drained soil
- Riversdale: shallow, well drained soil; occurs on parts of the floodplain that are flooded less frequently

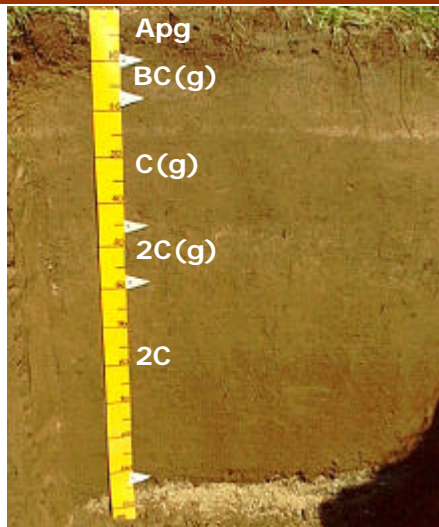
Similar soils

Some soils that have similar properties to Howe soils are:

- Upukerora: dominantly shallow soil formed on the active floodplain of the Waiau, Mararoa, and Aparima rivers
- Mataura: moderately deep to deep, well drained soil; occurs on parts of the floodplain that are flooded less frequently

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.

Howe profile	Horizon	Depth (cm)	Description
	Apg	0–10	Dull yellowish brown sandy loam; many grey and few bright brown mottles; weak soil strength; moderately developed very fine to fine polyhedral structure; abundant roots
	BC(g)	10–17	Dull yellowish brown loamy sand; few grey and bright brown mottles; slightly firm soil strength; massive structure; many roots
	C(g)	17–45	Dull yellowish brown silt loam; few light grey and very few bright brown mottles; slightly firm soil strength; massive structure; many roots
	2C(g)	45–58	Dull yellowish brown sandy loam; common grey and few bright brown mottles; weak soil strength; massive structure; many roots
	2C	58–90+	Dull yellowish brown sandy loam; very few grey mottles; very weak soil strength; massive structure; many roots

Key profile features

Howe topsoils vary in depth from 5 to 20cm and have weakly developed structure. Subsoils are structureless, and are characterised with variable layers from gravel to silt, that result from different flooding episodes. Soils used for grazing tend to have mottling in the upper horizons.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Apg	0–10	Moderate	<i>Moderate</i>	Sandy loam	—
BC(g)	10–17	Moderate	<i>Moderate</i>	Loamy sand	—
C(g)	17–45	Moderate	<i>Moderate</i>	Silt loam	—
2C(g)	45–58	Moderate	<i>Moderate</i>	Sandy loam	—
2C	58–90+	Moderate	<i>Moderate</i>	Sandy loam	—

Profile drainage: Moderately well
Plant readily available water: *Moderately high*
Potential rooting depth: Deep
Rooting restriction: No major restriction

Key physical properties

Howe soils are variable in depth and properties. The depth to gravel will determine the rooting depth and water-holding capacity; with deep gravel-free soils having moderately high plant available water, decreasing to low for stony soils. The soils typically have good aeration, with moderate to rapid permeability depending on the depth to gravels and sands. Textures are silt loam to sand. Topsoil clay content is often low (10–20%).

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Apg	0–10	Moderate	Very low	Low	High	Low	Low	High	Very low
BC(g)	10–17	Moderate	Very low	Low	Moderate	Very low	Very low	Moderate	Very low
C(g)	17–45	Moderate	Low	Low	Moderate	Very low	Very low	Very low	Very low
2C(g)	45–58	Moderate	Low	Very low	Moderate	Very low	Very low	Very low	Very low
2C	58–90	Moderate	Low	Very low	Moderate	Very low	Very low	Very low	Very low

Key chemical properties

Topsoil organic matter levels are 2–3%; P-retention <10% and pH moderate (high5s). Cation exchange is low and base saturation high. Available calcium and magnesium levels are low and potassium levels high. Reserve phosphorus and sulphur levels are also low. Micronutrient levels are unknown but are likely to be adequate.

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
Structural compaction	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 low clay, organic matter and P-retention.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the moderately high water-holding capacity. Soils that are shallow to gravels are likely to have a severe to very severe vulnerability.
Topsoil erodibility by water	moderate	Due to the low clay and organic matter content, topsoil erodibility in these soils is moderate. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	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).
Waterlogging	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the moderately good drainage.

General landuse versatility ratings for Howe soils

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

HwU (Howe undulating)

HwU2 (Howe undulating moderately deep)

Versatility evaluation for soil HwU, HwU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Potential flood risk
Arable	Unsuitable	Potential flood risk
Intensive pasture	Limited	Potential flood risk; vulnerability to structural compaction
Forestry	Unsuitable	Potential flood risk

Management practices that may improve soil versatility

- Howe soils would benefit from flood protection for intensive landuses
- Organic matter levels should be carefully maintained and enhanced

Soil profiles available for Howe soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
HwU2	VT7	4	✓	✓	✓	✓
HwU	GG/GW144	35	✓			

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