Soil name: Waimatuku

Overview

Waimatuku soils occupy about 7,600 ha on high terraces of the southern Southland Plain between the Longwoods and the Oreti River and in the Merrivale district of western Southland. They are formed in deep wind-deposited loess derived from greywacke and schist rocks. Waimatuku soils are moderately well to well drained with a moderately deep rooting depth, moderately high water-holding capacity, and have silt loam textures. They are high producing soils currently used for intensive sheep, dairy and deer production, with limited cropping. They have a cool temperate climate and receive regular rain over the year and seldom dry out.

Soil classification

NZ Soil Classification (NZSC): Typic Firm Brown; stoneless; silty
Previous NZ Genetic Classification: Moderately to strongly leached yellow-brown earth.

Classification explanation

The NZSC of the Waimatuku soils is consistent with the previous classification. Waimatuku soils are well-drained, 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, and has slow permeability that may cause waterlogging during wet periods. The soils have P-retention of 40–70%, are typically stone free and have silt loam textures to 90cm depth.

Soil phases and variants

Identified units in the Waimatuku soils are:

- Waimatuku undulating deep (WkU1): has no gravel within 90cm depth; occurs on slopes of 0–7°
- Waimatuku rolling dep (WkR1): has no gravel within 90cm depth; occurs on slopes of 7–15°.

The soil properties described in this Technical Data Sheet are based on the most common phase, Waimatuku undulating deep (WkU1). 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., Waimatuku rolling deep (WkR1).

Associated soils

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

- Woodlands: occurs on the same landforms, but has imperfect drainage
- Aparima: imperfectly drained soil with a fragipan
- Oteramika: shallow soil occuring on shoulder and sideslopes where loess has been eroded away
- Dacre: poorly drained soil on floodplains of streams and minor drainage channels.

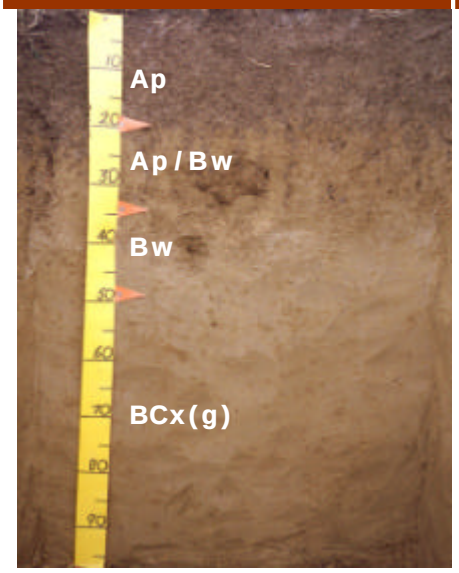
Similar soils

Some soils that have similar properties to Waimatuku soils are:

- Waikiwi: Very similar soil, but the Waimatuku soil is thought to have a consistantly firm subsoil fragipan that provides a barrier to root growth. If further analysis doesn't confirm this subsoil fragipan, then the Waimatuku series may be correlated into the Waikiwi series.
- Edendale: occur on intermediate terraces in lower Mataura and Oreti river valleys
- Lyoncross: occur on high terraces in the Eastern Bush district of western Southland
- Pourakino: occur on the flanks of the Pourakino Valley; paler colours; P-retention 70–85% throughout 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.

Waimatuku profile	Horizon	Depth (cm)	Description
	Ap	0–20	Greyish yellow brown silt loam; weak soil strength; moderately developed fine polyhedral structure; abundant roots.
	Ap/Bw	20–33	Dull yellowish brown silt loam; many wormcasts; weak soil strength; moderately developed fine to medium polyhedral structure; many roots.
	Bw	33–48	Dull yellowish brown silt loam; few wormcasts; slightly firm soil strength; moderately developed medium to coarse polyhedral structure; many roots
	BCx(g)	48–90+	Dull yellowish brown silt loam; firm soil strength; massive structure; few roots

Key profile features

Waimatuku topsoils are 20–30cm deep with a moderately developed structured. Subsoils have moderately developed structure that becomes more compact and structureless below 50cm depth. The moderate weathering of the soils is reflected in the yellowish brown colour.

Typical physical properties

Note: values in Italics are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–20	Moderate	*Moderate*	Silt loam	Gravel free
Ap/Bw	20–33	Moderate	*Moderate*	Silt loam	Gravel free
Bw	33–48	Moderate – High	*Moderate*	Silt loam	Gravel free
BCx(g)	48–90+	Moderate – High	*Slow*	Silt loam	Gravel free

Profile drainage: Moderately well
Plant readily available water: *Moderately High*
Potential rooting depth: Moderately deep
Rooting restriction: Dense subsoil

Key physical properties

Waimatuku soils have moderately high plant available water and moderately deep rooting depth that is limited by the dense lower subsoil. The soils are moderately well drained but the compact subsoil is slowly permeable, and may cause short-term waterlogging after heavy rainfall. Texture is silt loam in all horizons, with topsoil clay content of 25–30%. Waimatuku soils are typically stonefree.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–20	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Low
Ap/Bw	20–33	Moderate	High	Moderate	Low	Low	Low	Very low	Low
Bw	33–48	Moderate	High	Low	Low	Low	Low	Very low	Moderate
BCx(g)	48–90+	Moderate	High	Low	Low	Low	Low	Very low	Moderate

Key chemical properties

Topsoil organic matter levels are 6–8%; P-retention values 40–70%; pH values are moderate in all horizons. Cation exchange, base saturation, and major cations are moderate in the topsoil, but are low in the subsoil. Reserve phosphorus levels are low. Micro nutrient levels are generally adequate although boron responses in brassicas and molybdenum responses in legumes can occur.

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	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 good drainage, and the topsoil clay and P-retention values.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the moderately high water-holding capacity and slow subsoil permeability
Topsoil erodibility by water	slight	Due to the moderate clay and 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	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage, but slowly permeable subsoil

General landuse versatility ratings for Waimatuku 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.

WkU1 (Waimatuku undulating deep)

Versatility evaluation for soil WkU1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Risk of short-term waterlogging after heavy rain.
Arable	Moderate	Risk of short-term waterlogging after heavy rain
Intensive pasture	Moderate	Vulnerability to leaching to groundwater; risk of short-term waterlogging after heavy rain
Forestry	High	Few limitations

WkR1 (Waimatuku rolling deep)

Versatility evaluation for soil WkR1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Risk of short-term waterlogging after heavy rain.
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Vulnerability to leaching to ground water; risk of short-term waterlogging after heavy rain.
Forestry	High	Few limitations

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 use should be minimised during these periods.
- Installation and maintenance of subsurface mole and tile drains will reduce the risk of short-term waterlogging.
- If compaction occurs, aeration at the correct moisture condition and depth can be of benefit.

Soil profiles available for Waimatuku soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
WkU1	IT 12	8	✓	✓	✓	✓
WkR1	EMT5	18	✓	✓	✓	✓
WkU1	SB09799	8	✓	✓	✓	

Published by Crops for Southland with financial support from Environment Southland.

Crops for Southland
PO Box 1306, Invercargill. New Zealand

www.cropssouthland.co.nz