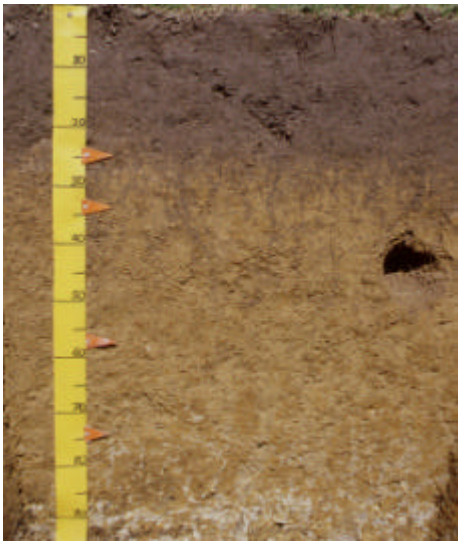
Soil name: Waianiwa

Overview

Waianiwa soils occupy about 1,500 ha on intermediate and high terraces of the Southland Plain between Riverton and Hedgehope. They are formed in deep loess deposits derived from tuffaceous greywacke rock. They have heavy silt loam textures, and are imperfectly drained, with a dense fragipan between 60 and 90cm depth which restricts water drainage. Waianiwa series was orginally defined and published prior to the investigation of the Aparima map units, and should be correlated into the Aparima soils. They respond well to mole and tile drainage and are used for intensive sheep, dairy and deer production with some cropping. Regular summer rainfall occurs though inland soils may be seasonally dry.



Waianiwa profile

Physical properties

Waianiwa soils have a moderately deep rooting depth that is restricted by the fragipan at 60–90cm depth. The depth of the fragipan means the Waianiwa soils typically have moderately high to high plant available water. The soils are imperfectly drained with slow permeability through the fragipan. Textures are heavy silt loams but tend towards silty clays in the lower subsoil. Topsoil clay content is 20–30%, and stonefree.

Fertility properties

Topsoil organic matter level is about 7%, P-retention 25–30% and pH values moderate (high 5s). Subsoil pH values are low (low 5s). Cation exchange values are moderate and base saturation values high. Available calcium is high, with magnesium and potassium low. Soil reserve phosphorus is low. Micronutrient values are generally adequate.

Associated and similar soils

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

- Oteramika: shallow soil occurring on shoulder and side slopes where loess has been eroded away
- Waikiwi: well drained deep Brown soil
- Pebbly Hills: shallow soil forming into quartz gravels

Some soils that have similar properties to Waianiwa soils are:

- Aparima: same soil – Waianiwa should be correlated into the Aparima series. Waianiwa series was orginally defined and published prior to the investigation of the Aparima map units. Occurs on high terraces east of the Aparima River.
- Pukemutu: poorly drained equivalent of the Aparima soil
- Woodlands: imperfectly drained Brown soil without a fragipan

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	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 and medium P-retention.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the imperfect drainage, slow subsoil permeability and moderately high water-holding capacity.
Topsoil erodibility by water	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.
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	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.

WbU1 (Waianiwa undulating deep) and **WbU2 (Waianiwa undulating moderately deep)**

Versatility evaluation for soil WbU1, WbU2		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Risk of short-term waterlogging after heavy rain; restricted rooting depth
Arable	Moderate	Inadequate aeration during wet periods; vulnerability to structural compaction
Intensive pasture	Moderate	Inadequate aeration during wet periods; vulnerability to structural compaction
Forestry	Moderate	Vulnerability to sustained waterlogging ; restricted rooting depth

WbR1 (Waianiwa rolling deep): as above, but limited versatility for arable landuse due to rolling slopes.

WbS1 (Waianiwa steep deep)

Versatility evaluation for soil WbS1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Unsuitable	Steep slopes
Arable	Unsuitable	Steep slopes
Intensive pasture	Limited	Steep slopes
Forestry	Limited	Steep slopes; restricted rooting depth

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.