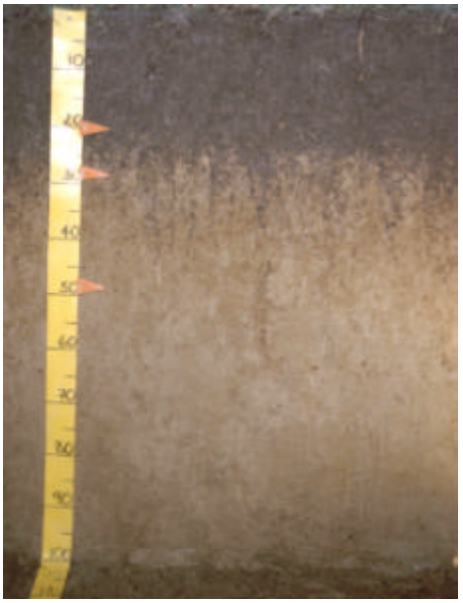
Soil name: Tokanui

Overview

Tokanui soils occupy about 15,900ha on hilly and rolling land east of the Mataura River, south of Mataura. They are formed in loess derived from greywacke and schist which overlays tuffaceous greywacke rock. Tokanui soils are well drained and have a deep rooting depth, high water holding capacity, heavy silt loam textures and P-retention of 40–85%. They are primarly used for intensive sheep and beef production. Climate is cool temperate with reliable summer rainfall.



Tokanui profile

Physical properties

Tokanui soils have a deep rooting depth and high plant available water, meaning there is no major physical barrier to root growth. The soils are well drained but the compact subsoil is slowly permeable, and may cause short-term waterlogging after heavy rainfall. Texture is heavy silt loam in all horizons, with topsoil clay content of 25–35%, and the soils are typically stone free.

Fertility properties

Topsoil organic matter levels are 5–9%, P-retention values in the topsoil are 40–60%, with subsoil values up to 80%. Soil pH values are moderate (high 5s) in all horizons. Cation exchange values are moderate, and base saturation values and available cation values mostly low. Soil reserves of phosphorus are low and sulphate sulphur values are high in the subsoil. Micro-nutrient levels are generally adequate.

Associated and similar soils

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

- Chaslands: imperfectly drained equivalent of the Tokanui soils
- Scrubby Hill: occurs above 100m altitude in the hilly land southeast of Waimahaka, but is more leached and has podzolised and acidic properties, high P-retention and thin iron pans
- Fortification: moderately deep over the underlying bedrock; strongly leached, with P-retention of >85%.
- Tyneholm: shallow over the underlying bedrock; occurs below 300m altitude north of Waimahaka

Some soils that have similar properties to Tokanui soils are:

- Otaraia: similar profile form, but has pH of less than 5.5 in the subsoil; occurs in the rolling and hilly land between Mataura and Clinton
- Waikiwi: similar profile form, occurs on high terraces of the Southland Plain
- Waimahaka: occurs in near-source loess adjacent to the Mataura river, south of Waimahaka; has loamy silt subsoil textures, P-retention of 60–85%, and occurs in complexes with soils that have podzolised properties
- Tuturau: occurs in near-source loess adjacent to the Mataura river, north of Waimahaka; is less weathered in subsoil, with P-retention of 25–60%, and is not associated with soils that have podzolised properties.

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	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 high water-holding capacity and slow subsoil permeability.
Topsoil erodibility by water	slight	Due to the clay content, the topsoil erodibility of these soils is slight. 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

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.

TkR1 (Tokanui rolling deep)

Versatility evaluation for soil TkR1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Risk of short-term waterlogging after heavy rain; rolling slope
Arable	Limited	Rolling slope
Intensive pasture	Moderate	Vulnerability to leaching to ground water; rolling slope.
Forestry	High	No major limitations

TkU1 (Tokanui undulating deep)

Versatility evaluation for soil TkU1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Risk of short-term waterlogging after heavy rain.
Arable	Moderate	Risk of short-term water logging after heavy rain.
Intensive pasture	Moderate	Vulnerability to leaching to ground water.
Forestry	High	No major limitations

TkH1 (Tokanui hilly deep)

Versatility evaluation for soil TkH1.		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Moderate	Hilly slopes

TkS1 (Tokanui steep deep): as for hilly phase above, but versatility rating for forestry landuse is 'Limited' and steep slopes are the main limitation for all landuses.

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 vehicular traffic should be minimised at these times.
- Subsurface mole and tile drains on flatter terrain will reduce the risk of short-term waterlogging.
- If compaction occurs, aeration at the correct depth and moisture content can be of benefit.