

This Information 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. Advice 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.

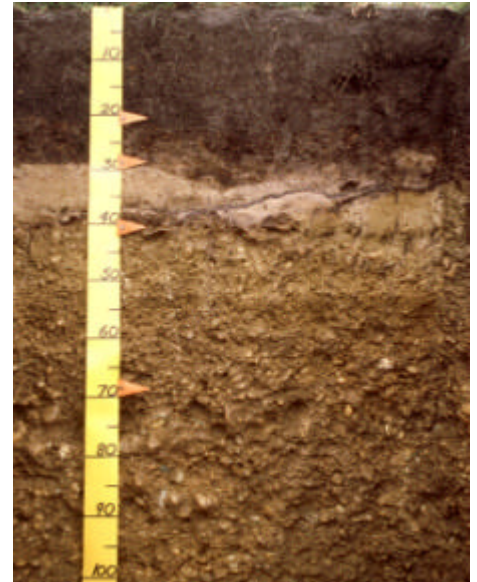
Soil name: **Tiwai**

Overview

Tiwai soils occupy about 2,300 ha on alluvial and old marine terraces in the coastal area of the Southland Plain south east of Invercargill. They are formed in shallow to moderately deep loess derived from greywacke that overlies gravel. Tiwai soils are imperfectly drained soils, with shallow rooting depth, moderately high available water capacity and silty textures. The soils show strong leaching, with high P-retention and are strongly acidic. The podzol features are likely to be less evident in areas that have significant development inputs. Present use is pastoral grazing with sheep, beef cattle and some dairy. Climate is cool temperate with regular rain throughout the year.

Physical properties

Tiwai soils have moderately high plant available water and a shallow rooting depth limited by the dense and gravelly subsoil. The subsoil acidity and aluminium toxicity may also be limiting (particularly on less developed sites). Soils are imperfectly drained, with slowly permeable subsoils that may cause short-term waterlogging after heavy rain. Textures are silt loams to loamy silts throughout the profile, with topsoil clay content of 10–22%. Tiwai soils typically have gravels within 45cm, although the shallow phase has gravels between 45–90cm depth.



Tiwai profile

Fertility properties

Topsoil organic matter levels are variable (16–25%); P-retention 49–64% and pH moderate in topsoils but low in the subsoil. Cation exchange is high and base saturation depends on lime application but is often low. Available calcium and magnesium levels are moderate to high and potassium low. Soil reserve phosphorus is low. Micronutrient levels are generally adequate.

Associated and similar soils

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

- Otanonomo: poorly drained peat soil; formed on raised peat bogs
- Invercargill: poorly drained peat soil; formed on basin peat bogs
- Mokotua: imperfectly drained Brown soil
- Tisbury : deep poorly drained soils

Some soils that have similar properties to Tiwai soils are:

- Ashers: podzolised soil formed into deep loess
- Kapuka: podzolised moderately deep to shallow soil on marine terraces; tends to have dominantly iron enriched Bs horizons, whereas Tiwai tends to have dominantly organic enriched Bh horizons, is typically shallow and has thin iron pans in the subsoil

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 slight vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the imperfect drainage and low clay content, offset by the high organic matter and P-retention. |
| Nutrient leaching | moderate | These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the imperfect drainage, moderately high water-holding capacity and slow subsoil permeability. |
| Topsoil erodibility by water | minimal | Due to the high 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 | 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.

TiU2 (Tiwai undulating moderately deep)

TiU3 (Tiwai undulating shallow)

Versatility evaluation for soil TiU2, TiU3

| Landuse | Versatility rating | Main limitation |
|-------------------------|--------------------|--------------------------|
| Non-arable horticulture | Limited | Restrictrd rooting depth |
| Arable | Limited | Restrictrd rooting depth |
| Intensive pasture | Limited | Restrictrd rooting depth |
| Forestry | Limited | Restrictrd 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.