

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: **Tomoporakau**

Overview

Tomoporakau soils occupy about 1,400 ha on low terraces and slowly accumulating floodplains of the lower Makarewa and Oreti rivers and Waimatuku stream. They are formed into fine alluvium probably mixed with some loess. They are deep, silty, poorly drained soils with a degraded fragipan that restricts water drainage. Present use is pastoral grazing with sheep, dairy and beef cattle. Climate is cool temperate with regular rainfall throughout the year.

Soil classification

NZ Soil Classification (NZSC):

Typic Perched-gley Pallic; stoneless; silty.

Previous NZ Genetic Classification:

Gley soils

Classification explanation

The NZSC of the Tomoporakau soil differs from the previous classification because the soils have properties more similar to Pallic soils than Gley soils. Tomoporakau soils are poorly drained, due to perching of water on a degraded fragipan. The fragipan is described as degraded due to the medium to coarse prismatic structure, compared to the extremely coarse or greater prismatic structure that is typical of a fragipan (e.g., Waikoikoi series). The degraded fragipan also typically has high density, which limits root growth to fissures between the prisms. Tomoporakau soils also have silty textures and are typically stonefree.

Soil phases and variants

Identified units in the Tomoporakau soils are:

- Tomoporakau undulating deep (TmU1): has no gravel within 90cm depth; occurs on slopes of 0–7°
- Tomoporakau undulating deep loamy variant (TmU1v): has loamy textures; has no gravel within 90cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Tomoporakau undulating deep (TmU1). 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 Tomoporakau soils are:

- Makarewa: moderately deep to deep poorly drained soil due to a high groundwater table; occurs on floodplains and has clayey textures
- Dacre: moderately deep to deep poorly drained soil due to a high groundwater table; occurs on floodplains and has silty textures
- Tisbury: deep poorly drained soil on terraces, with no perching horizon within 90cm depth
- Edendale: well drained Brown soil formed in deep loess, on intermediate terraces

Similar soils

Some soils that have similar properties to Tomoporakau soils are:

- Northope: moderately deep to deep imperfectly drained equivalent of the Tomoporakau soil
- Pukemutu: deep poorly drained soil with a fragipan
- Athol: equivalent soil formed in loess on terraces and downlands in northern Southland and west Otago

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.

| Tomoporakau profile | Horizon | Depth (cm) | Description |
|--|---------|------------|---|
|  | Apg | 0–23 | Greyish yellow brown silt loam; many brownish grey and few brown mottles; slightly firm soil strength; moderately developed coarse to very coarse prismatic and very fine to medium polyhedral structure; abundant roots |
| | Bg | 23–42 | Greyish olive silt loam; common dull yellow orange and few bright brown mottles; common worm casts; weak soil strength; moderately developed coarse prismatic breaking to medium prismatic structure; many roots |
| | Bw(g) | 42–90+ | Dull yellow orange silt loam; many greyish yellow and bright brown mottles; abundant light grey fracture faces on peds; slightly firm soil strength; moderately developed coarse to extremely coarse prismatic breaking to medium to coarse polyhedral structure; many roots between peds |
| | Bw(g) | 42–90+ | Dull yellow orange silt loam; many greyish yellow and bright brown mottles; abundant light grey fracture faces on peds; slightly firm soil strength; moderately developed coarse to extremely coarse prismatic breaking to medium to coarse polyhedral structure; many roots between peds |

Key profile features

Tomoporakau topsoils are about 20–25cm deep with a moderately developed structure. Subsoil structure is moderate to weakly developed. Greyish colours are dominant in the upper subsoil, indicating the poor drainage caused by water perching on the brighter coloured degraded fragipan.

Typical physical properties

Note: values in *Italics* are estimates

| Horizon | Depth (cm) | Bulk density | Permeability | Texture | Gravel content |
|---------|------------|-----------------|-----------------|-----------|----------------|
| Apg | 0–23 | Moderate – High | <i>Moderate</i> | Silt loam | Gravel free |
| Bg | 23–42 | Moderate – High | <i>Slow</i> | Silt loam | Gravel free |
| Bw(g) | 42–90+ | High | <i>Slow</i> | Silt loam | Gravel free |

| | |
|---------------------------------------|---|
| Profile drainage: | Poor |
| Plant readily available water: | <i>Moderately high</i> |
| Potential rooting depth: | Deep |
| Rooting restriction: | Limited subsoil aeration during sustained wet periods |

Key physical properties

Tomoporakau soils have a moderately deep to deep rooting depth, depending on the degree to which the fragipan has degraded. The soils are poorly drained with slow permeability in the subsoil, and moderately high waterholding capacity. Textures are heavy silt loams, with topsoil clay content of 25–35%. Soils contain no stones.

Typical chemical properties

| Horizon | Depth (cm) | pH | P retention | CEC | BS | Ca | Mg | K | Na |
|---------|------------|----------|-------------|----------|----------|----------|----------|----------|-----|
| Apg | 0–23 | Moderate | Moderate | Moderate | High | High | Moderate | Very low | Low |
| Bq | 23–42 | Moderate | Moderate | Moderate | Moderate | Moderate | Low | Very low | Low |
| Bw(g) | 42–90+ | Moderate | Low | Moderate | Moderate | Moderate | High | Very low | Low |

Key chemical properties

Topsoil organic matter content is 4–8%; P-retention 30–50% and pH moderate (high 5s). Cation exchange is moderate and base saturation high. Available calcium and magnesium levels are high to moderate and potassium levels low. Soil reserve phosphorus levels are low. Micronutrient levels are generally 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 | 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 poor drainage, with moderate clay and P-retention values. |
| Nutrient leaching | slight | These soils have a slight vulnerability to leaching to groundwater. This rating reflects the poor drainage, slow permeability and moderately high plant available water. |
| Topsoil erodibility by water | slight | Due to the moderate clay content, 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 | severe | These soils have a severe vulnerability to waterlogging during wet periods. This rating reflects the slow permeability of the subsoil and poor drainage. |

General landuse versatility ratings for Tomoporakau 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.

TmU1: (Tomoporakau undulating deep)

TmU1vl: (Tomoporakau undulating deep loamy variant)

Versatility evaluation for soil TmU1, TmU1vl

| Landuse | Versatility rating | Main limitation |
|-------------------------|--------------------|--|
| Non-arable horticulture | Limited | Inadequate aeration during wet periods; vulnerability to sustained waterlogging |
| Arable | Limited | Inadequate aeration during wet periods; vulnerability to sustained waterlogging |
| Intensive pasture | Moderate | Inadequate aeration during wet periods; vulnerability of topsoil to structural degradation by cultivation and intensive stocking |
| Forestry | Limited | Inadequate aeration during wet periods; potential flood risk. |

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 depth and moisture condition can be of benefit.

Soil profiles available for Tomoporakau soils

| Soil symbol | Profile ID | Topoclimate map sheet | Profile description available | Physical data available | Chemical data available | Profile photo available |
|-------------|------------|-----------------------|-------------------------------|-------------------------|-------------------------|-------------------------|
| TmU1 | IT8 | 8 | ✓ | ✓ | ✓ | ✓ |
| TmU1 | JT14 | 21 | ✓ | ✓ | ✓ | ✓ |

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