

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: Pomahaka

Overview

Pomahaka soils occupy about 130 ha on the accumulating flood plain of the Clutha River in the Clydevale district of south Otago, as well as in unsurveyed areas of the lower Clutha catchment. They are formed in moderately deep to deep fine alluvium derived mainly from schist rock. Pomahaka soils are typically free draining, with occasional depression areas that have imperfect drainage. They have deep rooting depth, and moderate to high water holding capacity, depending on the texture of the soil. Texture is variable, but dominantly loamy silt, with coarser textured sandy loams to sands common. Present use is pastoral grazing with cattle and sheep and cropping. Climate is temperate with regular rainfall.

Soil classification

NZ Soil Classification (NZSC): Typic Fluvial Recent; stoneless; silty.

Previous NZ Genetic Classification: Recent

Classification explanation

The NZSC of Pomahaka soils is consistent with previous classifications. The soils are formed in fluvial sediments and have topsoil development, with no subsoil development. Pomahaka soils are typically well drained, moderately deep to deep, and have loamy silt textures.

Soil phases and variants

Identified units in the Pomahaka soils are:

- Pomahaka undulating deep (PmU1): has no gravel within 90cm depth; occurs on slopes of 0–7°
- Pomahaka undulating deep imperfectly drained variant (PmU1vi): is imperfectly drained; has no gravel within 90cm depth; occurs on slopes of 0–7°
- Pomahaka undulating deep raw variant (PmU1vw): formed in recent silt deposits with no topsoil; has no gravel within 90cm depth; occurs on slopes of 0–7°
- Pomahaka undulating moderately deep (PmU2): has gravel between 45 and 90cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Pomahaka undulating deep (PmU1). 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., Pomahaka undulating moderately deep (PmU2).

Associated soils

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

- Pukeawa: well drained shallow soil, with less than 45cm to the underlying bedrock
- Paretai: moderately deep to deep poorly drained soil

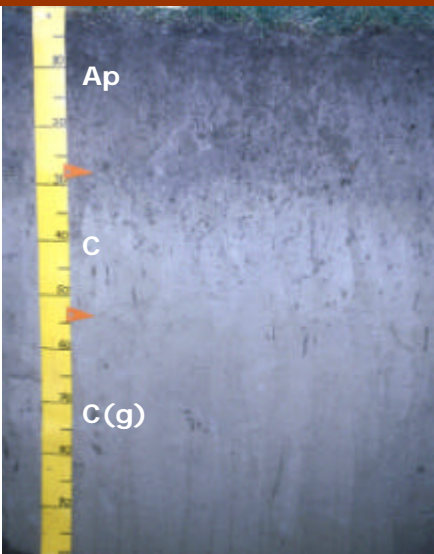
Similar soils

Some soils that have similar properties to Pomahaka soils are:

- Mataura: formed on the accumulating floodplains of the Mataura and Oreti rivers
- Clutha: formed on the slowly accumulating floodplain; has developed a weathered subsoil
- Popotunoa: forming on infrequently flooding low floodplain terraces with low sediment accumulation; has greater subsoil development, with the presence of a structured, brittle Bw horizon

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.

| Pomahaka profile | Horizon | Depth (cm) | Description |
|--|---------|------------|--|
|  | Ap | 0–28 | Brownish black loamy silt; weak soil strength; moderately developed fine polyhedral structure; abundant roots. |
| | C | 28–53 | Dark greyish yellow loamy silt; few wormcasts; slightly firm soil strength; massive structure; many roots. |
| | C(g) | 53–90+ | Pale yellowish brown loamy silt; common grey and few dark brown mottles; slightly firm soil strength; massive structure; common roots. |

Key profile features

Pomahaka soils have a moderately to weakly structured topsoil, 20–30cm deep. Subsoils show little weathering or development, and are generally structureless. Commonly there are layers of sand in the subsoil. There is good root distribution throughout the profile. The raw variant will have only a very thin topsoil, less than 10cm thick.

Typical physical properties

Note: values in *Italics* are estimates

| Horizon | Depth (cm) | Bulk density | Permeability | Texture | Gravel content |
|---------|------------|-----------------|-----------------|------------|----------------|
| Ap | 0–28 | Moderate – High | <i>Moderate</i> | Loamy silt | Gravel free |
| C | 28–53 | Moderate – High | <i>Moderate</i> | Loamy silt | Gravel free |
| C(g) | 53–90+ | High | <i>Moderate</i> | Loamy silt | Gravel free |

Profile drainage: Moderately well
Plant readily available water: *Very high*
Potential rooting depth: Deep
Rooting restriction: No major restriction

Key physical properties

Pomahaka soils have a deep rooting depth with very high plant available water. The water capacity will vary depending on texture, decreasing down to moderate as the amount of sand and/or gravel increases. The soils are generally well drained with good permeability, but the imperfectly drained variant may have some aeration limitations. Texture is variable, but dominantly loamy silt, with coarser textured sandy loams to sands common. Topsoil clay content is about 10%. Deep soils are stone free. Moderately deep soils have gravel below 45cm.

Typical chemical properties

| Horizon | Depth (cm) | pH | P retention | CEC | BS | Ca | Mg | K | Na |
|---------|------------|----------|-------------|----------|-----------|----------|----------|----------|----------|
| Ap | 0–28 | Moderate | Very low | Low | Very high | Moderate | Low | Very low | Very low |
| BC | 28–53 | High | Very low | Very low | Very high | Low | Very low | Very low | Very low |
| C(g) | 53–90+ | High | Very low | Very low | Very high | Low | Low | Very low | Very low |

Key chemical properties

Topsoil organic matter levels are 3–4%, P-retention 9–15% and topsoil pH moderate (high 5s). Subsoil pH values are high (high 6s). Cation exchange levels are very low and base saturation high. Available calcium levels are moderate with magnesium and potassium levels low. Soil reserve phosphorus and sulphur 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 | very severe | These soils have a very severe vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the low organic matter, clay and P-retention. |
| Nutrient leaching | moderate | These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the moderate drainage and permeability, offset by the high water-holding capacity. |
| Topsoil erodibility by water | moderate | Due to the low organic matter and clay content, topsoil erodibility in these soils is moderate. 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 | slight | These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the moderate drainage and permeability. |

General landuse versatility ratings for Pomahaka 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.

PmU1 (Pomahaka undulating deep)

PmU1vi (Pomahaka undulating deep imperfectly drained variant)

PmU2 (Pomahaka undulating moderately deep)

| Versatility evaluation for soil PmU1, PmU1vi, PmU2 | | |
|--|--------------------|--|
| Landuse | Versatility rating | Main limitation |
| Non-arable horticulture | Limited | Potential flood risk. |
| Arable | Moderate | Vulnerability to topsoil structural degradation by cultivation and compaction; Potential flood risk. |
| Intensive pasture | Moderate | Vulnerability to topsoil structural degradation by cultivation and compaction; risk of nutrient leaching |
| Forestry | Limited | Potential flood risk. |

PmU1vw (Pomahaka undulating deep raw variant)

| Versatility evaluation for soil PmU1vw | | |
|--|--------------------|--|
| Landuse | Versatility rating | Main limitation |
| Non-arable horticulture | Unsuitable | Potential flood risk. |
| Arable | Unsuitable | Potential flood risk. |
| Intensive pasture | Limited | Vulnerability to topsoil structural degradation by cultivation and compaction; potential flood risk. |
| Forestry | Unsuitable | Potential flood risk. |

Management practices that may improve soil versatility

- Pomahaka soils would benefit from flood protection for intensive landuses.
- Cultivation and intensive stocking or vehicular traffic should be minimised during wet periods
- Long-term cultivation should be carefully managed to minimise structural degradation
- Organic matter levels should be carefully maintained and enhanced
- Management of nutrient applications that minimise leaching losses

Soil profiles available for Pomahaka soils

| Soil symbol | Profile ID | Topoclimate map sheet | Profile description available | Physical data available | Chemical data available | Profile photo available |
|-------------|------------|-----------------------|-------------------------------|-------------------------|-------------------------|-------------------------|
| PmU1 | PCT8 | 33 | ✓ | ✓ | ✓ | ✓ |
| PmU1vi | PCT9 | 33 | ✓ | ✓ | ✓ | ✓ |

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