

**Soil name: Pukerangi**

**Overview**

Pukerangi soils occupy about 130 ha on fan and lower hill slopes in the upper Mataura River valley, near Garston. These soils also occur in northern Southland hill slopes outside the Topoclimate survey area. They are formed into moderately deep mixed fine alluvium and loess, overlying schist gravels. Soils are moderately well drained, with a slightly deep rooting depth, moderately high plant available moisture and silty textures. Present use is pastoral grazing with sheep and beef cattle. Climate is temperate with cold winters and warm summers, when soils are often seasonally dry.

**Physical properties**

Pukerangi soils have a slightly deep (45–60cm) rooting depth and moderately high plant available water holding capacity. The soils are moderately well drained with slow subsoil permeability. Textures are silt loams, with topsoil clay content about 20%. Upper soil horizons have a slight gravel content, but gravelly horizons typically occur below 45cm depth.

**No  
profile photo  
available**

*Pukerangi profile*

**Fertility properties**

Topsoil organic matter values are about 6%, P-retention 15–30% and pH moderate (high 5s). Cation exchange and base saturation values are low. Available calcium, magnesium and potassium levels are all low. Soil reserve phosphorus and sulphur levels are low. Micronutrient levels are generally adequate.

**Associated and similar soils**

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

- Arthurton: imperfectly drained moderately deep to deep soils that are formed in loess.
- Nokomai: deep well drained soil formed in loess
- Athol: deep poorly drained soil formed in loess

Some soils that have similar properties to Pukerangi soils are:

- Berwen: shallow equivalent of the Pukerangi soil, with gravels within 45cm depth

## 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
<b>Structural compaction</b>	severe	These soils have a severe vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the low P-retention, organic matter and clay content.
<b>Nutrient leaching</b>	severe	These soils have a severe vulnerability to leaching to groundwater. This rating reflects the moderately good drainage and moderately high water-holding capacity.
<b>Topsoil erodibility by water</b>	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.
<b>Organic matter loss</b>	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).
<b>Waterlogging</b>	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the moderately well drained nature of the soil 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.

### PKR2 (Pukerangi rolling moderately deep)

Versatility evaluation for soil PKR2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Restricted rooting depth
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Vulnerability to topsoil structural degradation by cultivation and compaction by intensive stocking.
Forestry	Limited	Restricted rooting depth

### PKU2 (Pukerangi undulating moderately deep)

Versatility evaluation for soil PKU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Restricted rooting depth
Arable	Limited	Vulnerability to topsoil structural degradation by cultivation and compaction; restricted rooting depth.
Intensive pasture	Moderate	Vulnerability to topsoil structural degradation by cultivation and compaction by intensive stocking; restricted rooting depth
Forestry	Limited	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 minimal during these 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 so as to minimise leaching losses