

Soil name: Te Anau

Overview

Te Anau soils occupy about 10,100 ha on rolling terrain in the Te Anau basin. They are formed on glacial moraines, derived from Fiordland rocks. These soils are formed in shallow to moderately deep mixed loess and gravel, overlying the compacted unweathered gravelly glacial till. They are well drained, with silt loam topsoil texture, strongly leached and have a high P-retention. They are suited to pastoral farming with sheep and deer and require a high fertiliser input to maintain pasture production. Winters are cold with summers occasionally seasonally dry in some years.



Te Anau profile

Physical properties

Te Anau soils have shallow rooting depth, due the glacial till, but have moderately high plant available water. The moderately deep phases are likely to have slightly deep rooting depth. Soils are moderately well drained, with good aeration in upper horizons, but drainage may be restricted during wet periods due to the slow water permeability through the glacial till. Textures are silt loams in the topsoil, with a clay content of less than 20%. The soil horizons above the glacial till are slightly to moderately gravelly, and boulders are common.

Fertility properties

Topsoil organic matter levels are 12–16%; P-retention values above 80% in horizons above the till; pH values are moderate throughout the profile. Cation exchange values are moderate and decrease down the profile, with low base saturation figures. Available calcium, magnesium and potassium levels are low. Reserve potassium and phosphorus values are low. Subsoil sulphate levels are moderate. Micro-nutrient levels are generally adequate.

Associated and similar soils

Some soils that commonly occur in association with Te Anau soils are:

- Kakapo: shallow, poorly drained soils occurring in depressions on old moraine surfaces.
- Excelsior: moderately deep to deep well drained soils with a fragipan
- Otanomomo: A peat soil occurring on low-lying poorly drained depressions

Some soils that have similar properties to Te Anau soils are:

- Monowai: formed on glacial outwash terraces

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	minimal	These soils have a minimal vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage, as well as high organic matter and P-retention in the topsoil.
Nutrient leaching	severe	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the good drainage and moderate water-holding capacity.
Topsoil erodibility by water	slight	Due to the high organic matter 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	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 good drainage, but slow permeability of the underlying till. The hilly phase is likely to have no vulnerability to waterlogging.

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.

AuU3 (Te Anau undulating shallow) and AuU2 (Te Anau undulating moderately deep)

Versatility evaluation for soil AuU3, AuU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Shallow potential rooting depth
Arable	Limited	Shallow potential rooting depth
Intensive pasture	Limited	Shallow potential rooting depth
Forestry	Limited	Shallow potential rooting depth

AuR3 (Te Anau rolling moderately deep) and AuR2 (Te Anau rolling shallow)

Versatility evaluation for soil AuR3, AuR2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Shallow potential rooting depth
Arable	Limited	Shallow potential rooting depth and rolling slopes
Intensive pasture	Limited	Shallow potential rooting depth
Forestry	Limited	Shallow potential rooting depth

AuH2 (Te Anau hilly moderately deep) and AuH3 (Te Anau hilly shallow)

AuS2 (Te Anau steep moderately deep) and AuS3 (Te Anau steep shallow)

Versatility evaluation for soil AuH2, AuH3, AuS2, AuS3		
Landuse	Versatility rating	Main limitation
Non arable horticulture	Unsuitable	Hilly to steep slopes
Arable	Unsuitable	Hilly to steep slopes
Intensive pasture	Limited	Shallow potential rooting depth and hilly to steep slopes
Forestry	Limited	Shallow potential rooting depth

Management practices that may improve soil versatility

- Organic matter levels should be carefully maintained and enhanced
- Over-cultivation of dry soils in summer may allow wind erosion
- Irrigation for intensive pasture and crop production to overcome summer moisture deficiencies.
- Management of nutrient applications so as to minimise leaching losses

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