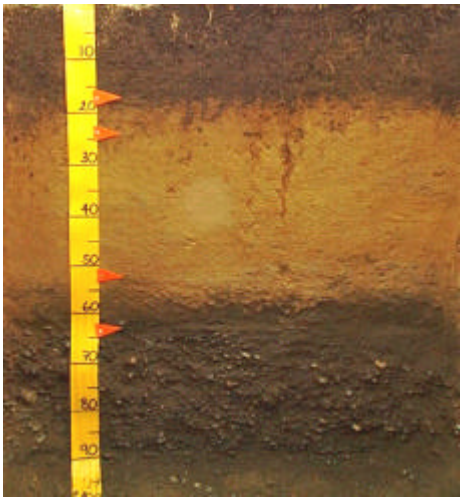
Soil name: Freestone

Overview

Freestone soils occupy about 700 ha on outwash terraces of the Waiau river southwest of Manapouri township. They are formed in fine gravelly alluvium derived from Fiordland rocks. They are moderately deep to deep, very well drained soils, with moderately deep rooting depth, moderately high water holding capacity, and sandy loam textures. They are used for pastoral farming with sheep and beef cattle and are recognised as having cropping potential. Climate is cold in the winter and summers can occasionally be dry, when soils can dry out.



Freestone profile

Physical properties

Freestone soils have a moderately deep rooting depth with moderately high plant-available water. They are well drained, with good aeration and permeability. Textures are loamy silts to sandy loams, and the topsoil clay content of 15–20%. The soils typically have gravels between 45 and 90cm. The deep phase has no gravels within 90cm depth, and has a deep rooting depth and high water-holding capacity.

Fertility properties

Topsoil organic matter levels are about 11%; P-retention values 75% and pH values moderate, with little change in the subsoil. Cation exchange values are moderate and base saturation low, with both properties grading to very low in the subsoil. Available magnesium, potassium, and sodium levels are very low. Reserve phosphorus levels are low, with high P-retention values compounding this. Micro-nutrient levels are generally adequate.

Associated and similar soils

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

- Monowai soils: occur on the same surface, but are shallow, stony soils
- Otanomomo: very poorly drained peat soils
- Te Anau: shallow and moderately deep soils forming on moraines
- Manapouri: deep, poorly drained due to a high groundwater table

Some soils that have similar properties to Freestone soils are:

- Mararoa: forming into loess on fans and terraces; has silty textures
- Tuatapere: formed into younger alluvium on floodplains and low terraces; has more varied soil properties depending on the age and parent material influence
- Ardlussa: forming into alluvium of rivers in northern Southland; has silty textures and lower P-retentions.

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, high organic matter and P-retention levels.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the good drainage and permeability, but is offset by the moderately high water-holding capacity.
Topsoil erodibility by water	minimal	Due to the topsoil clay percentage, the topsoil erodibility of these soils is minimal compared to other Southland soils. 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	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage and 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.

FsU2 (Freestone undulating moderately deep)

Versatility evaluation for soil FsU2		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Restricted rooting depth
Arable	High	No major limitations
Intensive pasture	Moderate	Vulnerability to nutrient leaching to groundwater
Forestry	Moderate	Restricted rooting depth.

FsU1 (Freestone undulating deep)

Versatility evaluation for soil FsU1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	High	No major limitations
Arable	High	No major limitations
Intensive pasture	Moderate	Vulnerability to nutrient leaching to groundwater
Forestry	High	No major limitations

Management practices that may improve soil versatility

- Management of nutrient applications so as to minimise leaching losses
- Can be seasonally dry in some years, with irrigation of benefit for growth.