Soil name: Nithdale

Overview

Nithdale soils occupy about 900 ha from the Kaiweras in eastern Southland to Waikawa in southern Southland. They occur on floodplains and low terraces adjacent to minor streams. They are formed in deep to moderately deep fine alluvium from tuffaceous greywacke. Nithdale soils are well drained soils with deep rooting depth, moderately high plant available water, and silt loam to clay loam textures. Present use is pastoral grazing with sheep, beef cattle and some deer. Climate is cool temperate with regular rain.

Nithdale profile

Physical properties

Nithdale soils have a deep rooting depth, high plant available water, and no major restriction to root growth. The soils are well to moderately well aerated, but have slow permeability in the lower subsoil. Horizon texture is typically heavy silt loam, but may contain contrasting layers of silty clay to sandy loam texture. Topsoil clay content is 25–35%. The deep phase soils are stoneless, with the moderately deep phase having gravel below 45cm depth.

Fertility properties

Topsoil organic matter levels are 9–13%; P-retention values 60–75% and topsoil pH values low to moderarte (low–mid 5s). Subsoil pH values are low. Cation exchange values are moderate and base saturation low. Available cations values are mostly low with reserve phosphorus levels low. Micronutrient values are generally adequate although pastures may be deficient in cobalt (for sheep) and in copper (for deer and cattle) in summer.

Associated and similar soils

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

- Jacobstown: poorly drained Gley soils due to a high groundwater table; slowly accumulating, with a structured subsoil
- Dacre: poorly drained Gley soils due to a high groundwater table; moderately accumulating with little structural developemnt in the subsoil
- Otanomomo: very poorly drained soil formed into peat

Some soils that have similar properties to Nithdale soils are:

- Niagara: imperfectly drained equivalent of the Nithdale soil
- Hedgehope: occurs as levees on the Hedgehope, Makarewa and Otapiri streams; typically has silty textures with no clayey horizons
- Ardlussa: occurs on floodplains and low terraces of streams and rivers in northern Southland and west Otago; not as strongly weathered as the Nithdale, with Pallic to Brown intergrade properties
- Tokanui: formed in loess on rolling downlands and hilly land; has a firm subsoil

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	slight	These soils have a slight vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the moderately well to well drained character of the soil and the moderate to high organic matter content and P-retention.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the moderately well to well drained character of this soil, offset by the high water holding capacity .
Topsoil erodibility by water	minimal	Due to the high organic matter content and moderate to high clay content, topsoil erodibility in these soils is minimal. 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, but slow permeability of the subsoil. The imperfectly drained variant has a moderate waterlogging vulnerability because of its poorer drainage status.

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.

NtU1 (Nithdale undulating deep)

Versatility evaluation for soil NtU1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Risk of short-term waterlogging after heavy rain; potential flood risk.
Arable	Moderate	Risk of short-term waterlogging after heavy rain.
Intensive pasture	Moderate	Vulnerability of leaching to groundwater; risk of short-term waterlogging after heavy rain.
Forestry	Limited	Potential flood risk

NtU1vi (Nithdale undulating deep imperfectly drained variant): inadequate aeration during wet periods becomes the primary limitation for all landuses except for forestry.

NtR1 (Nithdale rolling deep)

Versatility evaluation for soil NtR1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Rolling slopes; risk of short-term waterlogging after heavy rain.
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Vulnerability to leaching to ground water; risk of short-term waterlogging after heavy rain.
Forestry	Limited	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.