Soil name: Riversdale

Overview

Riversdale soils occupy about 19,200 ha on the flood plains of the Mataura, Oreti and Pomahaka rivers and their tributaries. They are formed in gravelly alluvium derived from greywacke and schist rocks. Riversdale soils are shallow (<45 cm to gravels) and free draining soils that are still occasionally flooded. They are moderately fertile, with silty to sandy texture, but the rooting depth and water capacity is limited by the gravels. Riversdale soils are used for sheep and dairy production with some cropping, but their versatility is limited by the stoniness and flood risk. Summer rainfall is often suboptimal and the soils tend to be droughty.

Soil classification

NZ Soil Classification (NZSC): Typic Fluvial Recent; rounded-stony, hard sandstone; silty
Previous NZ Genetic Classification: Recent soil

Classification explanation

The NZSC of Riversdale soils is consistent with previous classifications. The soils are formed in fluvial sediments dominated by greywacke gravels. Riversdale soils are well drained, with good topsoil development but no B horizon has developed in the subsoil. Gravels occur at between 0 and 45cm depth, with silty textures above the gravels.

Soil phases and variants

Identified units in the Riversdale soils are:

- Riversdale undulating shallow (RiU3): Stony soils on a slope of 0–7º

Associated soils

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

- Mataura: Gravel occurs at greater than 45 cm depth
- Lumsden: also shallow, but poorly drained due to a high water table
- Jacobstown: poorly drained, and gravel occurs at greater than 45cm depth
- Howe: on active accumlating floodplain; variable soils due to active flooding

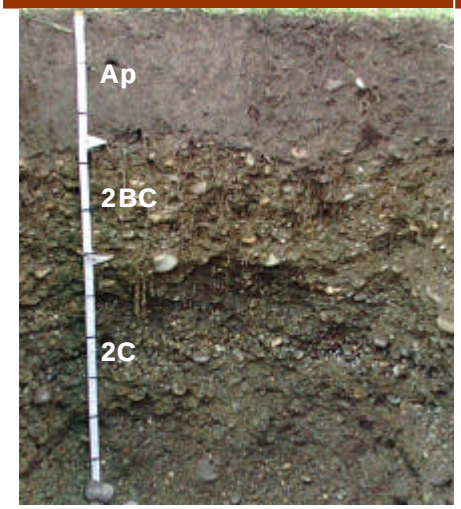
Similar soils

Some soils that have similar properties to Riversdale soils are:

- Upukerora: shallow recent soil on the floodplain of the Aparima and Waiau Rivers (including tributaries), in gravelly alluvium from tuffaceous greywacke and volcanic rocks
- Waiau: shallow soil on floodplain and low terraces of the Aparima and Waiau Rivers (including tributaries); some limited B horizon development
- Gore: shallow soil on low terraces of the Mataura and Oreti Rivers (including tributaries); has a more developed profile

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.

Riversdale profile	Horizon	Depth (cm)	Description
	Ap	0–26	Brownish grey slightly gravelly silt loam; weak soil strength; moderately developed medium polyhedral structure; gravels rounded and unweathered; abundant roots
	2BC	26–51	Greyish olive extremely gravelly sand; loose particle packing; single grain structure; gravels rounded and unweathered; many roots
	2C	51–100	Greyish olive extremely gravelly sand; very weak soil strength; loose particle packing; single grain structure; gravels rounded and unweathered; few roots

Key profile features

Riversdale soils have a topsoil 15–30cm deep, with moderately developed structure. Subsoil development is weak, with greyish colours and little structural development. Pasture roots extend to about 50cm with very few at lower depths, depending on the amount of gravel.

Typical physical properties

Note: values in Italics are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–26	Moderate	*Rapid*	Silt loam	Slightly gravelly
2BC	26–51	N/A	*Rapid*	Sand	Moderately gravelly
2C	51–100	N/A	*Rapid*	Sand	Extremely gravelly

Profile Drainage: Well drained

Plant readily available water: *Moderate–Low*

Potential rooting depth: Slightly deep

Rooting restriction: Extremely gravelly subsoil

Key physical properties

Riversdale soils have a moderate to slightly deep rooting depth, depending on the graveliness of the subsoil. Plant available water will vary from moderate to low depending on the amount of gravels present. The soils are well drained (sometimes excessively) with good aeration. Textures are usually silt loams to sandy loams in the topsoil, grading to sand in deeper horizons, with topsoil clay content of less than 18%. Topsoils often are slightly to moderately gravelly, and moderately to extremely gravelly below.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–26	Moderate	Low	Moderate	High	Moderate	Low	Very low	Very low
2BC	26–51	Moderate	Very low	Low	Moderate	Low	Low	Very low	Very low
2C	51–100	Moderate	Very low	Very low	Moderate	Very low	Very low	Very low	Very low

Key chemical properties

Topsoil organic matter levels range from 3 to 7%; P-retention values mostly under 15%; ph values are moderate, with little change down the profile. Cation exchange values are moderate in topsoils, but low in suboils; base saturation values are moderate. Values for available calcium, magnesium, potassium and sodium are all low to very low. Phosphorus and sulphur reserves are also low, with good responses to these nutrients. Micronutrient levels are grenerally 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–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	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 clay and P-retention in the topsoil that results in low structural stability.
Nutrient leaching	Very severe	These soils have a very severe vulnerability to leaching to ground water. This reflects the rapid permeability and low water-holding capacity.
Topsoil erodibility by water	Slight	Due to the low–moderate clay and organic matter content, topsoil erodibility in these soils is slight. Erodibility is highly dependent on management, especially when there is no vegetation cover.
Organic matter loss	Moderate	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	Nil	These soils have nil vulnerability to waterlogging during wet periods. This rating reflects the good drainage and rapid permeability.

General land-use versatility ratings for Riversdale 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.

RiU3 (Riversdale undulating shallow)

Versatility evaluation for soil RiU3		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Limited	Rooting depth and vulnerability to leaching to groundwater
Arable	Limited	Vulnerability to leaching to groundwater
Intensive pasture	Limited	Vulnerability to leaching to groundwater
Forestry	Limited	Rooting depth; risk of flooding

Management practices that may improve soil versatility

- Riversdale 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 so as to minimise leaching losses

Soil profiles available for Riversdale soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
RiU3	WT7	24	✓	✓	✓	✓
RiU3	ET3	28A	✓	✓	✓	✓
RiU3	FT18	15	✓	✓	✓	✓
RiU3	XT03	13	✓	✓	✓	✓
RiU3	M3158	1	✓	✓		
RiU3	G299	4	✓	✓		
RiU3	M737	1	✓	✓		
RiU3	150/75/32	43	✓	✓		

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