Soil name: Tailings

Overview

Tailings occupy about 3,500 ha on river flats and terraces that have been mined by dredging and sluicing in various districts of Southland. They are dominantly formed into disturbed alluvial gravels, with some areas of fine alluvium from sluicings. Soils have a wide range of properties with no site being typical. They are variable soils, but are generally shallow, well to imperfectly drained, and suficiently stable to have topsoil development. Present use is pastoral farming with sheep, dairy, beef cattle and deer grazing. Climate is temperate with regular rain. More inland shallow soils can be seasonally dry.

Soil classification

NZ Soil Classification (NZSC):	Stony-tailings Fill Anthropic; rounded-stony, hard sandstone; loamy
Previous NZ Genetic Classification:	Anthropic soils

Classification explanation

The NZSC for Tailings is consistent with the previous classification. They are soils formed as deposits from mining, and are dominantly shallow with gravel within 45cm depth.

Soil phases and variants

Identified units in the Tailings soils are:

- Tailings undulating shallow (UTaU3): has gravel within 45cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Tailings undulating shallow (UtU3). Values for other phases and variants can be taken as being similar. Where they differ significantly they are recorded with a separate versatility rating.

Associated soils

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

- Fleming: deep, poorly drained soil due to water perching on a fragipan
- Jacobstown: moderately deep to deep, poorly drained soil due to a high groundwater table; has no fragipan

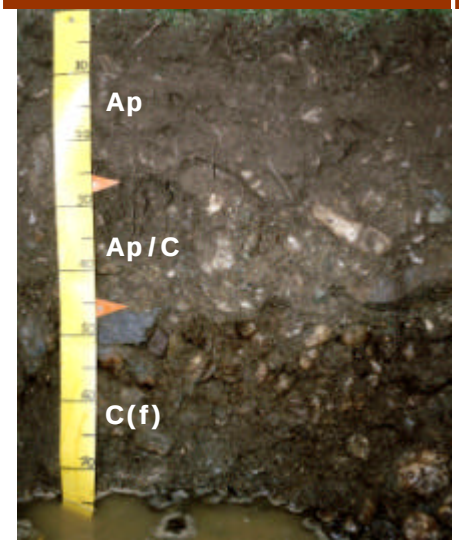
Similar soils

Some soils that have similar properties to Tailings soils are:

- Riversdale: shallow floodplain soil with little profile development

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.

Tailings profile	Horizon	Depth (cm)	Description
	Ap	0–27	Greyish yellow-brown very gravelly silt loam; loose particle packing; moderately developed very fine and medium polyhedral structure; gravels fresh and rounded; abundant roots
	Ap/C	27–49	Yellowish brown very gravelly sand; many worm casts; loose particle packing; single grain structure; gravels fresh and rounded; many roots
	C(f)	49–90+	Greyish yellow-brown extremely gravelly sand; many greyish brown sesquioxide coats on faces of gravels; loose particle packing; single grain structure; gravels fresh and rounded; common roots

Key profile features

Tailings have variable topsoil depth of 10–30cm, with a weak to moderately (in older soils) developed structure. Subsoil structure is weakly developed or absent. Gravel occurs in all horizons.

Typical physical properties

Note: values in Italics are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–27	—	*Moderate*	Loamy sand	Very gravelly
BC	27–49	—	*Moderate*	Loamy sand	Very gravelly
C(f)	49–90+	—	*Moderate*	Sand	Extremely gravelly

Profile drainage: Moderately well

Plant readily available water: *Moderate*

Potential rooting depth: Slightly deep

Rooting restriction: Gravel with high water table in some situations.

Key physical properties

Considerable variation in physical properties occurs, with values dependent on mining treatment and the time elapsed since mining. The following values are indicative, with variations expected in some situations. Soils have a slightly deep rooting depth with moderate plant available water. Topsoils are well aerated, with moderate permeability. Textures are loamy sands with occasional silt loams, and topsoil clay content is generally low (5–25%). Gravel occurs in varying amounts in all horizons, with lenses of fine material common, particularly where forming into sluicings.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–27	Moderate	Low	Moderate	Very high	High	Moderate	Low	Low
Ap/C	27–49	Moderate	Low	Low	Very high	Low	Low	Very low	Very low
C(f)	49–90+	Moderate	Low	Low	Very high	Low	Moderate	Very low	Low

Key chemical properties

As for the pysical features of this soil, considerable variation in properties can occur. Indicative values are given. Topsoil organic matter levels are about 4–5%. P-retention 10–15% and pH moderate (high 5s). Cation exchange is moderate to low with base saturation high. Available calcium and magnesium levels are moderate to high with potassium values low. Reserve phosphorus values are low. Micro nurtient values are generally 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 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	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 good drainage, offset by the low organic matter and clay content and P-retention.
Nutrient leaching	very severe	These soils have a very severe vulnerability to leaching to groundwater. This rating reflects the well-drained nature, moderate permeability and water holding capacity.
Topsoil erodibility by water	moderate	Due to the low clay and organic matter levels, topsoil erodibility in these soils is moderate. Erodibility is highly dependent on management, particularly 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	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the well-drained nature of the soil.

General landuse versatility ratings for Tailings 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.

UTaU3 (Tailings undulating shallow)

Versatility evaluation for soil UTaU3		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Limited	Vulnerability to leaching to groundwater; restricted rooting depth.
Arable	Limited	Vulnerability to leaching to groundwater.
Intensive pasture	Limited	Vulnerability to leaching to groundwater.
Forestry	Limited	Restricted rooting depth.

Management practices that may improve soil versatility

- Management of nutrient applications so as to minimise leaching losses
- Organic matter levels should be carefully maintained and enhanced
- Long-term intensive cultivation should be carefully managed to minimise structural degradation

Soil profiles available for Tailings soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
UTaU3	GMT13	27	✓	✓	✓	✓
UTaU3	VT10	2	✓	✓	✓	✓
UTaU3	M1987	26	✓			

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