

SUT Sutherlands Land System

Undulating stony rises formed on basement rocks in the Australia Plains - Sutherlands - Brownlow - Dutton East area.

Area: 106.0 km²

Annual rainfall: 275 – 375 mm average

Geology: The land system is formed on phyllites and metasiltstones of the Saddleworth, Appila, Tarcowie and Tapley Hill Formations. These rocks are generally within a metre of the surface, but in places they are covered by old medium to fine textured alluvial sediments on relict high level outwash fans. Both rocks and sediments are mantled by rubbly or soft carbonates, which are cemented into sheet forms in places. Medium to fine grained alluvial sediments are associated with modern water courses.

Topography: The Sutherlands Land System is a strip of basement rock rises on the boundary of the Mt. Lofty Ranges and the Murray Basin. There is an area of strong dissection in the south which is mapped separately as the North Hills Land System. The land has an easterly aspect with an overall gradient of about 2%, but dissection by east flowing water courses gives the land its relief. Slopes range from 3 to 12%. In a previous geological period the land was apparently covered by sediments washed from the higher ranges to the west. Although most of these sediments have been subsequently eroded away, remnants occur in the north of the System on very gently inclined upper slopes. Most of the surface of the rises is covered by 20% or more calcrete and basement rock fragments. The water courses which have dissected the land occupy narrow flats. Some of these are scalded (indicating severe sheet erosion in the past), and most water courses are eroded to some degree.

Elevation: 290 m in the north to 180 m in the south east

Relief: Maximum relief is 30 m

Soils: The soils are calcareous sandy loams to clay loams. They have variable amounts of subsoil carbonate rubble, and variable depths - shallow over weathering rock, to deep over alluvium:

Main soils:

- A4a** Moderately deep rubbly calcareous sandy loam
- A2** Shallow calcareous loam on rock
- A4b** Deep rubbly calcareous sandy loam
- B2** Shallow calcareous sandy loam on calcrete

Minor soils:

- A6** Deep calcareous clay loam
- A3** Deep calcareous loam

Main features: The Sutherlands Land System comprises undulating rises on the eastern margin of the Mt. Lofty Ranges. It roughly marks the eastern extent of regular cropping land in the district. The outstanding feature of the land system is the high proportion of rubbly calcareous soils. These have restricted moisture holding capacity due to the volume of rubble and, in many



cases, shallow depth over basement rock. However, given the marginal rainfall of the area, this constraint may not be as severe a limitation as it may appear. The soils have open structure and unless sheet calcrete occurs at shallow depth, there are no physical impediments to root growth. Natural fertility is moderately low due to low clay content and high surface pH. High subsoil pH may prevent deep root growth and maximum water use. Water course erosion is common on slopes, and the limited areas of creek flats are characterized by eroded banks and scalded patches.

Soil Landscape Unit summary: 6 Soil Landscape Units (SLUs) mapped in the Sutherlands Land System

SLU	% of area	Main features #
EEB EEC EEH	10.8 12.4 43.5	<p>Undulating rises formed on phyllites and metasilstones capped by fine to rubbly carbonates. There are 10-20% (up to 30%) surface calcrete and basement rock fragments. Water courses are well defined and usually eroded to some extent.</p> <p>EEB Rises to 20 m high with slopes of 2-4% and minor water course erosion. EEC Rises to 30 m high with slopes of 3-8%. EEH Rises to 30 m high with slopes of 3-12% and moderate water course erosion.</p> <p>Main soils: <u>moderately deep rubbly calcareous sandy loam - A4a</u> (E) and <u>shallow cal-careous loam on rock- A2</u> (E) with <u>shallow calcareous sandy loam over calcrete - B2</u> (L).</p> <p>Much of this land is cropped, although significant areas have not been cleared, presumably because the soils were too shallow. Soils throughout have restricted waterholding capacity due to high rubble content and moderate depth over bedrock, but given the marginal rainfall, this may only be a limitation in very shallow soils. Fertility is low to moderate due to low clay content and high pH, but structure, drainage and aeration are good. Very high subsoil pH levels may restrict root growth and water use.</p>
KVJ KV _o	7.0 3.9	<p>Drainage depressions formed on fine to medium grained alluvial sediments.</p> <p>KVJ Drainage depressions with eroded water courses. KV_o Drainage depressions with eroded water courses and scalded patches.</p> <p>Main soils: <u>deep calcareous clay loam - A6</u> (V), with <u>deep calcareous loam - A3</u> (L).</p> <p>These areas are generally too narrow and difficult to work (due to water courses) to have much agricultural value. Although soils are deep and have moderate inherent fertility, gully and sheet erosion in the past have reduced productivity potential. Subsoil salinity is moderate to high.</p>
ShB	22.4	<p>Gently undulating rises with slopes of 2-5% formed on medium textured sediments capped by rubbly carbonates. There are up to 30% surface calcrete fragments. Water courses are well defined and eroded in places.</p> <p>Main soils: <u>deep rubbly calcareous sandy loam - A4b</u> (V) with <u>shallow calcareous sandy loam on calcrete - B2</u> (L).</p> <p>There is variable rubble content in these soils, resulting in a variable effective soil depth. Although moisture holding capacity is generally restricted, this may only be a limitation on soils with heavy rubble layers or calcrete, given the marginal rainfall. Remnant scrub patches indicate areas where rock or shallow depth prevent cultivation. Fertility is low to moderate due to low clay content and high pH, but structure, drainage and aeration are good. Very high subsoil pH levels may restrict root growth and water use.</p>

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

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|----------------------------------------------|---------------------------------------|
| (D) Dominant in extent (>90% of SLU) | (C) Common in extent (20–30% of SLU) |
| (V) Very extensive in extent (60–90% of SLU) | (L) Limited in extent (10–20% of SLU) |
| (E) Extensive in extent (30–60% of SLU) | (M) Minor in extent (<10% of SLU) |



Detailed soil profile descriptions:

- A2** Shallow calcareous loam on rock (Paralithic, Hypercalcic Calcarosol)
10 - 20 cm calcareous loam becoming very highly calcareous with depth and grading to weathering basement rock at 45 cm.
- A3** Deep calcareous loam (Regolithic, Calcic Calcarosol)
Calcareous loam to clay loam continuing below 100 cm with only minor increases in clay and carbonate content.
- A4a** Moderately deep rubbly calcareous sandy loam (Paralithic, Lithocalcic / Supracalcic Calcarosol)
10 - 15 cm calcareous stony sandy loam over rubbly Class III C or III B carbonate, grading to a very highly calcareous sandy loam to sandy clay loam merging with weathering rock at 65 cm.
- A4b** Deep rubbly calcareous sandy loam (Regolithic, Lithocalcic / Supracalcic Calcarosol)
10 - 15 cm calcareous stony sandy loam to loam over rubbly Class III C or III B carbonate, grading to a very highly calcareous sandy loam to sandy clay loam merging with a reddish clay loam to light clay at about 100 cm.
- A6** Deep calcareous clay loam (Regolithic, Hypercalcic Calcarosol)
10 - 20 cm calcareous loam to clay loam grading to a very highly calcareous brown clay loam to clay merging with clayey alluvium from about 100 cm.
- B2** Shallow calcareous sandy loam on calcrete (Petrocalcic, Lithocalcic Calcarosol)
Medium to thick calcareous sandy loam with variable rubble over calcrete at depths shallower than 50 cm.

Further information: [DEWNR Soil and Land Program](#)

