## SUB Sunnybrae Land System

Undulating rises and rocky ridges south east of Yongala

**Area**: 83.1 km<sup>2</sup>

**Annual rainfall**: 350 – 425 mm average

**Geology**: Most of the land system is formed on siltstones and slates of the Tapley Hill and

Saddleworth Formations, with harder bands of Appila Tillite, Undalya Quartzite and Grampus Quartzite. There are extensive areas of locally derived sediments deposited in valleys between the basement rock highs. Both rocks and sediments are mantled by aeolian

carbonates which occur as fine or rubbly segregations in the lower soil profile.

**Topography**: Undulating rises formed mainly on the softer, fine grained rocks, interspersed with rocky

moderately steep ridges formed mainly on the more resistant tillites and quartzites. The rises and ridges grade to gently inclined outwash fans and valley flats formed on alluvium. Slopes range from 20-30% on the steeper ridges and 3-20% on the rises, to less than 3% on

fans and flats.

**Elevation**: 645 m to 550 m

**Relief**: Maximum relief is 50 m, but 10 - 30 m is more usual

**Soils**: Most soils are shallow to moderately deep over weathering basement rock. Some merge

directly with the rock, others have a well developed subsurface calcareous layer, and others have red clayey subsoils. On lower slopes and fans, soils are deeper, usually with loamy

surfaces and red clayey subsoils.

**Main soils:** Moderately deep to shallow soils on basement rock rises

A2 Shallow calcareous loam - calcareous rocks
 D1 Hard loam over red clay on rock - throughout
 C2 Shallow gradational loam - throughout
 Deep soils formed over alluvium on outwash fans

D2 Hard sandy loam over well structured red clayD3 Hard sandy loam over dispersive red clay

**Minor soils:** Moderately deep to shallow soils on basement rock rises

L1 Shallow stony loam - steeper, rockier slopes

**D7** Hard sandy loam over dispersive red clay on rock - coarser grained rocks

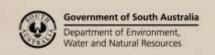
Deep soils formed over alluvium on outwash fans

C3 Gradational red loam

**Main features:** The Sunnybrae Land System has a high proportion of arable land, but moderately low

rainfall sets limits on productivity. On rising ground, the main soil limitations are shallowness (low waterholding capacity), and poor surface structure. Improving surface structure will help reduce run off and erosion, as well as increasing plant available water in the soil. Better water use on higher ground through fertility maintenance and surface condition improvements will also help alleviate salinity on lower lying land. Soils on lower slopes are deeper and more fertile, but often have poor surface and sometimes subsurface structure. This reduces water infiltration and increases erosion potential, and affects

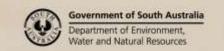
emergence, root growth and workability.





## Soil Landscape Unit summary: 19 Soil Landscape Units (SLUs) mapped in the Sunnybrae Land System

	% of	
SLU	% of area	Main features
AAC	1.7	Rocky low hills up to 40 m high with slopes of 10-25%, formed on Appila Tillite.
		Main soils: <u>shallow stony loam</u> - <b>L1</b> (E) and <u>shallow calcareous loam</u> - <b>A2</b> (C) with <u>hard loam over</u>
		<u>red clay on rock</u> - <b>D1</b> (L) and <u>shallow gradational loam</u> - <b>C2</b> (L). This land is largely inaccessible, due to steep slopes and rockiness. Pasture productivity is limited mainly by shallow soils and the
		difficulty in undertaking improvements (sowing, fertilizing etc). There is considerable potential for
		erosion. Watercourses are generally stable.
ABB	2.7	Rocky quartzite ridges.
ABC	0.8	ABB Up to 20 m high, with slopes of 10-25%.
		ABC Up to 50 m high with slopes of 15-30%.
		Main soils: <u>shallow stony loam</u> - <b>L1</b> (V) with <u>shallow calcareous loam</u> - <b>A2</b> (C). Extensive linear
		outcrops of quartzite are a feature of this land, together with shallow stony soils. The ridges are
DCD	4.2	largely inaccessible
DCB DCC	4.3 10.4	Rises formed on Saddleworth and Tapley Hill Formation rocks. There are minor linear rock outcrops.
	±0.⊣	DCB Very gently undulating rises to 10 m high with slopes of 2-4%.
		DCC Undulating rises to 20 m high with slopes of 3-10%.
		Main soils: <u>hard loam over red clay on rock</u> - <b>D1</b> (E), <u>shallow gradational loam</u> - <b>C2</b> (E) and <u>shallow</u>
		calcareous loam - A2 (E) over weathering rock. Rock is commonly less than 50 cm deep, but
		usually has moisture storage capacity in its vertical fissures, thus overcoming an apparent
		limitation. Natural fertility is moderate to high, but hard setting and sealing surfaces are a problem
		- erosion potential is therefore significant.
DKB	1.8	Rises formed on quartzitic sandstones of the Undalya Formation.
DKC	5.6	DKB Low rises less than 10 m high with slopes of 1-3%.
		<b>DKC</b> Rises to 20 m high with slopes of 3-8%.  Main soils: <u>hard sandy loam over dispersive red clay on rock</u> - <b>D7</b> (E), with <u>hard loam over red clay</u>
		on rock - <b>D1</b> (C), shallow gradational loam - <b>C2</b> (L), and shallow calcareous loam - <b>A2</b> (L). Poor soil
		structure leading to excessive runoff, reduced waterholding capacity, patchy emergence and
		erosion is a feature of the common soils in this landscape. Sandy and quartzitic surfaces cause
		accelerated implement abrasion. The A2 and C2 soils are more favourable.
DSC	10.9	Rises formed on basement rocks with quartzitic beds forming characteristic "tiger-stripe" patterns
DSH	1.4	of rock outcrop.
		DSC Undulating rises to 30 m high with slopes of 4-12%
		DSH Gentle slopes of 2-5% with eroded water courses.
		Main soils: shallow hard loam over red clay on rock - <b>D1</b> (E) with hard sandy loam over dispersive
		<u>red clay on rock</u> - <b>D7</b> (L) between the reefs, and <u>shallow stony loam</u> - <b>L1</b> (C) and <u>shallow</u> <u>calcareous loam</u> - <b>A2</b> (L) on rockier areas. These rises are semi-arable due to the amount of rock
		and the potential for erosion. Poor structure in the main soil types exacerbates the erosion
		potential, and causes emergence and root growth problems.
EGB	3.0	Rises formed on basement rock.
EGC	13.8	EGB Very gently undulating rises less than 10 m high with slopes of 1-3%.
		EGC Gently undulating rises, 20 m high with slopes of 4-12%.
		Main soils: shallow calcareous loam - <b>A2</b> (V), with hard loam over red clay - <b>D1</b> (L) and shallow
		gradational loam - C2 (L). The land is mostly arable (except for minor outcrop), but because most
		of the soils are relatively shallow, moisture shortages may limit crops in dry finishes. Reduction of
		water loss and erosion through runoff is the main management issue, together with fertility
		maintenance.





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ESC	6.6	Rises and ridges formed on basement rocks with resistant strata producing a pattern of linear
ESD	4.4	rocky outcrops.
ESH	0.9	ESC Rises from 10 to 30 m high with slopes of 3-12%.
		ESD Slopes and ridges up to 40 m high with slopes of 10-20%.
		ESH Gentle slopes of 4-8% with eroded water courses.
		Main soils: shallow calcareous loam - A2 (E) and shallow gradational loam - C2 (E) with shallow
		stony loam - <b>L1</b> (L) dominant on rocky areas. Rocky reefs, shallow stony soils and sometimes
		moderate slopes limit cropping of these areas. The arable land is generally confined to strips
		between the reefs of rock. Water erosion is a potential problem because of the high runoff from
		the shallow soils and rocky areas.
JBB	4.1	Outwash fans with slopes of 2-3% formed on alluvial sediments.
		Main soils: <u>hard sandy loam over dispersive red clay</u> - <b>D3</b> (V) with <u>hard sandy loam over well</u>
		structured red clay - <b>D2</b> (L) and gradational red loam - <b>C3</b> (L). These soils are deep and moderately
		fertile, but are characterized by poor structure leading to excessive runoff and erosion, poor water
		use, and workability and emergence problems.
JEA	7.1	Outwash fans formed on alluvial sediments.
JEB	14.9	JEA Flats with slopes of about 1%.
JEJ	4.8	JEB Very gentle slopes of 1-3%.
JEP	0.8	JEJ Drainage depressions with slopes of 1-2% and eroded water courses.
		JEP Marginally saline flat.
		Main soils: hard sandy loam over well structured red clay - <b>D2</b> (E) and hard sandy loam over
		dispersive red clay - D3 (E) with gradational red loam - C3 (C) all formed over alluvium. The soils
		are deep, inherently fertile and generally moderately well drained. The main limitations are poor
		surface (and subsurface in places) structure. Poor surface structure causes reduced water
		infiltration, increased erosion potential and surface waterlogging, working difficulty and seedling
		emergence problems. Dispersive subsoils in the D3 soils cause more prolonged waterlogging.
		Watercourse erosion is significant in <b>JEJ</b> . Saline seepage is minor, but it is likely that subsoil
		salinity levels are moderate and that saline water tables occur in places.

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

(D) Dominant in extent (>90% of SLU)

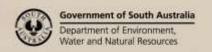
(C) Common in extent (20–30% of SLU)

(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 (Paralithic Calcarosol)
  - Calcareous loam grading to a very highly calcareous clay loam or rubble layer merging with calcareous weathering rock within 100 cm, usually 50 cm.
- **C2** Shallow gradational loam (Calcic, Red Dermosol)
  - Hard sandy loam to clay loam grading to a well structured red clay with fine carbonate at depth, overlying weathering fine grained rock within 100 cm.
- Gradational red loam (Hypercalcic / Supracalcic, Red Dermosol)

  Loam to clay loam grading to a well structured red clay with fine to rubbly carbonate at depth.
- Hard loam over red clay on rock (Calcic, Red Chromosol)
   Hard sandy loam to clay loam abruptly overlying a well structured red clay with fine carbonate at depth, grading to weathering fine grained rock within 100 cm.
- Hard sandy loam over well structured red clay (Calcic, Red Chromosol)
   Medium thickness hard setting sandy loam to sandy clay loam abruptly overlying a well structured red clay with fine carbonate accumulations at depth grading to alluvium.
- Hard sandy loam over dispersive red clay (Calcic, Red Sodosol)
   Medium thickness hard setting sandy loam to sandy clay loam abruptly overlying a poorly structured dispersive red clay with fine carbonate accumulations at depth grading to alluvium.
- Hard sandy loam over dispersive red clay on rock (Calcic, Red Sodosol)
   Medium thickness hard setting sandy loam to sandy clay loam abruptly overlying a poorly structured dispersive clay with fine carbonate at depth, grading to weathering rock within 100 cm.
- L1 Shallow stony loam (Lithic, Leptic Tenosol / Rudosol)
  Shallow stony loam, sometimes calcareous with depth, overlying basement rock within 50 cm.

Further information: <u>DEWNR Soil and Land Program</u>

