

ARW Arwakurra Land System

Undulating rises between Booleroo Centre and Tarcowie

- Area:** 105.7 km²
- Annual rainfall:** 380 – 450 mm average
- Geology:** Sandstones, quartzites and siltstones of the Cradock and Saddleworth Formations, and associated locally derived outwash sediments.
- Topography:** Most of the Land System forms the upper catchment of the north westerly flowing Booleroo Creek. Undulating rises with slopes of 3 - 10%, formed on basement rocks are separated by narrow drainage depressions which widen to broad, very gently inclined alluvial flats in the north of the system. The rises are largely free of rock, but some steeper slopes have rocky outcrops. The southern extension of the system includes steeper rocky slopes forming the watershed between Appila Creek and Rocky River.
- Elevation:** 390 m in the north where Booleroo Creek flows out, rising to 517 m in the south east
- Relief:** Typically up to 30 m, but as high as 70 m on the rocky slopes in the south
- Main soils:** Most soils have medium thickness hard setting non calcareous sandy loam to clay loam surfaces with red clayey subsoils. There are associated calcareous loams and shallow stony soils over basement rock. Most soils have a soft or rubbly carbonate layer usually within 50 cm of the surface. On hillslopes and rising ground, soils are usually less than a metre deep over weathering rock. On lower slopes and flats, soils are usually deeper over alluvium.

Main soils

Soils on rises formed on weathering rock

- D1** Hard loam over red clay on rock
C2a Gradational red loam on rock
D7 Hard sandy loam over dispersive red clay on rock
A2 Shallow calcareous loam

Soils on lower slopes / flats formed on alluvium or deeply weathered rock

- D2** Hard loam over red clay

Minor soils

Soils on lower slopes / flats formed on alluvium or deeply weathered rock

- C3** Gradational red loam
D3 Hard loam over dispersive red clay
A5 Deep calcareous loam

Soils on rises formed on weathering rock

- C2b** Scalded gradational loam
L1/B3 Shallow stony loam

- Main features:** The Arwakurra Land System is characterized by undulating rises with hard sandy loam to clay loam, quartz gravelly texture contrast soils. The poor surface structure of these soils is the main limitation. This causes increased runoff, reduced water holding capacity, restricted workability and patchy growth. Erosion potential is moderate to high. Modified surface management including the use of gypsum should help to alleviate surface structural problems. Smaller areas of calcareous or gradational soils are more favourable, although shallow profiles reduce water holding capacities. Parts of the undulating rises are affected by subsoil salinity and saline seepage. These areas should be monitored.



Soil Landscape Unit summary: 10 Soil Landscape Units (SLUs) mapped in the Arwakurra Land System:

SLU	% of area	Main features #
AAC	0.9	Rocky low hills of 10 - 25% slope formed on fine grained calcareous rocks. Main soils: <u>shallow calcareous loam - A2 (V)</u> , with <u>shallow stony loam - L1 (C)</u> and <u>hard loam over red clay on rock - D1 (L)</u> . These hills are non arable, and in places not accessible to machinery due to rocky outcrop. There is high potential for water erosion of the shallow soils on the steep slopes. Maintaining sufficient cover is difficult due to the low water holding capacity and moderately low fertility of the soil. The hills nevertheless provide valuable grazing.
DDB DDC	25.0 23.2	Rises formed on fine grained calcareous rocks with up to 10% surface quartzite stone. DDB Slopes of 2 - 4%. DDC Slopes of 4 - 10%. Main soils: shallow <u>hard loam over red clay on rock - D1 (E)</u> and <u>gradational red loam on rock - C2a (C)</u> , with <u>hard sandy loam over dispersive red clay on rock - D7 (L)</u> , <u>shallow calcareous loam - A2 (L)</u> and <u>scalded gradational loam - C2b (M)</u> . The land is fully arable, apart from scattered areas of scalding and saline seepage. Poor surface structure is the main limitation, resulting in patchy emergence, reduced water holding capacity and increased runoff which in turn results in higher erosion potential. Poor subsoil structure caused by dispersive clays affects soil permeability and root penetration. Subsoil salinity levels are high in places. This restricts root zone depth. Surface quartzite stones are abrasive on implements.
DKC	10.6	Undulating rises of 3 - 12% formed on coarse grained rocks. Main soils: shallow <u>hard sandy loam over dispersive red clay on rock - D7 (E)</u> with <u>gradational red loam on rock - C2a (C)</u> , <u>hard loam over red clay on rock - D1 (L)</u> , <u>shallow calcareous loam - A2 (L)</u> and <u>scalded gradational loam - C2b (M)</u> . The main feature of this land is poor soil structure, both hard setting surface soil and dispersive clayey subsoil. These features lead to reduced water holding capacity and increased runoff and therefore erosion potential; eroded watercourses are common. Patchy emergence, poor root growth and early finishing are the main productivity problems. Quartzite stones are abrasive on implements.
EGC	4.5	Rises of 4 - 12% with up to 10% surface stone and rocky outcrop, formed on fine grained rock. Main soils: <u>shallow calcareous loam - A2 (E)</u> , with <u>hard loam over red clay on rock - D1 (C)</u> , <u>gradational red loam on rock - C2a (L)</u> and <u>shallow stony loam - L1 (L)</u> . The slopes are arable although the predominantly shallow calcareous soils are associated with restricted water holding capacity, marginal fertility and stoniness. All slopes are susceptible to water erosion.
ESD	8.0	Rises of 8 - 20% formed on basement rock, with sporadic outcrop. Main soils: shallow <u>gradational red loam on rock - C2a (E)</u> and <u>shallow calcareous loam - A2 (E)</u> , with <u>shallow stony loam - L1 (L)</u> and <u>hard loam over red clay on rock - D1 (L)</u> . Rocky reefs and associated shallow soils restrict cropping on this land to the deeper soils and workable land between the outcrops. The rocky land generates high runoff, which together with shallow soils and moderate slopes causes a high potential for erosion. Productivity is restricted by moderately low water holding capacity and marginal fertility.
JEB JEJ JEW	4.7 14.9 0.5	Flats and gentle slopes formed on calcareous alluvium or deeply weathered rock. JEB Slopes of 1 - 3%. JEJ Drainage depressions with eroded watercourses. JEW Scalded slopes of 4 - 6%. Main soils: deep <u>hard loam over red clay - D2 (V)</u> , with deep <u>hard loam over dispersive red clay - D3 (L)</u> and <u>gradational red loam - C3 (L)</u> , all with generally little subsoil carbonate rubble. Hard setting surface soil and poor subsoil structure are the major limitations. Erosion has been a problem, as indicated by the condition of the watercourses of this unit. Fertility and soil depth are favourable, but impaired root growth and loss of water in runoff reduces potential.
KDE	7.7	Drainage depressions and flats with slopes of less than 3% formed on calcareous alluvium. Main soils: deep <u>gradational red loam - C3 (E)</u> , with <u>deep calcareous loam - A5 (L)</u> , <u>hard loam over red clay - D2 (L)</u> and <u>hard loam over dispersive red clay - D3 (L)</u> . This land has better physical conditions than the related "JE" units. There is still potential for erosion, but less severe. Shallow soils (over rubby carbonate) reduce waterholding capacity, and shallow carbonate in many soils restricts crop and management options.



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, Calcic / Lithocalcic Calcarosol)
Calcareous stony sandy loam to loam grading to fine or rubbly carbonate over weathering basement rock within 50 cm.
- A5** Deep calcareous loam (Regolithic, Lithocalcic / Hypercalcic Calcarosol)
Calcareous loam to clay loam grading to rubbly or fine carbonate overlying alluvium.
- C2a** Gradational red loam on rock (Lithocalcic / Calcic, Red Dermosol)
Medium thickness sandy loam to clay loam grading to a well structured red clayey subsoil with fine to rubbly carbonate at moderately shallow depth, overlying weathering rock.
- C2b** Scalded gradational loam (Sodic, Calcic, Red Dermosol)
Medium thickness to thin (depending on degree of soil loss) saline sandy loam to clay loam grading to a well structured red clayey subsoil with fine to rubbly carbonate at moderately shallow depth, overlying weathering rock.
- C3** Gradational red loam (Lithocalcic / Hypercalcic, Red Dermosol)
Medium thickness loam to light clay grading to a well structured red clayey subsoil with fine to rubbly carbonate at moderately shallow depth, overlying alluvium or deeply weathered rock.
- D1** Hard loam over red clay on rock (Lithocalcic / Calcic, Red Chromosol)
Medium thickness hard setting loam to clay loam over a well structured red clay, grading to rubbly or fine carbonate overlying weathering rock within 100 cm.
- D2** Hard loam over red clay (Calcic / Hypercalcic, Red Chromosol)
Medium thickness hard setting loam to clay loam over a well structured red clay, grading to rubbly or fine carbonate overlying alluvium or deeply weathered rock.
- D3** Hard loam over dispersive red clay (Calcic / Hypercalcic, Red Sodosol)
Medium thickness hard setting sandy loam to clay loam over a poorly structured dispersive red clay grading to fine carbonate overlying alluvium or deeply weathered rock.
- D7** Hard sandy loam over dispersive red clay on rock (Calcic / Supracalcic, Red Sodosol)
Medium thickness hard setting sandy loam to clay loam over a poorly structured dispersive red clay grading to fine or occasionally rubbly carbonate overlying weathering rock.
- L1/B3** Shallow stony loam (Paralithic / Lithic / Petrocalcic, Leptic Tenosol / Rudosol)
Shallow stony loam grading to hard rock (*Lithic*), weathering rock (*Paralithic*) or calcrete (*Petrocalcic*) within 50 cm.

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

