NBU North Bundaleer Land System

Rises and low hills between Caltowie and Jamestown

Area: 70.8 km^2

Annual rainfall 435 – 520 mm average

Geology: Tillites and siltstones of the Appila and Tapley Hill Formations, mantled by soft carbonates which have blown over the landscape and leached through the soil into the weathered zone of the underlying rock.

Topography: The Land System represents the rising ground of relatively low relief joining the Narien Range to the north and the Campbell Hill (Bundaleer) Range to the south. The land contains the headwaters of three major creek systems flowing northwest and south west (towards Caltowie) and south (Baderloo Creek). The topography consists of undulating rises and low hills with slopes of 2 - 12% and some steeper slopes to 20%. Outwash fans and valley flats with slopes of 2 - 4% lie between the basement rock highs. There are occasional rocky ridges, but generally the slopes have little rock outcrop.

Elevation: 380 m on the western side to 600 m in the north and 550 m in the south

Relief: Maximum relief is 60 m

Soils: The Main soils: sandy loam to clay loam texture contrast types, moderately shallow over rock or deep over alluvium. Associated with these are related gradational textured soils. Moderately shallow to shallow calcareous and non calcareous loams over rock occur on rises.

Main soils

Soils on rises formed on basement rock

D7 Hard sandy loam over dispersive red clay on rock
D1 Hard loam over red clay on rock
A2 Shallow calcareous loam over rock

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

D2 Hard loam over red clay
D3 Hard loam over dispersive red clay

Minor soils

C2 Gradational red loam on rock - rises
L1 Shallow stony loam over rock - steeper rocky slopes
C3 Gradational red loam - flats and fans on alluvium

Main Features: The North Bundaleer Land System land has a generally high productive potential with deep to moderately deep, inherently fertile and mostly well drained soils. The factors limiting productivity are of three types.

Poor surface structure (and subsurface structure in dispersive texture contrast soils) is common on soils throughout, particularly on the outwash fans and flats. This causes reduced water infiltration, excessive runoff and erosion, working difficulties and impeded seedling emergence.

Shallow soils on some rising ground have restricted waterholding capacity which prevents crops and pastures finishing off in dry springs.

This land is a significant area of recharge for the saline land to the west (near Caltowie), and is at risk itself of increasing salinization.

Soil Landscape Unit summary: 12 Soil Landscape Units (SLUs) mapped in the North Bundaleer Land System

SLU	% of area	Main features #
DCB DCC DCD	4.4 53.6 1.0	Rises and low hills formed on fine grained and quartzitic basement rocks. **DCB** Low rises with slopes of 1-3% and relief of less than 10 m. **DCC** Rises with slopes of 2-10% and relief of less than 30 m. **DCD** Low hills with slopes of 5-15% and relief of 30-60 m. Main soils: hard loam over (dispersive) red clay on rock - **D7/D1** (V) with shallow calcareous loam over rock - **A2** (L) and gradational red loam on rock - **C2** (L), generally overlying weathering rock within 100 cm. Shallow stony loam over rock - **L1** (L) occurs where rock strata are hard. These soils are moderately fertile, well drained and have moderately high waterholding capacities. The slopes are mostly arable (except for minor rocky outcrops and dissected areas). Gradients are moderate with a consequent potential for water erosion. This is exacerbated by the predominant hard setting, poorly structured soil type which tends to seal over and shed water. Other limitations caused by poor structure are difficulty in working and patchy emergence.
DSD	2.4	Moderately steep low rises with slopes of 10-20% and relief to 30 m. Main soils: shallow hard loam over red clay on rock - **D1** (E) and shallow stony loam over rock - **L1** (E). These rises are semi-arable due to their slopes and potential for erosion. Rocky reefs and frequent watercourses also limit cropping potential.
EGC	5.2	Rises and low hills formed on basement siltstones. Slopes are 4-12% and maximum relief is 30 m. Main soils: shallow calcareous loam over rock - **A2** (V), with hard loam over red clay on rock - **D1** (L) and gradational red loam on rock - **C2** (L). The land is fully arable (except for minor outcrop), although moisture shortages limit crops in dry finishes. Reduction of water loss and erosion through runoff is the main management issue, together with fertility maintenance.
ESD	2.3	Moderately steep and rocky slopes and ridges with slopes of 10-20%. Main soils: shallow gradational red loam on rock - **C2** (E) and shallow calcareous loam over rock - **A2** (E) formed over siltstone and containing variable amounts of soft and rubbly carbonate. Shallow stony loam over rock - **L1** (C) occurs in rocky areas. Rocky reefs, shallow stony soils and 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.
JEB JEC JEE JEG JEH JEJ	1.7 9.3 2.9 2.1 5.8 9.3	Outwash fans and drainage depressions formed on alluvial clays and sandy clays. **JEB** Very gentle slopes of 1-2%. **JEC** Gentle slopes of 2-4%. **JEE** Drainage depressions with 2-4% slopes and stable watercourses. **JEG** Very gentle slopes of 2-3% with an eroded watercourse. **JEH** Gentle slopes of 2-4% with eroded watercourses. **JEJ** Drainage depressions with 2-4% slope and partly eroded watercourses. Main soils: hard loam over red clay - **D2** (E) and hard loam over dispersive red clay - **D3** (E), with gradational red loam - **C3** (C) over alluvial sediments. Most of this land has deep moderately well drained fertile soils with only slight limitations to agriculture. Hard setting surface soils are the main limitation, causing reduced water infiltration, restricted opportunities for working and patchy emergence, increasing erosion potential. Sporadic saline seepages exist where drainage is restricted.

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

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

Detailed soil profile descriptions:

A2 Shallow calcareous loam over rock (Paralithic, Calcic / Lithocalcic Calcarosol)
Medium thickness calcareous loam over soft to rubbly carbonate grading to weathering siltstone within 100 cm. In 10% of soils the carbonate layer is in sheet rock form.

C2 Gradational red loam on rock (Hypercalcic / Supracalcic, Red Dermosol)
Medium thickness loam to clay loam grading to a well structured red clay with soft (occasionally rubbly) carbonate at depth, overlying weathering rock within 100 cm of the surface.

C3 Gradational red loam (Hypercalcic / Supracalcic, Red Dermosol)
Medium thickness loam to clay loam grading to a well structured red clay with soft (occasionally rubbly) carbonate at depth, overlying alluvium.

D1 Hard loam over red clay on rock (Calcic, Red Chromosol)
Medium thickness hard setting sandy loam to clay loam abruptly overlying a well structured red clay with soft carbonate at depth, over weathering basement rock within a metre.

D2 Hard loam over red clay (Calcic, Red Chromosol)
Medium thickness hard setting sandy loam to clay loam abruptly overlying a well structured and friable red clay with soft carbonate at depth, over alluvium.

D3 Hard loam over dispersive red clay (Calcic, Red Sodosol)
Medium thickness hard setting sandy loam to clay loam abruptly overlying a poorly structured and dispersive red clay with soft carbonate at depth, over alluvium derived from quartzitic rocks.

D7 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 and dispersive red clay with soft carbonate at depth, over weathering quartzitic basement rock within a metre.

L1 Shallow stony loam over rock (Calcareous, Paralithic, Leptic Tenosol OR Lithic / Petrocalcic, Leptic Rudosol)
The Tenosols have a slight clay increase with depth over soft carbonate grading to weathering rock at moderately shallow depth. The Rudosols comprise a loamy surface directly overlying basement rock or calcrete.

Further information: DEWNR Soil and Land Program