YON Yongala Land System

Low hills in the Yongala area

Area: 265.7 km^2

Annual rainfall: 325 - 400 mm average

Geology: Tillites, siltstones and interbedded quartzites of the Appila and Saddleworth Formations, capped by soft or rubbly carbonate of aeolian origin. Extensive alluvial sediments derived from localized erosion and re-deposition occur as valley fill and outwash fans between the basement rock highs. These deposits are generally fine grained, but are stony in places, particularly in the north of the land system.

Topography: The Yongala Land System covers an extensive area of undulating rises with intervening alluvial flats and broad gently inclined outwash fans. Slopes on the rises are usually less than 10%, but steeper ridges on resistant tillite have slopes of up to 30%. Slopes on the fans and flats are less than 8%. Drainage via Boniah and Nalia Creeks is in a general northerly direction towards Black Rock Plain.

Elevation: 460 m at the outfall of Boniah Creek to 694 m on the south western margin

Relief: Maximum local relief is 50 m, but is generally less than 30 m

Soils: Most soils are moderately deep to shallow loams over weathering rock. They usually have highly calcareous subsurface layers, often with red clay development. In some, the loamy surface soil grades directly to rock. On lower slopes and flats, soils are deeper - usually loams to sandy loams with red clayey subsoils which are commonly calcareous.

Main soils:

A2 Shallow calcareous loam - on basement rock rises
D3 Hard sandy loam over dispersive red clay - on alluvial outwash fans and flats
L1 Shallow stony loam - on rocky rising ground

Minor soils:

Soils of rising ground formed on basement rock
D1 Hard loam over red clay on rock
C2 Gradational loam on rock
Soils of outwash fans and flats formed on alluvium
D4 Loam over friable red clay
D2 Hard loam over red clay
C1 Deep gradational sandy loam
A4 Calcareous loam
C3 Hard loam over red clay

Main features: The Yongala Land System, except for limited areas of moderately steep rocky ridges, is gently undulating to undulating and potentially arable. However, rainfall especially in the north and east is marginal. Extensive evidence of scalding from past erosion indicates that inadequately managed cropping and over-grazing will lead to land degradation. The main soil limitations to agricultural use are poor soil structure (particularly on fans and flats), shallow, stony and alkaline profiles on rising ground, and moderate salinity (especially in scalded areas).

Soil Landscape Unit summary: 28 Soil Landscape Units (SLUs) mapped in the Yongala Land System

SLU	% of area	Main features #
AAB AAC	2.2 1.5	Irregular rocky rises and low hills formed on tillites. **AAB** Rises with slopes of 10-25% and relief of less than 30 m. **AAC** Low hills with slopes of 10-30% and relief of up to 50 m. Main soils: shallow stony loam - **L1** (E) and shallow calcareous loam - **A2** (E). This land is non arable and inaccessible in places, 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. Some scalded patches indicate past erosion. Watercourses are generally stable although there are sporadic occurrences of gully erosion.
ABB	1.2	Moderately steep ridges, 25 m high, of interbedded quartzite and tillite with slopes of 10-20%. There is extensive rock outcrop, particularly along the quartzite reefs. Main soils: shallow stony loam - **L1** (V) with shallow calcareous loam - **A2** (C). Shallow stony soils, low rainfall, rocky outcrops and moderate to steep slopes limit the use of these areas to light grazing. The soils are highly susceptible to erosion by water and wind.
DCC	2.3	Gentle slopes and low rises to 20 m high formed on basement rocks: slopes of 4-10%. Main soils: hard loam over red clay on rock - **D1** (E) with gradational loam on rock - **C2** (C) and calcareous loam - **A2** (C). Shallow stony loam - **L1** (L) occurs in minor areas of rock outcrop. The soils are moderately fertile, well drained and have moderately high water holding capacities. The slopes are mostly arable. 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.
EFB EFC EFV EFW	0.2 8.0 1.4 2.1	Rises formed on calcareous basement rock. **EFB** Rises less than 10 m high and with slopes of less than 3%. **EFC** Undulating rises, 20 m high with slopes of 3-8% and sporadic rock outcrop. **EFV** Low rises and slopes of 2-3% with minor scalding. **EFW** Rises and slopes of 3-8% with up to 10% of the land affected by scalding. Main soils: shallow calcareous loam - **A2** (E) and shallow stony loam - **L1** (E) with hard loam over red clay on rock - **D1** (L) and gradational loam on rock - **C2** (L) on lower slopes. The soils are well drained and well structured, but are shallow and only moderately fertile due to their relatively low clay contents. The mainly calcareous soils are relatively resistant to water erosion, but they tend to powder easily increasing the risk of both wind and water erosion. The effects of past erosion are still apparent particularly in EFW.
EGB EGC EGV EGW	3.5 24.9 0.5 4.9	Undulating rises formed on basement rock. **EGB** Low rises less than 10 m high with slopes of less than 3%. **EGC** Undulating rises up to 40 m high with slopes of 3-10% and minor scalding. **EGV** Rises less than 10 m high with slopes of 1-2% and up to 10% of the land affected by scalding. **EGW** Undulating rises up to 40 m high with slopes of 3-10% and up to 10% of the land affected by scalding. Main soils: shallow calcareous loam - **A2** (V), with hard loam over red clay on rock - **D1** (C) and gradational loam on rock - **C2** (L). The land is mostly arable (except for minor outcrop and remnant scalded areas), but because most of the soils are relatively shallow and marginally saline, moisture shortages may limit crops in dry finishes. Reduction of water loss and erosion through runoff is the main management issue especially on old scalded patches, together with fertility maintenance.
ESC ESD	1.6 3.0	Rises on basement rocks with 20-50% of the land surface occupied by rocky reefs. **ESC** Rises to 20 m high with slopes of 5-10%. **ESD** Rises and ridges to 20 m high with slopes of 10-20%. Main soils: shallow stony loam - **L1** (E) and shallow calcareous loam - **A2** (E) with gradational loam on rock - **C2** (L). 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.

EZB EZH EZV	1.4 0.1 6.1	Complex of low rises formed on siltstone basement rock and outwash fans formed on alluvium. **EZB** Gentle slopes of 1-4%. **EZH** Rises with slopes of 5-10%, fans of 3-5% and eroded water courses. **EZV** Gentle slopes of 1-4% and up to 10% of the land affected by scalding. Main soils: shallow calcareous loam - **A2** (E) and shallow stony loam - **L1** (C) on rises, and hard sandy loam over dispersive red clay - **D3** (C) and deep gradational sandy loam - **C1** (L) on fans. This land has a higher proportion of deeper soils than surrounding rises with consequent improved production potential. Limitations include marginal salinity (high on old scalded areas), poor soil structure on some outwash fan soils, and shallow stony soils on rises.
JFA JFB JFE JFH JFJ JFU JFV JFY JFo	2.2 7.2 5.7 0.9 1.3 4.4 0.8 0.3 1.4	Gentle slopes and flats formed on alluvium with varying degrees of scalding and water course erosion. **JFA** Flats with slopes of less than 1% and well defined water courses. **JFB** Fans with slopes of 1-3%. **JFE** Shallow drainage depressions with slopes of 1-3% and well defined water courses, eroded in places. **JFH** Fans with slopes of 4-8% and eroded water courses. **JFJ** Shallow drainage depressions with slopes of 1-3% and eroded water courses. **JFU** Flats with slopes of less than 1% and 5-10% of the land affected by scalding. **JFV** Fans with slopes of 1-3% and 5-10% of the land affected by scalding. **JFY** Shallow drainage depressions with slopes of 1-3% and 5-10% of the land affected by scalding. **JFo** Drainage depressions with slopes of 1-3%, eroded water courses and 5-10% of the land affected by scalding. Main soils: loam over friable red clay - **D4** (E) and hard sandy loam over dispersive red clay - **D3** (E), with deep gradational sandy loam - **C1** (L), hard loam over red clay - **D2** (L), and calcareous loam - **A4** (L). Most of the land is potentially arable. Limitations include marginal salinity (high on old scalded areas), poor soil structure (causing excessive runoff and erosion, emergence and root growth problems), and water course erosion. Erosion in the past has apparently been severe in places, indicating the high potential for degradation by both water and wind.
JMB JMH	10.7 0.2	Outwash fans formed on stony alluvium (Telford Gravel). **JMB** Very gently inclined slopes of 2-3% with well defined watercourses and up to 10% surface quartzite stones. **JMH** Gently inclined fans, 3-7% slope, with moderate gully erosion and up to 10% surface tillite and quartzite fragments. Main soils: deep stony hard loam over red clay - **D2** (E) and hard sandy loam over dispersive red clay - **D3** (E), with deep gradational loam - **C3** (L) and calcareous loam - **A4** (L). The main limitations are physical with hard setting surfaces and often poorly structured subsoils leading to poor infiltration, erosion on slopes, restricted workability and patchy emergence. Minor scalded areas indicate that these characteristics have caused problems in the past. Extensive stone cover causes excessive implement abrasion.

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 (Paralithic, Calcic / Lithocalcic Calcarosol)
Calcareous loam over soft or rubbly carbonate grading to weathering siltstone within 100 cm.

A4 Calcareous loam (Regolithic, Hypercalcic / Supracalcic Calcarosol)
Calcareous sandy loam to sandy clay loam grading to soft or rubbly carbonate within 50 cm.

C1 Deep gradational sandy loam (Hypercalcic, Red Kandosol)
Massive sandy loam with variable stone becoming more clayey and calcareous with depth over alluvium.

C2 Gradational loam on rock (Calcic / Hypercalcic, Red Dermosol)
Loam to clay loam grading to a well structured red clay with soft carbonate at depth over weathering basement rock within 100 cm.

C3 Deep gradational loam (Hypercalcic, Red Dermosol)
Medium thickness hard setting loam to clay loam with up to 20% quartzite stones grading to a well structured red clay with soft (occasionally rubbly) carbonate at depth over alluvium.

D1 Hard loam over red clay on rock (Calcic, Red Chromosol)
Loam to clay loam abruptly overlying a well structured red clay with soft carbonate at depth grading to weathering basement rock within 100 cm.

D2 Hard loam over red clay (Calcic, Red Chromosol)
Medium thickness hard setting loam to clay loam with up to 20% quartzite stones, over a well structured red clay with soft (occasionally rubbly) carbonate at depth over alluvium.

D3 Hard sandy loam over dispersive red clay (Calcic, Red Sodosol)
Medium thickness hard setting sandy loam to clay loam, with up to 50% quartzite stones, overlying a red coarsely structured dispersive clay, calcareous with depth over alluvium.

D4 Loam over friable red clay (Pedaric, Red Sodosol)
Medium thickness sandy loam to clay loam sharply overlying a finely structured friable moderately saline clay (pedaric B horizon), calcareous with depth over alluvium.

L1 Shallow stony loam (Lithic, Leptic Tenosol / Rudosol)
Shallow stony loam grading to hard basement rock within 50 cm. Soft carbonate commonly occurs in rock fissures.

Further information: DEWNR Soil and Land Program