YON Yongala Land System

Low hills in the Yongala area

Area: 265.7 km²

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

Loam over friable red clay

D2 Hard loam over red clay

C1 Deep gradational sandy loam

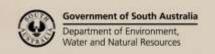
A4 Calcareous loam

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

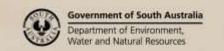
scalded areas).





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

SLU	% of area	Main features #
AAB	2.2	Irregular rocky rises and low hills formed on tillites.
AAC	1.5	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
	2.2	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 spiles band loom process and slove on rocks. P1 (f) with gradational loom on rocks. C2 (f) and
		Main soils: <u>hard loam over red clay on rock</u> - D1 (E) with <u>gradational loam on rock</u> - C2 (C) and <u>calcareous loam</u> - A2 (C). <u>Shallow stony loam</u> - 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	0.2	Rises formed on calcareous basement rock.
EFC	8.0	EFB Rises less than 10 m high and with slopes of less than 3%.
EFV	1.4	EFC Undulating rises, 20 m high with slopes of 3-8% and sporadic rock outcrop.
EFW	2.1	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
		<u>clay on rock</u> - D1 (L) and <u>gradational loam on rock</u> - 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
EGD	2.5	particularly in EFW.
EGB	3.5	Undulating rises formed on basement rock.
EGC EGV	24.9 0.5	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.
EGW	4.9	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	4.9	EGW Undulating rises up to 40 m high with slopes of 3-10% and up to 10% of the land affected by
1		scalding.
		Main soils: <u>shallow calcareous loam</u> - A2 (V), with <u>hard loam over red clay on rock</u> - 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	1.6	Rises on basement rocks with 20-50% of the land surface occupied by rocky reefs.
ESD	3.0	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
		<u>rock</u> - 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.





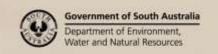
EZB	1.4	Complex of low rises formed on siltstone basement rock and outwash fans formed on alluvium.
EZH	0.1	EZB Gentle slopes of 1-4%.
EZV	6.1	EZH Rises with slopes of 5-10%, fans of 3-5% and eroded water courses.
LEZ (0.1	EZV Gentle slopes of 1-4% and up to 10% of the land affected by scalding.
		Main soils: <u>shallow calcareous loam</u> - A2 (E) and <u>shallow stony loam</u> - L1 (C) on rises, and <u>hard sandy</u>
		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	2.2	Gentle slopes and flats formed on alluvium with varying degrees of scalding and water course erosion.
JFB	7.2	JFA Flats with slopes of less than 1% and well defined water courses.
JFE	5.7	JFB Fans with slopes of 1-3%.
JFH	0.9	JFE Shallow drainage depressions with slopes of 1-3% and well defined water courses, eroded in
JFJ	1.3	places.
JFU	4.4	JFH Fans with slopes of 4-8% and eroded water courses.
JFV	0.8	JFJ Shallow drainage depressions with slopes of 1-3% and eroded water courses.
JFY	0.3	JFU Flats with slopes of less than 1% and 5-10% of the land affected by scalding.
JFo	1.4	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: <u>loam over friable red clay</u> - D4 (E) and <u>hard sandy loam over dispersive red clay</u> - 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	10.7	Outwash fans formed on stony alluvium (Telford Gravel).
JMH	0.2	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 <u>hard loam over red clay</u> - D2 (E) and <u>hard sandy loam over dispersive red clay</u> -
		D3 (E), with <u>deep gradational loam</u> - C3 (L) and <u>calcareous loam</u> - 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) (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 loam over soft or rubbly carbonate grading to weathering siltstone within 100 cm.
- A4 <u>Calcareous loam (Regolithic, Hypercalcic / Supracalcic Calcarosol)</u>
 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 <u>Gradational loam on rock (Calcic / Hypercalcic, Red Dermosol)</u>
 Loam to clay loam grading to a well structured red clay with soft carbonate at depth over weathering basement rock within 100 cm.
- C3 <u>Deep gradational loam (Hypercalcic, Red Dermosol)</u>

 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.
- <u>Hard loam over red clay on rock (Calcic, Red Chromosol)</u>
 Loam to clay loam abruptly overlying a well structured red clay with soft carbonate at depth grading to weathering basement rock within 100 cm.
- 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.
- 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.
- 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: <u>DEWNR Soil and Land Program</u>

