# YUM Yumali Land System

(Based on the description by A. K. McCord in "A Description of Land in the Southern Mallee of South Australia")

Gently undulating rises in the Hundreds of Kirkpatrick and Livingston

**Area**: 291.4 $km^2$

**Annual rainfall**: 375 - 450 mm average

**Geology**: The land system is underlain by sandy calcarenites of the Bridgewater Formation. The calcarenites are invariably capped by hard calcrete. About 25% of the landscape is overlain by aeolian Molineaux Sand. Locally derived medium to fine grained sediments have accumulated in some depressions.

**Topography**: The Yumali Land System comprises mainly gently undulating to undulating rises overlain by low to moderate irregular sandhills.

**Elevation**: 20 - 60 m

**Relief**: 5 - 20 m

**Soils**: Shallow soils over calcrete, deep sands and gradational clay loams are the most common soils.

Main soils

**B3** Shallow sandy loam on calcrete - extensive (stony flats and rises)
**H3** Deep siliceous sand - common (sand rises)
**C3** Red gradational clay loam - limited (clayey flats)
**B7** Sand over clay on calcrete - limited (sandy flats and slopes)

**Main features**: The Yumali Land System is an undulating landscape of mainly shallow stony soils of moderately low fertility and generally with low waterholding capacity. Sandy soils either as dunes superimposed over the rises, or sand spreads on the slopes are less fertile than the stony soils (although usually deeper), and are prone to water repellence and wind erosion, the dunes being at greater risk. Limited areas of loamy flats with little or no stone are fertile, easily worked and deep.

**Soil Landscape Unit summary:** 10 Soil Landscape Units (SLU's) are mapped in the Yumali Land System

| SLU | % of area | Main features # |
|---|---|---|
| MJA<br>MJB<br>MJC | 3.9<br>10.6<br>1.8 | Flats and rises formed on calcreted calcarenites (Bridgewater Formation), partially overlain by siliceous sands. There are less than 10% sand dunes and variable surface calcrete, up to 20% in places.<br>**MJA** Very gently undulating flats.<br>**MJB** Gently undulating low rises.<br>**MJC** Undulating rises.<br>Main soils: shallow sandy loam on calcrete - **B3** (V) on stony flats and rises, with red gradational clay loam - **C3** (L) on flats, and sand over clay on calcrete - **B7** (M) and deep siliceous sand - **H3** (M) on sand spreads, dunes and sandy slopes.<br><br>Key properties:<br>Drainage: Well to rapidly drained.<br>Fertility: Moderately low (B3 soils), moderate (C3 soils), low (B7 soils) to very low (H3 soils).<br>Physical condition: No limitations to root growth in the soil above the calcrete.<br>AWHC: Generally low due to shallowness over calcrete or sandy texture.<br>Salinity: Low.<br>Erosion potential Water: Low to moderately low.<br>Wind: Low (B3 and C3), moderately low (B7) and high (H3).<br>Water repellence: Nil (B3 and C3), moderate (B7) and strong (H3).<br>Rockiness: 20% or more surface calcrete with some outcrop associated with B3 soils. Other soils have little or no surface stone.<br><br>Summary: The loamy soils are favourable for cropping, although shallowness limits yields in dry seasons and stone makes working difficult in places. The deeper loamy soils of some flats have few limitations and are favourable cropping soils. The sandy soils, and in particular the deep sands of the low dunes, are infertile and susceptible to water repellence and wind erosion. They are marginal for cropping. |
| MJYA<br>MJYD<br>MJYE | 2.5<br>62.1<br>4.1 | Flats and rises formed on calcreted calcarenite (Bridgewater Formation), overlain by 10-30% Molineaux sand dunes of irregular shape.<br>**MJYA** Gently undulating calcrete plain with 10-30% low sand dunes.<br>**MJYD** Undulating calcrete rises with 10-30% low sand dunes.<br>**MJYE** Undulating calcrete rises with 10-30% moderate sand dunes.<br>Main soils: shallow sandy loam on calcrete - **B3** (E) on stony flats and rises, deep siliceous sand - **H3** (C) on sand dunes, with red gradational clay loam - **C3** (L) on flats and sand over clay on calcrete - **B7** (M) on sandy slopes.<br><br>Key properties:<br>Drainage: Well to rapidly drained. Heavier flats are moderately well drained.<br>Fertility: Moderately low (B3 soils), low (B7 soils), very low (H3 soils) and moderate (C3 soils)<br>Physical condition: No limitations for root growth in the soil above the calcrete.<br>AWHC: Generally low due to shallowness over calcrete or sandy texture.<br>Salinity: Low.<br>Erosion potential Water: Low to moderately low.<br>Wind: Low (B3, C3), moderately low (B7) and high (H3).<br>Water repellence: Nil (B3 and C3), moderate (B7) and strong (H3).<br>Rockiness: 20% or more surface calcrete with some outcrop associated with B3 soils. Other soils have little or no surface stone.<br><br>Summary: The loamy soils are favourable for cropping, although shallowness limits yields in dry seasons and stone makes working difficult in places. The deeper loamy soils of some flats have few limitations and are favourable cropping soils. The sandy soils, and in particular the deep sands of the low dunes, are infertile and susceptible to water repellence and wind erosion. They are marginal for cropping. |

| | | |
|---|---|---|
| O-A | 0.8 | Undulating slopes overlain by more than 30% jumbled siliceous sand dunes. |
| OEa | 5.9 | **O-A** More than 90% high sand dunes superimposed on slopes. |
| OEb | 4.5 | **OEa** 60-90% high sand dunes superimposed on slopes. |
| OEf | 3.8 | **OEb** 60-90% moderate sand dunes superimposed on slopes. |
| | | **OEf** 30-60% low sand dunes superimposed on slopes. |
| | | Main soil of **O-A** is deep siliceous sand - **H3** (D). In the other landscapes, main soils are deep siliceous sand - **H3** (V-E) on dunes, with sand over clay on calcrete - **B7** (L-C) on sandy slopes and shallow sandy loam on calcrete - **B3** (L-C) on stony slopes. |
| | | Key properties:<br>Drainage: Rapidly to well drained.<br>Fertility: Low to very low.<br>Physical cond.: There are no impediments to root growth.<br>AWHC: Moderately low to moderate.<br>Salinity: Low.<br>Erosion potential: Water: Low. Wind: Moderate to high.<br>Water repellence: High.<br>Rockiness: Nil. |
| | | Summary: The land is characterized by sandy rises and dunes with well drained low fertility soils prone to water repellence and wind erosion. |

# 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:**

**B3** Shallow sandy loam on calcrete (Petrocalcic, Red Kandosol)
Thin sandy loam grading to a sandy clay loam abruptly overlying hard calcrete at less than 30 cm. Calcrete grades to soft very highly calcareous sandy clay loam with depth.

**B7** Sand over clay on calcrete (Petrocalcic, Brown Chromosol)
Medium thickness sand to light sandy loam abruptly overlying a brown sandy clay on calcrete at less than 50 cm depth. Calcrete becomes softer very highly calcareous sandy clay loam with depth.

**C3** Red gradational clay loam (Petrocalcic, Red Dermosol)
Thin fine sandy clay loam grading to a well structured red light clay, calcareous with depth, over calcrete deeper than 100 cm.

**H3** Deep siliceous sand (Basic, Arenic, Bleached-Orthic Tenosol)
Loose grey sand with a bleached A2 layer grading to yellow sand over a thin more clayey layer deeper than 100 cm, resting on calcreted Bridgewater Formation sediments.

**Further information:** DEWNR Soil and Land Program