BIR Binnie Range Land System

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

Undulating range, parallel to and 10 - 20 km west of the Duke's Highway, between Tintinara and Coomandook.

Area: 422.7 km^2

Annual rainfall: 415 – 535 mm average

Geology: The System is formed on calcreted calcarenites (Bridgewater Formation) of an ancient coastal dune. About 30% of the land surface is overlain by more recent windblown sands (Molineaux Sand) in the form of dunes or sand spreads. Locally derived alluvium has accumulated in larger depressions and corridors between the rises. Granitic intrusions underlie the System and outcrop sporadically.

Topography: Undulating to rolling rises with occasional low to moderate irregular sandhills superimposed over the main landscape. Depressions between the rising ground are usually closed.

Elevation: 20 - 170 m

Relief: Up to 30 m

Soils: All soils are underlain by calcreted calcarenite. Some are shallow, with sand to sandy loam surfaces and thin clayey subsoils. Others have a substantial thickness of sand, with or without a more clayey subsoil.

Main soils

B6 Sandy loam over red sandy clay on calcrete. Extensive on slopes and flats.
B7 Loamy sand over brown sandy clay on calcrete. Common on sandy flats and slopes.
H3 Deep bleached sand. Common on sand dunes and spreads.

Minor soils

G2 Sand over sandy clay. Limited on sand dunes and spreads.
A6/D2 (Calcareous) sandy clay loam over red clay. Minor on lower slopes and swales.

Main features: The Binnie Range Land System comprises mainly shallow stony soils on rising ground, associated with either deep sands or shallow sand over clay soils. Most of the land is arable, although water holding capacity is restricted, and some areas are sufficiently stony or characterized by sheet rock as to be non arable. The sandy soils have lower inherent fertility and are susceptible to wind erosion, making them less attractive for agriculture. There are minor heavy flats which have high productive potential.

Soil Landscape Unit summary: 14 Soil Landscape Units (SLUs) mapped in the Binnie Range Land System:

SLU	% of area	Main features #
GrA GrE	1.9 0.7	Low lying areas between the calcarenite highs, which are large enough to map out. **GrA** Depressions, corridors and pediments. **GrE** Depressions with 10% stony rises. Main soils: loamy sand over brown sandy clay on calcrete - **B7** (E), sandy loam over red sandy clay on calcrete - **B6** (E) and (calcareous) sandy clay loam over red clay - **A6/D2** (E). Key properties: Drainage: Well to moderately well drained. Fertility: Moderate to moderately low (non sandy soils). Low to very low (sandy soils). Physical condition: Generally no restrictions on root growth or workability although heavier surface soils tend to set hard. Subsoils are well structured. AWHC: Low to moderate. High on deeper loamy soils. Salinity: Low to moderately low. Erosion potential: Water: Low although run off from adjacent steeper slopes may occasionally be a problem. Wind: Moderately low (stony soils) to moderate (sandy soils). Water repellence: Nil to moderate. Rockiness: Less than 2% surface calcrete. Summary: Sandy to loamy soils with marginal to moderate fertility and restricted waterholding capacity, mixed with deeper fertile soils with only minor limitations to agricultural land use.
MIC MJB MJC MJD MJY	11.1 0.8 52.4 7.6 7.1	Rises and low hills formed on calcarenite, partially overlain by windblown sand. There is variable surface calcrete (depending on the thickness of the sand cover). **MIC** Slopes with sporadic (less than 5%) granite outcrops. **MJB** Gentle lower slopes. **MJC** Undulating rises and low hills. **MJD** Moderately steep slopes with well defined water courses. **MJY** Undulating rises and low hills with 10-30% low sand ridges. Main soils: sandy loam over red sandy clay on calcrete - **B6** (V), with loamy sand over brown sandy clay on calcrete - **B7** (E) on thin sand spreads, and sand over sandy clay - **G2** (M) and deep bleached sand - **H3** (M) on sand hills. Key properties: Drainage: Well to rapidly drained. Fertility: Low (stony soils) to very low (deep sands). Physical condition: There are no soil physical limitations to root growth. AWHC: Moderately low to low. Salinity: Low. Erosion potential: Water: Moderately low (**MIC**, **MJC** and **MJY**) to moderate (**MJD**). Wind: Low (stony soils), moderate (shallower sands) to high/very high (sand dunes). Water repellence: Moderate to high on sandy soils. Rockiness: Up to 20% surface calcrete with occasional outcropping reefs. No surface stone on sand dunes. Summary: The ranges are dominated by moderately shallow to shallow soils of marginal fertility with significant surface stone and some outcrop, restricting cultivation. Associated sandy soils are infertile, water repellent and prone to wind erosion.
O-A OEF OEJ OEa OEb OEc	1.3 0.2 1.0 2.9 8.0 4.0	Undulating slopes and flats overlain by more than 30% jumbled siliceous sand dunes. **O-A** More than 90% high sand dunes superimposed on slopes. **OEF** 60-90% moderate sand dunes overlying flat land. **OEJ** 30-60% low sand dunes overlying flat land. **OEa** 60-90% high sand dunes superimposed on slopes. **OEb** 60-90% moderate sand dunes superimposed on slopes.

		OEc 60-90% low sand dunes superimposed on slopes. Main soils: deep bleached sand - **H3** (V-E) on dunes, and sand over sandy clay - **G2** (L-C) and loamy sand over brown sandy clay on calcrete - **B7** (M-C) on flats and low rises. Key properties: Drainage: Rapidly to well drained. Fertility: Low to very low. Physical condition: There are no impediments to root growth. AWHC: Moderately low to moderate. Salinity: Low. Erosion potential: Water: Low. Wind: Moderate to high. Water repellence: High. 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.
OGb	1.0	Gently undulating land with 60-90% moderate sand dunes, gently sloping swales and 5-10% granite outcrops. Soils are as for the "**OE**" landscapes with the addition of minor shallow stony soils and deep gritty outwash associated with the granitic outcrops.

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:

A6/D2 (Calcareous) sandy clay loam over red clay (Regolithic, Hypercalcic Calcarosol / Hypercalcic, Red Chromosol)
Thin calcareous fine sandy clay loam grading to a calcareous red clay with abundant fine carbonate in a clayey matrix from about 20 cm, over medium to fine grained outwash sediments within 100 cm. Minor on lower slopes and swales.

B6 Sandy loam over red sandy clay on calcrete (Supracalcic / Petrocalcic, Red Chromosol)
Thin light sandy clay loam abruptly overlying a well structured red sandy clay to clay grading to rubbly or sheet calcrete within 50 cm. The calcrete grades to soft calcareous sand within 100 cm. Extensive on slopes and flats.

B7 Loamy sand over brown sandy clay on calcrete (Petrocalcic, Brown Chromosol)
Medium thickness loamy sand to light sandy loam abruptly overlying a thin brown friable sandy clay over sheet calcrete within 50 cm. Common on sandy flats and slopes.

G2 Sand over sandy clay (Calcic, Red Chromosol)
Very thick loose sand with a bleached A2 layer abruptly overlying a red to brown weakly structured friable sandy clay loam to sandy clay with soft carbonate from about 100 cm. Limited on sand dunes and spreads.

H3 Deep bleached sand (Basic, Arenic, Bleached-Orthic Tenosol)
Thick to very thick bleached sand, organically darkened at the surface, over yellow sand continuing below 100 cm. Common on sand dunes and spreads.

Further information: DEWNR Soil and Land Program