

LIV Livingston Land System

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

Gently undulating stony plain with sandhills and sandplains between Culburra and KiKi.

Area: 380.7 km²

Annual rainfall: 425 – 475 mm average

Geology: The System is underlain by sandy limestones of the Coomandook Formation. These sediments are largely covered by calcarenites of the Bridgewater Formation (remnants of ancient coastal dunes). The calcarenites are strongly calcreted at the surface. Recent aeolian Molineaux Sands blanket about half of the landscape, generally reworked into irregular dunes.

Topography: The Livingston Land System comprises flat plains and undulating broad rises up to 20 m high. This landscape is veneered by frequent low to moderate and sometimes high irregular sand dunes.

Elevation: 20 - 50 m

Relief: Between 5 and 20 m

Soils: Deep sands dominate the sandhills, with sandy to sandy loam texture contrast soils on calcrete on rises and flats.

Main soils

H3 Deep siliceous sand - extensive on sand dunes.

B3 Shallow sandy loam on calcrete - common on stony rises and flats.

B6 Sandy loam over red clay on calcrete - common on stony rises and flats.

B7 Loamy sand over brown sandy clay on calcrete - common on sandy flats and slopes.

Main features: The Livingston Land System includes flat, but more commonly undulating land, comprising a complex of deep sandy soils on sand dunes, shallow loamy texture contrast soils over calcrete and moderately deep sandy texture contrast soils over calcrete on rises and flats. The loamy soils are potentially productive despite their shallowness, whereas the sandy soils are low in fertility. The deep sands in particular are very infertile and prone to water repellence and wind erosion.



Soil Landscape Unit summary: 15 Soil Landscape Units (SLUs) mapped in the Livingston Land System:

SLU	% of area	Main features #
MJA MJB MJYA MJYB MJYD	4.1 1.0 23.0 8.0 14.4	<p>Rises and flats formed on calcreted calcarenite of the Bridgewater Formation, overlain in places by deposits of aeolian Molineaux Sand.</p> <p>MJA Gently undulating calcrete plain with less than 10% sand dunes. MJB Undulating calcrete rises with less than 10% sand dunes. MJYA Gently undulating calcrete plain with 10-30% low sand dunes. MJYB Gently undulating calcrete plain with 10-30% moderate sand dunes. MJYD Undulating calcrete rises with 10-30% low sand dunes.</p> <p>Main soils: <u>loamy sand over brown sandy clay on calcrete</u> - B7 (E), <u>sandy loam over red clay on calcrete</u> - B6 (C) and <u>shallow sandy loam on calcrete</u> - B3 (C), with <u>deep siliceous sand</u> - H3 (M-C) on sand dunes.</p> <p>Key properties:</p> <p>Drainage: Well to rapidly drained. Occasional depressions are imperfectly drained. Fertility: Moderate (loamy soils), moderately low (sandy B7 soils) to very low (deep sands). Physical condition: No limitations for root growth in the soil above the calcrete. AWHC: Generally low due to shallowness over calcrete or sandy texture. Moderately low in deeper sandy texture contrast soils. Salinity: Low. Erosion potential: Water: Low to moderately low. Wind: Low (loamy soils), moderately low (sandy B7 soils) and moderately high (deep sands). Water repellence: Nil (loamy soils), moderate (sandy B7 soils) and strong (deep sands). Rockiness: 20% or more surface calcrete with some outcrop associated with loamy soils. Other soils have little or no surface stone.</p> <p><u>Summary:</u> The loamy soils are favourable for cropping, although shallowness limits yields in dry seasons and stone makes working difficult in places. 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.</p>
O-A O-B	2.9 1.6	<p>Jumbled sand dunes formed on Molineaux Sand.</p> <p>O-A High dunes O-B Moderate dunes. Main soil: <u>deep siliceous sand</u> - H3 (D).</p> <p>Key properties:</p> <p>Drainage: Rapid Fertility: Very low. Physical condition: No restrictions. AWHC: Low. Salinity: Low Erosion potential: Water: Low Wind: High (O-A) to moderately high (O-B) Water repellence: Strongly repellent. Rockiness: Nil.</p> <p><u>Summary:</u> These sand dunes are highly infertile and prone to water repellence and wind erosion. Once cleared, they easily become unstable.</p>



OOE	8.7	Gently undulating plains with more than 30% irregular sand dunes.
OEF	11.3	OOE 60-90% high sand dunes
OEG	3.8	OEF 60-90% moderate sand dunes
OEI	3.6	OEG 60-90% low sand dunes
OEJ	13.3	OEI 30-60% moderate sand dunes OEJ 30-60% low sand dunes
		Main soils: <u>deep siliceous sand</u> - H3 (V-E) on dunes, with <u>loamy sand over brown sandy clay on calcrete</u> - B7 (L-C), <u>sandy loam over red clay on calcrete</u> - B6 (L) and <u>shallow sandy loam on calcrete</u> - B3 (L) on intervening flats and slopes.
		Key properties: Drainage: Rapidly to well drained. Fertility: Low to very low. Physical condition: There are no impediments to root growth in the soil above the calcrete layer. AWHC: Moderately low to moderate, due to either sandy texture or shallow depth over calcrete. Salinity: Low. Erosion potential: Water: Low. Wind: Moderate to high. Water repellence: Strong (dunes), moderate on sandy flats, nil on loamy flats. Rockiness: Nil.
		<u>Summary</u> : The land is characterized by sandy rises and dunes with well drained low fertility soils prone to water repellence and wind erosion. Limited loamy soils are potentially more productive despite often shallow depth.
OEa	2.9	Rises formed on calcarenite with 60-90% cover of moderate to high jumbled sand dunes.
OEb	0.7	OEa 60-90% high sand dunes. OEb 60-90% moderate sand dunes.
		Main soils: <u>deep siliceous sand</u> - H3 (V) on dunes, with <u>loamy sand over brown sandy clay on calcrete</u> - B7 (L), <u>sandy loam over red clay on calcrete</u> - B6 (L) and <u>shallow sandy loam on calcrete</u> - B3 (L) on intervening flats and slopes.
		Key properties: Drainage: Rapidly to well drained. Fertility: Low to very low. Physical condition: There are no impediments to root growth in the soil above the calcrete layer. AWHC: Moderately low to moderate. Salinity: Low. Erosion potential: Water: Low. Wind: Moderate to high. Water repellence: Strong. Rockiness: Nil.
		<u>Summary</u> : The land is characterized by sandy rises and dunes with very low fertility but well drained soils prone to water repellence and erosion. Limited loamy soils are potentially more productive despite often shallow depth.



OGJ	0.7	<p>Gently undulating plains with 30-60% irregular sand dunes and isolated granite outcrops. Main soils: <u>deep siliceous sand</u> - H3 (E) on dunes with <u>loamy sand over brown sandy clay on calcrete</u> - B7 (C), <u>sandy loam over red clay on calcrete</u> - B6 (L) and <u>shallow sandy loam on calcrete</u> - B3 (L) on intervening flats. Gritty loamy sands occur adjacent to the rocky outcrops.</p> <p>Key properties:</p> <p>Drainage: Rapidly to well drained.</p> <p>Fertility: Low to very low.</p> <p>Physical condition: There are no impediments to root growth in the soil above the calcrete layer.</p> <p>AWHC: Moderately low to moderate, due to either sandy texture or shallow depth over calcrete.</p> <p>Salinity: Low.</p> <p>Erosion potential: Water: Low. Wind: Moderate to high.</p> <p>Water repellence: Strong (dunes), moderate on sandy flats, nil on loamy flats.</p> <p>Rockiness: Nil.</p> <p><u>Summary:</u> The land is characterized by sandy rises and dunes with well drained low fertility soils prone to water repellence and wind erosion. Limited loamy soils are potentially more productive despite often shallow depth. The granites may affect local groundwater movement.</p>
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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:

- H3** Deep siliceous sand (Basic, Arenic, Bleached-Orthic Tenosol)
Loose grey sand with a paler coloured A2 layer grading to a yellow sand continuing below 200 cm.
- B3** Shallow sandy loam on calcrete (Petrocalcic, Red Kandosol)
Sandy loam grading to a red sandy clay loam with variable rubble overlying calcreted calcarenite shallower than 50 cm and often shallower than 20 cm.
- B6** Sandy loam over red clay on calcrete (Petrocalcic, Red Chromosol)
Thin sandy loam abruptly overlying a red clay with hard sheet to very rubbly calcrete within 30 cm, grading to sandy very highly calcareous Bridgewater Formation calcarenite.
- B7** Loamy sand over brown sandy clay on calcrete (Petrocalcic, Brown Chromosol)
Medium thickness sand to light sandy loam with a pale or bleached A2 layer, abruptly overlying a friable brown sandy clay with hard calcrete within 50 cm, grading to sandy clay loam textured calcarenite.

Further information: [DEWNR Soil and Land Program](#)

