

# LAC Lacepede Land System

Frontal range adjacent to the Coorong extending from Salt Creek to Hundred of Duffield

**Area:** 299.8 km<sup>2</sup>

**Annual rainfall:** 535 – 615 mm average

**Geology:** The land system is formed on calcreted calcarenite of the Bridgewater Formation. The System is the youngest of the parallel series of consolidated ancient coastal dune formations which extend from the modern coastline inland for at least 75 km. The shelly and siliceous sands of the original dunes have been compressed and cemented over time to form calcarenite, which tends to be softer in this dune range than the older inland ranges. More prolonged atmospheric exposure coupled with seasonal wetting and drying cycles have caused cementation of the surface of the calcarenite into calcrete. Reworking of the silica component of the dune sands has produced some siliceous sand spreads, but these are less common on this range than on those inland.

**Topography:** The Lacepede Land System is an elongate range parallel to the Coorong (or its southern extension) with a NNW - SSE orientation. The main range is up to 40 m high with an undulating surface, interspersed with closed depressions which are commonly swampy. Between the main range and the Coorong is a strip of low parallel calcrete ridges with intervening flats, some of which are swampy. This strip of land has a distinctly corrugated cross section.

**Elevation:** Sea level on the western side to 50 m at the highest point on the main range.

**Relief:** Maximum relief is 40 m

**Main soils:** Shallow to moderately shallow sands to sandy loams over calcrete, and deep sands dominate the landscape.

## Main soils

### *Rises*

- B2** Shallow calcareous sandy loam on calcrete
- B8** Shallow bleached sand on calcrete
- H3** Deep sand

## Minor soils

### *Rises*

- B3a** Shallow sand on calcrete
- B3b** Shallow sandy loam on calcrete
- B6** Sandy loam over red sandy clay on calcrete
- B7** Loamy sand over sandy clay loam on calcrete
- G2** Sand over sandy clay loam

### *Depressions*

- A7** Calcareous loam
- B5** Black clay loam on calcrete
- B7/N2** Sand over saline clay on calcrete
- G4** Sand over dispersive yellow and brown clay
- N2a** Saline clay over sand
- N2b** Wet saline calcareous loam



**Main features:** The Lacepede Land System is characterized by undulating rises and low hills with shallow stony light textured soils and associated sand spreads. These have low fertility and restrictive water holding capacity, and are difficult to work in places due to rock outcrop. Flats between the rises are commonly poorly drained and saline. Salinity is probably increasing as a result of rising saline groundwater tables.

**Soil Landscape Unit summary:** 16 Soil Landscape Units (SLUs) mapped in the Lacepede Land System:

SLU	% of area	Main features #
M-B	0.1	Gently undulating rises with extensive sheet calcrete at the surface and shallow stony soils.
MEC	25.3	<p>Main range formed on calcreted calcarenite, bordering the eastern side of the Coorong. The range is elongate with overall relief of up to 40 m, but the land surface is irregular, consisting of undulating to rolling rises and closed depressions. There is extensive calcrete outcrop – up to 20% in places, and variable surface stone. Compared with related but older ranges further inland, this frontal range has less drift sand – less than 50% coverage.</p> <p>Main soils: <u>shallow sand on calcrete</u> - <b>B3a</b> (E), and <u>shallow calcareous loamy sand on calcrete</u> - <b>B2</b> (C), with <u>shallow bleached sand on calcrete</u> - <b>B8</b> (M). <u>Deep sand</u> - <b>H3</b> (L) and <u>sand over sandy clay loam</u> - <b>G2</b> (L) occur on sandy areas.</p> <p>The stony slopes are well drained, but shallow soil depth and extensive surface stone and sheet rock limit cultivation. Fertility is moderately low. The sandy areas have deep soils of low to very low natural fertility. They are prone to water repellence and are highly susceptible to wind erosion. Exposure is severe on west facing slopes. The only salinity hazards are in some minor depressions.</p>
MJAA	9.2	<p>Plains with low dune core topography characterized by <u>deep sand</u> - <b>H3</b> (E) and <u>shallow bleached sand on calcrete</u> - <b>B8</b> (E), with <u>sandy loam over red sandy clay on calcrete</u> - <b>B6</b> (L). Main features are low fertility, water repellence and high wind erosion potential.</p>
MJB	1.3	<p>Complex of low rises, up to 10 m high, formed on calcreted calcarenite and flats formed on calcified clayey sands to sandy clays of the Padthaway Formation.</p> <p>Main soils: <u>shallow calcareous loamy sand on calcrete</u> - <b>B2</b> (E) and <u>shallow sandy loam on calcrete</u> - <b>B3b</b> (C) on rises, with <u>sand over dispersive yellow and brown clay</u> - <b>G4</b> (C) and <u>calcareous loam</u> - <b>A7</b> (L) on flats. The rises are well drained with shallow moderately fertile soils and up to 10% surface calcrete. The flats are moderately well to imperfectly drained and often marginally to highly saline. Rising water tables have the potential to increase salinity levels.</p>
MJHA	4.4	<p>Gently undulating rises with low dune-core topography.</p> <p>Main soils: <u>shallow bleached sand on calcrete</u> - <b>B8</b> (E) and <u>deep sand</u> - <b>H3</b> (E), with <u>sandy loam over red sandy clay on calcrete</u> - <b>B6</b> (L) and <u>loamy sand over sandy clay loam on calcrete</u> - <b>B7</b> (L) in swales. <u>Saline clay over sand</u> - <b>N2a</b> (M), <u>wet saline calcareous loam</u> - <b>N2b</b> (M), <u>calcareous loam</u> - <b>A7</b> (M) and <u>sand over saline clay on calcrete</u> - <b>B7/N2</b> (M) occur in depressions. Up to 10% of the land is highly saline.</p>
MSL	3.5	<p>Gently undulating plains with <u>deep sand</u> - <b>H3</b> (E) and <u>shallow bleached sand over calcrete</u> - <b>B8</b> (C). <u>Sandy loam over red sandy clay on calcrete</u> - <b>B6</b> (L) occurs on rises. <u>Sand over dispersive yellow and brown clay</u> - <b>G4</b> (M) and <u>loamy sand over sandy clay loam on calcrete</u> - <b>B7</b> (M) occur on imperfectly drained flats. There are minor thick sand over clay and deep podzolized sand profiles. Soils are generally infertile and susceptible to wind erosion and water repellence, with variable depths determining waterholding capacities. Variable, often shallow soil depth is the main limitation on rises, with waterlogging and salinity the main limitations on flats.</p>



Mth	36.4	Gently undulating plain comprising a series of low linear calcrete ridges and intervening flats, running parallel to the Coorong, between the lagoon and the first range (MEC). The land is formed on calcreted calcarenite, partly overlain by Recent Molineaux Sand. Main soils: <u>shallow bleached sand on calcrete</u> - <b>B8</b> (E), <u>shallow calcareous loamy sand on calcrete</u> - <b>B2</b> (L) and <u>shallow sand on calcrete</u> - <b>B3a</b> (M) on stony rises, <u>deep sand</u> - <b>H3</b> (M) on sandy rises, with <u>shallow sandy loam on calcrete</u> - <b>B3b</b> (M) and <u>sand over dispersive yellow and brown clay</u> - <b>G4</b> (L) on flats. This land is rapidly to moderately well drained. Soils have low natural fertility and low to moderately low water holding capacity due to calcrete at shallow depth. Salinity is low on rises to moderate on flats. Sandy surfaced soils are water repellent. Surface stone and sheet rock restrict workability in places.
Mtt	12.7	Gently undulating plain comprising a series of low linear calcrete ridges, parallel to the Coorong (as for Mth), but in which the intervening flats are swampy or imperfectly drained. Underlying materials are calcreted calcarenite partly overlain by Recent Molineaux Sand, and interspersed with lagoonal clays and limestones. Main soils: <u>shallow calcareous loamy sand on calcrete</u> - <b>B2</b> (C), <u>shallow sand on calcrete</u> - <b>B3a</b> and <u>shallow bleached sand on calcrete</u> - <b>B8</b> (L) on stony rises, <u>deep sand</u> - <b>H3</b> (L) on sandy rises, with <u>saline clay over sand</u> - <b>N2a</b> (L) and <u>wet saline calcareous loam</u> - <b>N2b</b> (L) in swamps, and <u>sand over dispersive yellow and brown clay</u> - <b>G4</b> (M), <u>calcareous loam</u> - <b>A7</b> (M) and <u>sand over saline clay on calcrete</u> - <b>B7/N2</b> (M) on marginally wet flats. This land is well drained on the rises but the flats are poorly to very poorly drained. Salinity here is high to very high. Soil fertility is low, water holding capacity low to moderate. The sandy soils are prone to water repellence. Surface stone and sheet rock restrict workability in places.
NBb NBi	4.2 0.3	Stony plains. <b>NBb</b> Plains with 2-10% highly saline patches. <b>NBi</b> Plains with 20-30% saline swamps. Main soils: <u>shallow calcareous loamy sand on calcrete</u> - <b>B2</b> (E), <u>loamy sand over sandy clay loam on calcrete</u> - <b>B7</b> (C-M), <u>shallow bleached sand on calcrete</u> - <b>B8</b> (L-M) and <u>black clay loam on calcrete</u> - <b>B5</b> (M-C). <u>Wet saline calcareous loam</u> - <b>N2b</b> (M-L), <u>saline clay over sand</u> - <b>N2a</b> (M), <u>calcareous loam</u> - <b>A7</b> (L-M) and <u>sand over saline clay on calcrete</u> - <b>B7/N2</b> (L-M) occur in wetter areas and swamps. Limited water holding capacity and stone are the main restrictions to land use on the plains, with salinity the main limitation in depressions.
NDA	0.8	Plains formed on limestones and calcareous clays. Main soil is <u>loamy sand over sandy clay loam on calcrete</u> - <b>B7</b> (V) with limited deeper sand over clay soils. Shallow soil depth and moderately low fertility are the main features.
NJa	0.2	Plains with shallow sandy loam to clay loam soils on calcrete.
NIA	0.5	Plains with black or grey cracking clay soils.
XuX	0.1	Marginally saline swamp.
ZS-	0.2	Highly saline swamps of the Coorong depression.
ZnO	0.8	Closed depressions within the range (MEC). Underlying materials are calcreted calcarenites or clayey / limestone sediments of the Padthaway Formation. There are up to 20% stony rises within the depressions. The flats have a mixture of marginally wet, swampy and well drained land. Main soils: <u>saline clay over sand</u> - <b>N2a</b> (C) and <u>wet saline calcareous loam</u> - <b>N2</b> (C) in swamps, with <u>sand over dispersive yellow and brown clay</u> - <b>G4</b> (L), <u>sand over saline clay on calcrete</u> - <b>B2/N7</b> (L) and <u>calcareous loam</u> - <b>A7</b> (L) in marginally wet to well drained areas. <u>Shallow calcareous loamy sand on calcrete</u> - <b>B2</b> (M) and <u>shallow sand on calcrete</u> - <b>B3a</b> (M) occur on rises. This land is poorly to moderately well drained with moderately low (better drained flats) to very high (swampy flats) salinity.

# 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:**

- A7** Calcareous loam (Hypercalcic / Marly Calcarosol)  
Medium to thick dark calcareous loam grading to a pale grey clay loam over soft carbonate or marl from about 50 cm.
- B2** Shallow calcareous sandy loam on calcrete (Petrocalcic Calcarosol)  
Up to 40 cm calcareous loamy sand to sandy loam with variable calcrete rubble overlying calcreted calcarenite.
- B3a** Shallow sand on calcrete (Petrocalcic, Leptic Tenosol)  
Up to 50 cm non calcareous sand over calcreted calcarenite.
- B3b** Shallow sandy loam on calcrete (Petrocalcic Rudosol)  
Medium thickness non calcareous sandy loam over calcreted calcarenite
- B5** Black clay loam on calcrete (Petrocalcic, Black Dermosol)  
Black clay loam to light clay over a calcrete pan at shallow depth, grading to highly calcareous clay.
- 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.
- B7** Loamy sand over sandy clay loam on calcrete (Petrocalcic, Brown Chromosol)  
Medium to thick brown loamy sand with a bleached A2 layer abruptly overlying a brownish weakly structured friable sandy clay loam to sandy clay over calcreted calcarenite.
- B7/N2** Sand over saline clay on calcrete (Petrocalcic, Sodosolic, Salic Hydrosol)  
Bleached sand overlying a coarsely structured mottled grey sandy clay loam to clay, with a calcrete pan within 50 cm and a saline water table at depth.
- B8** Shallow bleached sand on calcrete (Petrocalcic, Bleached-Orthic / Bleached-Leptic Tenosol)  
Medium to thick sand with a bleached A2 layer grading to a yellow or brown clayey sand over calcreted calcarenite within 100 cm.
- G2** Sand over sandy clay loam (Petrocalcic, Brown Kandosol / Sodosol)  
Thick to very thick sand with a bleached A2 layer overlying a yellow sandy clay loam with calcrete at variable depth.
- G4** Sand over dispersive yellow and brown clay (Hypercalcic / Lithocalcic, Brown Sodosol)  
Medium thickness loamy sand abruptly overlying a coarsely structured dispersive brown and yellow brown mottled clay, with rubbly to soft carbonate at depth.
- H3** Deep sand (Basic, Arenic, Bleached-Orthic Tenosol)  
Thick brown sand with a bleached A2 layer grading to a yellow or brown sand continuing below 100 cm.
- N2a** Saline clay over sand (Petrocalcic, Calcarosolic, Salic Hydrosol)  
Thin black saline clay overlying a highly calcareous sandy soil with variable calcrete pans and fragments and a saline watertable within 100 cm.
- N2b** Wet saline calcareous loam (Calcarosolic, Hypersalic Hydrosol)  
Grey very highly calcareous loam grading to a pale grey clay loam over a white very highly calcareous silty clay loam by about 30 cm, with a watertable within 100 cm.

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

