

LOX Loxton Land System

(Based on the description by Potter, Wetherby and Chittleborough (1973) in "A Description of the Land in County Albert, County Alfred and Part of County Eyre, South Australia". Dept. of Agric. S.A. Soil Cons. Branch LD1).

Undulating plains and rises with extensive low dunefields extending from Moorook southwards to Veitch and Meribah and northwards along the Victorian border to east of Paringa.

Area: 2,301.5 km²

Annual rainfall: 250 – 280 mm average

Geology: The land is underlain by Loxton / Parilla Sands, partly veneered by Blanchetown Clay. These sediments are exposed in lower lying areas. A discontinuous calcrete cap overlies these Tertiary sediments. On the calcrete is a layer of highly calcareous medium textured material (Woorinen Formation), much of which is in rubbly form as a result of repeated wetting and drying during near surface exposure. Low dunes of Molineaux Sand are superimposed over the landscape.

Topography: The main terrain is typically undulating rises. Calcrete outcrops occur sporadically on both slopes and flats. Depressions occur where the calcareous materials have been largely removed either by solution or erosion. In these areas the Tertiary sediments are near the surface. The sandhills are typically low to moderate, rounded and oriented east - west.

Elevation: 30 - 60 m

Relief: 15 - 30 m

Soils: Gradational sandy loams, some calcareous throughout and some only calcareous in the subsoil, are the dominant soils. Deep and gradational sands are common on sandhills, and shallow stony soils occur to some extent on flats.

Main soils

Rises

A4 Rubbly calcareous loamy sand

Sandhills

H2a Deep sand

H2b Deep calcareous sand

G1 Sand over sandy clay loam

Flats

C1 Gradational loamy sand

A4/C1 Calcareous sandy loam

Depressions

D2/C1 Sandy loam over sandy clay loam

Minor soils

Flats

A5 Calcareous sandy loam over clay

B2 Shallow calcareous sandy loam on calcrete

Depressions

M1 Deep gradational sandy loam



Main features: The Loxton Land System is characterized by broad undulating rises and intervening flats of varying size. Sandhills overlie both rises and flats. The rises are dominated by calcareous sands to sandy loams of variable depth over rubbly calcrete. The consequent variability in moisture holding capacity is the main determinant of productive potential. The flats have deeper and less calcareous soils of moderate productive potential. All soils are mildly saline, with isolated moderately saline depressions occurring in irrigation areas and near the Noora Basin. The sandhills are infertile and highly susceptible to wind erosion. They are marginal cropping soils but are well suited to irrigated horticulture.

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

SLU	% of area	Main features #
SaB SaL	1.2 0.2	<p>Gently undulating stony rises formed on indurated Woorinen Formation carbonates. Minor sand spreads overlie the rises. Near the Noora Basin some lower lying areas are marginally saline.</p> <p>SaB Rises with negligible salinity. SaL Rises with marginal salinity in some lower lying areas.</p> <p>Main soil: <u>rubbly calcareous loamy sand - A4 (D)</u>. The depth to calcrete is critical in these soils in determining effective rootzone depth. The deeper types (with calcrete at about 70 cm) are not limiting, but where soil is down to 25 cm depth or less, water holding capacity is a major restriction. There are no physical restrictions on root growth. The soils are alkaline throughout, strongly so at depth. The soils are naturally mildly saline, with increased concentrations at depth. In SaL, up to 10% of the land is affected by salinity to the extent of retarding crop growth.</p>
SDA SDK SDP	17.3 1.1 0.2	<p>Very gently undulating flats and depressions formed on Parilla Sand, and Blanchetown Clay in places, variably capped by Woorinen Formation carbonates. There are minor stony patches. Low lying depressions are saline in places, particularly near the Noora Basin and in irrigation areas.</p> <p>SDA Flats and depressions with negligible salinity. SDK Flats with up to 10% marginally saline depressions. SDP Marginally saline flats.</p> <p>Main soils: <u>calcareous sandy loam - A4/C1 (E)</u>, with <u>sandy loam over sandy clay loam - D2/C1 (L)</u>, <u>gradational loamy sand - C1 (L)</u>, <u>calcareous sandy loam over clay - A5 (L)</u>, <u>deep gradational sandy loam - M1 (L)</u> and <u>shallow calcareous sandy loam on calcrete - B2 (L)</u>. The dominant soils are moderately deep with depth to highly calcareous layers determining effective root zone, which becomes limiting in the shallow B2 soils. All soils (even those which are non calcareous at the surface are alkaline), often mildly saline to the surface and moderately saline with depth. There are no physical problems for dryland cropping, but impeded deep drainage leads to salinity build up under irrigation.</p>
SeA SeP	1.0 0.1	<p>Very gently undulating flats formed on indurated Woorinen Formation carbonates. Surface calcrete stone is common and there are some calcrete reefs. Near the Noora Basin, some depressions are marginally saline.</p> <p>SeA Stony flats. SeP Marginally saline stony flats.</p> <p>Main soils: <u>shallow calcareous sandy loam on calcrete - B2 (E)</u>, <u>rubbly calcareous loamy sand - A4 (E)</u>, <u>calcareous sandy loam - A4/C1 (C)</u> and <u>calcareous sandy loam over clay - A5 (L)</u>. The majority of this land is marginally arable due to surface stone and shallow soils. The deeper soils are arable but have limited waterholding capacity. SeP is affected by saline water tables extending from the Noora Basin.</p>



SkB SkL	33.8 0.8	<p>Rises formed on rubbly Woorinen Formation carbonates. The rises are overlain by up to 30% low sand dunes and sand spreads. Near the Noora Basin and in irrigation areas, some lower lying areas are marginally saline.</p> <p>SkB Rises with negligible salinity. SkL Rises with some marginally saline low lying areas.</p> <p>Main soils: <u>rubbly calcareous loamy sand</u> - A4 (V) with <u>sand over sandy clay loam</u> - G1 (L) and <u>deep (calcareous) sand</u> - H2a/H2b (L) on sand spreads and dunes. The rubbly soils are as for SaB, with variable productive potential depending on depth to and strength of the calcrete. The soils are alkaline and mildly saline, moderately so at depth. Up to 10% of the land in SkL is affected by saline water tables either extending from the Noora Basin or from irrigation seepage. The sandy soils are deep but infertile and highly susceptible to wind erosion.</p>
UCI UCJ	13.1 31.0	<p>Dunefields of Molineaux Sand draped over the main landscape. The dunes are mostly parallel, low to moderate and evenly spaced between 200 and 500 m apart.</p> <p>UCI 30-50% low to moderate parallel sand ridges. UCJ 20-40% low parallel sand ridges.</p> <p>Main soils: <u>deep (calcareous) sand</u> - H2a/H2b (E-L) and <u>sand over sandy clay loam</u> - G1 (C-L) on sand ridges, with <u>rubbly calcareous loamy sand</u> - A4 (L) on slopes between the ridges, <u>calcareous sandy loam</u> - A4/C1 (L), <u>gradational loamy sand</u> - C1 (L) <u>sandy loam over sandy clay loam</u> - D2/C1 (L), <u>calcareous sandy loam over clay</u> - A5 (L), and <u>deep gradational sandy loam</u> - M1 (M) on flats between the ridges. The sandy soils are infertile with low water holding capacity. Some are water repellent and all are liable to erode when exposed. For these reasons they are poor cropping soils, but perform well under irrigation because of their free drainage. On swales and flats, the soils are as for SDA and SkB described above.</p>
ZB-	<0.1	Saline flats and swamps. These are isolated depressions where saline watertables are at or near the surface, associated with either irrigation discharge or the Noora Basin. The land is not arable.
ZJ-	0.1	Complex of highly saline flats and low gypsum rises (copi hills). The flats are highly saline with a natural vegetative cover of saltbush and samphire. They have limited grazing value, but overgrazing will seriously damage the plant cover. The gypsum rises have no agricultural value, but some are quarried.
ZL-	0.1	Gypseous lunettes. These are deep deposits of seed or flour gypsum of no agricultural production value.

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:*Rises*

- A4** Rubbly calcareous loamy sand (Supracalcic / Lithocalcic Calcarosol)
Medium thickness calcareous sand to sandy loam, grading to a highly calcareous sandy clay loam overlying rubbly Class III B or III C carbonate at depths ranging from 25 to 70 cm.

Sandhills

- H2a** Deep sand (Calcareous, Regolithic, Red-Orthic Tenosol)
Very thick reddish sand to light loamy sand, with segregations of soft carbonate at variable depth depending on erosional history. Usually sandy for several metres.
- H2b** Deep calcareous sand (Regolithic, Calcic Calcarosol)
Very thick soft calcareous light loamy sand becoming very highly calcareous and slightly more clayey with depth.
- G1** Sand over sandy clay loam (Calcic / Supracalcic, Red Kandosol)
Thick reddish sand over a red clayey sand to sandy clay loam, calcareous with depth, grading to clayey sand below 150 cm

Flats

- C1** Gradational loamy sand (Lithocalcic / Hypercalcic, Red Kandosol)
Thick soft loamy sand grading to a (rubbly) calcareous sandy loam to light sandy clay loam with depth
- A4/C1** Calcareous sandy loam (Epibasic, Regolithic, Calcic / Lithocalcic Calcarosol)
Medium thickness sand to sandy loam grading to a friable red sandy clay loam over soft to rubbly carbonate (sometimes sheet calcrete) at depths ranging from 45 to 95 cm. This grades to highly calcareous sandy clay loam which overlies substrate sediments at between 100 and 150 cm.
- A5** Calcareous sandy loam over clay (Regolithic, Hypercalcic Calcarosol)
Calcareous sandy loam grading to a highly calcareous sandy clay loam with variable rubble and sometimes calcrete, over clayey substrate from about 100 cm.
- B2** Shallow calcareous sandy loam on calcrete (Petrocalcic Calcarosol)
Medium thickness calcareous sand to sandy loam grading to sandy clay loam over hard calcrete at depths ranging from 25 to 40 cm.

Depressions

- D2/C1** Sandy loam over sandy clay loam (Hypercalcic, Red Kandosol)
Medium thickness sandy loam grading to a red sandy clay loam overlying a highly calcareous sandy clay loam with variable rubble, with underlying sandy Tertiary sediments within 100 cm of the surface.
- M1** Deep gradational sandy loam (Calcic / Petrocalcic, Red Kandosol)
Medium to thick sandy loam to light sandy clay loam over a weakly structured red sandy clay on calcrete within 100 cm.

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

