

SAU Saunders Land System

Valleys of the Saunders and Milendella Creeks on the Murray Plains

Area: 80.0 km²

Annual rainfall: 300 – 425 mm average

Geology: The landscape is a dissection feature, so there is a succession of underlying materials exposed in the banks. At the downstream end where dissection is greatest, Miocene limestones are exposed. The sequence of sediments exposed above the limestone includes Parilla Sand, Norwest Bend Formation limestone and Blanchetown Clay. Most of these materials are capped by highly calcareous materials, calcreted in places. There are sporadic deposits of windblown sand, mainly in the upstream areas. Much of this appears to have come from reworking of coarse grained alluvial sediments laid down in the valley floor. The alluvium is also predominant in the upstream area - there is little opportunity for alluvial deposition downstream due to the narrowness of the channels.

Topography: The land system represents the valleys of Saunders and Milendella Creeks. A small dissected part of Long Gully near Mannum is also included. The creeks, in flowing from the ranges to the west, cross the Murray Plains and over time have gouged substantial valleys in the plains. The degree of dissection increases towards the east. The landscape comprises distinctive components:

- Gently inclined fans adjacent to the ranges in the west, which include many small watercourses feeding the main channels.
- Creek flats including the modern watercourses. These are up to 400 m wide in the upstream, less dissected parts, but become narrow and discontinuous between the steeper dissection slopes.
- Gentle slopes grading from the flats to the adjacent plains, in the west. These include some sand rises and sand spreads.
- Moderate to steep eroded slopes in the east where the watercourses have cut down deeply into the plains prior to flowing into the Murray.

Elevation: 10 m at outfall to River Murray (at Pellaring Flat) to 200 m adjacent to ranges in the west.

Relief: The creeks are incised up to 50 m

Soils: Light textured calcareous soils are predominant, associated with deep sandy soils of either aeolian or alluvial origin.

Main soils: *Soils on dissected slopes and sand spreads*

- A4a** Calcareous sandy loam on clay
- A4b** Rubbly calcareous sandy loam on clay
- A4c** Calcareous sandy loam
- A4d** Rubbly calcareous sandy loam
- H2** Deep sand

Soils on creek flats

- M1** Deep alluvial loamy sand

Minor soils: *Soil on dissected slopes*

- B8** Sand over calcrete

Soils on fans

- A3** Deep calcareous sandy loam
- C1** Gradational loamy sand



Main features: The Saunders Land System includes the valleys of several major water courses crossing the Murray Plains. The main features are the slopes created by the down cutting of the water courses. In the west, these slope are gentle and characterized by moderately deep coarse to medium textured calcareous soils with reasonable productive potential. They are extensively covered by sand deposits. In the east the slopes are moderately steep to steep and eroded. Soils are mostly moderately shallow calcareous sandy loams. Dissected topography and excessive slopes limit agricultural land uses. There are broad creek flats with deep coarse textured alluvial soils in the west, but these grade into narrow drainage depressions in the steep country to the east.

Soil Landscape Unit summary: 10 Soil Landscape Units (SLUs) mapped in the Saunders Land System

SLU	% of area	Main features #
KYB KYG	4.1 3.4	<p>Fans adjacent to the ranges, formed on medium to coarse grained and gravelly outwash sediments. Slopes are 2-8%. There are minor low rises, probably basement rock outliers. There is variable surface calcrete, up to 20% on the calcareous soils, but little or none on the sandier soils.</p> <p>KYB Slopes without water courses. KYG Slopes with water courses, most of which have eroded in the past.</p> <p>Main soils: <u>deep calcareous sandy loam</u> - A3 (E) and <u>gradational loamy sand</u> - C1 (E). These soils are moderately deep but marginally fertile, particularly the sandier C1 soils. Productive potential is moderate, limited mainly by fertility, and restricted water holding capacity on some profiles. Water erosion is a potential problem where water runs on from the hills. Water courses have eroded in the past and need on-going protection.</p>
SGC SGH	17.5 6.4	<p>Gentle slopes grading from the creek flats to the higher land of adjacent land systems. Tertiary sediments, mainly Blanchetown Clay, exposed during the down cutting of the creeks, underlie the soils, but are generally deeper than 100 cm. Slopes are 3-10%. There are limited areas of sand spreads and low sandy rises. There is 10-20% surface calcrete stone on non sandy steeper slopes.</p> <p>SGC Slopes with no water courses. SGH Slopes with well defined water courses.</p> <p>Main soils: <u>calcareous sandy loam over clay</u> - A4a (E) and <u>rubbly calcareous sandy loam over clay</u> - A4b (E) with <u>deep sand</u> - H2 (L) on sand spreads and rises. These soils are moderately deep to moderately shallow and mostly calcareous throughout with coarse to medium grained textures. Restricted waterholding capacity and moderately low fertility are the main limitations to crop growth. Erosion by water is a potential problem on steeper slopes and particularly in water courses (SGH). The sandy soils are infertile and prone to water repellence and wind erosion.</p>
SSH SSI	10.5 22.5	<p>Dissected slopes at the downstream end of the system, where the water courses have gouged deep valleys into the plains. Dissection has been sufficient to cut through the younger Tertiary sediments and into the underlying limestone. Relief is up to 50 m, and slopes are moderate to steep. Short water courses from the adjacent highlands to the creek flats are common and generally eroded, more so on steeper slopes. There is extensive surface calcrete, 10-20% is common, with more in places.</p> <p>SSH Gentle to moderate slopes of 4-15%. SSI Moderate to steep slopes of 15-40%.</p> <p>Main soils: <u>calcareous sandy loam</u> - A4c (E) and <u>rubbly calcareous sandy loam</u> - A4d (E) with <u>sand over calcrete</u> - B8 (L). These soils are similar to those in SGC/SGH but are in landscapes which are highly susceptible to erosion due to moderate to steep slopes. The moderate slopes of SSH are generally arable, but the steeper slopes of SSI are non arable with the exception of small isolated pockets. Water courses are either eroded or susceptible to erosion and must be protected.</p>
UIm	2.9	<p>Gentle slopes (as for SGC) with 30-60% moderate sandhills.</p> <p>Main soils: <u>deep sand</u> - H2 (E) on sand hills and <u>calcareous sandy loam over clay</u> - A4a (C) and <u>rubbly calcareous sandy loam over clay</u> - A4b (C) on non sandy slopes. The sandy soils are infertile and prone to water repellence and wind erosion. The calcareous soils are more fertile soils, less susceptible to erosion, but sometimes have restricted waterholding capacity.</p>



USG	3.5	Alluvial terraces with 60-90% low sandy rises. Main soils: <u>deep sand</u> - H2 (E) on sand rises, with <u>deep alluvial loamy sand</u> - M1 (C) on intervening flats. The sandy soils are infertile and prone to water repellence and wind erosion. The alluvial soils are deep, marginally fertile and well drained.
XHJ	12.9	Terraces formed on alluvium overlain by 20-30% drift sand spreads. Main soils: <u>deep alluvial loamy sand</u> - M1 (E), with <u>deep sand</u> - H2 (C) on sand spreads and <u>deep calcareous sandy loam</u> - A3 (C). These soils are deep and moderately to marginally fertile. They are well, even excessively, drained. There is no apparent natural salinity, but salt levels may build up under irrigation. The sand spreads are infertile and susceptible to wind erosion.
XJS	16.3	Creek flats formed on alluvium. Main soil: <u>deep alluvial loamy sand</u> - M1 (D). These soils are deep and moderately to marginally fertile. They are well, even excessively, drained. There is no apparent natural salinity, but salt levels may build up under irrigation. Water course erosion is a risk - appropriate soil conservation measures are needed.

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

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| (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:

- A3** Deep calcareous sandy loam (Regolithic, Calcic / Hypercalcic Calcarosol)
Calcareous sandy loam grading to a highly calcareous sandy clay loam over a Class III A carbonate layer from about 30 cm.
- A4a** Calcareous sandy loam over clay (Regolithic, Hypercalcic Calcarosol)
Calcareous loamy sand to sandy loam grading to a highly calcareous sandy clay loam, continuing below 120 cm and overlying Blanchetown Clay.
- A4b** Rubbly calcareous sandy loam over clay (Regolithic, Supracalcic / Lithocalcic Calcarosol)
Calcareous loamy sand to sandy loam over Class III B or III C rubble at about 20 cm, grading to Blanchetown Clay, deeper than 120 cm.
- A4c** Calcareous sandy loam (Regolithic, Hypercalcic Calcarosol)
Calcareous loamy sand to sandy loam grading to a highly calcareous sandy clay loam, continuing below 120 cm and overlying Tertiary clayey sand, sandy clay or limestone.
- A4d** Rubbly calcareous sandy loam (Regolithic, Supracalcic / Lithocalcic Calcarosol)
Calcareous loamy sand to sandy loam over Class III B or III C rubble at about 20 cm, continuing below 120 cm and overlying Tertiary clayey sand, sandy clay or limestone.
- B8** Sand over calcrete (Petrocalcic, Arenic Rudosol)
Less than 80 cm loose loamy sand to sand over calcreted limestone.
- C1** Gradational loamy sand (Hypercalcic, Brown Kandosol)
Thick loamy sand to sandy loam grading to a brown sandy loam to sandy clay loam over Class III A carbonate from about 50 cm.
- H2** Deep sand (Arenic Rudosol)
More than 80 cm loose loamy sand to sand.
- M1** Deep alluvial loamy sand (Basic, Regolithic, Brown-Orthic Tenosol)
Very thick loamy sand to sandy loam, usually with a slight increase in clay content with depth, continuing below 100 cm.

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

