

# STW Stirling Well Land System

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

Undulating flats and rises

**Area:** 187.4 km<sup>2</sup>

**Annual rainfall:** 350 - 400 mm average

**Geology:** The geology of the land system is complicated by the depositional and erosional events which have shaped it. Underlying the entire area are Tertiary sediments of mainly Loxton / Parilla Sands, veneered in places by Blanchetown Clay equivalent. These sediments were apparently mantled by calcrete which formed a plain of sheet rock across the landscape. This sheet has subsequently been partly eroded and / or dissolved away, leaving isolated benches of calcrete, separated by flats and depressions underlain by the older Tertiary sediments. More recently there have been aeolian accessions of i) highly calcareous medium textured Woorinen Formation sediments (parts of which have subsequently hardened into rubbly forms), and ii) Molineaux Sand. These two materials are sporadically distributed over the pre-existing landscape.

**Topography:** The distinguishing feature of the land system is a sequence of NW-SE oriented ridges with intervening flats. Some of the ridges are very stony. Low to moderate rounded generally east - west oriented sandhills overlie both ridges and flats.

**Elevation:** 60 - 100 m

**Relief:** 5 - 30 m

**Soils:** Gradational sandy loams, both highly calcareous and non to weakly calcareous are predominant, with deep sandy and sandy texture contrast soils.

#### Main soils

**A4/C1** Rubbly calcareous sandy loam - slopes

**H3** Deep siliceous sand - sandhills

**D2** Sandy loam over red sandy clay - flats and swales

#### Minor soils

**G1** Loamy sand over sandy clay loam - slopes

**B2** Calcareous sandy loam over calcrete - stony ridges

**Main features:** The Stirling Well Land System comprises several facets with differing qualities. The flats are readily cultivated, with restricted waterholding capacity and wind erosion potential being the only (slight) limitations to productivity. The slopes are mostly arable with the main limitations being restricted waterholding capacity, stoniness on some ridges, and moderately low fertility. The sandhills are prone to water repellence, wind erosion and low fertility and have generally low productive potential, with some of the moderate dunes requiring specialized drift control management. Minor saline seepages adjacent to some sandhills are probably associated with localized rather than regional water tables.



**Soil Landscape Unit summary:** 11 Soil Landscape Units (SLUs) mapped in the Stirling Well Land System

SLU	% of area	Main features #
IaA IbA IbK	4.4 6.5 0.5	<p>Flats and depressions formed on sandy Tertiary sediments (Loxton/Parilla Sands), sporadically overlain by remnant rises of Woorinen Formation rubbly carbonates, and up to 30% Molineaux Sand as low sand rises.</p> <p><b>IaA</b> Flats and depressions with less than 10% sandy and stony rises.  <b>IbA</b> Very gently undulating flats and depressions with 10-30% low sand rises and up to 20% low stony rises.  <b>IbK</b> Very gently undulating flats and depressions with up to 20% low sand rises and less than 10% moderately to highly saline seepages.</p> <p>Main soils: <u>sandy loam over red sandy clay</u> - <b>D2</b> (V), with <u>deep siliceous sand</u> - <b>H3</b> (M-C) on sand rises and <u>rubbly calcareous sandy loam</u> - <b>A4/C1</b> (M-L) on stony rises.</p> <p>Key properties:</p> <p>Drainage: Flats are well drained, rises are rapidly drained. Seepage areas in IbK are poorly drained.</p> <p>Fertility: Moderate on flats, low on sand rises and moderately low on stony rises.</p> <p>Physical condition: No physical restrictions to root growth.</p> <p>AWHC: Moderately low to moderate</p> <p>Salinity: Low at surface, but may be moderate at depth in carbonate layers. Moderate to high salinity in <b>IbK</b> seepages.</p> <p>Erosion potential: Water: Low Wind: Low (moderate on sandy rises)</p> <p>Water repellence: Nil, except on sand rises which are repellent.</p> <p>Rockiness: Nil on flats and sand rises, moderate surface calcrete on stony rises, but does not affect tillage.</p> <p><u>Summary:</u> The flats are readily cultivated, with restricted waterholding capacity and slight wind erosion potential the main productivity limitations. The sandhills and stony rises are less productive.</p>
IcB	17.2	<p>Gently undulating low rises with about 40% slopes, 40% flats and 20% low sandhills. Tertiary sediments underlie the landscape, and are capped by Woorinen Formation carbonates on slopes and Molineaux Sands on sandhills. There is minor surface calcrete on the slopes. Main soils: <u>rubbly calcareous sandy loam</u> - <b>A4/C1</b> (E) and <u>loamy sand over sandy clay loam</u> - <b>G1</b> (L) on slopes, <u>sandy loam over red sandy clay</u> - <b>D2</b> (E) on flats and <u>deep siliceous sand</u> - <b>H3</b> (L) on sandhills.</p> <p>Key properties:</p> <p>Drainage: Rapidly to well drained.</p> <p>Fertility: Moderate (sandy loams), moderately low (shallow sandy soils) and low (deep sands).</p> <p>Physical condition: No physical impediments to emergence or root growth.</p> <p>AWHC: Moderately low to moderate.</p> <p>Salinity: Low at surface, but may be high in carbonate layer.</p> <p>Erosion potential: Water: Moderately low. Wind: Low to moderate</p> <p>Water repellence: Nil on calcareous sandy loams to strong on very sandy soils.</p> <p>Rockiness: Minor surface calcrete on slopes.</p> <p><u>Summary:</u> The land is fully arable, with the flats being potentially most productive. The rubbly soils of the slopes commonly have restricted waterholding capacity, and the sandhills are prone to wind erosion, water repellence and low fertility.</p>



ODa	0.5	<p>Dunes and rises of Molineaux Sand, superimposed on the rises, and occasionally the flats of the main landscape. The slopes between the sand rises are similar to those in <b>IcB</b>. Flats comprise about 10% of the total area.</p> <p><b>ODa</b> 60-90% large jumbled dunes.  <b>ODb</b> 60-90% medium jumbled dunes.  <b>ODc</b> 60-90% low jumbled sand rises.  <b>ODd</b> 30-60% moderate to high parallel sand ridges.  <b>ODE</b> 30-60% moderate jumbled dunes.  <b>ODf</b> 30-60% low jumbled sand rises.</p> <p>Main soils: <u>deep siliceous sand</u> - <b>H3</b> (E-V) on sand rises, with <u>rubbly calcareous sandy loam</u> - <b>A4/C1</b> (C-L), <u>loamy sand over sandy clay loam</u> - <b>G1</b>(L) and <u>calcareous sandy loam over calcrete</u> - <b>B2</b> (M) on slopes, and <u>sandy loam over red sandy clay</u> - <b>D2</b> (M) on flats.</p> <p>Key properties:  Drainage: Rapidly to well drained.  Fertility: Low to very low (sand rises), moderately low on slopes.  Physical condition: No physical impediments to emergence or root growth.  AWHC: Moderately low (sand rises). Moderate to moderately high (slopes)  Salinity: Low at surface, but often moderate in carbonate layers.  Erosion potential: Water: Moderately low.  Wind: Moderately low to low depending on sandiness and surface stone.  Moderate (<b>ODf</b>) to extreme (<b>ODa</b>) on sand rises and dunes.  Water repellence: Strong on dune soils, moderate on other sandy soils, to nil on calcareous soils.  Rockiness: Generally nil, with sporadic occurrences on some slopes.</p> <p><u>Summary</u>: Deep sandy soils on sand dunes and rises are the main feature. Water repellence, low fertility and wind erosion potential are the main management issues. The slopes and flats between the sand rises have mostly relatively shallow calcareous soils with restricted waterholding capacity, with the exception of deeper calcareous loams on minor flats.</p>
ODb	3.1	
ODc	3.8	
ODd	1.8	
ODE	23.4	
ODf	10.8	
SfB	28.0	

## # 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:****A4/C1** Rubbly calcareous sandy loam

(Hypercalcic / Supracalcic, Epibasic Calcarosol OR Hypercalcic / Supracalcic, Red Kandosol)

Medium thickness calcareous sandy loam grading to a red calcareous light sandy clay loam overlying Class III B carbonate rubble in a highly calcareous sandy clay loam matrix grading to a light clay Class III A carbonate layer with sandy Tertiary sediments from about 100cm.

**B2** Calcareous sandy loam over calcrete (Petrocalcic Calcarosol)

Thin calcareous sandy loam becoming more clayey with depth abruptly overlying a rubbly calcrete pan at about 20 cm, which becomes less rubbly and more clayey with depth and grades to Blanchetown Clay equivalent from about 100 cm.

**D2** Sandy loam over red sandy clay (Sodic, Calcic, Red Chromosol)

Medium to thick sandy loam over a reddish sandy light clay with minor soft carbonate from about 60 cm overlying Tertiary clayey sands to sandy clays within 100 cm.

**G1** Loamy sand over sandy clay loam (Lithocalcic / Calcic, Brown / Red Chromosol)

Medium thickness loamy sand abruptly overlying a brown or red friable sandy clay loam with rubbly (Class III C / B) or fine (Class III A) carbonate from about 30 cm, becoming less rubbly with depth and grading to Tertiary sediments below 100 cm.

**H3** Deep siliceous sand (Basic, Arenic, Bleached-Orthic Tenosol)

Thick bleached sand, organically darkened at the surface and becoming yellower with depth, over brown banded slightly clayey layers from about 75 cm and continuing below 200 cm.

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

