

# WDH Wandearah Land System

Flood plain of the Broughton River south of Port Pirie

**Area:** 262.3 km<sup>2</sup>

**Annual rainfall:** 325 - 375 mm average

**Geology:** Medium to fine grained alluvial sediments on modern flood plains, with fine grained gypseous sediments on the northern side. All sediments are mantled by soft carbonate, usually occurring as minor soft segregations in the lower part of the soil profile. Salt levels are generally moderate to high.

**Topography:** The land system is a flat plain with less than 1% slope. The surface features include:

- An old flood plain of the Broughton River (higher level plain and terraces adjacent to the river);
- The modern flood plain (characterized by a network of small channels which only carry water during major floods);
- A flat where the river branches into many distributary channels and which is regularly flooded;
- A large saline flat;
- An extensive plain apparently not related to the current course of the river (possibly an old lake bed or coastal mud flat); and
- Some minor low sandy rises.

**Elevation:** 5 m in the north west to 50 m on the eastern side.

**Relief:** Apart from the incised channel of the river (up to 5 m) and some low (up to 5 m) sand rises, there is negligible relief.

**Soils:** Most soils are deep over alluvium, with loamy to clay loamy surfaces. They include calcareous and non calcareous gradational soils, and texture contrast soils with red clayey subsoils. There are minor calcareous loams and sands on rises.

**Main soils:** *Soils formed over alluvium on flood plains*

<b>A3</b>	Calcareous clay loam
<b>D3a</b>	Loam over dispersive red clay
<b>D4</b>	Calcareous loam over friable red clay
<b>E2</b>	Red cracking clay

**Minor soils:** *Soils formed over alluvium on flood plains*

<b>M2</b>	Gradational clay loam
<b>D2</b>	Loam over red clay
<b>D3b</b>	Clay loam over dispersive red clay

*Soils of dunefields*

<b>H2</b>	Deep calcareous sand
<b>A4a</b>	Calcareous sandy loam
<b>A4b</b>	Rubbly calcareous loam

*Soils formed over basement rock on rises*

<b>A2</b>	Shallow calcareous loam
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**Main features:** The Wandearah Land System is characterized by flat plains with mainly deep, medium to fine textured soils with variable carbonate content. There are significant areas of texture contrast soils, some of which are poorly structured. Natural fertility is moderate to high, and soil structure generally good (except for the sodic texture contrast soils). Soils are alkaline to strongly alkaline and salinity is moderate to high. These latter features, together with the low rainfall, limit cropping opportunities.

**Soil Landscape Unit summary:** 8 Soil Landscape Units (SLUs) mapped in the Wandearah Land System

SLU	% of area	Main features #
EBB	0.1	Isolated low basement rock rise, an outlier of the Redhill Land System. The soils are moderately shallow. Main soil: <u>shallow calcareous loam</u> - <b>A2</b> (D). Although the soils are stony and often shallow this land is arable although restricted waterholding capacity and marginal fertility limit productivity.
KGE	2.8	Flats adjacent to the Broughton River, including the river channel. Main soils: <u>gradational clay loam</u> - <b>M2</b> (E), with <u>loam over dispersive red clay</u> - <b>D3a</b> (C), <u>loam over red clay</u> - <b>D2</b> (L) and <u>calcareous clay loam</u> - <b>A3</b> (E). Soil variability over short distances results in patchy occurrences of hard setting surface soils, poorly structured subsoils and surface pH, all affecting plant growth. Moderate subsoil salinity in places affects sensitive crops. The river channel is prone to stream bank erosion, and there is a risk of flooding.
KKA	25.5	Modern flood plain of the Broughton River, with networks of shallow channels and saline depressions. Main soils: <u>calcareous clay loam</u> - <b>A3</b> (V), with <u>red cracking clay</u> - <b>E2</b> (L) and <u>calcareous loam over friable red clay</u> - <b>D4</b> (L). Soils are inherently highly fertile and well structured, but have high wilting points due to their medium to fine textures. They are therefore less responsive to low rainfall. Moderate salinity further reduces capacity of plants to take up water. Network of surface channels causes unevenness in moisture content and creates difficulties for working.
KMA	32.3	Old flood plains on medium to fine textured alluvium. Main soils: <u>calcareous clay loam</u> - <b>A3</b> (E), with <u>loam over dispersive red clay</u> - <b>D3a</b> (C), <u>red cracking clay</u> - <b>E2</b> (L) and <u>calcareous loam over friable red clay</u> - <b>D4</b> (L). The plains are arable with few limitations other than low rainfall. Soils are generally well structured, although there are areas of hard setting surfaces and dispersive clay subsoils. Moderate levels of subsoil salinity and probably boron affect sensitive crops in dry years. Alkalinity reduces the availability of some nutrients.
UIJ	2.7	Gently undulating plains with 30-60% coverage of low dunes and sandy rises. Main soils: <u>deep calcareous sand</u> - <b>H2</b> (E) on the rises and <u>calcareous sandy loam</u> - <b>A4a</b> (E) and <u>rubbly calcareous loam</u> - <b>A4b</b> (L) in the swales. These low dunefields are a complex of low fertility, wind erosion prone sandy rises, and intervening swales with highly calcareous medium textured soils having minor limitations due to alkalinity, moderate fertility, and restricted waterholding capacity.
VTB	31.5	Plains formed on clayey and gypseous lake bed or old coastal mud flat sediments. Main soils: <u>calcareous clay loam</u> - <b>A3</b> (E), with <u>clay loam over dispersive red clay</u> - <b>D3b</b> (C), <u>calcareous loam over friable red clay</u> - <b>D4</b> (C), <u>gradational clay loam</u> - <b>M2</b> (L) and <u>calcareous sandy loam</u> - <b>A4a</b> (M). These flats are in marginal rainfall country, are moderately to highly saline and prone to boron toxicity. Regular cropping is not sustainable - opportunistic cropping is more feasible.
XLF	1.9	Plain dissected by distributary channels of the Broughton River. Main soils: <u>calcareous clay loam</u> - <b>A3</b> (E) and <u>red cracking clay</u> - <b>E2</b> (E). These flats are inherently fertile with fine textured well structured deep soils. They are prone to waterlogging in wet years but moderate salinity and low rainfall are the main limitations.
ZA-	3.2	Saltbush - bluebush - samphire flats. Main soil is saline <u>calcareous clay loam</u> - <b>A3</b> (D). The land is too salty for cropping, but can be used for grazing of chenopod shrubs.

# 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:**

- A2** Shallow calcareous loam (Paralithic, Lithocalcic / Supracalcic Calcarosol)  
Calcareous gravelly sandy loam to clay loam overlying rubbly carbonate within 50 cm and grading to weathering quartzite within 100 cm.
- A3** Calcareous clay loam (Pedal, Hypocalcic / Calcic Calcarosol)  
Calcareous clay loam to sandy loam gradually more clayey at depth, with fine carbonate between 50 and 100 cm and sometimes gypsum in the lower profile.
- A4a** Calcareous sandy loam (Regolithic, Hypercalcic / Calcic Calcarosol)  
Calcareous loamy sand to sandy loam grading to a very highly calcareous sandy clay loam to sandy clay from about 60 cm.
- A4b** Rubbly calcareous loam (Regolithic, Supracalcic Calcarosol)  
Calcareous loam grading to a very highly calcareous rubbly clay loam within 50 cm.
- D2** Loam over red clay (Calcic, Red Chromosol)  
Medium thickness sandy loam to clay loam overlying a moderately well structured hard red clay, calcareous below 50 cm, grading to gypseous clay below 100 cm.
- D3a** Loam over dispersive red clay (Calcic, Red Sodosol)  
Medium thickness sandy loam to loam overlying a coarsely structured and dispersive hard red clay, calcareous below 50 cm, grading to gypseous clay below 100 cm.
- D3b** Clay loam over dispersive red clay (Calcic, Red Sodosol)  
Thin hard clay loam overlying a coarsely structured and dispersive hard red clay, calcareous below 50 cm, grading to moderately saline gypseous clay below 100 cm.
- D4** Calcareous loam over friable red clay (Calcic, Effervescent / Pedaric, Red Sodosol)  
Medium to thick friable slightly calcareous loam over a well structured friable (moderately saline) red clay with minor soft carbonate and variable soft or crystalline gypsum from about 40 cm.
- E2** Red cracking clay (Self-mulching, Red Vertosol)  
Self-mulching cracking calcareous light clay becoming more clayey and calcareous with depth.
- H2** Deep calcareous sand (Regolithic, Calcic Calcarosol)  
Very thick reddish calcareous sand, becoming more calcareous with depth and grading to highly calcareous red clayey sand below 100 cm.
- M2** Gradational clay loam (Calcic, Red Dermosol)  
Medium thickness clay loam grading to a friable red clay with minor soft carbonate from about 50 cm, and soft or crystalline gypsum within 100 cm.

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

