

# WNG Wangoola Land System

Flats and rises in the Wampoony area

**Area:** 69.6 km<sup>2</sup>

**Annual rainfall:** 475 - 525 mm average

**Geology:** The land system is formed on an ancient coastal dune-corridor system. The dunes have consolidated into calcarenite (Bridgewater Formation), which is capped by a layer of hard calcrete. The corridors between the dunes are underlain by a complex of limestones and sandy clays of the Padthaway Formation, and older Tertiary clayey sediments.

**Topography:** The Wangoola Land System is a gently undulating plain abutting the north eastern edge of the Naracoorte Range. Relict outliers of the range project up to 40 m above the plain, which otherwise has relief of less than 10 m. Drainage is internal, with a series of small swamps, and two larger swamps (Wangoola and Changwa) receiving water from the rises and undulating plains. Artificial drains have been installed to assist in disposal of excess surface water.

**Elevation:** 50 - 80 m

**Relief:** Usually less than 10 m, but up to 40 m on isolated calcrete rises

**Soils:** Deep loamy and sandy texture contrast soils are predominant, with cracking clays and shallow sandy loams over calcrete.

**Main soils:**

*Flats*

**F2** Hard sandy loam over dispersive brown clay

**G4** Sand over dispersive brown clay

*Rises*

**G3b** Thick loamy sand over brown clay

**Minor soils:**

*Flats*

**G3a** Loamy sand over firm orange clay

**E3** Hard grey cracking clay

**E1** Black cracking clay

*Rises*

**B3a** Shallow stony loamy sand on calcrete

**B3b** Loamy sand over sandy clay loam on calcrete

**B4** Red loam on calcrete

**B6** Sandy loam over red sandy clay on calcrete

**Main features:** The Wangoola Land System is characterized by flats with sandy to loamy texture contrast soils, commonly affected by waterlogging due to perching of water on the surface of the subsoil. Fertility varies depending on texture; the sandier types are less fertile than the loamy and clayey soils. Drainage is satisfactory on the stony rises, but shallow soil depth and stoniness limit productive potential.



**Soil Landscape Unit summary:** 7 Soil Landscape Units (SLUs) mapped in the Wangoola Land System

SLU	% of area	Main features #
GdA	29.1	<p>Gently undulating flats and inter-ridge corridors formed on clays of the Padthaway Formation. Main soils: <u>sand over dispersive brown clay</u> - <b>G4</b> (E), <u>loamy sand over firm orange clay</u> - <b>G3a</b> (E) and <u>hard sandy loam over dispersive brown clay</u> - <b>F2</b> (E).</p> <p>Key properties:</p> <p>Drainage: Imperfect due to perching of water on dispersive subsoil clays.</p> <p>Fertility: Moderately low to moderate, due to the mainly sandy soils.</p> <p>Physical condition: Good to fair in surface (F2 soils set hard). Subsoil structure is fair to poor due to dispersive clays at moderately shallow depth.</p> <p>AWHC: Moderate.</p> <p>Salinity: Moderate (subsoil)</p> <p>Erosion potential: Water: Low Wind: Low to moderately low</p> <p>Water repellence: Moderate on sandy soils, nil on loamy soils</p> <p>Rockiness: Nil.</p> <p><u>Summary:</u> Impeded drainage, poor subsoil structure, water repellence and marginal fertility are the main features.</p>
GfB	25.8	<p>Undulating rises formed on clayey sediments. Main soils: <u>thick loamy sand over brown clay</u> - <b>G3b</b> (V) on rises and <u>hard sandy loam over dispersive brown clay</u> - <b>F2</b> (L) and <u>sand over dispersive brown clay</u> - <b>G4</b> (L) on flats.</p> <p>Key properties:</p> <p>Drainage: Moderately well (rises). Imperfect (flats) where perched water tables are more likely to develop on dispersive clay subsoils.</p> <p>Fertility: Moderate to moderately low, depending on sandiness of soil.</p> <p>Physical condition: Surface soils are good to fair, with some hard setting. G4 and F2 subsoils are dispersive and impede root growth. Structure of G3b soils is satisfactory.</p> <p>AWHC: Moderately high.</p> <p>Salinity: Moderately low (subsoil).</p> <p>Erosion potential: Water: Moderately low to moderate, depending on slope. Wind: Moderately low, due to sandier soils.</p> <p>Water repellence: Moderate on rises, nil on flats.</p> <p>Rockiness: Nil.</p> <p><u>Summary:</u> Marginal fertility, poor structure, water repellence and waterlogging on lower slopes are the main features.</p>
HcA	24.6	<p>Flats with very low relief formed on clayey sediments. Main soils: <u>hard sandy loam over dispersive brown clay</u> - <b>F2</b> (V) with <u>hard grey cracking clay</u> - <b>E3</b> (L).</p> <p>Key properties:</p> <p>Drainage: Imperfect to poor. Dispersive subsoils in F2 soils, and heavy sodic clays of the E3 soils have low permeability.</p> <p>Fertility: Moderate.</p> <p>Physical condition: Most surface soils set hard, and the clays crack as well. Subsoils are generally coarsely structured and prevent good root distribution.</p> <p>AWHC: Moderately high.</p> <p>Salinity: Moderately low to moderate (subsoil).</p> <p>Erosion potential: Water: Low. Wind: Low.</p> <p>Water repellence: Nil.</p> <p>Rockiness: Nil.</p> <p>Other: Sporadic boron toxicity is likely.</p> <p><u>Summary:</u> Poor drainage and soil structure are the main features.</p>



MCC	13.7	<p>Rises with relief to 40 metres and slopes to 10% formed on calcreted calcarenites of ancient coastal dunes. There is variable surface calcrete up to 10% and minor outcrops of sheet calcrete. Main soils: <u>sandy loam over red sandy clay on calcrete</u> - <b>B6</b> (E), with <u>red loam on calcrete</u> - <b>B4</b> (L), <u>loamy sand over sandy clay loam on calcrete</u> - <b>B3b</b> (L) and <u>shallow stony loamy sand on calcrete</u> - <b>B3a</b> (L). Key properties:</p> <p>Drainage: Rapidly to moderately well drained due to permeable soils and elevated position.</p> <p>Fertility: Moderately low to moderate, due to the predominantly sandy surfaces.</p> <p>Physical condition: Good. Most soils have firm to soft surface soils with friable subsoils.</p> <p>AWHC: Low (B3a soils) to moderately high (B3b/B6/B4 soils).</p> <p>Salinity: Low.</p> <p>Erosion potential: Water: Moderately low to moderate. Wind: Low to moderately low.</p> <p>Water repellence: Nil to moderate.</p> <p>Rockiness: Minor. Up to 10% surface calcrete and sheet rock.</p> <p>Other: Rises are exposed.</p> <p><u>Summary:</u> Well drained, but shallow stony soils with marginal fertility are the main features.</p>
TTA	2.2	<p>Flats with gilgai (crabholes) formed on clayey sediments. Main soils: <u>hard grey cracking clay</u> - <b>E3</b> (E), <u>hard sandy loam over dispersive brown clay</u> - <b>F2</b> (E) and <u>black cracking clay</u> - <b>E1</b> (L).</p> <p>Key properties:</p> <p>Drainage: Imperfect to poor. All soils have low permeability clays at shallow depth and surface drainage is very slow.</p> <p>Fertility: Moderate to high.</p> <p>Physical condition: Fair to poor. Sandy loams and grey clays have hard setting surfaces. They also have coarsely structured subsoils which restrict root growth. Black clays are better structured.</p> <p>AWHC: Moderate to high.</p> <p>Salinity: Moderate (subsoil).</p> <p>Erosion potential: Water: Low. Wind: Low.</p> <p>Water repellence: Nil.</p> <p>Rockiness: Nil.</p> <p>Other: Crabholes are prone to flooding. Sporadic boron toxicity is likely.</p> <p><u>Summary:</u> Impeded drainage and poor soil structure are the main features.</p>
VZ-	1.3	<p>Playas, or old swamp beds, roughly circular in shape and no longer subject to regular inundation. Main soils are <u>hard loam over dispersive brown clay</u> - <b>F2</b> (V) and <u>shallow calcareous loam</u> - <b>B2/A4</b> (E). These soils are moderately fertile, but have variable drainage characteristics. Some may be marginally saline, but elevated salt levels were not detected. They flood in wet years.</p>
Xq-	3.3	<p>Fresh to marginally saline swamps, at least seasonally inundated.</p>

# 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:**

- B3a** Shallow stony loamy sand on calcrete (Petrocalcic, Leptic Tenosol)  
Loamy sand to light sandy loam with variable rubble overlying calcreted calcarenite shallower than 50 cm.
- B3b** Loamy sand over sandy clay loam on calcrete (Petrocalcic, Red Kandosol)  
Medium to thick greyish brown loamy sand to sandy loam grading to a reddish weakly structured friable sandy clay loam over calcreted calcarenite.
- B4** Red loam on calcrete (Petrocalcic, Red Dermosol)  
Medium thickness red sandy loam grading to clay loam over calcreted calcarenite.
- B6** Sandy loam over red sandy clay on calcrete (Petrocalcic, Red Chromosol)  
Medium thickness red brown sandy loam with slight ironstone gravel overlying a reddish brown sandy clay on calcarenite.
- E1** Black cracking clay (Self-mulching, Black Vertosol)  
Black self-mulching seasonally cracking clay, becoming coarser structured, greyer and calcareous with depth.
- E3** Hard grey cracking clay (Epipedal, Grey Vertosol)  
Hard coarse blocky seasonally cracking grey clay, calcareous and prismatically structured at depth.
- F2** Hard sandy loam over dispersive brown clay (Hypercalcic, Brown Sodosol)  
Medium thickness hard setting loamy sand to loam abruptly overlying a coarsely structured grey brown, yellow and red clay grading to soft carbonate.
- G3a** Loamy sand over firm orange clay (Hypercalcic, Red / Brown Chromosol)  
Thin to medium thickness loamy sand abruptly overlying a yellowish red to yellowish brown clay with soft carbonate at depth.
- G3b** Thick loamy sand over brown clay (Calcic, Brown Chromosol)  
Thick loamy sand abruptly overlying a well structured brown and yellow clay, weakly calcareous at depth.
- G4** Sand over dispersive brown clay (Hypercalcic, Brown Sodosol)  
Thin to medium thickness sand sharply overlying a brown and yellow or grey mottled dispersive clay with strong columnar structure, calcareous with depth.

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

