

# CCA Coola Coola Land System

Flat plains and swamps in the north of Hundred of Peacock and the south west of Hundred of Petherick

**Area:** 87.1 km<sup>2</sup>

**Annual rainfall:** 540 – 565 mm average

**Geology:** The Land System is the lagoon depression of an old coastal dune complex. The land is underlain by calcareous clays and limestones (often calcrete capped) of the Padthaway Formation. Scattered across the landscape are low calcarenite rises. These are isolated coastal dune remnants protruding through the Padthaway Formation sediments. Intermittent sand spreads overlies the rises.

**Topography:** The Coola Coola Land System is a flat plain bordering the eastern side of Peacock Range. Water flowing northwards moves slowly across the landscape which terminates in a system of closed depressions collectively known as Coola Coola Swamp. The swamps and adjacent flats are seasonally flooded. The fall of the land to the north is imperceptible, so drains have been installed to assist the flow of water into the swamps. The plains are dotted with stony rises varying in height from less than 5 m to 20 m. Groundwater tables are rising through the district and are within one to two metres of the surface over much of the Land System.

**Elevation:** 20 - 40 m

**Relief:** 5 - 20 m (flats to crests of stony rises)

**Soils:** The soils fall into three generalized categories, depending on topographic position. Sand over clay soils (often wet and saline) dominate flats. Shallow loamy sand surfaced soils over calcreted calcarenite occur on stony rises, and moderately deep to deep sands are characteristic of sand spreads.

## Main soils

### *Moderately saline flats*

- B7/N2** Sand over clay on calcrete
- G4/N2** Sand over sodic clay
- G3** Thick sand over clay

## Minor soils

### *Stony rises*

- B3a** Shallow stony loamy sand on calcrete
- B3b** Loamy sand over red sandy clay loam on calcrete
- B8** Bleached sand on calcrete
- B7** Sand over brown clay on calcrete
- B6/B4** Shallow sandy loam over sandy clay on calcrete
- B2** Shallow calcareous sandy loam on calcrete

### *Sand spreads*

- H3** Deep bleached sand
- G2** Sand grading to sandy clay loam

### *Swamps*

- N2/G4** Wet saline sand over sodic clay
- N2/B7** Wet saline sand over clay on calcrete
- N2** Wet saline sand



**Main features:** The Coola Coola Land System is mainly flat land in the discharge area of a north flowing watercourse. Seasonal inundation of low-lying areas is compounded by waterlogging and salinity, which are increasing problems as saline groundwater tables rise. The northern parts cannot sustain conventional pastures, and productivity of clover-based pastures in the south is diminishing.

**Soil Landscape Unit summary:** 9 Soil Landscape Units (SLUs) mapped in the Coola Coola Land System:

SLU	% of area	Main features #
MHB MJA	20.3 4.0	<p>Rises formed on calcreted calcarenite. These rises are remnants of coastal dunes, isolated from the main ranges. They have variable calccrete stone cover to 20%.  <b>MHB</b> Rises usually between 10 and 20 m high.  <b>MJA</b> Low rises less than 10 m high and usually less than 5 m high.</p> <p>Main soils: <u>deep bleached sand - H3 (E-C)</u> and <u>sand grading to sandy clay loam - G2 (L)</u> on sand spreads, and <u>shallow stony loamy sand on calccrete - B3a (L)</u>, <u>shallow sandy loam over sandy clay on calccrete - B6/B4 (L)</u>, <u>bleached sand on calccrete - B8 (M)</u>, <u>loamy sand over red sandy clay loam on calccrete - B3b (M)</u>, <u>sand over brown clay on calccrete - B7 (M)</u> and <u>shallow calcareous sandy loam on calccrete - B2 (M)</u> on stony areas.  Sandy soils are more common on MHB than MJA.</p> <p>Key properties:  Drainage: Rapidly to well drained.  Fertility: Moderately low on stony soils, to very low on sands.  Physical condition: Surface soils are soft to loose and do not restrict root growth. Where subsoils occur they are friable and not restrictive to root growth.  AWHC: Very low to low on stony soils, due to shallow depth to hard calccrete. Moderate on sandy soils.  Salinity: Low.  Erosion potential: Water: Low to moderate, depending on slope.  Wind: Moderately low on stony ground to high on sand spreads.  Water repellence: Low to slight on stony land. Strong on sand spreads.  Rockiness: Variable to 50%, usually less than 20%. Nil on sand spreads.  Other: The higher rises are exposed.</p> <p><u>Summary:</u> Deep, low fertility, water repellent and erodible sands with shallow, stony soils of marginal fertility.</p>
NDP NDa	1.1 22.2	<p>Flat plains with occasional low sandy or stony rises formed on calcreted clays and limestones of the Padthaway Formation. Groundwater tables are within two metres of the surface over much of the area.  <b>NDP</b> Moderately saline level plain with up to 10% swamps and 20-30% sandy rises  <b>NDa</b> Moderately saline level plain with up to 10% swamps</p> <p>Main soils: <u>sand over clay on calccrete - B7/N2 (E)</u>, <u>sand over sodic clay - G4/N2 (C)</u> and <u>thick sand over clay - G3 (L-M)</u>. <u>Deep bleached sand - H3 (L)</u> and <u>sand grading to sandy clay loam - G2 (M)</u> occur on sandy rises. <u>Wet saline sand over sodic clay - N2/G4 (M)</u>, <u>wet saline sand over clay on calccrete - N2/B7 (M)</u> and <u>wet saline sand - N2 (M)</u> occur in swamps.</p> <p>Key properties:  Drainage: Imperfectly to poorly drained. Dispersive subsoils and/or shallow groundwater tables prevent satisfactory drainage.  Fertility: Moderate to moderately low.  Physical condition: Surface soils usually sandy (no limitations to root growth). Subsoils are commonly dispersive, preventing even root growth.  AWHC: Moderate.  Salinity: Moderate to moderately high. This land is being increasingly affected by rising saline groundwater tables.</p>



		<p>Erosion potential: Water: Low. Wind: Moderately low.</p> <p>Water repellence: Slight to moderate.</p> <p>Rockiness: Less than 2% surface calcrete stone.</p> <p><u>Summary:</u> Flat plains with increasing evidence of salinization, characterized by sandy soils with dispersive clay subsoils over rubbly or soft carbonate. Drainage is impeded, fertility is moderately low.</p>
Xq-	1.1	Jip Jip Water Hole.
ZF-	15.5	Coola Coola Swamp.
ZnL	15.2	<p>Saline, seasonally waterlogged flats with 5-10% low stony or sandy rises and up to 50% highly saline swampy depressions. The land is formed on clayey and limestone sediments of the Padthaway Formation, with minor outcrops of calcreted Bridgewater Formation. Saline groundwater tables are generally within 100 cm of the surface for significant periods.</p> <p><b>ZnL</b> Seasonally waterlogged flats with about 20% swamps and 10-20% stony rises.</p> <p><b>Znk</b> Saline flats subject to inundation, with 30-40% swamps and up to 30% sandy and stony rises.</p> <p><b>Znl</b> Saline flats subject to inundation in wet years with about 70% swamps and 10% stony rises.</p> <p>Main soils: <u>wet saline sand over sodic clay - N2/G4</u>, <u>wet saline sand over clay on calcrete - N2/B7</u> and <u>wet saline sand - N2</u> (E-C). Soils on stony and sandy rises are as for <b>MHB / MJA</b>.</p> <p>Key properties:</p> <p>Drainage: Flats are poorly drained due to a combination of shallow water tables and dispersive clay subsoils. Lower lying areas are seasonally inundated. The rises are well drained.</p> <p>Fertility: Moderately low on flats to low on rises.</p> <p>Physical condition: No limitation in surface soils. Dispersive subsoils on flats restrict root growth.</p> <p>AWHC: Moderate to low.</p> <p>Salinity: Flats - high (<b>ZnL</b>) to very high (<b>Znk</b> and <b>Znl</b>). Rises - low to moderately low.</p> <p>Erosion potential: Water: Low. Wind: Low.</p> <p>Water repellence: Nil.</p> <p>Rockiness: Minor (flats). Up to 20% surface calcrete stone (rises).</p> <p><u>Summary:</u> Flats with poorly drained saline soils requiring salt tolerant species for productive pasture growth (i.e. clovers and conventional perennial grasses will not persist on most of this land). The rises are not salt affected, but have low fertility, shallow stony soils.</p>
Znk	1.2	
Znl	19.4	

# 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:**

- B2** Shallow calcareous sandy loam on calcrete (Petrocalcic, Calcic Calcarosol)  
Thin calcareous loamy sand to sandy clay loam overlying calcreted calcarenite within 30 cm.
- B3a** Shallow stony loamy sand on calcrete (Petrocalcic, Leptic Tenosol)  
Loamy sand to loam with variable rubble and slight clay increase with depth overlying calcreted calcarenite shallower than 50 cm.
- B3b** Loamy sand over red sandy clay loam on calcrete (Petrocalcic, Red Kandosol)  
Medium thickness loamy sand with slight ironstone gravel overlying a weakly structured reddish brown sandy clay loam on calcarenite within 50 cm.
- B6/B4** Shallow sandy loam over sandy clay on calcrete (Petrocalcic, Red Chromosol / Dermosol)  
Medium thickness red sandy loam over a well structured red sandy clay to sandy clay loam over calcreted calcarenite within 50 cm.
- B7** Sand over brown clay on calcrete (Lithocalcic / Petrocalcic, Brown Chromosol)  
Medium thickness sand sharply overlying a coarsely structured dispersive brown and yellow mottled clay over calcreted calcarenite within 50 cm.
- B7/N2** Sand over clay on calcrete (Petrocalcic, Brown / Grey Sodosol)  
Bleached sand overlying a coarsely structured mottled grey sandy clay loam to clay, with a calcrete pan within 50 cm and a saline water table at depth. Moderately saline throughout.
- B8** Bleached sand on calcrete (Petrocalcic, Bleached-Leptic Tenosol)  
Medium to thick bleached sand over calcreted calcarenite within 50 cm.
- G2** Sand grading to sandy clay loam (Mesotrophic, Yellow Kandosol)  
Thick bleached sand, organically darkened at surface, over a yellow and red friable massive sandy clay loam.
- G3** Thick sand over clay (Calcic, Brown Chromosol)  
Thick to very thick bleached sand to loamy sand with an organically darkened surface abruptly overlying a friable yellowish brown and red sandy clay, grading to sandy clay loam to sandy clay with variable fine to rubbly carbonate.
- G4/N2** Sand over sodic clay (Hypercalcic / Lithocalcic, Grey / Brown Sodosol)  
Medium thickness sand sharply overlying a brown and yellow or grey mottled dispersive clay with strong columnar structure, calcareous within 50 cm, and with a water table at depth. Moderately saline throughout.
- H3** Deep bleached sand (Basic, Arenic, Bleached-Orthic Tenosol)  
Thick to very thick bleached sand, organically darkened at the surface over yellow sand continuing below 100 cm.
- N2** Wet highly saline sand (Sandy Calcarosolic / Tenosolic Salic Hydrosol)  
Thick bleached (calcareous) sand over a grey and yellow mottled clayey sand in a water table at about 100 cm. Sand commonly overlain by organic mat or dark clay loam up to 10 cm thick.
- N2/B7** Wet saline sand over clay on calcrete (Petrocalcic, Sodosolic, Salic Hydrosol)  
Bleached sand overlying a coarsely structured mottled grey sandy clay loam to clay (seasonally saturated), with a calcrete pan within 50 cm and a saline water table within 100 cm.
- N2/G4** Wet saline sand over sodic clay (Sodosolic, Salic Hydrosol)  
Medium thickness loamy sand abruptly overlying a grey and yellow brown mottled clay (seasonally saturated), with rubbly to soft carbonate at depth and a saline water within 100 cm.

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

