COO   Coonalpyn Land System

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

Area: 163.7 km²

Annual rainfall: 435 – 475 mm average

Geology: The System is underlain at depth by a sandy limestone (Coomandook Formation). This is overlain by sediments of the coastal dune - corridor system. These include mixed limestones and clays of the Padthaway Formation, and calcarenites of the Bridgewater Formation. Both of these materials usually have calcreted surfaces. Recent aeolian Molineaux Sands sporadically overlie the main landscape.

Topography: The Coonalpyn Land System is a flat to gently undulating plain with limited areas of low sand rises and spreads, and minor stony rises. The plains are characterized by frequent stony areas, usually with calcareous soils, and minor sand plain and poorly drained depressions.

Elevation: 15 - 25 m

Relief: Up to 5 m

Soils: Most soils are loamy and shallow over rubbly or sheet calcrete. They are overlain to a limited extent by deep sands.

Main soils
A4   Red-brown stony calcareous loam on rubbly calcrete - extensive on flats
A5   Grey calcareous loam - extensive on flats
B2   Calcareous loam on sheet calcrete - limited on stony flats
B7   Sand over sandy clay on limestone - limited on sandy flats
H3   Deep siliceous sand - limited on sandhills

Minor soils
F2   Clay loam over dispersive clay - minor in clayey depressions

Main features: The Coonalpyn Land System is dominated by flat to gently undulating plains with calcareous loamy soils, often shallow over calcrete. These soils have good productive potential, their main limitations being shallowness (in places), and nutrient deficiencies including manganese, copper and zinc, induced by highly calcareous conditions. Minor clayey depressions are poorly drained and poorly structured, with reduced productive potential. The sandy rises are characterized by deep siliceous sands with low to very low fertility. They are prone to water repellence and wind erosion and have marginal agricultural potential.

Soil Landscape Unit summary: 5 Soil Landscape Units (SLUs) mapped in the Coonalpyn Land System:

SLU	% of area	Main features #
NKA NKD NKF	19.5 25.6 48.1	Plains formed over Padthaway Formation clays and sandy clays. **NKA** Flat plain with less than 5% sandy or stony rises and less than 5% poorly drained clayey depressions. **NKD** Very gently undulating plain with 10-20% very low sandy rises. **NKF** Flat to very gently undulating plain with up to 10% low sandy and stony rises, and 5-10% poorly drained/clayey depressions. Main soils on flats: <u>red-brown stony calcareous loam on rubbly calcrete</u> - **A4** (E) and <u>grey calcareous loam</u> - **A5** (E), with <u>calcareous loam on sheet calcrete</u> - **B2** (L), <u>sand over sandy clay on limestone</u> - **B7** (M) and <u>clay loam over dispersive clay</u> - **F2** (M). Main soils on rises: <u>deep siliceous sand</u> - **H3** (L) on sandy rises and <u>red-brown stony calcareous loam on rubbly calcrete</u> - **A4** (M) on stony rises. Key properties: Drainage: Well drained generally, but calcareous loams (more clayey A5 soils) are more prone to water logging than the shallower soils over calcrete. The F2 soils are imperfectly to poorly drained due to dispersive subsoils. Soils on rises are rapidly to well drained. Fertility: Moderate to moderately low. Highly calcareous or sandy surface soils are naturally less fertile than non or moderately calcareous loamy or clayey soils. Manganese and copper deficiencies are likely as well as phosphorus. Deep sands (H3) on sandy rises have very low fertility. Physical condition: No limitations above the calcrete in most soils. The F2 soils are difficult to work, seal over and restrict root growth (dispersive subsoil). AWHC: Moderately low generally. Low in shallow soils over calcrete and in deep sands. Salinity: Low at the surface. Generally moderate at depth (except sandy rises). Erosion potential: Water: Low. Wind: Low except for sand over sandy clay (moderately low), and deep sand on sand hills (moderately high). Water repellence: Nil, except on sand hills (strongly repellent). Rockiness: 20% or more surface calcrete associated with shallow soils on calcrete (B2, A4, B7), and lesser amounts with other calcareous loams (A5). <u>Summary</u>: The flats, being predominantly calcareous loams are well suited to agriculture, although some soils are shallow, and others (notably highly calcareous and sandy types) have fertility problems. Erosion is only likely to be a problem on sand rises.
ODG ODJ	1.4 5.4	Low dunefields overlying the main plain. **ODG** Plains with 30-60% low sandy rises and no clayey depressions. **ODJ** Gently undulating flats with 30-60% low jumbled sand rises and 10-20% clayey depressions. Main soils: <u>deep siliceous sand</u> - **H3** (E) on sand rises, and <u>red-brown stony calcareous loam on rubbly calcrete</u> - **A4** (C), <u>grey calcareous loam</u> - **A5** (C) with <u>sand over sandy clay on limestone</u> - **B7** (M) and <u>clay loam over dispersive clay</u> - **F2** (L) in swales and flats. Key properties: Drainage: Well to rapidly drained. Clayey depressions in **ODJ** are imperfectly drained. Fertility: Low (sand rises), moderate to moderately low (swales). Physical condition: No physical restrictions except in dispersive F2 soils. AWHC: Low (sand rises) to moderate or moderately low (swales) Salinity: Low, but moderate in subsoils of swales. Erosion potential: Water: Low. Wind: Moderately high (sand rises). Low (swales). Water repellence: Sand rises strongly repellent. Nil elsewhere. Rockiness: Nil (sand rises), up to 20% surface calcrete in swales (highly variable). <u>Summary</u>: The land comprises about equal proportions of low sand rises with low fertility, water repellent, wind erosion prone sands; and heavier flats (swales) with mainly calcareous soils. The flats have good productive potential, main limitations being shallowness and lime induced nutrient deficiencies.

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   Red-brown stony calcareous loam on rubbly calcrete (Regolithic, Lithocalcic Calcarosol)
Calcareous red brown sandy clay loam, becoming redder and more clayey with depth overlying rubbly to sheet calcrete within 30 cm. The calcrete grades to a very highly calcareous pale coloured rubbly sandy clay loam with depth.

A5   Grey calcareous loam (Regolithic, Calcic / Lithocalcic Calcarosol)
Highly calcareous grey brown sandy clay loam becoming pale brown and more calcareous with depth, overlying soft to rubbly carbonate within 30 cm. Rubble content decreases with depth, and soil becomes more clayey.

B2   Calcareous loam on sheet calcrete (Petrocalcic, Lithocalcic Calcarosol)
Medium thickness calcareous stony loam to clay loam overlying Class III C carbonate grading to calcreted lagoonal sediments.

B7   Sand over sandy clay on limestone (Petrocalcic, Brown Chromosol)
Medium thickness sand to light sandy loam abruptly overlying a brown friable sandy clay on calcrete within 50 cm.

F2   Clay loam over dispersive clay (Hypercalcic, Brown Sodosol)
Medium thickness fine sandy clay loam abruptly overlying a brown poorly structured and dispersive heavy clay with abundant soft carbonate from about 40 cm, grading to clayey sediments with depth.

H3   Deep siliceous sand (Basic, Arenic, Bleached-Orthic Tenosol)
Pale grey loose sand becoming yellower with depth and continuing below 200 cm.

Further information: DEWNR Soil and Land Program

Government of South Australia
Department of Environment,
Water and Natural Resources