BON Bonney Land System

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

Gently undulating sandplain in the Hundreds of Jeffries and Bonney

Area: 112.6 km^2

Annual rainfall: 470 – 490 mm average

Geology: The System is formed over weak sandstones, sandy limestones and sandy marls of the Padthaway and Coomandook Formations. Substantial areas are blanketed by younger Molineaux Sands.

Topography: The Bonney Land System is a gently undulating sand plain with about 30% superimposed low to moderate parallel sand dunes. There are occasional stony rises.

Elevation: 3 - 32 m (Mt. Barlas)

Relief: Less than 15 m

Main soils: The landscape is dominated by sandy soils, either deep sands or sand over clay soils

Main soils

G3a Thick sand over sandy clay
G3b Sand over brown sandy clay
H3 Deep siliceous sand

Minor soils

B3 Shallow loamy sand over calcrete
B8 Bleached sand over calcrete
N2 Swamp soil

Main features: The flats are dominated by sandy surface soils which are marginally fertile and subject to water repellence and wind erosion. The dunes have very low fertility and are highly susceptible to water repellence and wind erosion and are not suited to cropping. Capability of the flats for cropping is low. Grazing of perennial pastures is the most extensive land use. Pasture productivity relies on fertility maintenance including acidity control, as well as careful grazing management to avoid baring off, particularly of the sand dunes. Rising saline water tables are affecting some land in the west. There is a need here for the introduction of saltland agronomy.

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

SLU	% of area	Main features #
NGA NGD NGd	3.1 25.3 8.4	Very gently undulating plains formed on sandy sediments and minor limestones of the Padthaway and Coomandook Formations. **NGA** Very gently undulating flats with less than 10% sandy rises. **NGD** Very gently undulating flats with 20-30% sandy rises and up to 10% stony rises. **NGd** Very gently undulating flats with 10-20% sandy rises and stony rises, and 2-10% saline depressions. Main soils: thick sand over sandy clay - **G3a** (V) and sand over brown sandy clay - **G3b** (C), with deep siliceous sand - **H3** (L) and loamy sand to sand over calcrete - **B3/B8** (M) on rises. Key properties: Drainage: Well drained. Fertility: Low (to very low on sand rises). Physical condition: No surface limitations. Subsoil clay in shallower sand over clay soils impedes root growth to a minor extent. AWHC: Moderate to moderately low. Salinity: Low, although rising ground water tables pose threat. Erosion potential: Water: Low. Wind: Moderate to moderately low. Water repellence: Repellent to strongly repellent. Rockiness: Nil (minor calcrete on stony rises). Summary: Marginally fertile sandy surface soils subject to water repellence and wind erosion are predominant. Cropping potential is low. Grazing of perennial pastures is the most extensive land use.
OAF OAG OAJ	3.7 43.3 14.7	Gently undulating to undulating dunefields with variable proportions of irregular sandhills overlying land formed on Padthaway / Coomandook Formation sediments (as for **NGA/NGD** above). **OAF** 60-90% moderate sandhills. **OAG** 60-90% low sandhills. **OAJ** 30-60% low sandhills. Main soils: deep siliceous sand - **H3** (V) on rises, and thick sand over sandy clay - **G3a** and sand over brown sandy clay - **G3b** (C) in swales and flats, with loamy sand to sand over calcrete - **B3/B8** (M-L) on stony rises. Key properties: Drainage: Rapidly to well drained. Fertility: Very low to low. Physical condition: No restrictions other than subsoil clay in shallower soils in some swales and moderately shallow calcrete on some rises. AWHC: Low to moderate. Salinity: Low. Erosion potential: Water: Low. Wind: Moderately high to high. Water repellence: Strongly repellent on deep sands. Rockiness: Nil. Summary: The predominant sand dunes are highly susceptible to water repellence and wind erosion and are not suited to cropping. Pasture productivity relies on fertility maintenance including acidity control.
ZoO	1.5	Very gently undulating depressions with about 60% low sandy and stony rises and about 40% salt flats. Main soils: thick sand over sand clay - **G3a** (C) and deep siliceous sand - **H3** (M) on sandy rises, loamy sand to sand over calcrete - **B3/B8** (C) on stony rises and swamp soil - **N2** (E) in salt flats. The rises are similar to those of **NGd**. The salt flats have little productive potential unless salt tolerant grasses or shrubs are established.

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:

B3 Shallow loamy sand over calcrete (Petrocalcic, Leptic Tenosol)
Medium thickness loamy sand to light sandy clay loam with variable rubble, overlying hard calcreted limestone. Minor on stony rises.

B8 Bleached sand over calcrete (Petrocalcic, Bleached-Leptic Tenosol)
Thick sand with a bleached A2 layer over hard calcreted limestone.

G3a Thick sand over sandy clay (Bleached, Hypocalcic, Brown Chromosol)
Very thick soft to loose sand with a bleached A2 layer, abruptly overlying a brown mottled sandy clay, weakly calcareous below 100 cm. Very extensive on flats.

G3b Sand over brown sandy clay (Bleached, Calcic, Brown Chromosol)
Medium thickness brown sand abruptly overlying a brown sandy clay with soft carbonates from about 50 cm. Common on flats and swales.

H3 Deep siliceous sand (Basic, Arenic, Brown-Orthic Tenosol)
Grey loose sand becoming paler coloured with depth and grading to a yellow to brown sand below 50 cm. Continues below 200 cm. Very extensive on sand ridges.

N2 Swamp soil (Salic Hydrosol)
Variable soils affected by high saline water tables.

Further information: DEWNR Soil and Land Program