MED Meningie Downs 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 east of Meningie

Area: 436.9 km^2

Annual rainfall: 445 – 505 mm average

Geology: The land is underlain by sandy limestones of the Coomandook Formation. These are covered by sandy lagoon sediments (Padthaway Formation) deposited in corridors between ancient coastal dunes. A discontinuous limestone layer caps the Padthaway Formation materials. Most of the land is covered by a veneer of aeolian Molineaux Sand. Minor Tertiary remnants with ironstone cappings protrude through the sedimentary cover.

Topography: The Meningie Downs Land System is a gently undulating sand plain with low to moderate irregular sand dunes and isolated low stony rises. Saline water tables underlie the System and are near the surface in some low lying depressions.

Elevation: 4 - 30 m

Relief: Up to 10 m

Soils: Sandy soils predominate. They range from deep sands to sand over sandy clays. Shallow stony soils are minor.

Main soils

G3a Sand over sandy clay - Extensive (on flats and rises)
H3 Deep siliceous sand - Extensive (on sand dunes)
G3b Thick sand over sandy clay - Common (on flats)

Minor soils

B3 Shallow stony loamy sand - stony rises
B7/N2 Sand over yellow and grey mottled clay - saline depressions

Main features: The Meningie Downs Land System comprises mainly sandy soils, with clayey subsoils on flats, but usually extending below a metre on sand dunes. Natural fertility is low, and water repellence and wind erosion are moderate to high limitations. Although some cropping is carried out, grazing of perennial pastures is the most extensive land use.

Soil Landscape Unit summary: 10 Soil Landscape Units (SLUs) mapped in the Meningie Downs Land System:

SLU	% of area	Main features #
MHB	1.6	Low rises formed on Padthaway Formation limestones, partially overlain by siliceous sand. There is variable surface calcrete, depending on thickness of sand. Main soils: deep siliceous sand - **H3** (E) and shallow stony loamy sand - **B3** (E). Key properties: Drainage: Rapidly to well drained. Fertility: Very low on deep sands to moderately low on stony soils. Physical condition: Surface soils are soft to loose and do not restrict root growth. AWHC: Moderate on sandy soils. Very low to low on stony soils, due to shallow depth to limestone. Salinity: Low. Erosion potential: Water: Low. Wind: High on sand spreads to moderately low on stony ground. Water repellence: Strong on sand spreads. Low to slight on stony land. Rockiness: Nil on sand spreads. Usually less than 20% elsewhere. Summary: Shallow stony soils of marginal fertility with deep, low fertility, water repellent and erodible sands.
NGA NGD NGp	37.7 48.8 1.2	Very gently undulating plains formed on a sandy phase of the Padthaway Formation. **NGA** Very gently undulating flats with less than 10% sandy rises **NGD** Very gently undulating flats with 20-30% sandy rises. **NGp** Very gently undulating flats with 20-30% sandy rises and about 10% saline depressions. Main soils: sand over sandy clay - **G3a** (E) and thick sand over sandy clay - **G3b** (E) on flats with deep siliceous sand - **H3** (C) on rises. Sand over yellow and grey mottled clay - **B7/N2** (M) occurs in swampy depressions. Key properties: Drainage: Well drained (except for swampy depressions). Fertility: Low (to very low on sand rises). Physical condition: No surface limitations. Subsoil clay in shallower sand over clay soils (G3a and B7/N2) impedes root growth to a minor extent. AWHC: Moderate to moderately low. Salinity: Low, although rising ground watertables pose a threat. Moderately high to high in saline depressions. Erosion potential: Water: Low. Wind: Moderate to moderately low. Water repellence: Repellent to strongly repellent. Rockiness: Nil. Summary: The land is dominated by sandy surface soils which are marginally fertile and subject to water repellence and wind erosion. Potential for cropping is low. Grazing of perennial pastures is the most extensive land use. Rising watertables are a threat in lower lying areas.
O-A O-B	0.8 0.4	Jumbled sand dunes formed on Molineaux Sand. **O-A** High dunes **O-B** Moderate dunes. Main soil: deep siliceous sand - **H3** (D). Key properties: Drainage: Rapid Fertility: Very low. Physical condition: No restrictions. AWHC: Low. Salinity: Low Erosion potential: Water: Low Wind: High (O-A) to moderately high (O-B) Water repellence: Strongly repellent. Rockiness: Nil. Summary: These sand dunes are highly infertile and prone to water repellence and wind erosion.

		Once cleared, they easily become unstable.
OAE OAF OAG OAJ	0.9 3.7 0.7 4.2	Gently undulating plains with more than 30% irregular sand dunes. **OAE** 60-90% high sand dunes **OAF** 60-90% moderate sand rises **OAG** 60-90% low sand rises **OAJ** 30-60% low sand rises Main soils: deep siliceous sand - **H3** (V) on rises, sand over sandy clay - **G3a** (L) and thick sand over sandy clay - **G3b** (L) in swales and flats. 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. 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.

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 stony loamy sand (Petrocalcic, Leptic Tenosol)
Medium thickness loamy sand to light sandy clay loam overlying limestone, grading to sandy Padthaway Formation sediments.

B7/N2 Sand over yellow and grey mottled clay (Lithocalcic, Grey Sodosol)
Medium thickness loamy sand abruptly overlying a grey and yellow brown mottled clay (seasonally saturated), with rubbly calcrete at depth.

G3a Sand over sandy clay (Calcic, Brown Chromosol)
Medium thickness loamy sand to sand abruptly overlying a brown sandy clay with soft carbonate from about 50 cm, grading to sandy Padthaway Formation sediments.

G3b Thick sand over sandy clay (Hypocalcic, Brown Chromosol)
Very thick loamy sand to sand abruptly overlying a brown sandy clay, slightly calcareous from about 100 cm, grading to sandy Padthaway Formation sediments.

H3 Deep siliceous sand (Calcareous, Arenic, Brown-Orthic / Bleached-Orthic Tenosol)
Loose grey sand, paler coloured with depth, grading to yellow sand, slightly calcareous from about 100 cm, continuing below 200 cm.

Further information: DEWNR Soil and Land Program