

# MEN Meningie Land System

Complex of rises and partly salinized flats east and south of Meningie

**Area:** 89.1 km<sup>2</sup>

**Annual rainfall:** 440 – 485 mm average

**Geology:** The rising ground is underlain by calcreted coastal dune sand (calcarenite) of the Bridgewater Formation, partly overlain by wind deposited Molineaux Sand. On the intervening flats are sandy limestones, calcareous sandstones and sands of the Padthaway and Coomandook Formations, laid down in Coorong-like lagoons between the coastal dunes. Adjacent to the lakes where there has been incursion of water during the most recent high sea level stand, the flats are covered with a veneer of black clay sediment.

**Topography:** The Land System is a complex of gently undulating to undulating rises, generally sandy but with some stone at the surface, and flats. Shallow saline groundwater tables under the flats have salinized parts of the area. There are extensive saltpans or samphire flats, interspersed with marginally and non-saline flats, depending on watertable depth.

**Elevation:** 0 - 20 m

**Relief:** Less than 10 m

**Soils:** Shallow to deep sandy soils predominate on rises, with a range of sandy loam texture contrast and gradational soils, calcareous loams and cracking clays on flats.

#### Main soils

##### *Saline flats*

**N2/A7** Pipeclay soil

##### *Rises*

**H2** Deep sand

**B3** Shallow loamy sand on calcrete

**B8** Moderately shallow sand on calcrete

#### Minor soils

##### *Flats*

**B7** Thick sand over sandy clay

**F2** Sandy loam over black clay

**M1** Gradational loamy sand

**E1** Black cracking clay

**M1/N3** Wet sand

**Main features:** The Meningie Land System is characterized by rises with moderately shallow to very deep sandy soils over calcrete, flats with variable sandy soils, or heavier black sandy loams or clays, and salt flats. The sandy soils are infertile and prone to seasonal water repellence and wind erosion. Some are shallow over calcrete, further limiting productive potential. The heavier soils of the flats are deeper and more fertile but are variably affected by salinity, which should be monitored. The salt flats are unproductive without the establishment of salt tolerant grasses and associated revegetation programmes.



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

SLU	% of area	Main features #
MNC MNn	19.4 26.2	Undulating rises and flats formed on calcreted calcarenite, with variable proportions of flats and saline depressions formed on Padthaway / Coomandook Formation sediments. <b>MNC</b> Undulating rises and flats with less than 2% saline depressions. <b>MNn</b> Undulating rises and flats with 2-10% saline depressions. Main soils: <u>deep sand</u> - <b>H2</b> (E), moderately <u>shallow sand</u> - <b>B8</b> (C) and <u>shallow loamy sand</u> - <b>B3</b> (C) on slopes with soils as for ZoO in saline depressions and lower slopes. The soils are generally infertile and prone to water repellence and wind erosion if exposed. Where the underlying calccrete is close to the surface, there is the additional limitation of restricted water holding capacity. Productivity in the depressions and flats is being progressively diminished by salinity build up. Establishment of salt tolerant grasses and shrubs is needed in these areas.
Mvm	3.9	Very gently undulating rises of Bridgewater calcarenites, with flats formed on Padthaway / Coomandook Formation sediments, partly overlain by clayey lake sediments. The latter occur mainly in saline flats and depressions which account for about 10% of the land area. Main soils: <u>shallow loamy sand</u> - <b>B3</b> (E) and <u>deep sand</u> - <b>H2</b> (E) on rises, with <u>gradational loamy sand</u> - <b>M1</b> (L) on lower slopes and <u>thick sand over sandy clay</u> - <b>B7</b> (M), <u>sandy loam over black clay</u> - <b>F2</b> (M) and <u>pipeclay soil</u> - <b>N2/A7</b> (M) on flats. The characteristics of this landscape are similar to those for MNn, the main difference being the higher proportion of clayey soils on the flats.
Ngr Ngv	6.3 6.3	Very gently undulating flats formed on sediments of the Padthaway Formation, with 20-50% low rises formed on Bridgewater Formation. The flats are variably salinized. <b>Ngr</b> Flats with up to 10% saline land. <b>Ngv</b> Flats with 10-50% saline land. Main soils: <u>moderately shallow sand</u> - <b>B8</b> (L) and <u>deep sand</u> - <b>H2</b> (L) on rises, <u>shallow loamy sand</u> - <b>B3</b> (C-L) on flats and rises, <u>thick sand over sandy clay</u> - <b>B7</b> (C) and <u>gradational loamy sand</u> - <b>M1</b> (L) on flats, with soils as for ZoO in saline depressions. The soils of the rises are infertile and prone to water repellence and wind erosion if exposed. Restricted waterholding capacity affects shallower types. The soils of the flats are moderately shallow to moderately deep with better fertility status, but at risk of salinization. Saline flats have low productive potential unless sown with salt tolerant species.
VtM	0.6	Flats adjacent to Lake Alexandrina, formed on lake floor sediments. About 20% swampy depressions. Main soils: <u>black cracking clay</u> - <b>E1</b> (V) and <u>pipeclay soil</u> - <b>N2/A7</b> (L). This land is too saline and waterlogged for uses other than light grazing.
VuR	9.7	Flats formed on lakebed sediments with about 20% low sandy rises and 20-50% saline depressions. Main soils: <u>pipeclay soil</u> - <b>N2/A7</b> (E) in saline depressions, with <u>sandy loam over black clay</u> - <b>F2</b> (L), <u>thick sand over sandy clay</u> - <b>B7</b> (L), <u>black cracking clay</u> - <b>E1</b> (M) and <u>wet sand</u> - <b>M1/N3</b> (M) on flats, and <u>moderately shallow sand</u> - <b>B8</b> (M) and <u>deep sand</u> - <b>H2</b> (M) on rises. The soils of the flats are fertile and moderately deep but marginal (and probably increasing) salinity limits productivity. On the rises, soils are well drained and not saline, but are infertile and often shallow and prone to wind erosion. The saline flats have limited potential unless resown to salt tolerant species.
ZC- ZoO	5.6 22.0	Flats in which the majority of the land is salt affected. <b>ZC-</b> Bare or partly samphire covered salt pans. <b>ZoO</b> Land with > 50% bare salt pans or samphire flats, and about 20% low sandy or stony rises. Main soil in ZC-: <u>pipeclay soil</u> - <b>N2/A7</b> (D). Main soils in ZoO are <u>pipeclay soil</u> - <b>N2/A7</b> (V) in salt pans, <u>sandy loam over black clay</u> - <b>F2</b> (M), <u>thick sand over sandy clay</u> - <b>B7</b> (M), <u>black cracking clay</u> - <b>E1</b> (M), <u>gradational loamy sand</u> - <b>M1</b> (M) and <u>wet sand</u> - <b>M1/N3</b> (M) on marginally to non saline flats, with <u>deep sand</u> - <b>H2</b> (M) and <u>shallow to moderately shallow loamy sand</u> - <b>B3/B8</b> (M) on rises. Management of the predominantly saline land is the key issue. This generally means establishment of salt tolerant grasses or shrubs.

# 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:***Saline flats***N2/A7** Pipeclay soil (Shelly Calcarosol / Calcarosolic, Salic Hydrosol)

Very highly calcareous light grey shelly and gypseous clay loam (pipeclay) grading to a grey light clay overlying a buried sand over clay soil from about 75 cm.

*Rises***H2** Deep sand (Arenic, Brown-Orthic Tenosol)

Loose brown sand, paler with depth, continuing below 100 cm.

**B3** Shallow loamy sand on calcrete (Petrocalcic, Leptic Rudosol)

Medium to thick loamy sand over calcrete at 30 - 40 cm.

**B8** Moderately shallow sand on calcrete (Petrocalcic, Leptic Tenosol)

Loose brown sand, paler with depth abruptly overlying calcrete at about 50 cm.

*Flats***B7** Thick sand over sandy clay (Lithocalcic / Petrocalcic, Brown Sodosol)

Medium to thick sand sharply overlying a brown sandy clay on rubbly or sometimes sheet calcrete at about 40 cm, grading to very highly calcareous sandy clay loam with calcrete nodules.

**F2** Sandy loam over black clay (Black Sodosol)

Medium thickness hard sandy loam over a black blocky heavy clay, becoming greyer with depth. Saline watertable may occur at about 100 cm.

**M1** Gradational loamy sand (Calcareous, Regolithic, Grey-Orthic Tenosol)

Thick loamy sand grading to a calcareous light sandy loam over semi hard carbonate from about 60 cm.

**E1** Black cracking clay (Pedal, Black Vertosol)

Medium thickness hard black cracking clay with coarse blocky structure, becoming greyer and moderately calcareous with depth overlying buried sand to sandy loam over clay soils at depths ranging from 30 to 100 cm (average 40 cm).

**M1/N3** Wet sand (Basic, Regolithic, Bleached-Orthic Tenosol / Tenosolic, Redoxic Hydrosol)

Grey sand becoming paler at depth with a water table at about 80 cm.

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

