COP Cooke Plains Land System

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

Low lying salinized plain east and south of Cooke Plains

Area: 19.7 km^2

Annual rainfall: 380 – 390 mm average

Geology: The landscape is formed on Bungunnia Limestone overlain by a veneer of clay (St. Kilda Formation) laid down on the bed of a lake or estuary during the last high sea level stand. There are some gypsum deposits derived from reworking of gypseous lake floor sediments. There are also minor deposits of Molineaux Sand.

Topography: The landscape is a flat low lying plain. The topography consists of an extensive samphire flat with a highly saline water table within a metre, and adjoining slightly higher flats less affected by salinity. There are limited areas of gypseous lunettes, the main occurrence arcing around the eastern side of the broad samphire flat.

Elevation: 3 - 10 m

Relief: 6 m

Soils: Wet saline soils are predominant. They are associated, depending on position in the landscape, with shallow stony soils, dark clayey soils, sandy soils and gypseous soils.

Main soils
Samphire flats (areas where water tables are closest to the surface)
N2 Grey wet saline clay
Clay flats (areas where the lake floor clay is thick)
E1/N2 Clay loam over black clay or black cracking clay
Lunettes (formed on gypsum deposits)
A8 Gypseous sandy loam

Minor soils
Stony flats (areas where Bungunnia Limestone is close to the surface)
B5 Shallow gradational clay loam
Sandy flats (formed on Molineaux Sand)
A4/N2 Loamy sand over sandy clay loam

Main features: The Cooke Plains Land System is a flat plain dominated by highly saline and waterlogged clayey soils. These are too saline for cropping but provide some grazing value which could be enhanced through the establishment of salt tolerant pastures. The slightly higher flats which are less affected by water tables are marginally arable, but if water tables continue to rise, productivity from these flats can be expected to decline unless appropriate revegetation is undertaken. Gypsum deposits have limited agricultural productive value, but are extensively quarried for use as a soil structure ameliorant.

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

SLU	% of area	Main features #
VVB VVF VVL	25.3 2.8 8.2	Moderately saline flats formed on clayey sediments of the St. Kilda Formation. There are minor highly saline depressions and variable gypseous rises. **VVB** Flats with minor gypseous rises. **VVF** Flats with extensive gypseous lunettes and minor highly saline depressions. **VVL** Flats with 20-30% gypseous rises. Main soils: clay loam over black clay / black cracking clay - **E1/N2** (E), shallow gradational clay loam - **B5** (C) and loamy sand over sandy clay loam - **A4/N2** (C), with gypseous sandy loam - **A8** (M-E) on rises and wet saline soil - **N2** (M) in saline depressions. This land is semi arable due to the influence of rising saline water tables. Soils are variably but increasingly affected by waterlogging and soil salinity. Restricted water holding capacity due to shallow calcrete or low fertility are additional limitations in the **B5** and **M4** soils respectively. Introduction of salt tolerant pasture species or perennials should be considered on this land.
ZB-	56.3	Samphire flats with scattered gypseous rises. Main soil: wet saline soil - **N2** (D), with gypseous sandy loam - **A8** (M) on rises. These flats are affected by highly saline water tables within a metre of the surface. They are non arable and are presently used mainly for rough grazing. Protection of existing halophytic vegetation, and establishment of salt tolerant pastures and/or perennials should be considered.
ZM-	7.4	Gypsum rises. Main soil: gypseous sandy loam - **A8** (D). These soils have restricted root zone depths due to low fertility, high salinity and possibly high boron. The deposits are potential sources of agricultural gypsum.

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:

Samphire flats (areas where watertables are closest to the surface)

N2 Grey wet saline clay (Dermosolic, Salic Hydrosol)
Thin dark grey silty clay loam over a dark grey slightly calcareous clay, becoming paler coloured with depth. Saline water table within 100 cm.

Stony flats (areas where Bungunnia Limestone is close to the surface)

B5 Shallow gradational clay loam (Petrocalcic, Black Dermosol)
Medium thickness clay loam to light clay over a black clay sharply overlying fractured calcrete at about 25 cm. Calcrete grades to semi hard Bungunnia Limestone containing a fluctuating saline water table below 100 cm.

Clay flats (areas where the lake floor clay is thick)

E1/N2 Black cracking clay or clay loam over black clay or (Aquic / Black Vertosol OR Black Dermosol)
Medium thickness hard black clay loam to cracking clay over a black blocky heavy clay, becoming greyer and moderately to highly gypseous with depth. Saline water table may occur at about 100 cm.

Sandy flats (formed on Molineaux Sand)

A4/N2 Loamy sand over sandy clay loam (Calcarosolic, Salic Hydrosol / Regolithic, Hypercalcic Calcarosol)
Thick light sandy loam, calcareous from shallow depth, grading to a brown massive highly calcareous sandy clay loam, with a saline water table at about 100 cm.

Lunettes (formed on gypsum deposits)

A8 Gypseous sandy loam (Hypergypsic Calcarosol)
Thin dark grey sandy loam becoming more clayey and greyer with depth and with increasing content of fine gypsum.

Further information: DEWNR Soil and Land Program