

# MAI Malinong Land System

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

Complex of gently undulating plains and sandhills south of Cooke Plains

**Area:** 139.3 km<sup>2</sup>

**Annual rainfall:** 385 – 415 mm average

**Geology:** The land is formed on Bungunnia Limestone equivalent interspersed with calcarenites capping ancient coastal sand dunes. Extensive deposits of Molineaux Sand are scattered across the landscape and thin layers of clay occur on some flats in old lakebeds.

**Topography:** The topography is gently undulating and comprises several distinctive elements. The main features are broad very gently undulating plains with extensive sandy rises and limited stony rises. There are extensive dunefields of low, moderate and high irregular sandhills with a rough east - west orientation. Several low rises formed on Bridgewater Formation calcarenites are scattered throughout the System. The land is underlain by saline watertables which have been steadily rising. These are at or near the surface in the lowest lying areas (the old lake floor depressions), and other parts of the plains are under threat of salinization if watertables continue to rise.

**Elevation:** 6 - 30 m

**Relief:** 5 - 10 m

**Soils:** Shallow sands with variable (and often absent) subsoils over calcrete or limestone are dominant. Heavier textured dark soils with variable salinity occur on flats, and deep sands dominate sandhills.

## Main soils

### *Sandy flats and rises*

**B7b** Sand over red sandy clay on limestone

### *Sandy rises and sandhills*

**H2** Deep sand

### *Stony flats and rises*

**B3** Shallow sandy loam

## Minor soils

### *Sandy rises and sandhills*

**G2** Sand over sandy clay loam

### *Moderately to highly saline flats*

**N2** Saline calcareous clay loam

**B5/C5** Gradational black clay loam

**B2b** Shallow calcareous sandy clay loam

### *Sandy flats and rises*

**B8** Shallow beached sand

### *Stony flats and rises*

**B2a** Shallow calcareous sandy loam

**B7a** Sand over grey sandy clay loam on calcrete

**B7c** Loamy sand over sandy clay loam on calcrete



**Main features:** The Malinong Land System is a gently undulating plain. The Main soils: sandy - deep sands on the extensive sandhill systems, and thick sands with more clayey subsoils on flats and sandy rises. Shallow sands to sandy loams are common on limestone flats and calcarenite rises. The sandy soils are generally infertile, often water repellent and prone to wind erosion. The deep sands are the least productive and higher sandhills are non arable due to the severity of erosion potential. The heavier soils are more fertile, but usually shallower, so their productive potential is also limited. The soils of the saline depressions are wet and too salty for cropping.

**Soil Landscape Unit summary:** 13 Soil Landscape Units (SLUs) mapped in the Malinong Land System:

SLU	% of area	Main features #
MFB	5.4	Low rises formed on calcreted calcarenites of the Bridgewater Formation, with minor Molineaux Sand cover. Main soils: <u>shallow sandy loam</u> - <b>B3</b> (E), <u>loamy sand over sandy clay loam</u> - <b>B7c</b> (E) and <u>shallow bleached sand</u> - <b>B8</b> (L). The predominant soils are shallow with restricted waterholding capacity and moderately low fertility, but they are arable.
MwB	1.4	Low rises formed on calcreted calcarenites of the Bridgewater Formation, extensively covered by Molineaux Sands. Main soils: <u>shallow sandy loam</u> - <b>B3</b> (C), <u>loamy sand over sandy clay loam</u> - <b>B7c</b> (L) and <u>shallow bleached sand</u> - <b>B8</b> (L) on stony rises, with <u>deep sand</u> - <b>H2</b> (C) and <u>sand over sandy clay loam</u> - <b>G2</b> (L) on sand spreads. The predominant soils are shallow with restricted waterholding capacity and moderately low fertility, but they are arable. Soils on the sand spreads are infertile, water repellent and prone to wind erosion.
NeA NeB NeE	9.1 0.5 8.3	Very gently undulating flats formed on Bungunnia Limestone equivalent with up to 30% low stony and sandy rises, up to 10% sandhills and minor saline depressions. <b>NeA</b> Flats. <b>NeB</b> Stony flats. <b>NeE</b> Flats with 10-30% low rises and minor saline depressions. Main soils: <u>sand over red sandy clay</u> - <b>B7b</b> (E) on sandy flats, <u>shallow sandy loam</u> - <b>B3</b> (E-D) on stony flats and stony rises, with <u>deep sand</u> - <b>H2</b> (M) and <u>sand over sandy clay loam</u> - <b>G2</b> (M) on sandhills and sandy rises. <u>Saline calcareous clay loam</u> - <b>N2</b> (M) and <u>sand over grey sandy clay loam</u> - <b>B7a</b> (M) occur in saline depressions. The stony flats are moderately fertile but their shallow profiles restrict water availability, and in places (eg NeB) are too stony for cultivation. The sandy soils are generally deeper, but productive potential is limited by low fertility, water repellence and wind erosion potential.
NfO NfP NfS	17.9 10.9 2.5	Gently undulating flats formed on Bungunnia Limestone equivalent with extensive sand spreads and up to 20% saline depressions. <b>NfO</b> Flats with 10-30% stony rises and minor saline depressions. <b>NfP</b> Flats with less than 10% stony rises. <b>NfS</b> Flats with up to 20% saline depressions. Main soils: <u>sand over red sandy clay</u> - <b>B7b</b> (E) on sandy flats, <u>deep sand</u> - <b>H2</b> (C) and <u>sand over sandy clay loam</u> - <b>G2</b> (L) on sand spreads and sandhills, with <u>shallow sandy loam</u> - <b>B3</b> (L-M) and <u>shallow calcareous sandy loam</u> - <b>B2a</b> (M-L) on stony flats and rises, <u>saline calcareous clay loam</u> - <b>N2</b> (M), <u>gradational black clay loam</u> - <b>B5/C5</b> (M), <u>shallow calcareous sandy clay loam</u> - <b>B2b</b> (M) and <u>sand over grey sandy clay loam</u> - <b>B7a</b> (M) in saline depressions. The predominantly sandy soils are infertile, water repellent and prone to wind erosion. Although arable, productive potential is low. The heavier soils are shallow so their productive potential is also restricted. The saline depressions are mostly non arable.
UXE UXF UXI UXJ	2.1 6.0 13.1 19.8	Sandhill complexes with varying proportions and sizes of irregular sandhills. <b>UXE</b> 60-90% high sandhills. <b>UXF</b> 60-90% moderate sandhills. <b>UXI</b> 30-60% moderate sandhills. <b>UXJ</b> 30-60% low sandhills. Main soils: <u>deep sand</u> - <b>H2</b> (E) and <u>sand over sandy clay loam</u> - <b>G2</b> (L) on sandhills, with <u>sand over</u>



		<u>red sandy clay</u> - <b>B7b</b> (L-C) and <u>shallow sandy loam</u> - <b>B3</b> (L-C) on flats and swales. The sandy soils of the sandhills are infertile, often water repellent and prone to wind erosion. The high sandhills are non arable due to severe erosion potential. The moderate sandhills are semi arable, while the low sandhills are arable with appropriate soil conservation management. The soils of the flats and swales are also mostly sandy with similar limitations. The B3 soils are more fertile but shallow with restricted waterholding capacity. The flats are fully arable but with limited productive potential.
ZB-	3.0	Depressions with a highly saline water table at or near the surface. These depressions commonly support samphire vegetation. Main soil: <u>saline calcareous clay loam</u> - <b>N2</b> (D). These areas are too saline for cropping, but have some opportunistic grazing value. Protection of existing vegetation and revegetation to salt tolerant pastures or perennial shrubs are the main management considerations.

# 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:

- B2a** Shallow calcareous sandy loam (Petrocalcic, Hypercalcic Calcarosol)  
Calcareous sandy loam becoming very highly calcareous at shallow depth, over calcreted limestone or clay within 50 cm.
- B2b** Shallow calcareous sandy clay loam (Petrocalcic, Supracalcic Calcarosol)  
Medium thickness calcareous sandy loam to sandy clay loam with variable carbonate nodules, over rubbly or laminar calcrete becoming softer with depth over very highly calcareous marl and limestone (sometimes with watertable).
- B3** Shallow sandy loam (Petrocalcic, Red Kandosol or Petrocalcic, Leptic Tenosol)  
Medium thickness firm sandy loam with a paler coloured A2 layer and variable calcrete stones (sometimes grading to a red sandy clay loam), over calcrete at depths ranging from 15 to 35 cm.
- B5/C5** Gradational black clay loam (Black Dermosol)  
Medium thickness black clay loam to clay overlying calcrete or buried soils B7b or B8 soils (below).
- B7a** Sand over grey sandy clay loam on calcrete (Petrocalcic, Grey Sodosol)  
Medium thickness loamy sand abruptly overlying a thin light grey sandy clay loam on calcrete at about 20 cm. Occurs in depressions.
- B7b** Sand over red sandy clay on limestone (Petrocalcic, Red Chromosol)  
Medium thickness loamy sand with a sandier and bleached A2 layer abruptly overlying a red massive sandy clay on calcrete from about 35 cm, grading to Bungunnia Limestone equivalent.
- B7c** Loamy sand over sandy clay loam on calcrete (Petrocalcic, Brown Chromosol)  
Medium thickness brown loamy sand abruptly overlying a thin brown weakly structured friable sandy clay loam over calcreted calcarenite.
- B8** Shallow beached sand (Petrocalcic, Bleached-Leptic Tenosol)  
Medium thickness grey brown sand with a bleached sandy A2 layer directly overlying calcrete (as above) at about 30 cm.
- G2** Sand over sandy clay loam (Hypercalcic, Red Chromosol)  
Very thick grey brown loose sand with a paler coloured or bleached A2 layer over a yellowish red or brown sandy clay loam, highly calcareous from about 80 cm.



**H2** Deep sand (Basic, Brown-Orthic Tenosol)

Grey brown loose sand, paler coloured with depth grading to an orange loamy sand below 100 cm.

**N2** Saline calcareous clay loam (Calcarosolic, Salic Hydrosol)

Thin highly calcareous dark grey clay loam over a pale brown to white very highly calcareous sandy clay loam with a watertable between 50 and 100 cm.

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

