# SHE Sherlock Land System

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

Flat stony plain between Netherton and Tailem Bend

**Area**: 923.3 km<sup>2</sup>

**Annual rainfall**: 350 - 425 mm average

**Geology**: The land system is underlain at depth by calcareous clayey sands to sandy clays, limestones

and sandstones of the Coomandook Formation. Overlying these sediments is a sheet of Bungunnia Limestone, a consolidated carbonate rich sediment deposited in an ancient lake. The thickness of the limestone varies from 250 cm to 1000 cm (average 500 cm). Remnants of older coastal ridges projected above lake level and persist today as isolated rises of Bridgewater calcarenite. The calcarenite is less than 500 cm thick, and directly overlies

Coomandook Formation sediments. The flats and rises have both been calcreted in more recent times, so that a more or less continuous layer of sheet or boulder calcrete blankets the landscape. "Holes" in this calcrete cap are significant from a soil formation point of view. Sporadic sandhills and small dunefields of Molineaux Sand deposits are superimposed on

both flats and rises. The thickness of sand rarely exceeds 300 cm.

**Topography**: The landscape is characteristically flat and stony. Stony rises and low sandhills provide some

relief, but they are limited in overall extent. In the lower elevation areas to the west, saline

groundwater tables are near the surface, so depressions here are saline.

**Elevation**: 5 - 35 m

**Relief**: 3 - 8 m

**Soils**: Shallow coarse to medium textured soils over calcrete or calcreted limestone are characteristic

- however there are several significantly different forms.

Main soils: Flats formed on Bungunnia Limestone equivalent

**B3a** Red sandy loam **B3b** Brown sandy loam

**A4/C1** Shallow brown calcareous sandy loam

**B1** Grey calcareous sandy loam

**B2a** Grey calcareous sandy loam on calcrete

A1 Deep very highly calcareous loam

Rises formed on calcreted Bridgewater Formation

B2b Shallow calcareous sandy loam

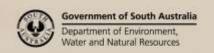
**Minor soils:** Rises formed on calcreted Bridgewater Formation

**B2/A4** Calcareous sandy loam

Sandhills

**H2** Deep sand

**G3** Thick bleached sand over clay





## Main features:

The Sherlock Land System is a flat stony plain with limited areas of sandhills and stony rises. Soils are generally shallow over calcrete. Much of the area, particularly in the west is effectively non arable due to shallow soils and sheet calcrete. Elsewhere on the plains and stony rises, insufficient moisture holding capacity, stoniness and marginal fertility restrict productivity. Infertile sands prone to water repellence and wind erosion on the sandhills preclude regular cropping.

## Soil Landscape Unit summary: 16 Soil Landscape Units (SLUs) mapped in the Sherlock Land System

|     | % of |  |
|-----|------|--|
| SLU | area | Main features #  |
| MxB | 6.5  | Rises less than 10 m high formed on calcreted Bridgewater Formation calcarenites. There is variable  |
| MyB | 2.0  | surface calcrete stone, often extensive and with sheet rock at the surface. Low sandhills cover up to  |
|     |      | 30% of the land surface.   |
|     |      | MxB Rises with less than 10% low sandhills.  |
|     |      | MyB Rises with 10-30% low sandhills.   |
|     |      | Main soils: <u>calcareous sandy loam</u> - <b>B2/A4</b> (E) and <u>shallow calcareous sandy loam</u> - <b>B2b</b> (E), with                                |
|     |      | <u>deep sand</u> - <b>H2</b> (M-C) and <u>thick bleached sand over clay</u> - <b>G3</b> (M-L) on sandhills. These rises have                               |
|     |      | moderately shallow to shallow calcareous sandy loams which are generally arable, but productivity is   |
|     |      | invariably limited by one or more of insufficient waterholding capacity, low fertility or stoniness.   |
|     |      | Limited sandhills have deeper soils but very low fertility and susceptibility to water repellence and  |
| M-D | 0.1  | wind erosion limit their usefulness.   |
| MzB | 0.1  | Rises less than 10 m high formed on calcreted Bridgewater Formation calcarenites. There is extensive surface calcrete stone and sheet rock at the surface. |
|     |      | Main soils: <u>shallow calcareous sandy loam</u> - <b>B2b</b> (V), with <u>calcareous sandy loam</u> - <b>B2/A4</b> (C). These                             |
|     |      | rises are dominated by very shallow stony soils which are essentially non arable.  |
| NbA | 23.0 | Very stony flats formed on calcreted Bungunnia Limestone equivalent. There are limited sandy and   |
| NbM | 0.2  | stony rises.   |
| NbP | 1.0  | NbA Flats with less than 10% rises.  |
|     |      | <b>NbM</b> Flats with up to 30% low stony rises.   |
|     |      | NbP Flats with 10-30% low sandy rises.   |
|     |      | Main soils: <u>brown / grey shallow calcareous sandy loam</u> - <b>A4/C1, B2a, B2b</b> (E), <u>brown sandy loam</u> -                                      |
|     |      | B3b (C) and red sandy loam - B3a (L) on flats and stony rises, with deep sand - H2 (M-C) on  |
|     |      | sandhills. The flats have moderately shallow to shallow calcareous sandy loams which are only semi   |
|     |      | arable due to extensive stoniness, shallow soils and marginal fertility. The sandhills have deeper soils   |
|     |      | but very low fertility and susceptibility to water repellence and wind erosion limit their usefulness.   |
| NdA | 42.3 | Flats formed on Bungunnia Limestone equivalent. There is extensive surface calcrete and up to 30%  |
| Nda | 1.1  | coverage of low sandhills. There are small areas of saline depressions adjacent to the highly saline   |
| NdO | 1.6  | Blind Creek Land System.   |
| NdP | 9.3  | NdA Flats with less than 10% stony or sandy rises.   |
|     |      | Nda Flats with up to 10% marginally saline depressions.  |
|     |      | NdO Flats with up to 30% stony and sandy rises. NdP Flats with 10-30% low sandhills.   |
|     |      | Main soils: <u>brown sandy loam</u> - <b>B3b</b> (E) and <u>red sandy loam</u> - <b>B3a</b> (C), with <u>grey calcareous sandy</u>                         |
|     |      | loam on calcrete - <b>B1</b> (L) and grey calcareous sandy loam on calcrete - <b>B2a</b> (M) on calcreted flats.   |
|     |      | Shallow brown calcareous sandy loam - <b>A4/C1</b> (C) and deep very highly calcareous loam - <b>A1</b> (M)  |
|     |      | occur on flats where the underlying limestone has not been calcreted. <u>Deep sand</u> - <b>H2</b> (M-C) occurs  |
|     |      | on low sandhills, and <u>shallow calcareous sandy loam</u> - <b>B2b</b> (M-L) occurs on stony rises. The soils are   |
|     |      | generally shallow although predominantly arable. Restricted waterholding capacity is widespread  |
|     |      | and the most significant limitation to crop production. Stone is continually brought to the surface by   |
|     |      | cultivation and causes excessive wear on machinery. Fertility is sub optimal. Apart for nitrogen and   |
|     |      | phosphorus, copper and zinc are commonly deficient. There are occasional magnesia patches  |
|     |      | associated with remnants of eroded lunettes.   |



| U-B | 0.1 | Areas where sandhills occupy more than 30% of the land surface. Size and frequency vary:  |
|-----|-----|---|
| U-D | 0.4 | U-B Individual moderate to high sandhills.  |
| UUF | 0.6 | U-D Individual low sandhills.   |
| UUI | 2.4 | UUF 60-90% moderate sandhills.  |
| UUJ | 9.3 | UUI 30-60% moderate sandhills.  |
|     |     | UUJ 30-60% low sandhills.   |
|     |     | Main soil: <u>deep sand</u> - <b>H2</b> (E-V) and <u>thick bleached sand over</u> clay - <b>G3</b> (M-L) on sandhills, with soils |
|     |     | as for NdA on the intervening flats. The sands are infertile and often water repellent. Wind erosion is                           |
|     |     | a problem when soils are exposed. The moderate sandhills are only semi arable due to the hazard                                   |
|     |     | and need specialized soil conservation management. The flats have shallow stony soils on which                                    |
|     |     | productivity is limited mainly by restricted waterholding capacity.   |
| ZB- | 0.1 | Moderately to highly saline flats with a range of halophytic vegetation.  |
|     |     | No soils data. These flats have no cropping potential, but provide some grazing value. Care must be                               |
|     |     | taken to avoid overstocking and consequent destruction of surface cover.  |

# 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:**

Flats formed on Bungunnia Limestone equivalent

- Deep very highly calcareous loam (Hypervescent, Regolithic, Hypercalcic Calcarosol)

  Brown very highly calcareous powdery loam becoming more clayey with depth, and with variable gypsum segregations, over interbedded limestone and calcareous clay.
- A4/C1 Shallow brown calcareous sandy loam (Petrocalcic, Supracalcic Calcarosol)

Thin calcareous sandy loam grading to a calcareous sandy clay loam overlying calcreted limestone at about 15 cm. The limestone softens at depth to a very highly calcareous sandy clay with abundant limestone fragments.

- Grey calcareous sandy loam on calcrete (Hypervescent, Petrocalcic, Supracalcic Calcarosol)
  Grey brown very highly calcareous sandy loam to light sandy clay loam, becoming greyer and more calcareous with depth and with increasing calcrete fragments, over calcreted limestone at about 60 cm.
- Grey calcareous sandy loam on calcrete (Petrocalcic, Hypercalcic Calcarosol)
   Grey brown calcareous sandy loam becoming very highly calcareous at shallow depth, over calcreted limestone or clay within 50 cm.
- **B3a** Red sandy loam (Petrocalcic, Red Kandosol)

Thin sandy loam grading to a red sandy clay loam overlying calcreted limestone at about 20 cm. The limestone softens with depth to a very highly calcareous sandy clay loam with abundant limestone fragments.

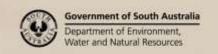
B3b Brown sandy loam (Calcareous, Petrocalcic, Leptic Tenosol)

Medium thickness brown sandy loam to light sandy clay loam over calcreted limestone within 25 cm. The limestone softens with depth to a very highly calcareous sandy clay loam to sandy clay with abundant limestone fragments.

Rises formed on calcreted Bridgewater Formation

**A4** Calcareous sandy loam (Petrocalcic, Supracalcic Calcarosol)

Calcareous sandy loam becoming more clayey, more calcareous and more rubbly with depth, over calcrete at about 80 cm, softening with depth to a very highly calcareous pale pink sandy clay loam.





# **B2b** Shallow calcareous sandy loam (Petrocalcic, Supracalcic Calcarosol)

Thin calcareous sandy loam grading to a calcareous sandy clay loam overlying calcreted calcarenite at about 15 cm.

#### Sandhills

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

  Greyish brown loose sand, becoming yellow with depth and continuing below 200 cm.
- Thick bleached sand over clay (Hypercalcic, Brown Sodosol)

  Thick loose sand, with a paler coloured or bleached A2 layer, abruptly overlying a brown coarsely structured sandy clay, calcareous with depth, grading to Bridgewater Formation calcarenite.

Further information: <u>DEWNR Soil and Land Program</u>

