# BUC Buccleuch Land System

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

Flat plains in the Buccleuch - Sherlock area

**Area**: 60.0 km$^2$

**Annual rainfall**: 365 – 380 mm average

**Geology**: The land is underlain by Bungunnia Limestone, usually within a metre of the surface. The limestone is variably calcreted. Minor coastal dune remnants (Bridgewater Formation) protrude through the surface.

**Topography**: Flat to very gently undulating plain with occasional rises of Bridgewater Formation calcarenites

**Elevation**: 13 - 17 m

**Relief**: 2 - 4 m

**Soils**: The soils are typically shallow sandy loams over calcrete or highly calcareous rubbly materials.

Main soils
**B1/A1** Grey calcareous sandy loam
**B2** Red-brown calcareous sandy loam over calcrete
**B3** Red sandy loam over calcrete

Minor soils
**H2** Deep sand

**Main features**: The Buccleuch Land System is characterized by extensive flats of grey highly calcareous soils with strong nutrient fixation properties. Although fully arable and moderately deep, the productivity of this land is limited. Other soils which are less calcareous at the surface are usually very shallow and stony, often semi arable and with low productive potential.

**Soil Landscape Unit summary:** 4 Soil Landscape Units (SLUs) mapped in the Buccleuch Land System:

| SLU | % of area | Main features # |
|---|---|---|
| MxB | 3.2 | Low rises formed on calcreted Bridgewater Formation, with extensive surface stone and minor sand spreads.<br>Main soils: red-brown calcareous sandy loam over calcrete - **B2** (V) and red sandy loam over calcrete - **B3** (L).<br><br>Key properties:<br>Drainage: All soils are well drained.<br>Fertility: Moderately low due to low clay content and high pH.<br>Physical condition: No soil physical limitations to root growth. Root zone depth is determined by depth to hard calcrete which is variable from very shallow to moderately deep. |

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|---|---|---|
| | | AWHC: Moderate to low depending on depth to calcrete.<br>Salinity: Low at the surface, but may be moderate in the carbonate below the calcrete.<br>Erosion potential: Water: Moderately low to low depending on slope. Wind: Low.<br>Water repellence: Nil.<br>Rockiness: Variable, often sufficient to warrant picking or rolling. Occasional sheet rock at the surface.<br>Summary: These isolated rises have moderately shallow to shallow calcareous sandy loams which are generally arable, but productivity is invariably limited by one or more of insufficient water holding capacity, low fertility or stoniness. |
| NaA<br>NaP | 25.3<br>9.4 | Flats formed on calcreted Bungunnia Limestone equivalent. There is extensive surface calcrete and up to 30% coverage of low sandhills.<br>**NaA** Flats with less than 10% stony or sandy rises.<br>**NaP** Flats with 10-30% low sandhills.<br>Main soils: red-brown calcareous sandy loam over calcrete - **B2** (E) and red sandy loam over calcrete - **B3** (E) on calcreted flats, with grey calcareous sandy loam - **B1/A1** (M) on flats where the underlying limestone has not been calcreted. Deep sand - **H2** (M-C) occurs on low sandhills.<br><br>Key properties:<br>Drainage: Well to rapidly drained.<br>Fertility: Moderately low due to low clay content. Deep sands are highly infertile. B1/A1 soils have high fixation capacity, particularly for phosphorus and a range of trace elements.<br>Physical condition: No soil physical limitations but root zone depth is determined by depth to and hardness of calcrete. This is usually moderately shallow. Sands have physically unrestricted root zones.<br>AWHC: Moderately low to low.<br>Salinity: Low at the surface but may be moderate to high in subsoil carbonate layers.<br>Erosion potential: Water: Low. Wind: Low to moderate (sandhills).<br>Water repellence: Nil (stony soils) to high (sands)<br>Rockiness: Moderate amounts of surface calcrete, often sufficient to warrant picking or rolling. Outcrops of sheet rock are minor.<br>Summary: These flats are difficult to work and shallowness of soil over calcrete is a major limitation to productivity. Limited areas of deep sands and very highly calcareous "grey soils" are fully arable but infertile. |
| NcA | 62.1 | Flats formed on Bungunnia Limestone equivalent.<br>Main soil: grey calcareous sandy loam - **B1/A1** (D).<br><br>Key properties:<br>Drainage: Well drained.<br>Fertility: Low due to high levels of carbonate in surface soil which fixes phosphorus and trace elements.<br>Physical condition: No physical limitations to root growth, workability or emergence.<br>AWHC: Moderate.<br>Salinity: Low at surface, high with depth.<br>Erosion potential: Water: Low<br>Wind: Low, but will blow if over-cultivated or heavily grazed.<br>Water repellence: Nil.<br>Rockiness: Nil to minor<br>Summary: These "grey mallee" soils are notorious for fixation of phosphorus and trace elements. Water holding capacities and workability are not significantly limiting. |

# 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**:

**B1/A1** Grey calcareous sandy loam (Hypervescent, 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 limestone at about 60 cm.

**B2** Red-brown calcareous sandy loam over calcrete (Petrocalcic, Supracalcic Calcarosol)
Thin calcareous sandy loam grading to a calcareous sandy clay loam overlying calcreted limestone at about 15 cm. The limestone softens with depth to a very highly calcareous sandy clay with abundant limestone fragments.

**B3** Red sandy loam over calcrete (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.

**H2** Deep sand (Basic, Arenic, Brown-Orthic Tenosol)
Greyish brown loose sand, becoming yellow with depth overlying calcrete at variable depth.

**Further information:** DEWNR Soil and Land Program