

BIL Billiatt Land System

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

Gently undulating dunefield in the Sandalwood - Marama - Peebinga area

Area: 1,340.2 km²

Annual rainfall: 285 - 375 mm average

Geology: The System is formed on Tertiary Loxton / Parilla Sands, veneered in places by younger Blanchetown Clay equivalent. Occasionally these sediments carry a calcrete capping. Superimposed on all parts of the landscape are extensive deposits of Molineaux Sand.

Topography: The landscape is an undulating plain comprising a complex of low to moderate and occasionally high jumbled sand ridges and intervening flats or slopes. In some of the more pronounced depressions, Blanchetown Clay is near the surface, but elsewhere the flats are underlain by sandier Loxton / Parilla sediments or Molineaux Sand.

Elevation: 60 - 90 m

Relief: 5 - 15 m

Typical soils: Sandy soils, either deep sands, or thick sands with more clayey subsoils are dominant. Loamier texture contrast soils and calcareous soils are limited overall.

Main soils

Sandhills

H3/H2 Deep sand

Flats

G2 Bleached sand over sandy clay loam

Minor soils

Flats

D3 Sandy loam over red dispersive clay

G1 Loamy sand over red sandy clay loam

G3 Thick sand over poorly structured brown clay

Calcrete rises

A4/B2 Calcareous stony loamy sand

Main features: The Billiatt Land System is characterized by a strongly developed sandhill - swale topography. Deep infertile sands prone to water repellence and wind erosion dominate the landscape. Potential for dryland agriculture is limited, but irrigated horticultural potential is reasonable, despite the fertility problems. The flats have either loamy or sandy texture contrast soils depending on the nature of the underlying sediments. The loamier types are better agricultural soils but not favourable for irrigation due to impeded drainage. The sandy types are infertile, but where there is sufficient depth of sand over subsoil clay and/or permeable sandy substrate material, there is potential for irrigation.



Soil Landscape Unit summary: 11 Soil Landscape Units (SLUs) mapped in the Billiatt Land System:

SLU	% of area	Main features #
GhA	7.4	Flats (mainly sandy), probably formed on Parilla Sand, and with 10-30% low sand ridges. Main soils: <u>bleached sand over sandy clay loam</u> - G2 (E) and <u>sandy loam over red dispersive clay</u> - D3 (C) with <u>loamy sand over red sandy clay loam</u> - G1 (L) and <u>thick sand over poorly structured brown clay</u> - G3 (L) on flats, and <u>deep sand</u> - H3/H2 (C) on sand ridges. The mainly sandy soils have low fertility and are prone to wind erosion and water repellence. They also have restricted water-holding capacities due to their sandy textures and poorly structured clayey subsoils. Waterlogging is not likely to be a problem unless the thickness of sand over the clay is less than 30 cm. The heavier textured soils are more fertile and potentially productive for dryland crops although waterlogging and accessibility in wet seasons may be a problem. Boron toxicity and salinity can be expected.
HaA	0.6	Flats (mainly loamy) probably formed on Blanchetown Clay, with less than 10% low sandy rises. Main soils: <u>sandy loam over red dispersive clay</u> - D3 (V) with <u>thick sand over poorly structured brown clay</u> - G3 (L), <u>bleached sand over sandy clay loam</u> - G2 (L) and <u>loamy sand over red sandy clay loam</u> - G1 (M). The mainly loamy soils are moderately fertile, but root zone depth is restricted by dispersive clay subsoils, often at shallow depth, and boron above the Blanchetown Clay. Waterlogging is likely in wet seasons, due to water perching on the slowly permeable subsoil.
O-A OAE OAF OAG OAH OAI OAJ OAM OAf	<0.1 7.5 38.5 28.3 0.3 1.7 14.1 0.7 0.9	Dunefields with jumbled sand ridges formed on Molineaux Sand overlying mainly Tertiary sediments. O-A Large to very large sand ridges, either as isolated dunes or in dunefields with less than 10% swale area. OAE 60-90% large sand ridges. OAF 60-90% moderate to large sand ridges. OAG 60-90% small to moderate sand ridges. OAH 30-60% large sand ridges. OAI 30-60% moderate to large sand ridges. OAJ 30-60% small sand ridges. OAM 60-90% moderate sand ridges with some swales prone to seepage and waterlogging. OAf 30-60% low sand ridges superimposed on undulating calcrete rises. Main soils: <u>deep sand</u> - H3/H2 (V-E) on ridges, with <u>bleached sand over sandy clay loam</u> - G2 (C-E), <u>sandy loam over red dispersive clay</u> - D3 (L), <u>loamy sand over red sandy clay loam</u> - G1 (L) and <u>thick sand over poorly structured brown clay</u> - G3 (L) on flats. <u>Calcareous stony loamy sand</u> - A4/B2 (M) occurs on occasional calcrete rises (in OAf). The predominantly deep sandy soils have severe limitations for dryland agriculture due to their very low inherent fertility, and their susceptibility to wind erosion and water repellence. The higher dunes in particular are generally uncleared, and need careful surveillance to prevent rabbit colonization. The flats between the sand ridges have moderate productive potential (refer GhA and HaA above), particularly where surfaces are loamier. However, the complex dune-swale topography makes management difficult.

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:*Sandhills***H3/H2** Deep sand (Calcareous, Arenic, Bleached-Orthic / Yellow-Orthic Tenosol)

Medium thickness loose brown sand with a paler coloured or bleached A2 layer becoming browner with depth and grading to a moderately calcareous loamy sand to clayey sand below 100 cm, although depth depends on erosional history.

*Flats***G2** Bleached sand over sandy clay loam (Calcic, Brown Chromosol / Sodosol)

Thick loose sand with a bleached A2 layer, sharply overlying a weakly structured red or brown sandy clay loam to sandy clay, with minor soft carbonate segregations from about 70 cm, grading to Parilla Sand (massive clayey sand to sandy light clay) at about 100 cm.

D3 Sandy loam over red dispersive clay (Calcic, Red Sodosol)

Medium thickness sandy loam abruptly overlying a red coarsely structured sandy clay to light clay grading to a calcareous medium clay within 30 cm. Blanchetown Clay appears at about 50 cm, and has variable thickness over Parilla Sand (deeper than 100 cm).

G1 Loamy sand over red sandy clay loam (Supracalcic, Red Chromosol)

Thick loamy sand over a red weakly structured sandy clay loam with rubbly carbonate grading to Parilla Sand from about 100 cm.

G3 Thick sand over poorly structured brown clay (Calcic, Brown Chromosol / Sodosol)

Thick sand with a bleached A2 layer abruptly overlying a brown coarsely structured clay, calcareous with depth, grading to Parilla Sand from about 100 cm.

*Calcrete rises***A4/B2** Stony calcareous loamy sand (Regolithic / Petrocalcic, Lithocalcic Calcarosol)

Calcareous loamy sand to loam with variable rubble and slight clay increase with depth overlying rubbly calcrete shallower than 50 cm.

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

