

GOH Gosse Hill Land System

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

Dunefields of mainly high jumbled dunes north east of the Duke's Highway between Keith and Coonalpyn

Area: 386.4 km²

Annual rainfall: 405 – 505 mm average

Geology: The land system is underlain by siliceous Molineaux Sands derived from the reworking of the silica component of old coastal dunes and other siliceous sand sediments (eg Loxton Sands) to the west. The sands are superimposed on calcreted calcarenites (Bridgewater Formation) which protrude through to the surface in places.

Topography: The land system is a dunefield of mostly parabolic and jumbled dunes 10 - 20 m high. The dunes are superimposed on a ridge (mapped as Archibald Range Land System). Swales between the dunes are generally narrow, but there are some broader flats. There are occasional low stony rises where the underlying calcarenite breaks through the sand cover.

Elevation: 60 – 80 m

Relief: 10 – 20 m

Soils: Sandy soils cover virtually the entire area. Deep sands are most common, although soils with more clayey subsoils are common.

Main soils

Soils of sandy dunes and rises

H3 Deep bleached sand

Soils of flats

G2 Sand grading to sandy clay loam

G3 Thick sand over friable sandy clay

Minor soils

Soils of stony rises and flats

B3 Shallow gradational stony sandy loam over calcrete

Main features: The Gosse Hill Land System is characterized by deep highly infertile and water repellent sandhills with severe potential for wind erosion. Although capable of supporting perennial pastures provided nutrition is maintained, suitability for cultivated agriculture is low. Much of the land is uncleared.



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

SLU	% of area	Main features #
GmA	6.6	<p>Gently undulating depressions with variable (up to 30%) low sandy rises. The flats are underlain by clayey sand to sandy clay loam sediments presumably derived from local reworking and/or leaching.</p> <p>Main soils: <u>thick sand over friable sandy clay</u> - G3 (V) on flats, with <u>sand grading to sandy clay loam</u> - G2 (L) and <u>deep bleached sand</u> - H3 (M) on rises.</p> <p>Key properties:</p> <p>Drainage: Rapidly to well drained.</p> <p>Fertility: Low.</p> <p>Physical condition: No restrictions.</p> <p>AWHC: Moderately low.</p> <p>Salinity: Low.</p> <p>Erosion potential: Water: Low Wind: Moderate to high.</p> <p>Water repellence: High.</p> <p>Rockiness Nil</p> <p><u>Summary:</u> Low fertility and water repellence/wind erosion potential are the main limitations, but land is arable.</p>
MHB MHE	2.3 0.4	<p>Areas where the underlying Bridgewater Formation calcarenites are exposed at the surface. These areas are either rises protruding through the sand cover, or depressions within the dune systems where the overlying sand has been stripped off.</p> <p>MHB Low stony rises formed on calcarenite, overlain by variable sand deposits.</p> <p>MHE Closed depressions.</p> <p>Main soils: <u>shallow gradational stony sandy loam over calcrete</u> - B3 (E), <u>sand grading to sandy clay loam</u> - G2 (C) and <u>deep bleached sand</u> - H3 (C).</p> <p>Key properties:</p> <p>Drainage: Rapidly to well drained.</p> <p>Fertility: Moderately low on stony soils, to very low on deep sands.</p> <p>Physical condition: Surface soils are soft to loose and do not restrict root growth. Where subsoils occur they are friable and not restrictive to root growth.</p> <p>AWHC: Very low to low on stony soils, due to shallow depth to hard calcrete. Moderate on sandy soils.</p> <p>Salinity: Low.</p> <p>Erosion potential: Water: Low to moderate, depending on slope. Wind: Moderately low on stony ground to high on sand spreads.</p> <p>Water repellence: Low to slight on stony land. Strong on sand spreads.</p> <p>Rockiness: Variable to 50%, usually less than 20%. Nil on sand spreads.</p> <p>Other: The higher rises are exposed.</p> <p><u>Summary:</u> Shallow stony soils of marginal fertility dominate the ranges. However, compared with ranges to the west, rock does not usually prevent cultivation. Associated sands are deep, but are infertile, water repellent and erodible.</p>



O-A	69.9	<p>Moderate to steep parabolic or jumbled siliceous sand hills, more than 12 metres high, formed on Molineaux Sand.</p> <p>Main soils: <u>deep bleached sand - H3</u> (V) throughout, <u>thick sand over friable sandy clay - G3</u> (L) on lower slopes and swales, and <u>sand grading to sandy clay loam - G2</u> (L) on low rises.</p> <p>Key properties: Drainage: Rapid. Fertility: Very low. Physical condition: No limitations (soft to loose sand). Clayey subsoils, where present, are friable. AWHC: Moderately low to moderate. Salinity: Low. Erosion potential: Water: Low. Wind: High to very high. Water repellence: High. Rockiness: Nil.</p> <p><u>Summary:</u> The land is dominated by high sandhills with very low fertility, and prone to water repellence and wind erosion. Much of it has not been cleared. The predominant high sand hills are unsuitable for farming.</p>
OAa OAb OAc OAE OAF OAI OAe	13.7 1.7 1.3 2.9 0.3 0.7 0.2	<p>Undulating flats and rises with superimposed moderate to high sand dunes.</p> <p>OAa Rises with 60-90% moderate to high sand dunes. OAb Rises with 60-90% moderate sand dunes. OAc Rises with 60-90% low sand dunes. OAE Flats with 60-90% moderate to high sand dunes. OAF Flats with 60-90% moderate sand dunes. OAI Flats with 30-60% moderate sand dunes. OAe Rises with 30-60% moderate sand dunes.</p> <p>Main soils: <u>sand grading to sandy clay loam - G2</u> (E) and <u>sand over friable sandy clay - G3</u> (C) on flats, and <u>deep bleached sand - H3</u> (E) on rises.</p> <p>Key properties: Drainage: Well drained (flats) to rapidly drained (rises) Fertility: Low (flats) to very low (rises). Physical condition: No restrictions to root growth. AWHC: Moderately low. Salinity: Low. Erosion potential: Water: Low. Wind: Moderately high to very high. Water repellence: High. Rockiness Nil.</p> <p><u>Summary:</u> Marginally fertile flats intimately mixed with sand hills of low fertility and high erosion and water repellence potential.</p>

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:*Soils of sandy dunes and rises*

- H3** Deep bleached sand (Basic, Arenic, Bleached-Orthic Tenosol)
Thick to very thick bleached sand, organically darkened at the surface over yellow sand continuing below 100 cm.

Soils of flats

- G2** Sand grading to sandy clay loam (Mesotrophic, Yellow Kandosol)
Thick bleached sand, organically darkened at surface, over a yellow and red friable massive sandy clay loam.
- G3** Thick sand over friable sandy clay (Eutrophic / Calcic, Red / Brown Chromosol)
Thick to very thick bleached sand to loamy sand with an organically darkened surface abruptly overlying a friable red or yellowish brown sandy clay loam to sandy clay, with or without soft carbonate accumulations. Texture becomes sandier with depth.

Soils of stony rises and flats

- B3** Shallow gradational stony sandy loam over calcrete (Petrocalcic, Red Kandosol)
Sandy loam grading to a red sandy clay loam with variable rubble overlying calcreted calcarenite shallower than 50 cm and often shallower than 20 cm.

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

