

ARC Archibald Range Land System

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

Range of low hills east of the Dukes Highway between Keith and Culburra

Area: 493.9 km²

Annual rainfall: 440 – 490 mm average

Geology: The Land System is formed on calcreted calcarenites of the Bridgewater Formation, on an ancient coastal dune. Overlying the calcarenites are locally derived outwash sediments (clayey sands to sandy clays) washed into depressions, and reworked siliceous sands (Molineaux Sand). These are draped over the main landscape as sand spreads or dunes.

Topography: The System is a dissected range of rises and low hills with local relief of up to 40 m. They are rounded and separated by flat depressions. Aeolian sand is deposited over the landscape as low rises and spreads on both rises and flats, and as narrow east - west bands of jumbled sand dunes 10 - 20 m high.

Elevation: 30 - 100 m

Relief: Maximum relief is 70 m. Local relief is 10 - 40 m

Soils: Most soils fall into two categories - shallow loamy sand over calcrete or deep sand, with or without a more clayey subsoil.

Main soils

Soils on sandy rises

H3 Deep bleached sand

G2 Sand grading to sandy clay loam

Shallow soils over calcrete on stony rises

B6 Loamy sand over red sandy clay on calcrete

B8 Shallow bleached sand

Soils on flats

G3 Thick sand over friable sandy clay

B7 Sand over friable brown clay on calcrete

Minor soils

B3 Shallow stony loamy sand

A6 Calcareous clay loam to clay on clayey sediment

Main features: The Archibald Range Land System is undulating country with generally shallow stony soils on rising ground, and deep sands, and deeper sandy texture contrast soils on the flats. Rock and stone are less of a limitation than on equivalent ranges to the west, so most of the land is arable, with water holding capacity and fertility the main limitations. The flats, with deeper soils, are generally productive provided fertility is maintained. Sand rises and particularly the higher dunes have low productive potential and are severely water repellent and prone to wind erosion.



Soil Landscape Unit summary: 8 Soil Landscape Units (SLUs) mapped in Archibald Range Land System:

| SLU | % of area | Main features # |
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| GrA | 3.1 | <p>Inter-ridge corridors and flats formed on locally derived sandy outwash sediments. Adjacent to rising ground, or where the ancient dunes have been buried by outwash sediments, the landscape is formed on calcarenites.</p> <p>Main soils: <u>sand over friable brown sandy clay on calcrete</u> - B7 (E), <u>sand over friable sandy clay</u> - G3 (E) and <u>calcareous clay loam to clay</u> - A6 (E).</p> <p>Key properties:</p> <p>Drainage: Well drained generally, although water may perch on clayey subsoils where present.</p> <p>Fertility: Moderately low to low due to sandy surfaces.</p> <p>Physical condition: Surface soils are sandy and soft with no restrictions on root growth. Subsoils are well structured although occasional poorly structured types impede root growth.</p> <p>AWHC: Moderately low to moderately high depending on depth to calcrete.</p> <p>Salinity: Low.</p> <p>Erosion potential: Water: Low. Wind: Moderately low to moderate.</p> <p>Water repellence: Slight.</p> <p>Rockiness: Less than 2% surface calcrete.</p> <p><u>Summary:</u> Sandy, often shallow soils with marginal fertility and generally satisfactory drainage.</p> |
| MHC MHY | 49.0 13.5 | <p>Rounded rises and low hills between 10 and 40 m high and with slopes of 4-15% formed on calcreted calcarenite. They are partially overlain by sand spreads which tend to be more extensive on the eastern slopes. There is variable surface stone on the non sandy slopes. There are minor seepage areas on lower slopes.</p> <p>MHC Slopes with less than 10% sand dunes. MHY Slopes with 10-30% low to moderate sand dunes.</p> <p>Main soils: <u>shallow stony loamy sand</u> - B6 (C), <u>shallow bleached sand</u> - B8 (L) and <u>loamy sand over red sandy clay</u> - B3 (L), all shallow over calcrete on stony areas, <u>sand over friable brown sandy clay on calcrete</u> - B7 (L), <u>sand grading to sandy clay loam</u> - G2 (L) and <u>sand over friable sandy clay</u> - G3 (L) on sand spreads, and <u>deep bleached sand</u> - H3 (M-C) on sand dunes.</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> |
| MRL | 4.2 | <p>Gently undulating slopes comprising a complex of low calcarenite rises and outwash slopes, in an approximate ratio of 50:50. Main soils and key properties are as for MHC on rises and as for GrA on outwash slopes.</p> |



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| <p>O-A</p> | <p>5.1</p> | <p>Moderate to steep longitudinal, parabolic or jumbled siliceous sand hills, often more than 12 metres high, formed on Molineaux Sand. Main soils: <u>deep bleached sand</u> - H3 (V), with <u>sand over friable sandy clay</u> - G3 (M) and <u>sand grading to sandy clay loam</u> - G2 (M) on lower slopes and swales.</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 moderate to high sandhills with very low fertility, and prone to water repellence and wind erosion.</p> |
| <p>OEa OEb OEG</p> | <p>10.3 1.6 13.2</p> | <p>Undulating slopes overlain by more than 30% jumbled siliceous sand dunes. OEa 60-90% high sand dunes. OEb 60-90% moderate sand dunes. OEG Undulating flats with 30 - 60% low sand rises and sand spreads formed on clayey sand to sandy clay outwash sediments overlain by Molineaux Sand. Main soils: <u>deep bleached sand</u> - H3 (V-E) on dunes and <u>sand over friable sandy clay</u> - G3 (L-E) and <u>sand grading to sandy clay loam</u> - G2 (L-C) on slopes and low rises.</p> <p>Key properties: Drainage: Rapidly to well drained. Fertility: Low to very low. Physical condition: There are no impediments to root growth. AWHC: Moderately low to moderate. Salinity: Low. Erosion potential: Water: Low. Wind: Moderate to high. Water repellence: High. Rockiness: Nil.</p> <p><u>Summary</u>: The land is characterized by sandy rises and dunes with very low fertility, well drained soils prone to water repellence and erosion.</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 on stony rises*

- B3** Shallow stony loamy sand over calcrete (Petrocalcic, Leptic Tenosol)
Loamy sand to loam with variable rubble and slight clay increase with depth overlying calcreted calcarenite shallower than 50 cm.
- B6** Loamy sand over red sandy clay (Petrocalcic, Red Kandosol / Chromosol)
Medium thickness loamy sand with slight ironstone gravel overlying a weakly structured reddish brown sandy clay on calcarenite.
- B8** Shallow bleached sand (Petrocalcic, Bleached-Leptic Tenosol)
Thick bleached sand over calcarenite.

Soils on flats

- A6** Calcareous clay loam to clay (Calcic Calcarosol)
Medium thickness calcareous sandy clay loam to clay becoming more clayey and calcareous with depth, grading to outwash clay from about 70 cm.
- B7** Sand over friable brown clay on calcrete (Petrocalcic, Brown Chromosol)
Medium thickness sand overlying yellowish brown friable clay on limestone or calcreted sandy clay within 50 cm.
- G3** Thick sand over friable sandy clay (Eutrophic / Calcic, Brown Chromosol)
Thick to very thick bleached sand to loamy sand with an organically darkened surface abruptly overlying a friable yellowish brown and red sandy clay.

Soils on sandy rises

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

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

