

WAI Waitpinga Land System

Undulating rises between Encounter Bay and Waitpinga

Area: 42.3 km²

Annual rainfall: 650 – 750 mm average

Geology: The majority of the land is underlain by unconsolidated or weakly indurated sediments of indeterminate age. The Geological Survey of South Australia (Barker 1:250,000 sheet, 1962) maps the area as Permian age glacial and fluvio-glacial deposits, but the sediments are similar to the sequences found in the Willunga basin (Tertiary age). Massive clayey sands to sandy clays, often weakly indurated, are typical of the rising ground. These have characteristic red, yellow and grey colourings, and are generally associated with ironstone gravel. Occasionally they contain soft carbonate segregations. The sandy soils derived from these sediments have been extensively reworked into low dunes of deep sand. On lower lying ground, heavy grey brown and yellow brown clays are typical. These have coarse lenticular structure, and closely resemble Hindmarsh Clay. They are usually capped by moderate amounts of soft carbonates which have leached through the soil. The coastal section of the land system is underlain by calcreted calcarenite of the Bridgewater Formation. This is consolidated coastal dune sand. It outcrops over about 50% of its area, the rest being covered by deep siliceous sands, or deep calcareous (shell) sands near the coast.

Topography: The landscape is undulating to gently rolling. Watercourses draining the rising ground flow to a broad central flat where drainage is sluggish. Excess water flows from the western end of the depression into Waitpinga Creek which occupies a narrow valley, eventually discharging to the sea at Waitpinga Beach. At the eastern end of the System is an internally draining depression, about 150 ha in area. The coastal land formed on calcarenites and sand is characterized by irregular topography without defined surface drainage patterns. The landscape is broadly undulating, but there is a micro-topography of hummocks and depressions (the calcarenite surface), overlain by jumbled sand dunes. These are generally low, but adjacent to the coast they are moderate to high.

Elevation: 0 m to 190 m

Relief: Up to 60 m

Soils: The majority of soils are texture contrast types. These fall into two main groups - those with soft sandy surfaces and friable clayey subsoils, and hard sandy loam to sandy clay loam surfaces with dispersive clay subsoils. Other important soils are cracking clays, deep sands and shallow coarse textured soils over calcreted calcarenite.

Main soils

Soils formed on glacial valley sediments

- G2** Sand over sandy clay
- F2** Sandy loam over dispersive brown clay
- H3** Deep siliceous sand
- G3** Sand over clay



Minor soils*Soils formed on glacial valley sediments***D3** Sandy loam over red dispersive clay**E3** Grey-brown cracking clay*Coastal sands***H1** Deep calcareous (shell) sand*Soils formed on calcreted calcarenites***B2** Shallow calcareous loamy sand**B3** Shallow loamy sand**B7** Shallow sand over sandy clay loam**Main features:**

The Waitpinga Land System comprises four elements:

- Undulating rises of moderately well drained sand over sandy clay soils occupy about a third of the area. Although the soils are infertile and prone to wind erosion and water repellence, this land has the most potential for uses involving irrigation.
- Undulating rises of imperfectly drained sandy loam over clay soils occupy about a quarter of the area. These soils are more fertile than the sandy types, but are more likely to be affected by waterlogging, thereby reducing their potential for irrigation. However, for dryland cropping and grazing they are potentially productive.
- Broad poorly drained flats occupy about 15% of the area. The soils are similar to the heavier rises, but the low lying position causes further deterioration in drainage conditions, with associated salt accumulation. This land is generally unsuitable for irrigation.
- Undulating coastal rises with shallow stony soils and deep sands are unsuitable for any agricultural uses other than light grazing, and most is contained within conservation reserves.

Soil Landscape Unit summary: 10 Soil Landscape Units (SLUs) mapped in the Waitpinga Land System

SLU	% of area	Main features #
HYA	13.4	<p>Flat plains with slopes of less than 1%, formed on heavy clays (Hindmarsh Clay equivalent). Gilgai microrelief occurs in places. Surface drainage is generally poorly defined, except in the north west where there is a severely gullied watercourse. The characteristic feature of the soils is a heavy dispersive clay subsoil.</p> <p>Main soils: <u>Sandy loam over dispersive brown clay</u> - F2 (E) <u>Grey-brown cracking clay</u> - E3 (C) <u>Sand over clay</u> - G3 (L) on margins grading to surrounding rises <u>Sandy loam over red dispersive clay</u> - D3 (L)</p> <p>Although deep and inherently fertile, productive potential of these soils is limited by imperfect drainage and associated salt accumulation.</p>
HZB HZC HZI	4.5 15.1 1.8	<p>Undulating rises with slopes from 2% and relief of less than 30 metres, to gently rolling low hills with slopes up to 15% and relief of up to 40 metres. The parent sediments are sandy clays and clays, containing some remnant ferricrete (ironstone). Watercourses are incised on steeper slopes but occupy shallow depressions on gentler slopes.</p> <p>HZB Gentle slopes of 2-3%. HZC Undulating rises with slopes of 3-8%. HZI Low hills with slopes of 8-15% and eroded watercourses.</p> <p>All of the main soils have well developed texture contrast profiles with loamy to sandy surfaces and subsoils ranging from heavy clays to friable sandy clay loams. Variations between the soils are due to differences in the texture of the underlying sediments.</p> <p>Main soils: <u>Sandy loam over dispersive brown clay</u> - F2 (E) <u>Sand over clay</u> - G3 (E)</p>



		<p><u>Sand over sandy clay - G2 (L)</u> This land is better drained than the flats of HYA, due to the higher proportion of more permeable soils, and the additional slope. Although half the area suffers from drainage problems, the soils of other half are moderately well drained, although low in natural fertility. Erosion potential to both wind and water is more of an issue on this land.</p>
PyC PyD	35.5 5.9	<p>Gently undulating rises to moderately inclined low hills with slopes of 2% to 15% and relief of between 10 and 60 m. The landscape is formed on sands and sandy clays, weakly lithified, and characterized by accumulations of ferricrete (ironstone). Low sandhills overlie the landscape in places.</p> <p>PyC Undulating rises and low hills with slopes of 2-8%. PyD Low hill, 60 m high, with slopes of 8-15%.</p> <p>The dominant soil has a sandy surface with a friable sandy clay subsoil and abundant ironstone gravel throughout. Deep sands are also extensive.</p> <p>Main soils: <u>Sand over sandy clay - G2 (E)</u> <u>Deep siliceous sand - H3 (C)</u> <u>Sand over clay - G3 (L)</u></p> <p>These soils are generally well drained although inherently infertile. They are also susceptible to wind erosion and water repellence. Nevertheless, they have greater potential for intensive land uses than the other components of the Land System, mainly by virtue of more favourable drainage.</p>
WB-	0.6	Coastal cliffs.
WVE	21.9	<p>Undulating to gently rolling rises and low hills formed on calcreted calcareous sands of the Bridgewater Formation, with superimposed sand dunes of siliceous and calcareous Semaphore Sands. Slopes range from 2% to 20%, but steepen to cliffs in the area around Newland Head. Beaches are also included in the Waitpinga area. Relief varies from 20 to 80 metres. Sheet calcrete and surface stones occur sporadically. The predominant soils are deep siliceous sands, associated with deep calcareous sands, usually nearer the coast. Calcreted materials are close to the surface over about half of the area, where there is a range of shallow soils.</p> <p>Main soils: <u>Deep siliceous sand - H3 (E)</u> <u>Deep calcareous sand - H1 (C)</u> near the coast <u>Shallow calcareous loamy sand - B2 (L)</u> } on calcrete <u>Shallow loamy sand - B3 (L)</u> } <u>Shallow sand over sandy clay loam - B7 (L)</u> }</p> <p>These soils are either very shallow and stony, or deep and highly infertile. They have poor agricultural potential and are mostly contained within a conservation reserve.</p>
XJJ	0.4	Flat at the mouth of Waitpinga Creek. No soils data, but the land is periodically waterlogged, and marginally saline.
ZA-	0.9	<p>Moderately saline depression underlain by Hindmarsh Clay equivalent.</p> <p>Main soils: <u>Sandy loam over dispersive brown clay - F2 (E)</u> <u>Grey-brown cracking clay - E3 (E)</u></p> <p>Productivity is restricted by the soil salt levels and waterlogging, but establishment of suitable salt tolerant pasture species will help improve grazing returns. The land has no prospects for irrigated uses.</p>

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

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| (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:*Soils formed on glacial valley sediments*

- D3** Sandy loam over red dispersive clay (Calcic, Red Sodosol)
Medium thickness hard setting fine sandy loam with a hard bleached A2 layer, abruptly overlying a coarsely blocky red clay.
- E3** Grey-brown cracking clay (Episodic-Epicalcareous, Pedal, Brown Vertosol)
Thin grey brown moderately calcareous coarse blocky clay, overlying a yellow brown and brown mottled calcareous heavy clay with coarse blocky structure, and soft carbonate segregations from 25 cm (Class I carbonate). The carbonate grades to Hindmarsh Clay equivalent at 35 cm.
- F2** Sandy loam over dispersive brown clay (Calcic, Brown Sodosol)
10-30 cm hard setting dark brown sandy loam to sandy clay loam with a very hard, massive and bleached A2 layer sharply overlying a greyish brown and yellowish brown mottled medium heavy clay with coarse prismatic structure, calcareous from about 70 cm.
- G2** Sand over sandy clay (Ferric, Eutrophic, Brown Chromosol)
15 - 45 cm grey soft loamy sand with a pale grey or bleached A2 layer containing up to 50% ferricrete nodules, over a brown, yellowish brown or red sandy clay (sandy clay loam to light clay) with weak to moderate subangular blocky structure. Becomes brighter yellow and red with depth grading to soft sandstone from about 100 cm.
- G3** Sand over clay (Eutrophic, Brown Chromosol)
20 - 50 cm soft grey brown loamy sand with a bleached A2 layer and variable ironstone gravel, over a dark brown and yellowish brown mottled medium clay with strong blocky structure, grading to sandy clay from about 75 cm, with occasional soft carbonate segregations.

Deep sands

- H1** Deep calcareous (shell) sand (Shelly Calcarosol)
Up to 50 cm loose single grained light greyish brown highly calcareous shell sand, overlying up to several metres of white shell sand. Calcreted calcarenite may underlie the sand at variable depths at the margins of the sand deposits.
- H3** Deep siliceous sand (Arenic, Bleached-Orthic Tenosol)
40 - 70 cm loose bleached sand grading to loose yellow sand, continuing below 100 cm.

Soils formed on calcreted calcarenites

- B2** Shallow calcareous loamy sand (Petrocalcic Calcarosol)
10 - 40 cm brown soft calcareous loamy sand to sandy loam with up to 50% calcrete fragments overlying sheet calcrete up to 100 cm thick, grading to very highly calcareous pale brown shell sand.
- B3** Shallow loamy sand (Petrocalcic, Leptic Tenosol)
Up to 40 cm soft non calcareous loamy sand with variable calcrete fragments, overlying calcreted calcarenite (as for B2 above).
- B7** Shallow sand over sandy clay loam (Petrocalcic, Brown Chromosol)
Up to 30 cm grey sand with a bleached A2 layer over a thin brown sandy clay loam, abruptly overlying calcreted calcarenite as for B2.

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

