CBD Cape Borda Land System

Coastal deposits along the west coast of Kangaroo Island. This land system stretches from Cape Borda in the north to Sandy Beach (on the north coast of Maupertuis Bay) in the south.

Area: 64.8 km^2

Annual rainfall: 600 – 690 mm average

Geology: This land system is dominated by calcrete capped calcarenite (Pleistocene age Bridgewater Formation). The landscape typically exhibits a preserved dune topography. This indicates that this area was once covered by lime-rich coastal sand dunes. In some places, especially where the calcrete and/or calcarenite overlie steep gully slopes, no preserved dune topography is evident.

The calcrete is overlain by siliceous sand. This sand is remnant following the leaching of its former 'lime' content. The thickness of sand varies from negligible on the exposed coastal margins to over a metre deep in less exposed situations further inland. Deeper sands occur in valleys and depressions where sand has been concentrated by water and wind action and the former calcarenite cover has been 'dissolved'. Also on some highland areas the calcarenite has been 'dissolved', and older ironstone gravelly sediments in a sandy matrix underlie covering sands. At depth, below the ironstone gravelly layers, are mottled Pliocene age clays. Underlying the more recent sandy and calcarenite sediments on some steep gully slopes are Early Cambrian age Kanmantoo Group metasandstones. Various of these Kanmantoo Group rocks are exposed in cliffs along the coast (which include Middleton Sandstone grey metasandstones, Petrel Cove Formation which contains sandstones, siltstones and mudstones, and Balquhidder Formation grey dirty metasandstones around Cape Borda).

The youngest sediments are 'lime-rich' sands (Gantheaume Sand) which form dunes (often on clifftops), sand spreads, and beaches.

Topography: Mostly rises with an overlying preserved jumbled dune topography. There are a few depressions, gully slopes, and beaches at river mouths. Slopes are typically between 0 - 10%, however, slopes of around 50% occur in gullies, and of more than 100% on many coastal cliffs.

Elevation: Elevation increases generally from south to north. The highest point is at 170 m. Typical elevations range from around 50 m in the south to 150 m in the north.

Relief: Typically from 20 - 40m, but up to 120 m in the steep gully of Ravine des Casoars

Main soils:

H2a-**B8**	Moderate to shallow depth sands on calcrete
H3a-**H2**b	Deep sands
H3b	Ironstone gravelly deep sands
I2-**I1**	Highly leached sands

Minor soils:

H1-**B1**	Shell sands
B3-**B2**-**B1**	Very shallow soil on calcrete
B7-**G3**	Sandy texture contrast soil over an orange, brown or red subsoil

Main features: The system is mostly covered by infertile sandy soils which are often shallow. Calcrete fragments are frequently seen on the land surface; exposures are less common but especially occur on coastal margins. Native scrub covers this area. Nature conservation is the main priority in this land system.

Soil Landscape Unit summary: Cape Borda Land System (CBD)

SLU	% of area	Main features #
FzB FzZ	9.9 6.2	Mostly deep sands, many with ironstone gravel. Main soils: deep sands with ironstone gravel **H3**b (sandy Ferric Tenosol); and deep sands **H3**a (sandy Tenosol), many with ironstone gravel at depth. With some areas of moderate depth sand on calcrete **H2**a (Petrocalcic Tenosol). Minor areas of highly leached sand **I2**-**I1** (Podosol) may occur particularly in low lying areas. **FzB** – slopes/slight dune topography (slopes 2-8%, 1-2e, 4a, 1w, 2y) **FzZ** – plateau surface/low dune topography (slopes 0-2%, 1e, 4a, 1w, 2y) Summary: sandy areas with ironstone gravel; clayey substrate at depth.
M-A M-C M-E M-F M-YA M-YB	0.5 0.9 0.2 0.3 4.3 1.0	Mostly bare calcrete and very shallow soil on calcrete. Main: >50% calcrete outcrop. With dark loams and sands on calcrete in hollows **B3**-**B2**-**B1** (Petrocalcic Rudosol). Soils can be non calcareous, calcareous, or even shelly. *Cliff top areas and depressions:* **M-A** – exposed very gently undulating land on cliff top area (slopes 0-2%, 1e, 2-1w, 3y) **M-C** – exposed slope on cliff top area (slopes 5-20%, 3-4e, 1w, 3y) **M-E** – basin/closed depression (slopes 0-3%, 4-3w, 2a, 1-2y) **M-F** – exposed slopes on cliff top area (slopes 20-50%, 1w, 5e, 3y) *Dune core topography:* **M-YA** – exposed low dune core topography (<5m, slopes 0-4%, 2-1e, 2-1w, 3y) **M-YB** – exposed moderate height dune core topography (5-10m, slopes 3-10%, 3-2e, 1w, 3y) Summary: rocky area exposed to extreme winds.
MbA	0.2	Sand spread of shell sand on calcrete. Main soils: shallow to moderate depth shell sand on calcrete **B1**-**H1** (Petrocalcic Shelly Rudosol). **MbA** – exposed very gently undulating land on cliff top area (slopes 0-2%, 1w, 5a, 3y) Summary: stony area exposed to extreme winds.
MiC MiCx MiD MiF MiYA MiYB MiYC MiZ	0.1 2.5 1.8 0.3 11.7 8.1 0.5 1.3	Mostly shallow to moderate depth soil on calcrete. Main soils: shallow to moderate depth sand on calcrete **B8**-**H2**a (*Petrocalcic Tenosol*). Some soils may be calcareous, or even shelly, when adjacent to shelly deposits, especially in hollows and depressions. Deep sandy soils, occasionally including shell sands, may occur in some hollows. Minor areas of texture contrast soil may occur: some with ironstone gravel; some without; a few formed over weathered rock with rock fragments in the topsoil. *Slopes:* **MiC** – slopes (slopes 5-12%, 3-2e, 1w, 2-1y). **MiCx** – exposed slopes (slopes 3-12%, 3-2e, 1w, 3y). Patches of stony texture contrast soils occur to the west of Cape Borda. **MiD** – slopes (slopes 8-20%, 4-3e, 1w, 2-3y). Valley slope adjacent to Breakneck Creek, slope adjacent to West Bay, and others. **MiF** – steep river valley slope (slopes 20-50%, 5-6e, 1w, 2-3y). Valley slope at mouth of Ravine des Casoars. *Dune core topography:* **MiYA** – low to moderate dune core topography (mostly <5m, slopes 0-4%, 1e, 1-2w, 3-2y) **MiYB** – moderate height dune core topography (5-10m, slopes 1-5%, 2-1e, 1w, 3-2y) **MiYC** – high dune core topography (>10m, slopes 5-15%, 3e, 1w, 3y) *Summit surfaces/low rise:* **MiZ** – summit surface/low rise (slopes 0-2%, 1e, 1w, 3a, 3y) Summary: extensive calcarenite rock evident on landscape surface.

MlB MlC MlD MlE MlF MlYA MlYB	0.9 3.2 1.8 3.6 0.6 9.3 10.0	Mostly moderate to shallow depth soil on calcrete, with some deep sands. Main soils: moderate to shallow depth sand on calcrete **H2**a-**B8** (*Petrocalcic Tenosol*); with some deep sands **H3**a-**H2**b (*sandy Tenosol*), especially in hollows. Minor areas of calcareous soils, or even shelly soils, may occur. Minor areas of texture contrast soil with ironstone may occur where calcarenite has been removed, particularly on the eastern edges adjacent to the low ironstone plateau areas. *Slopes and depressions:* **MlB** – slopes (slopes 2-5%, 2-1e, 1w, 2-1y) **MlC** – slopes (slopes 5-12%, 3-2e, 1w, 2-1y) **M1D** – slopes (slopes 8-20%, 4-3e, 1w, 2-1y). Slope adjacent to Sandy River, slope adjacent to West Bay creek, Knapmans Creek valley slopes, slope adjacent to Breakneck River, and slopes above Ravine des Casoars. **MlE** – depressions (slopes <1%, 4-3w, 2a, 1e, 1y). Soils in depressions are especially likely to be calcareous, or even shelly, when adjacent or near shelly deposits. **MlF** – steep river valley slope (slopes 20-50%, 5-6e, 1w, 1-2y). Rocky River valley slopes. *Dune core topography:* **MlYA** – low dune core topography to very gently undulating topography (<5m, slopes 0-3%, 1e, 1-2w, 2-1y) **MlYB** – moderate height dune core topography (5-10m, slopes 0-4%, 2-1e, 1w, 2y) Summary: some patches of calcarenite rock evident on landscape surface.
PhA PhB PhE PhF	1.3 0.8 5.2 0.7	Mostly deep sands. Wind deposited; but possibly partially concentrated by water into depressions. Remnant siliceous sand derived from coastal deposits. Close to a '**M****', or maybe a '**L****' in depressions. Main soils: deep sands **H3**a-**H2**b (*sandy Tenosol*), some with ironstone gravel at moderate depth or depth. Minor areas of highly leached sand **I2**-**I1** (*Podosol*) occur, particularly in depressions. Some soils may be calcareous when adjacent to shelly deposits. Minor areas of sodic texture contrast soils may occur. **PhA** – very gently undulating land (slopes 0-4%, 1e, 1w, 3a, 2-1y) **PhB** – slopes (slopes 2-8%, 1-2e, 1w, 3a, 1y) **PhE** – drainage depressions (slopes 0-5%, 3w, 1-2e, 2a, 1y) Summary: sand deposits, with occasional calcarenite rock evident on landscape surface. Native vegetation dominated by eucalypt woodland.
PiE	0.3	Mostly highly leached wet sands. Main soils: wet highly leached sand **I2**-**I1** (Podosol). **PiE** – closed, low lying depression (slopes <1%, 5w, 2a, 1e, 1y) Summary: very wet depression. Eucalypts give way the low scrub.
WAA WAB	2.4 4.2	Mostly calcarenite coastal cliffs and slopes. **WAA** – coastal slopes (slopes mostly 30-100%, 6e, 3y). **WAB** – coastal cliffs (slopes >100%, 7e, 3y)
WBA	0.6	Mostly rocky coastal slopes. **WBA** – coastal slopes (slopes mostly 30-100%, 6e, 3y). Including a small island.
WGD WGE WGEq WGN WGO WGe WGex	1.8 0.8 0.3 0.1 1.6 0.5 0.1	Areas dominated by shell sand. Main soils: deep to moderate depth shell sand **H1** (*Shelly Rudosol*). **WGD** – moderate height dunes (5-10m, 1e, 1w, 7-5a, 3y) **WGE** – low dunes (<5m, 1e, 1w, 7-5a, 3y) **WGEq** – low lying low dunes (<5m, 1e, 2w, 4a, 1-2y) **WGN** – low dunes/sand spreads on slopes (slopes 8-20%, 1e, 1w, 7-5a, 3y). Mostly vegetated with some bare areas. **WGO** – low dunes/sand spreads on steep slopes (slopes 30-100%, 3e, 1w, 7-5a, 3y). Breakneck Creek valley slope and at West Bay. Mostly vegetated with some bare areas. **WGe** – bare sandy beaches, some with low dunes (slopes <0%, 1e, 3w, 7-5a, 3y). Bare sandy beach. At outlets of Sandy River, Breakneck Creek, West Bay, and Ravine des Casoars. **WGex** – bare and exposed low dunes on cliff top (<5m, 1e, 1w, 7a, 3y)

Classes in the 'Soil Landscape Unit summary' table (eg. 2-1e, 3w, 2y, etc) describe the predominant soil and land conditions, and their range, found in Soil Landscape Units. The number '1' reflects minimal limitation, while increasing numbers reflect increasing limitation. Letters correspond to the type of attribute:

a - wind erosion	e - water erosion	f - flooding	g - gullying
r - surface rockiness	s - salinity	w - waterlogging	y - exposure

Detailed soil profile descriptions:

Main soils:

H2a-**B8** Moderate to shallow depth sands on calcrete (*Petrocalcic Tenosol-Calcarosol*). Brown loamy sands to light sandy loams, occasionally with a bleached subsurface layer, overlying calcreted calcarenite. These soils often contain rubble and some are calcareous, especially nearer the coast. Found on preserved jumbled dune topography.

H3a-**H2**b Deep sands (*sandy Tenosol*). Usually a thin organic rich surface underlain by a bleached subsurface layer often extending to 50cm or more, or sometimes to below one metre. Below this is yellow or orange sand. Sometimes, especially in depressions, the bleached layer does not occur. Underlying this is more sand, calcreted calcarenite, heavier textured sediments, or ironstone gravel. Found on areas with preserved jumbled dune topography.

H3b Ironstone gravelly deep sands (*sandy Ferric Tenosol*). A variant of the deep sands which has thick ironstone gravel in the yellow or orange sandy subsoil. Found on areas with a vaguely preserved jumbled dune topography, where the formerly present calcarenite has been 'dissolved'.

I2-**I1** Highly leached sand (*Podosol*). A further variant of the deep sands which has highly leached sand with accumulations of organic, iron and aluminium compounds in the subsoil. These soils often contain ironstone gravel. Usually found in wetter, lower lying situations.

Minor soils:

H1-**B1** Shell sand (*Shelly Rudosol* and *Petrocalcic Shelly Rudosol*).Deep to shallow depth, loose shell sand soil with little profile development other than a surface build up of organic matter. Underlain by calcreted calcarenite. Cliff top dunes, sand spreads and beaches.

B3-**B2**-**B1** Very shallow soil on calcrete (*Petrocalcic Rudosol*). Very shallow, often dark and organic rich, non calcareous or calcareous, rubbly loamy to sandy soil on calcrete. Soils can be shelly. Found on wind-swept cliff top areas where the land surface is a mosaic of bare calcrete outcrop and calcrete covered by a thin veneer of soil.

B7-**G3** Sandy texture contrast soil over an orange, brown or red subsoil (*Brown Sodosol-Chromosol*). Brown loamy sand, or sometimes sandy loam topsoil, sometimes with a bleached subsurface layer, overlying orange, brown or red sandy clay loam or sometimes clay. The subsoil can be dispersive. These soils are often underlain by calcrete at shallow to moderate depth. They are not extensive in any soil landscape unit, but tend to occur where the calcarenite is thin, such as on steeper slopes, or in depressions without much sand and often where the calcarenite has been 'dissolved'.

Further information: DEWNR Soil and Land Program