

# BAG Balgowan Land System

Elevated plains, rises, slopes and dunes overlooking Spencer Gulf

**Area:** 36.3 km<sup>2</sup>

**Landscape:** Elevated plains, rises, slopes and dunes overlooking Spencer Gulf. The rising land of this system is probably the result of underlying bedrock. However, there is no sign of this rock as it is buried by younger sediments. The system is dominated by wind-deposited sediments. It is likely that the wind-deposited sediments are underlain by clay (Hindmarsh Clay), however, no evidence of soils forming in these clays was encountered in this system. [The coastal cliffs just north of Balgowan have Hindmarsh Clay evident in lower cliff faces, however, this is overlain by four layers of calcrete capped highly calcareous sediments (Bakara Calcrete capping ancient Bridgewater Formation.)

Calcareous loess (Woorinen Formation), with some influence of coastal carbonate sand, forms deep surface deposits over most of this system. These are overlain in places by mallee sands, with some influence of coastal sand, and are oriented approximately northwest-southeast. Carbonate sands (Semaphore Sand), derived from coastal deposits, occur in the south of the system, largely oriented parallel to the coast – these may be former coastal dunes, indicating the position of a former coastline, or else be the result of aggregation via deposition from coastal sands.

**Annual rainfall:** 355 – 390 mm average

**Main soils:** **A4-A1** Calcareous sandy loam (around 78% of area: mostly A4 soil)

**Minor soils:** **H2-H1** Calcareous siliceous sand grading to carbonate sand (around 22% area)

**Main features:** The system is mostly arable. The dominant soils are deep calcareous sandy loams. A major issue is maintenance of soil fertility. The soils of this system are free draining and so soluble nutrients such as nitrogen are easily leached. In addition calcareous soils limit the availability of certain nutrients: deficiencies of the major nutrient phosphorus and the trace element zinc are common, while deficiencies of the trace elements manganese and iron are possible. Temporary trace element deficiencies can occur in cold and wet conditions with susceptible crops.

Wind erosion potential is significant on these soils. Maintenance of surface cover is needed to ensure protection. Sandy rise and sand dune soils need special measures to prevent erosion. Toxic accumulations of boron and sodium may occur in lower subsoils, largely due to the proximity of this area to the coast and salt-bearing winds, and the low and light rainfall diminishing the potential for leaching. Toxic elements can particularly accumulate where a subsoil or lower subsoil is clay loamy or light clayey in texture – restricting leaching to some extent. Minor areas saline seepage occur, resulting in raised subsoil salinity levels.



**Soil Landscape Unit summary:** Balgowan Land System (BAG)

SLU	% of area	Main features
SIA SIB SIL SIZ	48.3 32.5 0.7 7.9	Land dominated by soils formed in calcareous loess. Main soils: <i>calcareous sandy loam</i> <b>A4-A1</b> . With minor to common areas of <i>calcareous siliceous sand</i> <b>H2</b> grading to <i>carbonate sand</i> <b>H1</b> on low mallee sand dunes and sandy rises. There are minor areas of <i>shallow calcareous sandy loam on calcrete</i> <b>B2</b> . <b>SIA</b> – somewhat elevated gently undulating plains (slopes 0-2%). <b>SIB</b> – slight slopes (slopes 0.5-2.5%) <b>SIL</b> – relatively low lying gently undulating plains (slopes 0-1.5%). <b>SIZ</b> – rise surface (slopes <1%).
UaD	0.1	Single mallee/carbonate dominant sand dunes. Main soils: <i>calcareous siliceous sand</i> <b>H2</b> grading to <i>carbonate sand</i> <b>H1</b> . <b>UaD</b> – semi arable low sand dunes.
UbG	8.7	Land overlain by >60% mallee/carbonate dominant sand dunes. Dune soils: <i>calcareous siliceous sand</i> <b>H2</b> grading to <i>carbonate sand</i> <b>H1</b> . Swale soils: <i>shallow calcareous sandy loam on calcrete</i> <b>B1-B2</b> to <i>calcareous sandy loam</i> <b>A1-A4</b> . <b>UbG</b> – semi arable plains and low rises overlain by 60-90% low sand dunes, sand dunes and sandy rises: some dunes are approximately oriented northwest-southeast as per the typical inland mallee dunes on Yorke Peninsula, while other often higher dunes are oriented more so to be parallel to the coastline.
YBB1 YBC1	1.7 0.1	Carbonate dominant near-coastal sand dunes: dunes are oriented parallel to the coast. These are possibly coastal dunes indicating a former coastline, or else have been aggregated via deposition from coastal sands. Main soils: <i>carbonate sand</i> <b>H1</b> grading to <i>calcareous siliceous sand</i> <b>H2</b> . <b>YBB1</b> – non arable sand dunes: with significant relatively bare areas. <b>YBC1</b> – non arable low sand dunes.

**Detailed soil profile descriptions:****Main soils:****A4-A1** *Calcareous sandy loam* [Regolithic Hypercalcic Calcarosol]

Grey brown calcareous light sandy loams, light fine sandy loams and fine sandy loams grade to light brown or orange brown sandy loam subsoils. Subsoils are sometimes as lightly textured as loamy sands, and can be as heavily textured as clay loams (which can grade to light clayey lower subsoils). The lightest textured soils can grade to *highly calcareous sandy loams* **A1** which have very high carbonate contents. Minor amounts of hard carbonate rubble commonly occur in subsoils or lower subsoils.

**Minor soils:****H2-H1** *Calcareous siliceous sand* grading to *carbonate sand* [Arenic Calcarosol grading to Shelly Calcarosol]

Deep to moderate depth calcareous brown sand. These grade to highly calcareous soils which are dominantly composed of carbonate particles (soil **H1**). Found on dunes and sandy rises.

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

