

# HIN Hindmarsh Land System

Low lying land on central and southern Hindmarsh Island

**Area:** 46.3 km<sup>2</sup>

**Annual rainfall:** 440 – 490 mm average

**Geology:** The land system was until relatively recent times submerged under the waters of Lake Alexandrina. Prior to that period of inundation the area appears to have been covered by coastal sands as dunes and beaches, evidenced by white shelly sands underlying most of the area within a metre of the surface. In places, depending on water table fluctuations, this limy sand has hardened to calcrete. Overlying the sandy material is a veneer (usually less than 50 cm thick) of black clay, laid down under the lake. In modern swampy areas, this clay is greenish grey in colour. Minor recent drift sand deposits occur in the north of the System, and minor shell sands occur on modern coastal sandhills along the southern edge.

**Topography:** The system is low lying and flat except for minor drift sand rises in the north, and a series of small coastal sandhills in the south. The slightly elevated flats are well drained, although marginally saline water tables occur within one to two metres of the surface. Channels and small lakes (abandoned channel sections) meander across the flats. Prior to the installation of the barrages, water would have regularly flowed through these channels at high tides. The water now in the channels reflects the shallow groundwater tables in the System. As the elevation falls below about three metres, the water tables approach the surface and swampy conditions prevail. These grade to mud flats and reed beds on the outer margins.

**Elevation:** 0 m at lake level to 10 m

**Relief:** Less than 10 m

**Soils:** Most soils are moderately shallow to moderately deep over buried sandy or sand over clay soils. Many are imperfectly to poorly drained due to high water tables. Dark colours and medium to fine textures are extensive, although pale coloured sandy soils occur on sandhills and well drained flats.

## Main soils

**F1** Loam over dark clay

## Minor soils

*Soils of moderately well to well drained flats*

**A1** Carbonate dominant sandy loam

*Soils of imperfectly drained to swampy flats*

**A7/N2** Wet, saline calcareous clay loam over marl

**E1/N2** Wet, saline black cracking clay

**F1/N2** Loam over dark clay

**N3/N2** Wet marginally saline clay loam

*Soils of coastal sandhills*

**H1** Carbonate sand

*Soils of inland sandhills*

**H2** Siliceous sand

**H3** Bleached siliceous sand



**Main features:** The Hindmarsh Land System comprises low lying flats formed on an old floor of Lake Alexandrina. The more elevated flats are well drained with a mixture of fertile black loamy texture contrast soils and less fertile highly calcareous sandy soils. As the elevation decreases, swampy conditions develop and agricultural potential diminishes. Deep sandy soils on drift deposits and coastal sandhills are highly infertile and prone to wind erosion. The System includes a substantial proportion of wetlands, as either mud flats, samphire swamps and reed beds, of high conservation and recreation value. Lake shore erosion is a problem in exposed coastal areas.

**Soil Landscape Unit summary:** 8 Soil Landscape Units (SLUs) mapped in the Hindmarsh Land System:

SLU	% of area	Main features #
O-B	3.9	Jumbled to longitudinal dunes and sandspreads formed on loose, windblown medium to coarse sands. Soils are deep and sandy. Main soils: <u>bleached siliceous sand</u> - <b>H3</b> (E) and <u>siliceous sand</u> - <b>H2</b> (E). These soils are infertile and prone to wind erosion. Water repellence is a common problem.
Vr-	24.9	Lake fringe swamps, reclaimed in places, formed on lake bed sediments, permanently or temporarily submerged. Main soil: <u>marginally saline wet clay loam</u> - <b>N3/N2</b> (D). These areas are naturally inundated, and although levee construction in places has made them useable, their over-riding feature is very poor drainage and moderate to high salinity.
VuS	6.3	Channels and small lakes (abandoned channel sections) which meander across the low lying flats on the southern part of Hindmarsh Island. Prior to the installation of the barrages, water would have regularly flowed through these channels at high tides. The water now in the channels reflects the shallow groundwater tables occurring across the southern part of the island.
VxA VxK	22.5 1.8	Low lying flats on Hindmarsh Island, characterized by thin black soils over shelly sands. Marginally saline water tables are commonly within 100 cm of the surface. <b>VxA</b> Flats. <b>VxK</b> Flats with narrow meander channels. (Larger channels are mapped separately as <b>VuS</b> ). Main soil: <u>loam over dark clay</u> - <b>F1</b> (D). These soils are inherently fertile and although moderately shallow, moisture from underlying water tables is likely to be available. The main limitation is marginal salinity. Irrigation potential is restricted by the water table.
WFE	2.8	Complex of low coastal sand dunes (90%) and intervening samphire flats and swamps (10%). Main soil: <u>carbonate sand</u> - <b>H1</b> (V) on sandhills and soils as for <b>ZB-</b> (L) in swales and flats. The sandhills are very infertile and highly susceptible to wind erosion. The flats are wet and marginally to highly saline. Both components have little agricultural value.
WJQ	13.5	Flat to very gently undulating plains formed on sandy and shelly sediments, predominantly along the southern fringe of Hindmarsh Island. Water tables may rise to within 100 cm of the surface. Main soils: <u>carbonate dominant sandy loam</u> - <b>A1</b> (E) and <u>loam over dark clay</u> - <b>F1</b> (E). The highly calcareous A1 soils have low inherent fertility and limited water holding capacity. They have productive potential, but water table depth may be a problem. The black F1 soils are fertile and have high productive potential, although the scope for irrigation is limited by the water table.
ZB-	24.3	Marginally to highly saline flats characterized by thin black sediments overlying shell sands or buried sand over clay soils. Samphire is the dominant vegetation. Saline water tables are at or near the surface for extended periods. Main soils: <u>wet, saline black cracking clay</u> - <b>E1/N2</b> (E), <u>wet, saline calcareous clay loam over marl</u> - <b>A7/N2</b> (E), and <u>loam over dark clay</u> - <b>F1/N2</b> (E). This land is generally too waterlogged and saline for any uses other than light grazing.

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

- |  |                                       |
|--|---------------------------------------|
| (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 of moderately well to well drained flats*

- A1** Carbonate dominant sandy loam (Hypervescent, Regolithic, Hypercalcic Calcarosol)  
Very highly calcareous sand to sandy loam grading to a very highly calcareous grey sandy loam to sandy clay, over shell sand within 50 cm.
- F1** Loam over dark clay (Calcic, Black Chromosol)  
Thin to medium thickness dark grey loamy sand to sandy clay loam, overlying a black sandy clay to heavy clay with coarse prismatic structure, calcareous at shallow depth, grading to a white mottled shelly sand from about 50 cm.

*Soils of imperfectly drained to swampy flats*

- A7/N2** Wet, saline calcareous clay loam over marl (Marly, Calcic/Lithocalcic Calcarosol / Calcarosolic Hydrosol)  
Medium thickness black moderately calcareous loam to fine sandy clay loam, overlying shell-grit, semi-hard limestone or soft marl, grading to highly calcareous grey clay. Buried sand over clay soil at 50 cm.
- E1/N2** Wet, saline black cracking clay (Salic, Epipedal, Aquic Vertosol)  
Medium thickness black clay with coarse blocky structure, overlying a dark grey clay with coarse prismatic structure, on a buried sand over clay soil at 50 cm.
- F1/N2** Loam over dark clay (Calcic, Black Chromosol / Chromosolic Hydrosol)  
Thin to medium thickness dark grey loamy sand to sandy clay loam, overlying a black sandy clay to heavy clay with coarse prismatic structure, calcareous at shallow depth, grading to a white mottled shelly sand from about 50 cm.
- N3/N2** Wet marginally saline clay loam (Oxyaquic Hydrosol)  
Thin black organic clay loam over a greenish grey sandy clay to clay with buried soils from as shallow as 20 cm.

*Soils of coastal sandhills*

- H1** Carbonate sand (Shelly Calcarosol)  
Deep pale grey shell sand, overlying consolidated sands at variable depths.

*Soils of inland sandhills*

- H2** Siliceous sand (Calcareous, Arenic, Brown-Orthic Tenosol)  
Very thick brown sand to loamy sand, overlying a thin layer of orange clayey sand on soft to rubbly Class III carbonate.
- H3** Bleached siliceous sand (Basic, Arenic, Bleached-Orthic Tenosol)  
Very thick white loose sand, organically darkened at the surface, overlying a yellow loose sand, grading to a pale brown sand from 125 cm.

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

