

THL Three Hole Lagoon Land System

A low-lying plain with much salinized land and numerous lagoons. The majority of the land system is nestled between two old beach ridges; except in the south-west where the system is adjacent to a plain with lagoons, and in the extreme south the land system abuts a remnant dune area. The system is named after the three small lagoonal waterholes clustered together beside the road to Salt Lake toward the north-eastern end of this land system.

Area: 17 km²

Annual rainfall: 500 - 550 mm average

Geology: A low-lying area with extensive deposits of second highest member (younger) and second lowest member (older) Quaternary age Bridgewater Formation. Bridgewater Formation consists of calcreted calcarenite underlain by highly calcareous unconsolidated sediments. The Bridgewater material has been removed in places, revealing older clayey sediments. These are non-calcareous sandy clay sediments which are very deep. Deposits of Holocene age lacustrine marl are found in lagoonal depressions. Salt Lake itself has deposits of Holocene age St. Kilda Formation material in the form of gypseous lacustrine sediment of coastal saline lake origin.

Topography: A low-lying level to gently undulating plain with many lagoonal and saline depressions. Areas of low jumbled and linear calcreted dune topography occur (less than 5 m high). A curved and parallel series of very low remnant beach ridges occurs on a plain in the south-west of the land system and is evidence of a retreating coastline. A few lower slopes are included (slopes of up to 5%).

Elevation: From 20 m in the north-east, to about 2 m in the south-west

Relief: Less than 10 m. Typically 0-5 m

Main Soils:

B7-B3-B2-N2a	<u>Shallow soil on calcrete</u>
G3-G4	<u>Sand over sodic clay</u>
N2b-N2c	<u>Saline soils</u>

Main Features: Non-arable to semi-arable. Topsoils are mostly sandy. The main soils are shallow soils over calcrete; with some sandy topsoils over sodic clay. Saline areas are widespread. Salt lakes, lagoons, saline flats and depressions, and marginally saline areas all occur. Soils over calcrete are limited by shallow depth and the presence of calcrete rubble. Sandy soils pose a wind erosion risk and are naturally infertile.

Soil Landscape Unit summary: Three Hole Lagoon Land System (THL)

SLU	% of area	Main features #
MqC	1.4	Semi-arable to non-arable calcreted slopes, jumbled remnant dunes and depressions; with some areas of sand over sodic clay. Main soils: <u>shallow soil on calcrete</u> B7-B3-B2 (<i>Petrocalcic Chromosol-Tenosol-Calcarosol</i>). With 10-30% <u>sand over sodic clay</u> G3-G4 (<i>Brown Sodosol</i>). MqC – slopes (approx. 5%) MqE – depression
MqE	0.5	
MqYA	2.2	
Mqe	14.6	



		<p>MqYA – low jumbled dune topography (<5m) Mqe – depression with <10% saline seepage (2-3s). Summary: the majority of soils are shallow and rocky with low waterholding capacity; other soils have relatively infertile sandy topsoils and relatively impermeable sodic clayey subsoils.</p>
MpA MpYA Mpa MpYa	13.8 5.1 6.7 2.2	<p>Non-arable to semi-arable calcreted plains, depressions, and remnant linear and jumbled dunes. Main soils: <u>shallow soil on calcrete</u> B7-B3-B2 (<i>Petrocalcic Chromosol-Tenosol-Calcarosol</i>). With 0-10% <u>sand over sodic clay</u> G3-G4 (<i>Brown Sodosol</i>). With 0-10% deep to moderate depth bleached sand on a low linear dune I1-H3 (Podosol-Tenosol). With 0-10% deep to moderate depth shell sand deposits H1 (Shelly Calcarosol-Rudosol). MpA – plain (slopes 0-1.5%). This is a series of very low old beach ridges. MpYA – low linear and jumbled dune topography (<5m) Mpa - level plain with <10% saline seepage (2-3s) MpYa – low jumbled dune topography (<5m) with <10% saline seepage (2^os-2⁺s) Summary: soils are shallow and rocky with low waterholding capacities.</p>
MsYA	1.4	<p>Semi-arable calcreted jumbled dunes; with some sand deposits and some areas of sand over sodic clay. Main soils: <u>shallow soil on calcrete</u> B7-B3-B2 (<i>Petrocalcic Chromosol-Tenosol-Calcarosol</i>). With 10-30% deep to moderate depth sand deposits on low linear dunes I1-H3 (Podosol-Tenosol). With 10-30% <u>sand over sodic clay</u> G3-G4 (<i>Brown Sodosol</i>). MsYA – low jumbled dune topography (<5m) Summary: the majority of soils are shallow and rocky with low waterholding capacity; while other soils include very infertile deep sands with a high wind erosion risk, and sand over clays with relatively infertile sandy topsoils and relatively impermeable sodic clayey subsoils.</p>
PcO PcU	15.0 9.9	<p>Semi-arable to arable thick, with some medium thickness sand deposits in depression areas; with some areas of shallow soil on calcrete. Low-lying plains with saline patches. Main soils: <u>sand over sodic clay</u> G3-G4 (<i>Brown Sodosol</i>). With 10-30% <u>shallow soil on calcrete</u> B7-B3-B2 (<i>Petrocalcic Chromosol-Tenosol-Calcarosol</i>). With 0-5% deep to moderate depth bleached sand on low linear dunes I1-H3 (Podosol-Tenosol). PcO – depression with <10% saline seepage (2-3s) PcU – depression with 10-50% saline seepage (4s) Summary: the majority of soils are sand over clays with relatively infertile sandy topsoils, relatively impermeable sodic clayey subsoils, some areas prone to waterlogging, and many areas are affected by saline seepage; other areas have shallow and rocky soils with low waterholding capacity.</p>
ZA- ZB-	4.0 1.6	<p>ZA- – non-arable saline flats (Vs). Salinized low-lying areas: mostly covered with salt tolerant grasses and samphire. Main soils: <u>shallow soil on calcrete</u> B2-B3 (<i>Petrocalcic Tenosol-Calcarosol</i>). With 20-50% calcareous to non-calcareous soil over marl N2c (<i>Calcarosol-Tenosol</i>). ZB- – non-arable saline depressions (VIIs). Highly salinized land: mostly samphire covered or bare. Main soils: calcareous to non-calcareous soil over marl N2c-N2b (<i>Calcarosol-Tenosol-Hydrosol</i>). With 20-50% <u>shallow soil on calcrete</u> B2-B3-N2a (<i>Petrocalcic Calcarosol-Tenosol-Hydrosol</i>). Summary: non-arable salinized land.</p>
ZE- ZR- ZS- ZY-	6.2 1.4 8.8 5.1	<p><i>Complex of salt lakes and salinized land.</i> Main soils: <u>saline soils</u> - calcareous soil over marl which is gypsum rich N2b (calcareous <i>Hydrosol</i>). With approx. 40% <u>shallow soil over calcrete</u> B2-B3-N2a (<i>Petrocalcic Calcarosol-Tenosol-Hydrosol</i>). ZE- – non-arable complex of salt lakes, salt flats (VIII-VIIs), salinised land usually with shallow soil on calcrete (VII-Vs), and marginally saline land with outcrops of shallow soil on calcrete (IV-III). <i>Lagoon:</i> Main soils: <u>saline soils</u> – calcareous soil over marl N2b (calcareous <i>Hydrosol</i>) ZR- – mostly samphire covered: sometimes submerged (VIIs) ZS- – mostly bare: often submerged (VIIs). <i>Gypsum salt lake:</i> Main soils: <u>saline soils</u> - calcareous soil over marl which is gypsum rich N2b (calcareous <i>Gypsic Hydrosol</i>). ZY- – gypsum salt lake (VIIs). Summary: Highly saline lagoonal/lake depressions, and some salinized land: lagoonal/lake areas are subject to seasonal inundation.</p>



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 - gullyng
r - surface rockiness	s - salinity	w - waterlogging	y – exposure

Detailed soil profile descriptions:

Main Soils:

- B7-B3-B2-N2a** Shallow soil on calcrete (*Petrocalcic Chromosol-Tenosol-Calcarosol-Hydrosol*)
Shallow to very shallow soil. Sandy topsoil; over yellow-brown sandy clay loam or sometimes loamy sand or sandy loam; overlying calcrete. The layer directly above the calcrete sometimes consists mostly of calcrete fragments. Some soils are calcareous throughout. Occasionally there is a highly calcareous subsoil layer directly overlying the calcrete. Some soils in depression areas are wet and saline. Found on jumbled remnant dunes, slopes, flats and depressions.
- G3-G4** Sand over sodic clay (*Brown Sodosol*)
Medium to very thick sandy topsoil, usually with a bleached sub-surface layer; over olive-brown to orange-brown sodic clay, often with some olive and maybe some red mottles. Often there is fine carbonate in the lower subsoil and/or some calcrete fragments in the subsoil. Some soils have ironstone nodules included in the clayey subsoil. Found on plains, depressions, flats and slopes.
- N2b** Saline soils (*Hydrosol*)
Calcareous, and often gypseous, sandy to loamy soil over marl. Found in lagoons and saline depressions. And including calcareous and non-calcareous soil overlying marl (**N2c**) in less wet areas (*Calcarosol-Tenosol*).

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

