

MOW Moorowie Land System

A relatively low lying land system dominated by undulating to gently undulating plains. It comprises calcreted relict jumbled dunes, calcreted plains, some deep sands on low dunes, some saline depressions, and low lying coastal deposits (especially the area adjacent to Point Davenport). Named after the Hundred of Moorowie, this system has slightly higher elevation than the Peesey Swamp system, and lower elevation than the adjacent systems to the east and west.

Area: 191.2 km²

Landscape: A relatively low lying system, connected structurally to Peesey Swamp, but less saline and somewhat higher in elevation. Some rising land occurs in the central west of the system. Recent coastal deposits occur along the coast, and an extensive area of low lying coastal deposits lie adjacent to Point Davenport. Undulating plains dominate the rest of the system. Most of the east of the system covered by relict inland dunes, which are now calcreted low rises. Most of the west of the system is covered by carbonate sand, usually with calcrete at shallow to moderate depth. Some sandy rises occur. Salinised depressions occur.

Annual rainfall: 420 – 475 mm average

Main soils:

- B1** *Shallow highly calcareous sands and sandy loams on calcrete*
- H1** *Carbonate sands*
- B2** *Shallow calcareous loams on calcrete*

Minor soils:

- N2** *Saline soil*
- A4** *Calcareous loams*
- A1** *Highly calcareous sandy loams*

Main features: Sandy highly calcareous soils dominate. Calcareous loams are also common. Many soils are shallow to very shallow over calcrete. Some soils are too shallow and stony for agriculture. Carbonate in soils creates nutrient imbalances, restricting the availability of phosphorus, manganese, zinc and iron. This is particularly the case with the carbonate dominant sandy soils which need regular applications of manganese to maintain productive agricultural systems. Copper and cobalt are also normally deficient on such soils. Some deep carbonate sands on dunes are highly infertile, where soluble nutrients readily leach beyond the root zone, and so have not been cleared for cropping. Wind erosion is a potential problem across this system, in particular for sandy soils. Saline seepage affects many parts of the system, with many areas non-arable to marginally arable due to the effects of saline watertables.

Soil Landscape Unit summary: Moorowie Land System (MOW)

SLU	% of area	Main features #
QHK	11.3	Shallow to very shallow calcareous soils on calcrete.
QHK1	8.6	Main soils: shallow calcareous to highly calcareous loam on calcrete (soil B2-B1). Minor to limited areas of deeper rubbly calcareous loam (soil A4-A1) particularly in arable areas and salinised depressions. QHK – mostly arable gently undulating plains and low rises with some saline seepage (slopes 0-3%, 3-2s, approx. 5-10% outcrop, 4r). QHK1 – non arable undulating stony plains and low rises (which are calcreted relict jumbled dunes) with some saline seepage (slopes 0-3%, 3-2s, 5r).
QHO	9.2	
QHO1	1.2	
QHT	3.7	



		<p>QHO – semi arable to arable lower lying areas/depressions with saline seepage (slopes <1%, 3-4s°, 5-10% outcrop, 4r).</p> <p>QHO1 – non-arable low lying areas with saline seepage (slopes 0-1%, 3-4s°, 5-4r).</p> <p>QHT – non-arable to semi arable salinised depressions (slopes <1%, 4-5s°, 4-5r).</p>
SVP SVT	0.2 0.1	<p>Deep to moderate depth calcareous soils, with some shallow.</p> <p>Main soils: calcareous loams (soil A4-A1). And shallow calcareous loams (soil B2-B1) especially on undulating land.</p> <p>SVP – undulating land (slopes 0-2%, 3-2s, 3-2r).</p> <p>SVT – marginally saline depression (slopes <1%, 4-3s, 2r).</p>
Maa Mam MaYA MaYC MaYa	0.1 0.1 0.1 0.1 0.04	<p>Mostly calcreted relict coastal dunes and back plains.</p> <p>Relict dunes and flats with shallow highly calcareous sands on calcrete (soil B1). Minor to limited deeper carbonate sands (soil H1).</p> <p>Maa – arable back plain (slopes <1%, 2-3s, 3r, 3a).</p> <p>Mam – semi arable back low lying plain (slopes <1%, 3s, 3-4r, 3a).</p> <p>MaYA – arable relict low coastal dune (height mostly around 5m, 2s, 3r, 3-4a).</p> <p>MaYC – non-arable relict high coastal dune (height to >15m, 1s, 4-5r, 4-3a, 3e).</p> <p>MaYa – non-arable very low relict coastal dune (slopes 0-1%, 3-2s, 5r, 3-2a).</p>
YaL1 YaU YaU1 YaUs Yag Yag1 Yap1	0.5 1.8 3.0 0.6 0.4 0.3 0.2	<p>Areas with mostly shallow loamy sands and sandy loams dominated by carbonate particles.</p> <p>Main soils: shallow highly calcareous sandy loams and loamy sands on calcrete (soil B1). Minor deeper carbonate loamy sands and sandy loams (soil A1-H1), especially in depressions.</p> <p>YaL1 – non-arable relict jumbled dune topography and rises (slopes 0-2%, 1-2e, 2-3s, 5-4r).</p> <p>YaU – arable to semi arable gently undulating plains with some saline seepage (slopes 0-1.5%, 3-2s, 5-10% outcrop, 4r).</p> <p>YaU1 – non-arable stony very slight rises (mostly relict dunes), plains, often with some depression areas; or relict jumbled dune topography with some saline seepage (slopes 0-4%, 1-2e, 3-2s, 5-4r).</p> <p>YaUs – semi arable very gently undulating relatively low lying plains affected by saline seepage to marginal salinity (slopes 0-1.5%, 3-4s°, 5-10% outcrop, 4r).</p> <p>Yag – non-arable to semi arable marginally saline depressions (slopes <1%, 4s°, 4r).</p> <p>Yag1 – non-arable flats and slight depressions with marginal salinity (slopes <1%, 4-3s, 5r). A few slight rises may occur.</p> <p>Yap1 – non-arable to semi arable slopes (slopes 1-4%, 2-1e, 2-3s, 4-5r, 2a).</p>
YdL YdL1 YdU YdU1 YdX YdX1 Ydp Ydp1	4.9 2.3 17.3 0.1 1.3 1.9 0.4 0.1	<p>Areas with mostly shallow sands dominated by carbonate sand.</p> <p>Main soils: shallow highly calcareous loamy sands, and some light sandy loams on calcrete (soil B1). With deeper carbonate sands (soil H1) especially on rising ground, on low sandy rises, and in depressions.</p> <p>YdL – somewhat raised gently undulating plains and low rises with <30% low sandy rises (slopes 0-4%, 1-2e, 2-3s, 0-10% outcrop, 3-2r, 3a).</p> <p>YdL1 – scrub covered somewhat raised gently undulating plains, low rises or jumbled dune topography with <30% low sandy rises (slopes 0-4%, 1-2e, 2-3s, 3-4r, 3a).</p> <p>YdU – gently undulating plains with <30% low sandy rises and some saline seepage (slopes 0-2%, 3-2s°, 0-10% outcrop, 3r, 3a).</p> <p>YdU1 – gently undulating to level low lying plains with some saline seepage (slopes 0-1%, 3-2s, 3-4r, 3-2a).</p> <p>YdX – depressions and low lying areas mostly with marginal salinity (slopes 0-1.5%, 4-3s, 3-2r, 3-2a).</p> <p>YdX1 – depressions with marginal salinity and covered by native vegetation (slopes 0-1%, 4-3s°, 4r).</p> <p>Ydp – slopes (slopes 1.5-6%, 2-1e, 2-3s, 3-2r, 3-2a).</p> <p>Ydp1 – scrub covered slopes (slopes 1.5-6%, 2-1e, 2-3s, 3-4r, 2-3a).</p>
YEC YEU YEU _s YEW YEX	0.7 3.7 2.1 0.8 0.3	<p>Areas with moderate depth, deep and shallow carbonate sands.</p> <p>Main soils: carbonate sands (soil H1) and areas of shallow carbonate sands on calcrete (soil B1).</p> <p>YEC – semi arable low dunes and rises (slopes 0-4%, 2-1s, 1-2r, 4a).</p> <p>YEU – undulating plains with 10-30% sandy rises and some saline seepage (slopes 0-4%, 2-3s°, 0-10% outcrop, 2-3r).</p> <p>YEU_s – relatively low lying undulating plains with 0-30% sandy rises and some saline seepage and saline patches (slopes 0-3.5%, 3-4s°, 0-5% outcrop, 2-3r).</p> <p>YEW – depressions and low lying areas with some saline seepage (slopes 0-1.5%, 3s, 5%</p>



		outcrop, 2-3r). YEX – depressions and low lying areas with marginally salinity (slopes 0-1%, 4-3s, 2-3r).
WGC	0.2	Carbonate sand coastal dunes. Includes some flats.
WGD	2.1	Main soils: <i>carbonate sand</i> (soil H1), especially on dunes and some flats. With shallow calcareous
WGE	3.3	soils on calcrete (soil B1), especially on flats in some land units.
WGI	0.2	WGC – non-arable mostly high jumbled coastal dunes and some flats (dune height mostly
WGIj	0.6	>15m, 7a).
WGK	2.1	WGD – non-arable mostly moderate height jumbled coastal dunes, some flats, and some beach
W-E	0.02	areas (dune height mostly 5-15m, 7-5a). WGE – non-arable mostly low parallel coastal dunes and adjacent beaches (dune height mostly around 5m, 2-3s, 5-7a). WGI – mostly non-arable very low jumbled dunes and flats (dune height mostly <5m, 3-4s, 4-3a). WGIj – semi arable to non-arable hummocky very low dunes (slopes <1%, 3-4s°, 4a). WGK – very low coastal dunes and some flats with some saline seepage or marginal salinity (dune height <5m, 5a, 2-4s°). W-E – non-arable sand spread (height of spread mostly <2m, 2-3s, 4a).
WKQ	3.3	Carbonate sand coastal flats. Includes some coastal dunes.
WKR	1.0	Main soils: <i>carbonate sand</i> (soil H1): often composed of fine shell grit. With some shallow calcareous soils on calcrete (soil B1). WKQ – semi arable coastal flat with some saline seepage (slopes <1%, 4-3s°, 2r, 3-4a). WKR – mostly non-arable coastal flats/depressions with marginal salinity (slopes <1%, 5-4s, 1-2r, 3-4a).
WN-	2.1	Low lying and saline coastal land.
WO-	0.8	Main soils: <i>saline soil</i> (soil N2).
WP-	1.4	WN- – saline coastal swamps with melaleuca scrub (slopes <1%, 5-7s, 1-2f).
WQ-	0.1	WO- – highly saline flats mostly with samphire (slopes <1%, 7s, 1-2f).
WR-	0.5	WP- – very highly saline mostly bare salt flats (slopes <1%, 8s, 2f). WQ- – very highly saline mostly bare salt flats with saline margins with melaleuca scrub (slopes <1%, 8-5s, 2-1f). WR- – coastal samphire swamps and some very low coastal dunes (slopes <1%, 7-8s, 2-1f).
WT-	1.0	Tidal flats and sandy beaches.
WU-	0.2	WT- – mostly rocky reefs with some sandy beaches and tidal flats. WU- – sandy and some rocky subtidal flats.
ZA-	2.7	Saline depressions.
ZB-	0.6	Main soils: mostly saline soils, many gypsum-rich (soil N2). Salinised shallow calcareous soils especially occur in land unit 'ZA-' (soil B2-B1), and salinised gypseous calcareous soils (soil A8) especially in land units 'ZY-' and 'ZA-'.
ZC-	0.1	
ZD-	0.1	
ZY-	0.04	ZA- – salinised depressions (slopes <1%, 5-4s, 3-2-4r). ZB- – saline depressions (slopes <1%, 7-5s, 2-1r). ZC- – highly saline depressions (slopes <1%, 8-7s). ZD- – small salt lakes (slopes <1%, 8s). ZY- – gypsum-rich saline depressions (4w, 7-5s).

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:**

- B1** *Shallow highly calcareous sands and sandy loams on calcrete*
[Petrocalcic Shelly Calcarosol or Suprarescent Petrocalcic Calcarosol]
Grey to grey-brown fine loamy sand, or sometimes sandy loam or loam, mostly dominated by carbonate particles, overlying calcrete at shallow to very shallow depth. Found on undulating land, dune topography, and relict inland dunes. These soils are sometimes non arable due to shallow depth and stoniness. The sandy variants have the highest calcium carbonate contents and are the least fertile B1 soils.
- H1** *Carbonate sands* [Shelly Calcarosol with Shelly Rudosols on coastal deposits]
Deep to moderate depth grey to grey-brown fine loamy sands, dominated by carbonate particles, and usually overlying calcrete. Found on sandy rises, dune topography, and undulating land. Soils formed in recent coastal deposits are less well developed than the older inland variants and on flats often include shell grit. Found on coastal dunes and flats. A few of these are non arable to semi arable due to very low fertility, excessive drainage, and exposed position on dunes.
- B2** *Shallow calcareous loams on calcrete* [Ceteric-Hyperrescent Petrocalcic Calcarosol]
Calcareous grey-brown, brown or reddish brown loam, or occasionally sandy loam, dominated by siliceous particles, overlying calcrete at shallow to very shallow depth. Soils range from slightly to highly calcareous. Found on relict inland dunes, flats and depressions, and undulating land. These soils are often non arable due to shallow depth and stoniness.

Minor soils:

- N2** *Saline soil* [Hypersalic-Salic Hydrosol and Intertidal-Supratidal-Extratidal Hydrosol on saline coastal deposits]
Inland soils. When near the coast these soils can overlie sandy and/or shelly sediments:
1) Grey-brown clay loam grading to grey-brown or brown clay loam to light clay, often with hard carbonate rubble (saline **A4-A1**): in highly saline depressions colours are gleyed and carbonate rubble is absent.
2) Grey-brown to reddish-brown calcareous loam or clay loam grading to loam, clay loam, silty clay loam or light clay, and overlying calcrete at shallow depth (saline **B2-B1**).
3) Brown to olive-brown loam to silty clay loam grading to grey or olive-grey silty loams, clay loams and light clays with abundant gypsum (saline **A8**: gypseous calcareous loam).
Coastal soils:
4) Olive-grey to grey sandy clay loams overlying sandy sediments, often with shell fragments.
- A4** *Calcareous loams* [Ceteric-Hyperrescent Hypercalcic-Lithocalcic Calcarosol]
Calcareous grey-brown loam or sometimes clay loam, grading to loam, clay loam or even light clay, often with abundant hard carbonate fragments. Clay loamy and light clayey subsoils are typically dispersive. Found on undulating land and in some depressions.
- A1** *Highly calcareous sandy loams* [Suprarescent Calcarosol]
Highly calcareous grey to grey-brown sandy loam and loam, mostly dominated by carbonate particles, grading to loam, clay loam, or even light clay. Usually found in low lying areas and depressions.

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

