ORC Orrie Cowie Land System

Low lying area with some swampy land and a few low rises. This system is traversed by Orrie Cowie Road, and is overlooked by the old Orrie Cowie school site (1892 - 1922).

Area: 55.0 km^2

Landscape: A mostly relatively low lying land system. The lowest lying areas are swampy and saline. Drainage through these areas is from the south to the north of the system, with saline seepage and drainage entering the sea just west of Point Turton, and some saline seepage also entering the sea just south of Point Turton. Some low rises occur. The system is dominated by soils underlain by calcrete, with many surface outcrops. Soils are highly calcareous, with the majority dominated by carbonate particles. Soils tend to be loams and fine sandy loams in the north of the system, but tend to be sandier in the south of the system, with textures of loamy sand and light sandy loam becoming more prevalent. Many relict jumbled dunes occur, either as isolated dunes or as dunefield topography. The relict dunes are dominated by very shallow soils on calcrete and calcrete outcrops. Most of the south and central of this system was covered by low jumbled carbonate sand dunes in recent geological times; however, the majority of the sand has since blown away.

Annual rainfall: 410 – 455 mm average

Main soil:
B1 *Shallow highly calcareous loams and loamy sands on calcrete.*
B1a *Shallow highly calcareous loams on calcrete* [Supravescent Petrocalcic Calcarosol]
B1b *Shallow carbonate loamy sands on calcrete* [Petrocalcic Shelly Calcarosol]

Main features: Most soils are highly calcareous, being dominated by carbonate particles, and are either loamy or sandy. Most soils are shallow or very shallow. There are a number of patches where soils are too shallow to be cropped. Nutrient imbalances caused by the high fine carbonate contents occur, particularly with manganese, phosphorus and zinc. Raised subsoil salinity levels are common, especially on low lying areas; many depression areas are saline and non arable. High subsoil levels of the toxic elements boron and sodium, especially and in depression areas, are likely to occur. Most surface soils have potential for wind erosion, especially when sandy; and many soils are water repellent, again, especially when sandy.

Soil Landscape Unit summary: Orrie Cowie Land System (ORC)

SLU	% of area	Main features #
QHB QHB1 QHK QHK1 QHL QHL1 QHO QHOs QHOx QHT QHT1	5.2 3.0 2.6 4.6 0.2 0.8 20.8 6.6 1.3 5.3 1.1	Mostly shallow calcareous loamy soils. Main soils: highly calcareous sandy loams and loams on calcrete (soil **B1**-**B2**: mostly **B1a**). Minor to limited areas with deeper highly calcareous sandy loams and loams (soil **A1**-**A4**), with hard carbonate rubble in the profile, or calcrete at moderate depth. **QHB** – semi arable to arable stony low rises with some saline seepage (slopes 0-2.5%, 1-2e, 2-3s, 4-3r, 3-2a). **QHB1** – non-arable to semi arable stony low rises with some saline seepage (slopes 0-2.5%, 1-2e, 2-3s, 5-4r, 2-3a). **QHK** – undulating to gently undulating somewhat raised plains with some saline seepage (slopes 0-2%, 3-2s, 3-4r, 3a): mostly sandier surfaces than other 'QH' land units. **QHK1** – non-arable to semi arable stony plains with saline seepage (slopes 0-1%, 3-2s, 5-4r, 2-3a). **QHL** – slopes with some saline seepage (slopes 1-3.5%, 2-1e, 3-2s, 3-4r, 3-2a). **QHL1** – non-arable to semi arable slopes with some saline seepage (slopes 1-3.5%, 2-1e, 3-2s, 5-4r, 2-3a). **QHO** – relatively low lying plains with saline seepage (slopes 0-1%, 3s^o, 0-10% outcrop, 3r, 2-3a).

		QHOs – low lying plains and depressions with areas of marginal salinity (slopes <1%, 3-4s°, 4-3r, 2-3a). **QHOx** – relatively low lying coastal plain with areas of marginal salinity (slopes <1%, 4-3s, 3r, 2-3a). **QHT** – depression with marginal salinity and some saline patches (slopes <1%, 4s°, 3-4r, 2a). **QHT1** – non-arable to semi arable low lying stony plains with marginal salinity and some saline patches (slopes <1%, 4s°, 5-4r, 2-1a).
QKZ	4.8	Mostly shallow calcareous loamy soils, with some deeper variants. Main soils: shallow highly calcareous loams and sandy loams on calcrete (soil **B1**-**B2**: mostly **B1a**). With limited to common areas of deep to moderate depth highly calcareous loams and sandy loams (soil **A1**-**A4**). **QKZ** – gently undulating rises with some saline seepage (slopes 0-3%, 1-2e, 2-3s, 3-4r).
YaL YaU YaR YaW YaX	9.8 11.9 3.6 4.3 1.5	Relict inland jumbled dunes, rises, plains, and depressions mostly with shallow carbonate dominant soils. Often with carbonate sand surface soils which have been deposited upon older highly calcareous siliceous layers. Main soils: shallow carbonate loamy sands to sandy loams (soil **B1**: mostly **B1b**). Minor to limited areas of deeper carbonate dominant loamy sands to sandy loams (soil **A1**-**H1**). **YaL** – low rises with some saline seepage (slopes 0-2%, 2-3s, 3-4r, 3-2a). **YaU** – relatively low lying plains with areas of marginal salinity (slopes 0-1%, 3-4s°, 0-10% outcrop, 3-4r, 3-2a): minor to limited areas of very low relict jumbled dunes can occur. **YaR** – low rise with semi arable jumbled dune topography with 30-60% non arable low jumbled relict dunes and mostly arable intervening gently undulating land with some saline seepage (slopes 0-2%, 2-3s, 4-5r, 3-2a). **YaW** – semi arable depression area with jumbled dune topography with approx. 30% non arable low jumbled relict dunes and intervening gently undulating land with saline seepage (slopes 0-1.5%, 3s, 4-5r, 2-3a). **YaX** – semi arable depression with jumbled dune topography with approx. 30% stony low jumbled relict dunes and intervening gently undulating land with marginal salinity (slopes 0-1.5%, 4-5s, 4r, 2a).
YEC YEW	0.2 0.6	Deep, moderate depth and shallow carbonate dominant soils. Main soils: carbonate loamy sands to sandy loams (soil **H1**-**A1**). And minor to limited areas of shallow carbonate loamy sands to sandy loams (soil **B1b**). **YEC** – low jumbled dunes with some saline seepage (slopes 0-2.5%, 2-3s, 1-2r, 4-5a): minor to limited areas of shallow soil. **YEW** – low lying plains with saline seepage (slopes <1%, 3s, 2r, 2-3a).
MdYa	1.3	Relict coastal dunes. Main soils: highly calcareous to calcareous sandy loams on calcrete (soil **B2**-**B1a**). **MdYa** – non arable to semi arable low coastal dune with some saline seepage (slopes 0-3%, 2-3s, 4-5r, 3-4a).
ZA- ZC-	8.3 0.03	Saline and swampy depressions. Main soils: saline soil (soil **N2**): salinised variants of shallow calcareous loams (soil **B2**-**B1**) and calcareous loams (soil **A4**-**A1**) in '**ZA**' land units. **ZA-** – saline swampy depressions (slopes <1%, 5s, 3r, 2a). **ZC-** – highly saline depression (slopes <1%, 7s, 1r, 1-2a).
WAA	0.2	**WAA** - coastal cliffs and slopes (slopes mostly 30-100%): mostly calcarenite and unconsolidated highly calcareous sediments (Bridgewater Formation) which cap clay(?) and bedrock.
WFK	0.4	Mostly calcareous siliceous sands and shell fragments: coarse siliceous sand derived from weathered granite. Main soils: *calcareous siliceous sand* with some shell fragments (soil **H2**) with some *carbonate sand* (soil **H1**). Some shallow soils on calcrete occur (soil **B2**-**B1**). **WFK** – low coastal dunes and flats (slopes 0-2%, 2-3s⁺, 4-3a).
WU-	1.6	**WU-** – Subtidal sandy and rocky flats (bedrock, including pink granite, and calcrete).

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 soil:

B1 *Shallow highly calcareous loams and loamy sands on calcrete*
[Supravescent Petrocalcic Calcarosol to Petrocalcic Shelly Calcarosol]

Two variants of this soil occur:

a) *Shallow highly calcareous loams on calcrete* [Supravescent Petrocalcic Calcarosol]
A very highly to highly calcareous grey loam or fine sandy loam which is dominated by carbonate particles, but still has significant content of siliceous particles, overlying calcrete at shallow to very shallow depth. Hard carbonate rubble commonly occurs in the profile. Subsoil textures of clay loam sometimes occur.

Heavier textured variants occur on some areas of marginally saline land, and in saline swampy and saline depressions: mostly loams, clay loams or silty clay loams over clay loams or light clays (soil **N2**).
Deeper soils like this also occur (soil **A1**-**A4**), sometimes with calcrete at moderate depth, or sometimes with no calcrete below the profile: subsoils can be as heavily texture as sandy clay loams.

b) *Shallow carbonate loamy sands on calcrete* [Petrocalcic Shelly Calcarosol]
A very highly calcareous, grey carbonate loamy sand to light sandy loam, with very little content of siliceous particles, overlying calcrete at shallow depth. Surface soils are grey and subsoils are brown. Surface soils are water repellent.

Often a thin to moderate thickness layer of loose carbonate sand (type (b) material) overlies older highly calcareous massive sediments (type (a) material).
Deeper soils like this also occur (soil **A1**-**H1**): subsoils can be as heavily texture as sandy clay loam.

Further information: DEWNR Soil and Land Program