WAU Wauraltee Land System

Low lying stony coastal plains, with some carbonate-rich sandy rises, and many saline depressions

Area: 92.7 km^2

Landscape: Low lying stony coastal plains. Some areas which are close to the coast are overlain with jumbled sandy rises composed of carbonate-rich material. Many small saline depressions occur: ranging from salinised very shallow stony depressions to small salt lakes. A number of coastal back swamps covered by samphire shrubs lie adjacent to neighbouring coastal dunes. The land system is underlain by Permian age sediments associated with glacial activity (Crawford, A.R., 1965). However, most soils are underlain by calcrete at shallow or very shallow depth (Bakara and Ripon Calcrete). It is likely that the calcrete is underlain by clayey sediments in most places. There are a few very low rises composed of calcareous loess (Woorinen Formation). The most recent sediments are the carbonate-rich sandy rises which were deposited in very recent geological times.

Annual rainfall: 375 - 400 mm average

Main soils:

B2 *shallow loam on calcrete*

Minor soils:

A1 *highly calcareous loamy sand*
H1 *carbonate sand*
B1 *shallow carbonate sand to highly calcareous loamy sand on calcrete*
N2 *saline soil*
A4 *calcareous loam*

Main features: Land in this system ranges from arable to non arable. There are many non arable stony areas. While the many highly saline depressions/salt lakes/back swamps are non arable. And the numerous patches of wet saline discharge are also non arable to semi arable (and are often very stony as well). The sandy rises composed of carbonate-rich material are loose, infertile, and water repellent – resulting in these areas being semi arable to non arable.

Many arable to semi arable areas are underlain by calcrete at shallow to very shallow depth and/or contain abundant hard carbonate rubble – these limit profile water holding capacity and hence productive potential. Surface stones and outcrops also interfere with many farming practices.

Surface textures range from loam on flats, to sands on low rises. The most common soils are shallow calcareous loams on calcrete. Surfaces are sometimes hardsetting, however, adverse soil physical condition is not an issue.

Saline seepage affects many areas. Wet marginally saline patches occur in numerous patches where saline groundwater nears the land surface. Where salinity levels are high, boron and sodium levels are also high.

All soils described during field work in this system where calcareous throughout. Calcareous soils restrict 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. This is particularly the case for soils with highly calcareous surfaces, and especially for soils dominated composed of carbonate particles. Waterlogging can occur in low lying areas, and when combined with saline soils, is particularly hard on crops.

Soil Landscape Unit summary: Wauraltee Land System (WAU)

SLU	% of area	Main features
QKK QKP	34.3 42.8	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2**, with minor to limited areas of rubbly *calcareous loam* **A4**, and with some outcropping calcrete (**RR**). **QKK** – low lying level to gently undulating plain, with some stony depressions, and many small patches showing surface expression of saline seepage (slopes 0-1%, 3-4s): approximately 10% non arable stony land. Minor areas of *shallow highly calcareous loamy sand on calcrete* **B1** occur on very low rises. **QKP** – low lying level stony plain with marginal salinity and numerous small patches showing surface expression of saline seepage (slopes <1%): approximately 20% non arable stony land.
QPP	11.3	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2**. With extensive areas *highly calcareous loamy sand* **A1** and *carbonate sand* **H1** grading to *shallow carbonate sand to highly calcareous loamy sand on calcrete* **B1**, on jumbled sandy rises. **QPP** – low lying marginally saline stony plains, with extensive areas of jumbled sandy rises.
WO-	2.2	Highly saline coastal back swamps. Main soils: *saline soil* **N2**. Some smaller swamps are overlain in parts by carbonate sand spreads. **WO-** – samphire swamps (slopes <1%, 7s).
YEL	0.4	Land with soils dominated by carbonate particles. Main soils: *highly calcareous loamy sand* **A1**, with some *shallow highly calcareous loamy sand on calcrete* **B1**, and with *carbonate sand* **H1** on sandy rises. **YEL** – low rise with approximately 20% sandy rises (slopes 0-1%).
ZA- ZB- ZC-	6.8 1.6 0.6	Saline depressions Main soils: *saline soil* **N2**. With areas of *shallow calcareous loam on calcrete* **B2**, mostly in '**ZA-**' land units. **ZA-** – low lying salinised stony plain with some samphire swamp areas. Or small and shallow salinised depressions (slopes <1%). **ZB-** – highly saline depression, often with a salt lake incorporated. **ZC-** – small salt lake.

Detailed soil profile descriptions:

Main soils:

B2 *shallow loam on calcrete* [Petrocalcic Calcarosol]
Grey brown calcareous grey loam or sometimes sandy loam overlying calcrete at shallow or very shallow depth. Surfaces can be hardsetting. Profiles often contain abundant hard carbonate rubble, and are often associated with calcrete outcrops. Mostly found on plains, flats, and in saline depressions.

Minor soils:

A1 *highly calcareous loamy sand* [Supravescent Calcarosol]
Moderate depth to deep grey loamy sand to light sandy loam which is a mixture of carbonate and quartz particles. Underlain by calcrete or containing abundant hard carbonate rubble. Found on some low rises. Typically strongly water repellent

H1 *carbonate sand* [Shelly Calcarosol-Rudosol]
Moderate depth to deep loose light grey carbonate sand. Underlain by calcrete. Strongly water repellent. Found on jumbled sandy rises.

B1 *shallow carbonate sand to highly calcareous loamy sand on calcrete*
[Petrocalcic Shelly Calcarosol-Rudosol or Supravescent Petrocalcic Calcarosol]
Carbonate-rich sandy soil overlying calcrete at shallow depth. The soil can be almost entirely composed of loose light grey carbonate sand – found on jumbled sandy rises. Or can be a grey loamy sand or light sandy loam which is a mixture of carbonate and quartz – found on some low rises and flats. Typically strongly water repellent.

N2 *saline soil* [Hypersalic-Salic Hydrosol]
These range from salinised shallow calcareous loams on calcrete to moderate depth calcareous soils with clayey subsoils on calcrete in saline depressions. In salt lakes the calcrete is 'dissolved' and deep soils underlain by clay occur. In the coastal backswamps, calcareous to carbonate-rich loams to light clays, often with shelly fragments, overlie calcrete. It is usual for saline soils to contain gypsum.

A4 *calcareous loam* [Regolithic Lithocalcic Calcarosol]
Grey brown medium thickness grey calcareous loamy topsoil grading to loamy or clay loamy subsoil with abundant fine carbonate and abundant hard carbonate rubble. Surfaces can be hardsetting. Subsoils are strongly alkaline, found on some very low rises.

References:
Crawford, A.R. (1965). `The Geology of Yorke Peninsula'. *Bull. geol. Surv. S. Aust., 39*.

Further information: DEWNR Soil and Land Program