CHE Chenoweth Land System

Gently undulating plains dominated by carbonate-rich sandy deposits. There are many sandy rises, and a number of saline depressions.

Area: 43.5 km^2

Landscape: The system consists of gently undulating coastal plains, with some saline depressions. This area is underlain at depth by Permian age sediments associated with glacial activity (Crawford, A. R., 1965). These, and any other older sediments, are overlain by highly calcareous sediments with a calcrete cap. Calcrete is exposed in some low lying areas. However, this calcrete is largely blanketed by younger carbonate-rich coastal sands. These sands were deposited in very recent geological times and have been worked into sandy rises in parts of the system. The sandy rises are mostly jumbled in the south of the system, but are mostly roughly linear and orientated northwest-southeast in the north.

Annual rainfall: 385 – 405 mm average

Main soils:

A1 Highly calcareous loamy sand (around 73% of area)

Minor soils:

B1 Shallow highly calcareous loamy sand on calcrete (around 20% of area)
H1 Carbonate sand (around 6% of area)
B2 Shallow calcareous sandy loam on calcrete (approximately 1% of area)

Main features: Most soils have sandy textures. The soils on sandy rises have been formed by the reworking of sand, and are somewhat lighter textured, and less well developed than other soils in the system. The potential for wind erosion is moderately high to moderate on flats, and high on sandy rises. This is exacerbated by the water repellent nature of these soils. Careful surface management is needed to protect soils. The soils on sandy rises are dominantly composed of carbonate particles, while those on the flats are typically a mixture of carbonate and quartz particles but can also be dominantly composed of carbonate particles. Such highly calcareous soils have low to very low fertility. The high carbonate content of these soils leads to the restricted availability of a number of nutrients. The availability of phosphorus, manganese, zinc and iron is restricted. Typically, higher than normally recommended phosphorus fertilizer applications are needed for adequate crop production. Regular manganese applications are also necessary. Copper and cobalt are also normally deficient on such soils. The sandy nature of these soils also allows for the leaching of soluble nutrients, such as nitrogen and sulfur. Saline seepage affects the depression areas in this system to the extent that they are highly to marginally saline. It is likely that many subsoils have raised salinity levels. Correspondingly, sodium levels are high in most soils, as evidenced by their dispersive natures. In sandy soils this does not adversely affect soil structure, however, amounts in subsoils may reach levels of toxicity which impede root growth. Calcrete layers occur under many soils, and some soils contain abundant hard carbonate rubble – these conditions restrict profile water holding capacity and hence productive potential.

Soil Landscape Unit summary: Chenoweth Land System (CHE)

SLU	% of area	Main features #
QEP QEPs	1.6 0.7	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous sandy loam on calcrete* **B2** grading to *shallow highly calcareous loamy sand on calcrete* **B1**. And possibly with some *highly calcareous loamy sand* **A1** grading to *calcareous sandy loam* **A4**. **QEP** – marginally saline low lying stony plain (slopes <1%, 4s). **QEPs** – marginally saline low lying stony plain, with some highly saline patches (slopes 0-1%, 4s^{x}).
YAA1	0.3	Land dominated by carbonate-rich sandy soil. Main soils: *highly calcareous loamy sand* **A1** grading to *carbonate sand* **H1** on sandy rises. **YAA1** – non arable high to moderate height transverse dunes (slopes 0-10%, 7a).
YER YEU	26.7 65.9	Land dominated by carbonate-rich sandy soil. Main soils: *highly calcareous loamy sand* **A1** grading to *carbonate sand* **H1** on sandy rises. With some *shallow highly calcareous loamy sand on calcrete* **B1**. **YER** – gently undulating plains and a few low rises, with approximately 30% sandy rises (slopes 0-1.5%, 3s^{o}). **YEU** – gently undulating mostly low lying plains with approximately 2-5% sandy rises, and a few lows showing expression of saline seepage (slopes 0-1%, 3-4s^{o}).
ZA- ZB-	0.8 4.0	Saline depressions. Main soils: saline variants of various soils mostly underlain by calcrete: *highly calcareous loamy sand* **A1** grading to *shallow highly calcareous loamy sand on calcrete* **B1**. With *carbonate sand* **H1** on sandy rises. **ZA-** – shallow depression with some marginally saline land (5-4s). **ZB-** – saline depression (5s). Some carbonate sand deposits occur in a few units as jumbled sandy rises.

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 soils:

A1 *Highly calcareous loamy sand* [Supravescent-Shelly Calcarosol]
Moderate depth to deep grey loamy sand to light sandy loam. The soil is usually a mixture of carbonate and quartz particles but can be dominantly composed of carbonate particles. Profiles often contain abundant hard carbonate rubble in subsoil layers, and are often underlain by calcrete at moderate depth. Topsoil layers are usually strongly water repellent. Subsoil layers may be as heavily textured as clay loam in depression areas.

Minor soils:

B1 *Shallow highly calcareous loamy sand on calcrete* [Supravescent Petrocalcic Calcarosol]
Shallow grey loamy sand to light sandy loam on calcrete. The soil is usually a mixture of carbonate and quartz particles. Profiles are usually strongly water repellent.

H1 *Carbonate sand* [Shelly Calcarosol]
Deep and loose grey carbonate sand. The soil is dominantly composed of carbonate particles. Topsoil layers are strongly water repellent. Found on sandy rises.

B2 *Shallow calcareous sandy loam on calcrete* [Petrocalcic Calcarosol]
Grey brown calcareous loamy soil with calcrete at shallow depth. The surface layer is dominated by quartz particles. Textures are usually sandy loam or loam, however, clay loams may also occur. Profiles often contain abundant hard carbonate rubble. These occur in areas not overlain by carbonate-rich sandy sediments. Usually found in marginally saline low lying areas.

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

Further information: DEWNR Soil and Land Program