KOW Koolywurtie Land System

Slightly elevated plains with drainage areas

Area: 110.5 km^2

Landscape: Slightly elevated plains with drainage areas. There are also a few rises, a creek line in the north, and two small areas in the south of the system with carbonate-rich sandy rises. To the west are lower lying stony plains. Adjacent to the upper east side of the system is the Mount Rat highland area from which water moves into the system. Rises and slopes line the lower east side of the system, and lie adjacent to a lower lying broad stony valley. To the north is higher elevation land from which water moves into and through the system. There is a creek line in the very northwest, and the valley of Urania Gap in the very northeast, which in former geological times, before it was elevated by block faulting, drained the Yorke Valley, and allowed water to flow into Spencer Gulf. To the south is land blanketed by carbonate-rich sandy sediments. Surface flows do not occur regularly; most excess water moves underground. Saline discharge areas are evident in this system. The system is mostly underlain at depth by Permian age sediments associated with glacial activity, while the rises along the lower east side of the system are underlain by Proterozoic age sandstone (Crawford, A.R., 1965). The bedrock has been overlain by a thick blanket of calcareous loess (Woorinen Formation). Calcrete layers have formed within this. Soils are mostly underlain by unconsolidated highly calcareous loamy to clay loamy sediments, or calcrete. Clayey sediments (Hindmarsh Clay equivalent) presumably lie between the bedrock and the calcareous-rich surface sediments: soils are formed in these clays in a few low lying areas. Carbonate-rich sands have been deposited in very recent geological times as small patches of low sandy rises in the south of the system.

Annual rainfall: 380 – 430 mm average

Main soils:
A4-**A5** *calcareous loam*
B2 *shallow calcareous loam on calcrete*

Main features: Land in this system is mostly arable, however, a minor areas of non arable stony land occur. Some wet marginally saline patches are evident, which are semi-arable. Many soils are underlain by calcrete at shallow depth and/or contain hard carbonate rubble – these limit profile waterholding capacity and hence productive potential. Surface stones also interfere with many farming practices.

Loam is the most common surface texture. There are some sandy loam surfaces, and a few sandy and clay loam surfaces. The most common soils are calcareous loams, many with calcrete at shallow depth. Surface soils are sometimes hardsetting, while the usual loamy to clay loamy subsoils are sometimes dispersive. However, generally adverse soil physical condition is not an issue.

Saline seepage affects some areas. Wet marginally saline patches occur in some drainage areas, saline groundwater nears the land surface. However, the only indication of salinity in most soils is the presence of raised subsoil salinity levels.

All soils described during field work in tis 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 true for soils with highly calcareous surfaces.

There is little land in this system with appreciable slopes, however, water can move into the system from adjacent areas, and potentially cause erosion such as rilling, and sheet erosion in drainage areas.

Soil Landscape Unit summary: Koolywurtie Land System (KOW)

SLU	% of area	Main features #
QBP	6.2	Land dominated by shallow calcareous soil on calcrete and soils formed in rubbly calcareous loess. Main soils: *shallow calcareous loam on calcrete* **B2**, extensive areas of rubbly *calcareous loam* **A4**. **QBP** – plain/drainage area: showing signs of surface expression of saline seepage across the unit (slopes 0-1%, 3-4s^{+}).
QKK QKb QKj	6.1 1.4 0.4	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2** grading to *calcareous loam* **A4**. **QKK** – slightly elevated plains with a few drainage ways, and showing minor surface expression of saline seepage in the southeast of the unit (slopes 0-1%, 3-2s^{o}). **QKb** – a drainage area consisting of a low lying plain with some drainage lines (slopes 0-1.5%). **QKj** – eroded creek line/gully, showing some surface expression of saline seepage (slopes 1-4%): in the narrow drainage flat of this unit the *calcareous loam* is underlain by clay at moderate depth, which is an **A5** soil grading to a **A6** soil.
QLOg	2.2	Land dominated by soils formed in calcareous loess. Main soils: *shallow calcareous loam on calcrete* **B2** grading to *shallow loam over clay on calcrete* **B6** and *shallow loam on calcrete* **B3**. With some *calcareous loam* **A5**-**A4**, and some *gradational calcareous clay loam* **A6** in drainage lows. **QLOg** – low lying drainage area with a few drainage ways (slopes 0-1%).
QMB QMK QMKg QMZ	0.5 3.4 2.0 3.1	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2**, with some rubbly *calcareous loam* **A4**. **QMB** – stony slope (slopes 1-5%). **QMK** – plain, showing minor surface expression of saline seepage (slopes 0-1%). **QMKg** – level plains, adjacent to sloping land, and with a few drainage lines (slopes 0-1%). **QMZ** – rise (slopes 0-1%).
QRA QRB QRBg	0.7 0.05 0.9	Land dominated by shallow calcareous soil on calcrete. Main soils: *shallow calcareous loam on calcrete* **B2** grading to some *shallow loam on calcrete* **B3**. **QRA** – stony plain (slopes <1%). **QRB** – low rise (slopes 0-1.5%): situated in Urania Gap. **QRBg** – slopes with a drainage way (slopes 1-3.5%).
SaA SaKg	15.0 7.6	Land dominated by soils formed in rubbly calcareous loess. Main soils: rubbly *calcareous loam* **A4**. **SaA** – somewhat elevated plains (slopes 0-1.5%). **SaKg** – slightly elevated plains with some drainage areas with drainage ways, and a few very low ridge lines (remnant dunes) with light sandy loam textured soils (slopes 0-1.5%).
ShA ShAr ShB Shb ShK ShKg	32.9 1.3 0.6 1.0 2.3 3.2	Land dominated by soils formed in rubbly calcareous loess. Main soils: rubbly *calcareous loam* **A4**, with some *shallow calcareous loam on calcrete* **B2**. **ShA** – slightly elevated plains (slopes 0-1%). **ShAr** – low rise (slopes 0-1%). **ShB** – slopes (slopes 1-2%). **Shb** – a drainage area consisting of a low lying plain with a drainage ways, and a small eroded drainage line in the west of the unit (slopes 0-1.5%). **ShK** – slightly low lying plain with a few very low ridge lines (remnant dunes) (slopes 0-1%). **ShKg** – a drainage areas consisting of low lying plains with a few drainage ways, and showing minor surface expression of saline seepage (slopes 0-1%).
SMOg	1.5	Land dominated by soils formed in calcareous loess. Main soils: *calcareous loam* **A4**-**A5**. Probably with minor *shallow calcareous loam on calcrete* **B2**,

		and minor *gradational calcareous clay loam* **A6** in lower lying areas. **SMOg** – drainage area consisting of lower slopes, drainage lows, and a section of drainage line (slopes 0-2.5%): Urania Gap.
SVKg	7.5	Land dominated by soils formed in calcareous loess. Main soils: *calcareous loam* **A4**, with some *shallow calcareous loam on calcrete* **B2**. **SVKg** – plains with drainage areas, a few drainage lines, and showing minor surface expression in the centre of the unit (slopes 0-1.5%, 3-2s°).
YAF YAI	0.1 0.1	Land with soils dominated by carbonate particles. Main soils: *highly calcareous loamy sand* **A1** grading to *carbonate sand* **H1** on the crests of low sandy rises. **YAF** – plains area with 60-90% very low sandy rises. **YAI** – low rise with 30-60% low 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:

A5-**A5** C*alcareous loam* [Regolithic Lithocalcic-Hypercalcic Calcarosol]
Grey brown medium thickness calcareous loamy topsoil grading to clay loamy, light clayey, or loamy subsoil with abundant fine carbonate. Profiles very often contain abundant hard carbonate rubble, and are occasionally underlain by clayey sediments (soil **A5**). Surfaces are sometimes hardsetting. Subsoils are sometimes dispersive, and sometimes strongly alkaline.

B2 *Shallow calcareous loam on calcrete* [Petrocalcic Calcarosol]
Grey brown calcareous loam, with calcrete at shallow depth. Surfaces are often hardsetting. Subsoils may sometimes be as heavily textured as clay loam. Profiles often contain abundant hard carbonate rubble. These possibly grade to a few *shallow loams on calcrete* **B3**, with non to slightly calcareous surfaces, in a few units in the southeast of the system.

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

Further information: DEWNR Soil and Land Program