

YOV Yorke Valley Land System

This broad valley area includes the basins of the Yorke Valley and North Maitland Flat. The land system consists of broad depression areas, adjacent lower slopes, slightly elevated plains, and a few low rises.

Area: 81.7 km²

Landscape: This broad valley area includes the basins of the Yorke Valley and North Maitland Flat (named by Crawford, A.R., 1965). The system consists of broad depression areas, adjacent lower slopes, slightly elevated plains, and a few low rises. Faulting to the west and east has produced this tectonic valley.

The land system is dominantly underlain by clayey outwash sediments: these are known from some bore hole logs to extend to depths of many tens of metres. In past ages the basins of the North Maitland Flat and the Yorke Valley may have been occupied by shallow lakes. The movement of land along faultlines blocked the drainage from these basins, causing ponding, and allowing the accumulation of clayey sediments. The area now has no outlet – consequently modern drainage is very poor. The previous outlet of the Urania Gap is now elevated above the level of the Yorke Valley.

The North Maitland Flat connects to the head of the Winulta Creek valley: this area seems to act as a vague watershed. The North Maitland Flat is at a higher elevation than the Yorke Valley basin: faulting has resulted in a short drainage slope separating the two areas just northeast of Maitland. The southern Yorke Valley area connects to a broad basin which extends to Minlaton, and then beyond to the salt lake country of southern Yorke Peninsula.

Soils are dominantly formed in clayey sediments. Gilgai microrelief (flats, mounds and crabholes) occurs in numerous areas, but is most prominent on the North Maitland Flat.

Accessions of wind-deposited carbonate dust have infused into profiles. Numerous profiles are calcareous throughout; and many include hard carbonate fragments. Calcrete occurs under some profiles, sometimes forming remnant stony rises. Wind-deposited calcareous loess (Woorinen Formation) overlies older sediments in a few places.

Annual rainfall: 405 - 475 mm average

Main soils:

- C4-D3** *clay loam to loam over clay*
- A6** *gradational calcareous clay loam*
- E3** *brown cracking clay*

Minor soils:

- B6** *shallow clay loam to loam over clay on calcrete*
- B2** *shallow calcareous loam on calcrete*
- A5-A4** *calcareous loam*

Main features: The land system is mostly arable. The most common soils are clay loams to clays overlying clayey subsoil. Cracking clays occur, and many other soils have reactive or vertic clayey subsoils which swell when wet and shrink when dry. The resultant gilgai microrelief can result in management problems due to uneven land surfaces and crabholes becoming flooded or severely waterlogged. Many soils are calcareous throughout. Many soils contain some hard carbonate fragments, and some contain small amounts of fine quartz fragments. Most subsoils, and some surface soils, are dispersive, resulting in restricted internal drainage and the potential for waterlogged conditions. The low lying nature of most of the land in



this land system exacerbates this. Flooding can occur in drainage ways and other low lying areas. Saline seepage affects soils, especially in low lying areas – mostly with resultant raised subsoil salinity. A few patches of marginal to highly saline land occur – mostly on the southern North Maitland Flat and the closed depression of the southern Yorke Valley around Hall Corner. Areas with gilgai microrelief pose special challenges, with conditions and land surface changing significantly over short distances, for example, crabholes can remain waterlogged or flooded throughout most of the growing season, and can have higher salinity levels than surrounding land.

Water erosion is a potential problem on lower slopes, land adjacent to slopes which can be affected by overland flow, and along drainage ways where overland flow of water can concentrate.

Toxic accumulations of boron in subsoils were found to be problem in salinised areas with poor drainage, whereas toxic accumulations of sodium in the subsoil were found to be more widespread.

Where they occur, 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 those soils with highly calcareous surfaces.

Soil Landscape Unit summary: Yorke Valley Land System (YOV)

SLU	% of area	Main features
KaE KaO	9.8 2.9	Land dominated by soils formed in clayey sediments. Main soils: <i>clay loam to loam over clay C4-D3</i> grading to <i>gradational calcareous clay loam A6</i> . In the southern part of the 'KaE' unit, some soils are rubbly, and some <i>shallow clay loam over red clay on calcrete B6</i> probably occurs. KaE – broad drainage depression (slopes <1%). KaO – depression area with drainage ways (slopes 0-1%).
KbB KbK KbO KbOw	0.3 3.1 7.2 6.0	Land dominated by calcareous soils formed in clayey outwash sediments. Vague or minor gilgai microrelief is often evident. Main soils: <i>gradational calcareous clay loam A6</i> grading to <i>clay loam to loam over clay D3-C4</i> : vertic (reactive) subsoils are common. KbB – sloping drainage area with a drainage line (slopes 0.5-2%). Clayey surfaces are likely to occur along areas of preferred drainage, probably as a result of previous surface soil erosion via overlaid flow of water. KbK – slightly elevated plains (slopes <1%). KbO – broad plain/depression area (slopes <1%). There are some vague drainage ways and a drainage line where water runs onto the unit from adjacent higher drainage depressions. There are a few small areas with crabholes: crabholes are prone to flooding. KbOw – depressions (slopes <1%). Most with vertic (reactive) subsoils. Parts of these areas are at risk of temporary flooding in wet seasons. The southern-most unit at the southern end of the North Maitland Flat has soils with clayey surfaces along areas of preferred drainage, probably as a result of previous surface soil erosion via overlaid flow of water.
KBO	10.3	Land dominated by soils formed in clayey outwash sediments. Main soils: <i>gradational calcareous clay loam A6</i> with vertic (reactive) subsoils. With common to extensive areas of <i>clay loam to loam over clay C4-D3</i> with vertic (reactive) subsoil. And with minor to limited <i>brown cracking clay E3</i> . KBO – broad drainage area with a number of drainage ways and some patches of gilgai microrelief (slopes 0-1%). Flooding is a risk in parts.



KHB KHBc KHO	3.9 0.2 2.5	Land dominated by soils formed in clayey outwash sediments. Main soils: <i>gradational calcareous clay loam A6</i> , grading of <i>clay loam to loam over clay D3-C4</i> over extensive areas. KHB – lower slopes/footslopes (slopes 1-3%). KHBc – lower slopes/footslopes with contour banks (slopes 1-3%). KHO – gently undulating depression area with some drainage lows (slopes 0-1%). With minor areas of <i>shallow calcareous loam on calcrete B2</i> , and probably <i>calcareous loam A5</i> .
KKO KKT	0.6 11.0	Land dominated by calcareous soils formed in clayey outwash sediments: these areas are dominated by gilgai microrelief. Main soils: <i>gradational calcareous clay loam A6</i> with vertic (reactive) subsoils, with some <i>brown cracking clay E3</i> . With minor to limited areas of <i>clay loam over clay D3-C4</i> with vertic (reactive) subsoil. KKO – drainage depression dominated by gilgai microrelief (slopes 0-1%). KKT – broad drainage depression dominated by gilgai microrelief, and mostly with marginal salinity (slopes <1%). There are drainage ways within this unit which are at greater risk of flooding and have higher salinity levels than adjacent land. Some gilgai depressions are non arable due to high salinity levels and the frequency of flooding.
KRO KRT	9.2 15.3	Land dominated by cracking clays formed in clayey outwash sediments. Main soils: <i>brown cracking clay E3</i> grading to <i>gradational calcareous clay loam A6</i> with vertic (reactive) subsoil. Minor <i>clay loam over clay C4-D3</i> with vertic (reactive) subsoil may occur. KRO - broad low lying depression area with some patches of gilgai microrelief (slopes <1%). KRT – broad very low lying closed depression area with some patches of gilgai microrelief and areas of marginal salinity (slopes <1%).
KVb	0.9	Land dominated by calcareous soils formed in clayey outwash sediments. Main soils: <i>gradational calcareous clay loam A6</i> . With some <i>shallow calcareous loam on calcrete B2</i> , and probably some <i>calcareous loam A5-A4</i> . Minor areas of <i>clay loam to loam over red clay C4-D3</i> may occur. KVb – lower slope/footslopes with some rilling and probably some surface patches of saline seepage (slopes 1-3%). There are some patches with vague gilgai microrelief.
QHA QHB	0.5 0.3	Land dominated by shallow calcareous soil on calcrete. Main soils: <i>shallow calcareous loam on calcrete B2</i> . Possibly with minor areas of rubbly <i>gradational calcareous clay loam A6</i> , <i>shallow loam on calcrete B3</i> or <i>shallow loam over red clay on calcrete B6</i> . QHA – slightly elevated plain/low rise (slopes 0-1%). QHB – low rise (slopes 0.5-3%).
RHA RHK RHL	3.8 0.8 0.8	Land dominated by shallow calcareous texture contrast soil on calcrete. Main soils: <i>shallow loam over red clay on calcrete B6</i> grading to mostly rubbly, <i>loam to clay loam over clay D3-C4</i> and some <i>gradational calcareous clay loam A6</i> , and probably with some <i>shallow calcareous loam on calcrete B2</i> . With minor to limited areas of rubbly <i>calcareous loam A5</i> . RHA – slightly elevated plains and low rises (slopes 0-1%). RHK – low lying plains/very lower slopes (slopes 0-1%). RHL – lower slopes/footslopes (slopes 1-3%).
TCA	1.6	Land dominated by soils formed in clayey sediments with clay loamy to clayey surfaces. Main soils: <i>clay loam to loam over red clay C4-D3</i> grading to <i>gradational calcareous clay loam A6</i> , probably with numerous soils with hard carbonate rubble. With minor to limited areas of <i>shallow clay loam over red clay on calcrete B6</i> . TCA – slightly elevated plains (slopes <1%).
TPA	9.1	Land dominated by soils formed in clayey sediments with clay loamy to clayey surfaces. Main soils: <i>clay loam over red clay C4-D3</i> grading to <i>gradational calcareous clay loam A6</i> . TPA – slightly elevated plains and low rises (slopes 0-1%).



Detailed soil profile descriptions:**Main soils:**

- C4-D3** *clay loam to loam over clay* [Sodic-Effervescent Hypercalcic-Lithocalcic Red-Brown Dermosol-Sodosol]
Red brown to brown thin to medium thickness clay loamy, clayey or loamy topsoil overlying red to brown clayey subsoil grading to clay with abundant fine carbonate. This is typically underlain by clayey sediments. Profiles can include hard carbonate fragments, and small amounts of fine quartz fragments. Topsoils can be slightly calcareous when the profile is gradational (grading to soil **A6** and **E3**), and slightly to highly calcareous when the profile is texture contrast. Subsurface layers are often non calcareous to slightly calcareous with more highly calcareous layers above and below (possibly an indication of subsurface lateral water flow). Subsoils are typically dispersive, and topsoils are occasionally dispersive. Subsoils are often vertic (reactive).
- A6** *gradational calcareous clay loam* [Pedal Hypercalcic-Lithocalcic Calcarosol]
Calcareous grey brown to brown medium thickness to thin clay loamy, clayey or loamy topsoil overlying brown to yellow brown clayey subsoil with abundant fine carbonate. Fine carbonate content increases with depth. This is typically underlain by clayey sediments. Profiles can include hard carbonate fragments. Subsoils are usually dispersive, and surface soils are sometimes dispersive.
- E3** *brown cracking clay* [Brown Vertosol]
Cracking and mostly calcareous brown clayey surface soil grading to yellow brown to red brown to grey clayey subsoils with abundant fine carbonate which shrink on drying and swell on wetting. Often found in areas of gilgai microrelief (mounds, flats, and crabholes) which have formed in clayey outwash, typically along broad drainage ways. These typically grade to **A6** soils.

Minor soils:

- B6** *shallow clay loam to loam over clay on calcrete* [Sodic-Effervescent Petrocalcic Red-Brown Sodosol-Dermosol]
Brown to red medium thickness to thin clay loamy, clayey or loamy topsoil overlying red or brown clayey subsoil. Underlying this is a calcrete layer which can be relatively thin (eg 10-20cm). Subsoils are typically dispersive, and surfaces can be dispersive. Found on slightly elevated land and slopes.
- B2** *shallow calcareous loam on calcrete* [Petrocalcic Calcarosol]
Grey brown to red brown calcareous loams or clay loams overlying calcrete at shallow depth. Profiles can contain abundant hard carbonate rubble.
- A5-A4** *calcareous loam* [Regolithic Hypercalcic-Lithocalcic Calcarosol]
Grey brown medium thickness calcareous clay loamy to loamy topsoil grading to clay loamy or light clayey subsoil with abundant fine carbonate. Lower subsoils are dispersive and strongly alkaline. Profiles typically contain some hard carbonate rubble, and are usually underlain by clayey sediments (soil **A5**). Especially found on slightly elevated land.

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

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

