

WIC Winulta Creek Land System

Slopes and rises, and drainage depressions. The main part of the system consists of the upper Winulta Creek valley and adjacent hills and rises. There are two main drainage depressions: the upper part of the Winulta Creek, and a smaller drainage depression in the northeast of the system. Most slopes lie adjacent to Winulta Creek or the drainage depression to the north. This system forms a north-easterly part of the Yorke Peninsula central highlands zone.

Area: 31.9 km²

Landscape: Slopes and rises, and drainage depressions. There are two main drainage depressions: the upper part of the Winulta Creek, and a smaller drainage depression in the northeast of the land system. Most slopes lie adjacent to Winulta Creek or the drainage depression to the north. Drainage from the Winulta Creek and the more northerly drainage depression is to the east, with Winulta Creek eventually draining into the coastal strip north of Ardrossan. In the southeast of the system the Winulta Creek depression joins the depression area of the 'North Maitland Flat' (the northerly extension of the Yorke Valley). The adjacent slopes and rises have numerous drainage lines, drainage ways, and minor creek gullies.

The land system is underlain by Proterozoic age rocks with mixed grain size. This includes older pre-Adelaidean metamorphosed rock (eg pegmatite), and younger Adelaide System 'shield Proterozoic' (eg conglomerate) (Crawford, A.R., 1965). Saprolitic materials are found at the base of many profiles. Texture contrast soil profiles have formed in these sediments. Weathered rock and rock fragments are found in and on many soils. Accessions of wind-deposited carbonate dust have infused into profiles. Hard carbonate rubble and/or calcrete are found in many soils. Wind-deposited calcareous loess (Woorinen Formation) overlies older sediments in places.

Annual rainfall: 385 - 435 mm average

Main soils:

D3-D7-D2-C3	<i>loam to clay loam over red clay</i>
A4-A2	<i>calcareous loam</i>
B6	<i>shallow loam over red clay on calcrete</i>

Main features: The land system is mostly arable, however, a few slopes are too steep, and a few parts of Winulta Creek are too saline to be cropped. The most common soils are loams overlying clayey subsoil. Many soils contain hard carbonate rubble and/or calcrete, and some rock fragments. Such soils have reduced effective water holding capacities, and hence reduced production potentials. Also, surface stones can interfere with some farming operations.

Flooding can occur in parts of drainage depressions where water flow can concentrate. Saline seepage affects soils in low lying areas, and a few patches are highly saline.

Soils on sloping land, adjacent lower lying areas, and in drainage depressions have potential for water erosion. This is particularly the case in sloping drainage lines and drainage ways where overland water-flow can concentrate. Texture contrast profiles are particularly prone to water erosion. It is likely that there has been some topsoil erosion since clearing and settlement.

Toxic accumulations of boron and sodium were not found to be a significant issue. However, many subsoils and/or substrates have raised salinity levels, which in some cases is probably due to an accumulation of cyclic salt in or below the profile.

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 the case for the calcareous loams.



Soil Landscape Unit summary: Winulta Creek Land System (WIC)

SLU	% of area	Main features
HME HMK	1.5 1.2	Land dominated by soils formed in clayey sediments. Main soils: <i>loam to clay loam over red clay</i> D2-C3 . With limited to common areas of <i>calcareous loam</i> A4-A2 . HME – drainage depression with a drainage line in parts (slopes <1%). HMK – relatively low lying plain with drainage lows (slopes 0-1.5%).
HSB HSBg HSBj HSC HSCg HSI	8.7 7.1 0.6 11.5 25.1 3.1	Land dominated by soils formed in saprolitic sediments. Main soils: <i>loam to clay loam over red clay</i> D3-D7-D2-C3 . With limited to extensive areas of <i>calcareous loam</i> A4-A2 grading to <i>shallow loam over red clay on calcrete</i> B6 : some <i>shallow calcareous loam on calcrete</i> B2 may occur. HSB – upper slopes and crests with some drainage lows (slopes 0-2.5%). HSBg – rises and slopes with drainage ways (slopes 0.5-2.5%). HSBj – lower slopes (0.5-2.5%). HSC – slopes with drainage lines and drainage ways (slopes 1-6%). HSCg – slopes with drainage ways and drainage lines and minor creek gullies (slopes 1-10%). HSI – semi arable slopes with drainage lines and minor creek gullies (slopes 5-30%).
HUB HUBg HUCc HUCg	14.2 4.2 1.7 4.8	Land dominated by soils formed in saprolitic sediments. Main soils: <i>loam to clay loam over red clay</i> D3-D7-D2-C3 . With limited to common areas of <i>calcareous loam</i> A4-A2 . HUB – rises and upper slopes with drainage ways (slopes 0.5-2.5%). HUBg – upper slopes with drainage ways/depressions and a crest area (slopes 0.5-3%). HUCc – upper slopes with contour banks (slopes 3-8%). HUCg – slopes with drainage lines and minor creek gullies (slopes 1-6%).
KaE KaOg KaT	3.6 10.3 1.4	Drainage depressions dominated by soils formed in clayey sediments. Main soils: <i>loam to clay loam over red clay</i> D2-C3 . With limited to common areas of <i>calcareous loam</i> A4-A2 . KaE – drainage depression area with a narrow line (slopes <1%). KaOg – drainage depressions, the main parts with a central drainage line: the main parts of the upper Winulta Creek (slopes 0-2%). KaT – marginally saline to highly saline depression: a section of the Winulta Creek (slopes <1%).
ZA-	0.8	Saline depression dominated by soils formed in clayey sediments. Main soils: <i>loam to clay loam over red clay</i> D2-C3 . With limited to common areas of <i>calcareous loam</i> A4-A2 . ZA- – saline depression: a section of the Winulta Creek.



Detailed soil profile descriptions:**Main soils:****D3-D7-D2-C3** *loam to clay loam over red clay*

[Sodic-Effervescent-Haplic Hypercalcic-Supracalcic-Lithocalcic Red Chromosol-Dermosol]
Red brown to brown thin to medium thickness loamy to clay loamy topsoil overlying red to red brown clayey subsoil, grading to clayey to loamy saprolitic sediments or weathered rock with abundant fine carbonate. Profiles often including some hard carbonate rubble. Topsoils can be calcareous. Weathered rock and rock fragments may occur in the profile or on the soil surface, and small quartz fragments commonly occur. Variants with clay loamy topsoils are usually found in drainage areas.

A4-A2 *calcareous loam*

[Regolithic-Paralithic Hypercalcic-Lithocalcic Calcarosol]
Grey brown to brown medium thickness calcareous loamy to clay loamy topsoil grading to loamy to light clayey subsoil with abundant fine carbonate. Profiles, especially shallower variants, can contain abundant carbonate rubble. Profiles are underlain by substrates of highly calcareous saprolitic sediments or weathered rock with abundant fine carbonate, or calcareous loess.

B6 *shallow loam over red clay on calcrete*

[Sodic-Effervescent-Haplic Petrocalcic Red Chromosol]
Red brown to brown thin to medium thickness loamy topsoil overlying red to red brown clayey subsoil. Subsoil layers typically contain abundant hard carbonate rubble. Underlying this is a calcrete layer, which overlies saprolitic sediments or weathered rock with abundant fine carbonate. Topsoils are often calcareous. Weathered rock and rock fragments may occur in the profile or on the soil surface.

References:

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

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

