

WLW Willowie Land System

Area:	264 km ²
Landscape:	Flat plains of the headwaters of Willochra Creek extending from east of Melrose to Terka and Willowie
Annual rainfall:	300 - 375 mm average
Geology:	Fine to medium grained alluvial sediments
Topography:	Level alluvial plains of Rotten and Booleroo Creeks. Slopes are less than 1%. Booleroo Creek is contained in a well defined single channel, with very low levees of recent alluvial deposits. By contrast, the Rotten Creek plain has several channels and evidence of numerous abandoned channels meandering across the surface.
Elevation:	290 - 360 m at the highest point of the plain south east of Booleroo Whim
Relief:	The only relief is that of watercourse channels which are up to 8 m deep in the upper reaches of Booleroo Creek
Soils:	<p>The soils are deep and loamy, with clayey subsoils. Structure, colour and distinctness of subsoils varies. Typical soils are:</p> <p>D2 Loam over well structured red clay D3 Loam over dispersive red clay F2 Loam over dispersive brown clay C3 Gradational loam</p> <p>Hard loam over dispersive clay (Sodosol). These soils have hard setting sandy loam to clay loam surfaces sharply overlying poorly structured dispersive red to brown clay subsoils with minor soft carbonate at depth.</p> <p>Hard loam over well structured clay (Chromosol). These soils have hard setting sandy loam to clay loam surfaces abruptly overlying well structured red clay subsoils with soft carbonate at depth.</p> <p>Friable clay loam grading to well structured clay (Dermosol). These soils have friable clay loamy to loamy surface soils grading to well structured red clayey subsoils with soft carbonate at depth.</p> <p>Calcareous loam grading to highly calcareous clay loam to clay with much soft or rubbly carbonate (calcic-hypercalcic Calcarosols). These soils occur on low rises on the plain and on lower pediment remnants or outliers of the adjacent Bruce Land System.</p>
Main soils:	<p>D2 (26%) Loam over red clay (Calcic-Hypercalcic Red Chromosol-Sodosol) C1 (14%) Gradational sandy loam (Calcic-Hypercalcic Kandosol-Calcarosol) C3 (13%) Friable gradational clay loam (Calcic-Hypercalcic Red Dermosol-Calcarosol) D4 (12%) Loam over pedaric red clay (Pedaric Red Sodosol-Dermosol) A5 (10%) Rubbly calcareous loam on clay (Supracalcic-Lithocalcic Calcarosol on clay)</p>



- Minor soils:**
- D3** (6%) Loam over poorly structured red clay (Calcic-Hypercalcic Red Sodosol-Chromosol)
 - A4** (5%) Deep (rubbly) calcareous loam (Hypercalcic-Lithocalcic Calcarosol)
 - A2** (4%) Calcareous loam on rock (Paralithic Calcarosol)
 - F2** (4%) Sandy loam over poorly structured brown or dark clay (Brown-Dark Sodosol-Chromosol)

Summary: The Willowie Land System is flat land with deep, inherently fertile soils. The main soil limitation to productivity is poor structure. Most soils have hard setting surfaces, which restrict infiltration, are difficult to work at times, and may cause patchy emergence and early growth. However, the main factor affecting productivity is low rainfall. Significant areas of marginally saline soils are mostly too salty for cropping.

Soil Landscape Unit summary: Willowie Land System (WLW)

SLU	% of area	Component	Main soils	Prop#	Notes
JDA	11.9	Plains	D2D4A4	D	JDA Plains with texture contrast clay loam over, often crumbly, red clay; or deep rubbly calcareous loam. Slopes are 0-2%, relief is less than 9m. JDE Creek flats as for JDA
JDE	2.2	Creek flat	D2D4A4	D	Main soils: <u>Loam over red clay - D2</u> , <u>Loam over pedaric red clay - D4</u> and <u>Deep (rubbly) calcareous loam - A4</u> .
JEA	12.4	Alluvial flats	D2	D	Flats and watercourses formed on fine-grained alluvium. JEA Alluvial flats with slopes of less than 1%. JEE Creek flats with soils as above JEJ Creek flats and drainage depressions with eroded watercourses, Main soils: <u>loam over well structured red clay - D2</u> (E) with <u>loam over dispersive red clay - D3</u> (C) and <u>gradational loam - C3</u> (C). This land is arable although productivity is limited by poor soil structure. Hard setting surface soils and dispersive subsoils restrict infiltration, make effective working difficult and cause patchy emergence. The plains have historically received large volumes of uncontrolled runoff from the surrounding rises, causing severe erosion especially in watercourses. Salinity is a sporadic problem.
JEE	0.9	Creek flat	D2D3C3	D	
JEJ	2.4	Creek flats	D2D3C3	D	
JFA	9.2	Plains	D2D4C1	D	
JFY	0.3	Creek flat	D2D4C1	D	Plains with mostly red texture contrast soils with clay loam surfaces, calcareous soils occupy more than 20% and other gradational soils occupy more than 10%. JFA Plains with texture contrast or gradational, loam over, often crumbly, red clay. Slopes are less than 1%, relief is less than 9m. JFY Creek flats with soils as above, moderately (up to 50%) scalded. Main soils: <u>Loam over red clay - D2</u> , <u>Loam over pedaric red clay - D4</u> and <u>Gradational sandy loam - C1</u> .



JNA	1.2	Plains	D4D2A5	D	<p>Pediments with non-stony pedaric, texture contrast soils with calcareous subsoils. Surface textures are clay loamy most commonly.</p> <p>JNA Plains.</p> <p>Slopes are less than 1%, relief is less than 9m.</p> <p>JNE Drainage line with stable banks.</p> <p>JNk Plain; 10-20% affected by gullyng and 40-50% scalded. Scalding may be more than 50% locally.</p> <p>JNo Creek flat 10-20% affected by gullyng and 40-50% scalded. Scalding may be more than 50% locally.</p> <p>JNU Level plain; 5-10% scalded.</p> <p>Slopes are less than 1%, relief is less than 9m.</p> <p>JNY Drainage line with eroded banks, stable now.</p> <p>Main soils: <u>Loam over red clay</u> - D2, <u>Loam over pedaric red clay</u> - D4 and <u>Rubbly calcareous loam on clay</u> - A5. Red clay soils occur in minor association.</p>
JNE	0.8	Creek flats	D4D2A5	D	
JNo	0.1	Creek flats	D4D2A5	D	
JNU	12.1	Plains	D4D2A5	D	
JNY	1.0	Drainage line	D4D2A5	D	
JQP	9.3	Alluvial flats	F2D3D2	D	<p>Alluvial flats with slopes of less than 0.5% formed on clayey alluvium.</p> <p>Main soils: <u>loam over dispersive brown clay</u> - F2 (V) with <u>loam over dispersive red clay</u> - D3 and <u>loam over well structured red clay</u> - D2 (E).</p> <p>These flats are widely affected by salinity with significant areas too salty for cropping. Elsewhere, soil structure is the main limitation, causing poor infiltration, limited opportunities for effective working, and patchy emergence. Flooding occurs in wet years.</p>
KAE	4.5	Drainage line	C1A2	D	<p>Valley flats and pediments with well-structured, often calcareous, gradational texture-increase soils formed in outwash sediments.</p> <p>KAE Drainage line with gradational sandy loam and calcareous loam on rock.</p> <p>Main soils: <u>Hard gradational clay loam</u> - C4 and <u>Calcareous loam on rock</u> - A2.</p>
KCE	2.8	Creek line	C3A3 M3	D	<p>Plains and pediments of outwash sediments with gradational soils with sandy clay loam surface textures. Soils are mostly not calcareous throughout.</p> <p>KCE Creek line with friable gradational clay loam, deep moderately calcareous loam or deep gravelly soils.</p> <p>Main soils: <u>Friable gradational sandy clay loam</u> - C3 and <u>Deep moderately calcareous sandy loam</u> - A3. Additionally, <u>Deep gravelly soil</u> - M3 is found associated with creek flats.</p>
KGA	9.1	Plains	C3C1	D	<p>Pediments and plains with sandy surface textured red gradational soils with calcareous subsoils.</p> <p>KGA Plains with friable gradational clay loam or gradational sandy loam.</p> <p>Slopes are 0-1%, relief is less than 9m.</p> <p>KGB Gently sloping pediments with soils as above.</p> <p>Slopes are 1-3%, relief is less than 9m.</p> <p>KGE Creek flats.</p> <p>KGJ Creek flats, with 10-20% gullied land</p> <p>Main soils: <u>Friable gradational sandy clay loam</u> - C3 and <u>Gradational sandy loam</u> - C1.</p>
KGB	3.6	Gently undulating pediments	C3C1	D	
KGE	4.0	Creek flat	C3C1	D	
KGJ	0.2	Creek flat	C3C1	D	
KLA	7.8	Plains	A5	D	<p>Pediments and plains with clay loamy calcareous soils.</p> <p>KLA Plains.</p> <p>Slopes are 0-1%, relief is less than 9m.</p> <p>KLB Gently undulating pediment</p>
KLB	1.8	Gently undulating pediment	A5	D	



KLE	0.1	Drainage line	A5	D	Slopes are 1-3%, relief is less than 9m. KLE Drainage line with soils as above. Main soils: <u>Rubbly calcareous clay loam on clay - A5</u> . Minor soils include: <u>Calcareous clay loam on rock - A2</u> , <u>Gradational red-brown clay loam over rock - C2</u> and <u>Shallow calcareous loam on calcrete - B2</u> .
U-D	0.2	Low dunes	H2	D	Low dunes with deep to moderate depth siliceous sand with calcareous subsoil. Main soils: Deep to moderate depth calcareous siliceous sand - H2 .
XJJ	2.1	Floodplain	M3M1	D	Flood plains with deep, mostly gravelly, loamy to sandy soil with little profile development. Main soils: <u>Deep gravelly soil - M3</u> , <u>Deep alluvial loam - M1</u> . <u>Sand over sandy clay loam - G1</u> soils occupy up to 30%.

PROPORTION codes assigned to Soil Landscape Unit (SLU) components:

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|---|--|---|-----------------------------------|
| D | Dominant in extent (>90% of SLU) | C | Common in extent (20–30% of SLU) |
| V | Very extensive in extent (60–90% of SLU) | L | Limited in extent (10–20% of SLU) |
| E | Extensive in extent (30–60% of SLU) | M | Minor in extent (<10% of SLU) |

Detailed soil profile descriptions:

- A2/L1** Shallow calcareous loam (Paralithic, Hypercalcic / Lithocalcic Calcarosol)(A2) OR Shallow stony loam (Calcareous, Paralithic, Leptic Tenosol)(L1)
- A3** Deep moderately calcareous (sandy) loam (Calcic Calcarosol)
Calcareous (sandy) loam topsoil grading into loamy-clay loamy subsoil without a significant CO₃ buildup in the subsoil (<20% CO₃ in subsoil). Pediment type Calcarosols.
- A4** Deep (rubbly) calcareous loam (Hypercalcic-Lithocalcic Calcarosol)
Calcareous sandy-clay loamy topsoil grading into loamy-clay loamy subsoil with a significant CO₃ buildup in the subsoil. Often rubbly. Soil usually >120 cm in depth
- A5** Rubbly calcareous loamy sand on clay (Supracalcic-Lithocalcic Calcarosol on clay)
Calcareous loamy sand topsoil grading into loamy-clay loamy subsoil on a clayey substrate. Usually rubbly. Clayey substrate occurs at >60 cm and <120 cm.
- C1** Gradational sandy loam (Calcic-Hypercalcic Kandosol-Calcarosol)
Friable sandy to loamy topsoil grading into massive red-brown alkaline loamy to clay loamy subsoil.
- C3** Gradational clay loam (Calcic / Hypercalcic Red Dermosol)
Medium thickness sandy clay loam with up to 20% quartzite stones grading to a friable red clay with soft Class I carbonate within 50 cm, grading to alluvium within 100 cm
- D2** Loam over well structured red clay (Calcic, Red Chromosol)
Medium thickness hard setting silt loam to clay loam, with up to 20% quartzite stones, abruptly overlying a red well structured clay grading to soft Class I carbonate.
- D3** Loam over dispersive red clay (Calcic, Red Sodosol)
Medium thickness hard setting sandy loam to clay loam, with up to 20% quartzite stones, sharply overlying a red coarsely structured dispersive clay grading to soft Class I carbonate.
- D4** Loam over red friable clay (Calcic, Pedaric, Red Sodosol)
Thin to medium thickness fine sandy loam to loam over a finely structured friable red clay, calcareous from about 50 cm, grading to fine or medium grained alluvium.



- F2** Loam over dispersive brown clay (Hypocalcic, Brown Sodosol)
Medium thickness hard setting clay loam to sandy loam with a bleached A2 horizon, sharply overlying a brown or red, often mottled, poorly structured dispersive clay, weakly calcareous with depth.
- H2** Siliceous sand (sandy Calcarosol-Tenosol)
Deep to moderate depth calcareous siliceous sand. Often with non calcareous topsoil; can be non calcareous throughout.
- G1** Sand over sandy clay loam (sandy Red-Brown Chromosol-Kandosol)
Sandy texture contrast soil with a friable red-brown sandy clay loam subsoil. Weakly leached.
- M1** Alluvial loam (Orthic Tenosol)
Very thick loam with variable gritty or more-clayey lenses, formed over recent alluvium.
- M3** Deep gravelly soil (Gravelly Kandosol-Tenosol)
Deep uniform loamy alluvial soils with at least 50% gravel in the major part of the profile.

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

