

TWS Two Sisters Land System

Area: 69 km²

Landscape: Two Sisters is the name of two steep low rocky hills in the centre of the land system. They are surrounded by low rocky calcareous rises and calcareous pediments. The northern part of the land system is occupied by a plain or low plateau with ironstone gravelly soils on deeply weathered kaolinized materials, in association with low calcareous rises.

Annual rainfall: 250 – 275 mm average, grading from higher in the south to lower in the north.

Soils: Most soils are deep loams to clay loams formed on outwash sediments. These are mainly calcareous gradational or texture contrast soils. Deep ironstone gravelly texture contrast soils occur on highly weathered rocks. Shallow stony soils over fresh weathering rocks occur on rises and hills.

Main soils:

- A5** Rubbly calcareous loam to clay loam on clay (on outwash)
- D4** Loam to clay loam over pedaric red clay (on outwash)
- A2** Shallow calcareous loam (on fresh weathering rock)
- J1** Ironstone gravelly clay loam over brown clay (on highly weathered rock)

Minor soils:

On outwash

- A3** Deep moderately calcareous sandy loam
- A4** Deep (rubbly) calcareous loam
- A6** Gradational calcareous clay loam
- C3** Friable gradational clay loam
- M1** Deep alluvial loam
- M3** Deep gravelly loam

On rock

- B2** Shallow calcareous loam to sandy loam on calcrete
- C2** Gradational loam on rock
- L1a** Shallow stony loam
- L1b** Shallow stony sandy loam
- RR** Rock outcrop

Summary: The Two Sisters Land System is named after two prominent hard-rock, steep low hills. These are surrounded by gently undulating rises with shallow calcareous soils and pediments with deeper gradational calcareous soils. The land system is divided by a flood-plain with a deeply weathered plain to the north, with ironstone gravelly texture contrast soils.



Soil Landscape Unit summary: 18 Soil Landscape Units (SLUs) mapped in the Two Sisters Land System

SLU	% of area	Component	Main soils	Prop#	Notes
AYA	0.3	Undulating rises	A2L1 RR	D	Hills and rises on fine grained rocks, especially siltstones of the Tapley Hill Formation.
AYD	1.1	Steep low hills	RRL1	D	AYA Undulating rises. Relief is less than 30m, slopes are 3-10%. AYD Steep low hills. Relief is 30-90m, slopes are 30-50%. Main soils: <u>shallow calcareous loam - A2</u> , <u>shallow stony sandy loam to loam - L1b</u> and <u>L1a</u> , with <u>rock outcrop - RR</u> and <u>shallow calcareous sandy loam on calcrete - B2</u> .
EOB	0.7	Gently undulating rises	A2A6	D	Gently undulating rises formed mainly on Hawker Group Limestones. Up to 5% of land is scalded, and 5% is gullied. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 30m. Main soils: <u>shallow calcareous loam - A2</u> and <u>gradational calcareous clay loam - A6</u> , with <u>shallow stony loam - L1a</u> .
EVB	6.9	Gently undulating rises	A2	V	Rises with 20-30% rock outcrops and shallow calcareous soils formed on fine grained calcareous rocks. EVB Gently undulating rises. Slopes are 1-3%, relief is less than 30m. EVC Undulating rises. Slopes are 3-10%, relief is less than 9-30m. EVV Gently undulating rises with 10-20% scalding. Subsoils are moderately saline. Slopes are 1-3%, relief is less than 30m. Main soils:
		Rocky outcrops	RR	C	
EVC	12.6	Undulating rises	A2	V	Rises: <u>shallow calcareous loam - A2</u> , with <u>rubbly calcareous loam on clay - A5</u> and <u>shallow calcareous loam on calcrete - B2</u> . Rocky areas: <u>rock outcrop - RR</u> and <u>shallow stony loam - L1a</u> .
		Rocky outcrops	RR	C	
EVB	3.8	Gently undulating rises	A2	V	Rises: <u>shallow calcareous loam - A2</u> , with <u>rubbly calcareous loam on clay - A5</u> and <u>shallow calcareous loam on calcrete - B2</u> . Rocky areas: <u>rock outcrop - RR</u> and <u>shallow stony loam - L1a</u> .
		Rocky outcrops	RR	C	
HEFz	10.9	Plains	J1D4 A5	D	Plains with ironstone gravelly soils underlain by deeply weathered basement. HEFz Plains with 10-50% scalded land. Soils are saline.
HEHz	1.5	Breakaway slopes	J1D4 A5	D	HEHz Breakaway slopes with up to 5% gullying and 10-50% scalding. Soils are saline.
HEU	18.1	Plains	J1D4 A5	D	HEU Plains with 10-50% scalded land. Subsoils are moderately saline. Main soils: <u>ironstone gravelly sandy clay loam over brown clay - J1</u> , <u>clay loam over pedaric red clay - D4</u> and <u>rubbly calcareous loam on clay - A5</u> .
JLu	2.1	Plains	D4	D	Plains formed on fine grained alluvium. 10-20% is gullied and scalding affects over 50%. Subsoils are moderately saline. Main soils: <u>loam over pedaric red clay - D4</u> , with <u>deep moderately calcareous sandy loam - A3</u> .
KLB	4.2	Pediments	A5	D	Gently undulating pediments with clay loamy calcareous soils. Subsoils are moderately saline. Slopes are 1-3%. Main soils: <u>rubbly calcareous loam on clay - A5</u> , with <u>shallow calcareous loam - A2</u> , <u>gradational loam on rock - C2</u> and <u>shallow calcareous loam on calcrete - B2</u> .
KOU	11.2	Plains	A6A5	D	Plains and pediments formed on clayey alluvium. KOU Plains with slopes of less than 1%. 10-50% of land is scalded. Subsoils are moderately saline. KOV Gently sloping pediments with slopes of 1-3%. 10-50% scalding and 0-5% gullying. Subsoils are moderately saline. Main soils: <u>gradational calcareous clay loam - A6</u> and <u>rubbly calcareous clay loam on clay - A5</u> , with <u>clay loam over pedaric red clay - D4</u> , and <u>deep (rubbly) calcareous loam - A4</u> .
KOV	5.6	Gently sloping pediments	A6A5	D	



KQC	2.9	Pediments	A5	V	Complex of pediments formed on clayey alluvium, and low rises formed on basement rocks.
		Low rises	A2	C	
KQV	3.4	Pediments	A5	V	<p>KQC Undulating pediments with low rises. Slopes are 3-10%, relief is less than 9m on pediments and 9-30m on rises.</p> <p>KQV Gently undulating pediments with low rises. 10-50% of pediment land is scalded, and 0-5% is gullied. Rises are generally not gullied and scalding affects less than 5% of land. Slopes are 1-3%, relief is less than 9m on pediments and 9-30m on rises.</p> <p>Main soils:</p> <p>Pediments: <u>rubbly calcareous clay loam on clay</u> - A5, with <u>clay loam over pedaric red clay</u> - D4.</p> <p>Rises: <u>shallow calcareous loam</u> - A2, with <u>shallow calcareous loam on calcrete</u> - B2 and <u>rock outcrop</u> - RR.</p>
		Low rises	A2	C	
KVq	3.0	Gently sloping pediments	A2	D	<p>Gently sloping (1-3%) pediments formed on calcareous rocks. Over 50% of land is scalded.</p> <p>Main soils: <u>shallow calcareous loam</u> - A2, with <u>calcareous loam on calcrete</u> - B2 and <u>rock outcrop</u> - RR.</p>
KbA	4.4	Plains	A6C3	D	<p>Outwash plains formed on clayey alluvium. Slopes are less than 1%.</p> <p>Main soils: <u>gradational calcareous clay loam</u> - A6 and <u>friable gradational clay loam</u> - C3, with <u>clay loam over pedaric red clay</u> - D4.</p>
XAA	7.3	Flood plains	M1M3 D4	D	<p>Floodplain on mixed alluvium.</p> <p>Main soils: <u>deep alluvial loam</u> - M1, <u>deep gravelly loam</u> - M3 and <u>loam over pedaric red clay</u> - D4.</p>

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

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

Detailed soil profile descriptions:

- A2** Shallow calcareous loam (Paralithic, Hypercalcic / Lithocalcic Calcarosol)
Calcareous stony loam grading to soft or rubbly carbonate over weathering dolomite or calc-siltstone within 50 cm.
- A3** Deep moderately calcareous sandy loam (Regolithic, Calcic Calcarosol)
Calcareous sandy loam grading to a loamy to clayey subsoil without a significant carbonate accumulation in the subsoil, grading to medium to fine grained alluvium.
- A4** Deep (rubbly) calcareous loam (Regolithic, Hypercalcic / Lithocalcic Calcarosol)
Calcareous loam grading to a very highly calcareous sandy clay loam to light clay with variable rubble, continuing below 120 cm.
- A5** Rubbly calcareous loam to clay loam on clay (Regolithic, Supracalcic / Hypercalcic Calcarosol)
Calcareous loam to clay loam grading to a very highly calcareous rubbly sandy clay loam to light clay, over a clayey substrate deeper than 60 cm, but within 120 cm.
- A6** Gradational calcareous clay loam (Pedal, Hypercalcic / Supracalcic Calcarosol)
Calcareous clay loam grading to a well structured very highly calcareous (sometimes rubbly) clay, over a red clayey substrate within 120 cm.



- B2** Shallow calcareous loam to sandy loam on calcrete (Petrocalcic, Calcic / Lithocalcic Calcarosol)
Stony calcareous sandy loam to loam, often with a very highly calcareous more clayey subsoil, over sheet calcrete within 50 cm. This grades to rubbly carbonate over weathering basement rock within 150 cm.
- C2** Gradational loam on rock (Calcic / Hypercalcic Red Dermosol)
Loam grading to a friable red clay with soft Class I carbonate within 50 cm, grading to weathering rock within 100 cm.
- C3** Friable gradational clay loam (Calcic / Hypercalcic Red Dermosol)
Clay loam grading to a friable red clay with abundant soft Class I carbonate within 50 cm, overlying alluvium within 100 cm.
- D4** Loam to clay loam over red friable clay (Calcic, Pedaric, Red Sodosol)
Thin to medium thickness loam to clay loam over a finely structured friable red clay, calcareous from about 50 cm, grading to fine or medium grained alluvium.
- J1** Ironstone gravelly sandy clay loam over brown clay (Ferric, Calcic, Brown Sodosol)
Ironstone gravelly clay loam to loam overlying a brown alkaline clayey subsoil, calcareous with depth, grading to highly weathered, kaolinized sediments or basement rocks.
- L1a** Shallow stony loam (Paralithic, Leptic Tenosol)
Shallow stony loam, often calcareous with depth, overlying weathering fine grained rock shallower than 50 cm.
- L1b** Shallow stony sandy loam (Paralithic, Leptic Tenosol)
Shallow stony sandy loam, often calcareous with depth, overlying weathering fine to medium grained sandstone or tillite shallower than 50 cm.
- M1** Deep alluvial loam (Calcareous, Regolithic, Brown-Orthic Tenosol)
Very thick brown loam to sandy loam, usually calcareous with depth, continuing below 100 cm.
- M3** Deep gravelly loam (Basic, Fluvic, Clastic Rudosol OR Basic, Regolithic, Red-Orthic Tenosol)
Thick to very thick loam to sandy loam with more than 50% quartzite stones overlying boulder beds.
- RR** Rock outcrop

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

