

CRG Cave Range Land System

Area:	72.6 km ²
Landscape:	Disjunct linear dune ranges and low ridges south east of Lucindale, including the southern parts of Cave Range, Stewarts Range and Bakers Range.
Annual rainfall:	620 – 710 mm average
Geology:	Pleistocene Bridgewater Formation calcreted calcarenite on stranded beach ridge deposits.
Main soils:	<p>H3 (27%) Bleached siliceous sand (sandy Bleached Tenosol)</p> <p>B6 (18%) Shallow loam over red-brown clay on calcrete (Petrocalcic Red Chromosol-Kandosol)</p> <p>G3 (11%) Thick sand over clay (sandy Brown-Red Chromosol-Sodosol)</p>
Minor soils:	<p>B7 (9%) Shallow sand over clay on calcrete (sandy Petrocalcic Sodosol-Chromosol)</p> <p>I1 (9%) Highly leached sand (Aeric Podosol)</p> <p>B3 (6%) Shallow sandy loam on calcrete (Petrocalcic Red Tenosol-Kandosol-Rudosol)</p> <p>B4 (5%) Shallow red loam on limestone (Petrocalcic Red-Brown Dermosol)</p> <p>RR (4%) Bare calcrete</p>
Summary:	Both shallow soils on calcarenite and deep water repellent, infertile sands are common. Deeper sand-over-clay soils present management problems where subsurface, seasonal waterlogging occurs, affecting plant root development. These soils also may have low fertility. Sands, whether deep, or shallow over clay, tend to be acidic, or become so under legume pastures. Productivity declines if soils are allowed to become too acid. Shallow soils over calcrete are mostly well drained and, apart from the restricted root depth and low moisture holding capacity and rockiness, can be managed relatively easily particularly for irrigated horticulture.

Soil Landscape Unit summary: Cave Range Land System (CRG)

SLU	% of area	Component	Main soils	Prop#	Notes
MCB	2.9	Dune range	B6B3 H3	D	Gently undulating dune range rises with; shallow sand over red clay, or on calcreted calcarenite; often water repellent, deep siliceous bleached sand; 10-30% shallow sand over poorly structured clay on calcrete. Main soils: <u>Shallow sandy loam over red-brown clay on calcrete - B6</u> , <u>Shallow sandy loam on calcrete - B3</u> and <u>Bleached siliceous sand - H3</u> .
MDAA	1.5	Loamy plain	B6B4	E	MDAA Plains, with low dune core ridges, with texture contrast or gradational, moderately shallow, reddish clay loam, over friable, well structured red-brown clay, on calcreted calcarenite; 10-30% texture contrast deep loam over red clay, where no calcrete exists, such as solution pipes infilled with soil materials. Bare calcrete outcrop is co-dominant, with very shallow calcareous red clay loam,
		Outcrop	RRB2	E	
MDB	2.6	Clay-loamy rise	B4D2 F1	E	
		Stony rise	B2B4	E	



		Sandy rise	H3G3	L	occasionally deeper with red clay subsoils. MDB Gently undulating clay loamy rises with gradational, mostly moderately shallow but also deep, reddish clay loam, over friable, well structured clay, on calcreted calcarenite or slightly to highly calcareous clay; 10-30% shallow, texture contrast, red soils on calcrete. Stony rises are co-dominant with very shallow, mostly calcareous, reddish clay loam, often grading to red clay, on calcrete. 10-20% sandy rises with deep bleached siliceous sand, often over brown clay; 10-30% sandy loam over poorly structured brown clay, or deep loam over reddish clay. MDC Undulating rises with main soils as for MDAA, also with 10-30% deep siliceous sand rises.
MDC	1.3	Rise	B4B6	D	MDC Undulating rises with main soils as for MDAA, also with 10-30% deep siliceous sand rises. Main soils: Plains and stony rises: <u>Shallow calcareous loam on calcrete - B2</u> , <u>Shallow red loam on limestone - B4</u> , <u>Shallow sandy loam over red-brown clay on calcrete - B6</u> and <u>Rock or exposed calcrete - RR</u> . Clay-loamy rises: <u>Shallow red loam on limestone - B4</u> , <u>Loam over red clay - D2</u> and <u>Loam over brown or dark clay - F1</u> . Sandy rises: <u>Bleached siliceous sand - H3</u> and <u>Thick sand over clay - G3</u> .
MEA	8.3	Plain	G3B7	D	MEA Plains on calcreted calcarenite, with deep sand over brown clay, or shallow sand over poorly structured brown clay on calcrete; 10-30% bleached sand on calcrete or sandy loam on red clay over calcrete. MEC Undulating dune range with shallow sand over reddish clay on calcrete; or deep bleached siliceous sand; 10-30% bare calcrete outcrop. Main soils: Plains: <u>Thick sand over clay - G3</u> and <u>Sand over friable brown clay on calcrete - B7</u> . Dune ranges: <u>Shallow sandy loam over red-brown clay on calcrete - B6</u> <u>Bleached siliceous sand - H3</u> and <u>Highly leached sand - I1</u> .
MEC	4.3	Dune range	B6H3I1	D	
MfAA	1.2	Sand rise	G3B7	D	Sandy rises with deep sand over brown clay, or shallow sandy loam over poorly structured brown clay, on calcreted calcarenite. Main soils: <u>Thick sand over clay - G3</u> and <u>Sand over friable brown clay on calcrete - B7</u> .
MFB	2.0	Low rise	B6B3 B8	D	Gently sloping rises with shallow sand, often bleached, and often over reddish clay, on calcrete; 10-30% poorly structured brown clay subsoils in low positions. Main soils: <u>Shallow sandy loam over red-brown clay on calcrete - B6</u> , <u>Shallow sandy loam on calcrete - B3</u> and <u>Shallow sand on calcrete - B8</u> .
MHAA	2.8	Sandy rise	H3	V	MHAA Very gently undulating sandy rises and low dune core ridges, on calcreted calcarenite with deep, bleached, siliceous sand; 10-30% bleached sand over poorly structured brown clay, in lower positions. 30-60% stony rises with shallow sandy loam over calcrete, or shallow sandy clay loam grading to red clay on calcrete; 10-30% with poorly structured brown clay on calcrete in swales and flats, or very shallow calcareous loam on calcrete. MHB Gently sloping calcarenite ridges with deep bleached siliceous sands on dunes, often over brown sandy clay. <10% shallow stony rises with shallow sandy loam, often on red
		Stony rise	B3B4	E	
MHB	1.4	Sandy rise	H3	D	
		Stony rise	B3B4	M	
MHC	5.0	Dune range	H3I1B7	D	
MHI	1.6	Sandy rise	H3	V	
		Stony rise	B3B4	C	
		Swale	G2G3	M	



					<p>clay, on calcrete; 10-30% with poorly structured brown clay on calcrete in swales and flats, or very shallow calcareous loam on calcrete.</p> <p>MHC Undulating slopes on calcarenite range as for MHB but with 10-30% of rise areas have rock outcrop or shallow sand on calcrete or deep siliceous sand, less well drained on lower slopes.</p> <p>MHI Low sandy rises with soils as for MHB. 20-30% stony rises with shallow sandy loam on calcrete, or shallow clay loam over red clay on calcrete. <10% swales with mostly bleached sand over poorly structured brown clay; occasionally deep bleached siliceous sand.</p> <p>Main soils: Sandy rises: <u>Bleached siliceous sand - H3.</u> Stony rises: <u>Shallow sandy loam on calcrete - B3</u> and <u>Shallow red loam on limestone - B4.</u> Dune ranges: <u>Bleached siliceous sand - H3, Highly leached sand - I1</u> and <u>Sand over friable brown clay on calcrete - B7.</u> Swales: <u>Bleached sand over sandy clay loam - G2</u> and <u>Thick sand over clay - G3.</u></p>
MNB	5.3	Dune range	H3B6	D	<p>MNB Gently undulating low hills and rises with deep, bleached, water repellent, acid sand and shallow sandy loam over red clay on calcreted calcarenite; 10-30% shallow sand or bare calcrete.</p> <p>MNC Undulating low hills and rises with soils as above.</p> <p>Main soils: <u>Bleached siliceous sand - H3</u> and <u>Shallow sandy loam over red-brown clay on calcrete - B6.</u></p>
MNC	22.7	Dune range	H3B6	D	
MRB	5.4	Undulating plain	B6B7 G3	D	<p>MRB Gently undulating plains with shallow sand over red clay, or poorly structured brown clay in low parts, on calcrete; or deep sand over brown clay; 10-30% deep siliceous sandy rises.</p> <p>MRC Undulating rises with very shallow red and brown sandy loam mostly over red clay; 10-30% bare calcrete outcrop.</p> <p>MRUA Gently undulating rises with deep bleached siliceous sand, occasionally shallow sand on yellow-brown clay. 20-30% stony rises with shallow sand, often over poorly structured brown clay, on calcrete; 10-30% deep sand over brown clay.</p> <p>Main soils: Plains: <u>Shallow sandy loam over red-brown clay on calcrete - B6, Sand over friable brown clay on calcrete - B7</u> and <u>Thick sand over clay - G3.</u> Shallow Rises: <u>Shallow sandy loam over red-brown clay on calcrete - B6, Shallow sandy loam on calcrete - B3</u> and <u>Sand over friable brown clay on calcrete - B7.</u> Sandy rises: <u>Bleached siliceous sand - H3.</u> Swamps: <u>Sand over yellow and brown clay - G4.</u></p>
MRC	0.5	Rise	B6B3	D	
MRUA	5.0	Sandy rise	H3	E	
		Shallow Swamp	B3B7 G4	C L	
MVB	0.5	Rise	B4B6 B3	D	<p>MVB Gently undulating rises with gradational and texture contrast, moderately shallow to very shallow, reddish clay loam, mostly over friable, well structured red-brown clay, on calcreted calcarenite; 10-30% bare calcrete outcrop.</p> <p>MVC Undulating rises, with soils as for MVB.</p> <p>Main soils: <u>Shallow red loam on limestone - B4, Shallow sandy loam over red-brown clay on calcrete - B6</u> and <u>Shallow sandy loam on calcrete - B3.</u></p>
MVC	1.4	Rise	B4B6 B3	D	
MwB	1.4	Undulating	B6B4	D	Undulating plains with texture contrast or gradational,



		plain			moderately shallow, reddish clay loam, over friable, well structured red-brown clay, on calcreted calcarenite; 10-30% very shallow on calcrete or bare calcrete outcrop. Main soils: <u>Shallow sandy loam over red-brown clay on calcrete</u> - B6 and <u>Shallow red loam on limestone</u> - B4 .
MWB	0.7	Rise	B7	D	MWB Gently sloping rises with sandy loam over poorly structured brown clay on calcreted calcarenite; 10-30% shallow sandy loam over red clay, on calcrete, deep bleached siliceous sand, or very shallow sandy loam on calcrete. MWBK Gently undulating rises as for MWB , with karst topography or sinkholes. Main soils: <u>Sand over friable brown clay on calcrete</u> - B7 .
MWBK	0.4	Rise	B7	D	
MYB	1.0	Low range	B6H3I1	D	MYB Low, gently sloping rises with shallow sandy loam over red clay, on calcreted calcarenite; and deep, bleached, acid, siliceous sand. 10-30% sandy loam over poorly structured brown clay on calcrete, especially on lower slopes. MYC Undulating rises with deep sand over brown clay; and clay loam over red clay on calcrete 10-30% with poorly structured subsoils, or very shallow over calcrete, or deep siliceous sand. Co-dominant are sandy rises with deep siliceous sand; 10-30% of which have shallow sand over brown clay. 10-20% stony rises with shallow sandy loam, often over poorly structured brown clay on calcrete; or deep sand. MYP Gently undulating rises, soils as for MYC ; but additionally with <10% swales with sand over brown clay; 10-30% with deep siliceous sands. Main soils: Low ranges: <u>Shallow sandy loam over red-brown clay on calcrete</u> - B6 , <u>Bleached siliceous sand</u> - H3 and <u>Highly leached sand</u> - I1 . Loamy rises: <u>Thick sand over clay</u> - G3 and <u>Shallow red loam on limestone</u> - B4 . Sandy rises: <u>Bleached siliceous sand</u> - H3 . Stony rises: <u>Sand over friable brown clay on calcrete</u> - B7 , <u>Shallow red loam on limestone</u> - B4 and <u>Shallow calcareous loam on calcrete</u> - B2 . Swales: <u>Bleached sand over sandy clay loam</u> - G2 and <u>Thick sand over clay</u> - G3 .
MYC	4.0	Loamy rises	G3B4	E	
		Sandy rise	H3	E	
		Stony	B7B4 B2	L	
MYP	4.7	Loamy rises	G3B4	E	
		Sandy rise	H3	E	
		Stony	B7B4 B2	L	
		Swale	G2G3	M	
NMF	0.7	Plain	B7B5	V	Plains with shallow dark sandy loam over poorly structured brown clay, and dark clay loam over dark clay on calcrete; 100-30% wet soils or deep siliceous sands, or shallow bleached sand on calcrete. 10-20% swamps with mostly wet, dark cracking clay, on calcrete. Main soils: Plains: <u>Sand over friable brown clay on calcrete</u> - B7 and <u>Shallow dark clay loam on limestone</u> - B5 . Swamps: <u>Wet clay loam</u> - N3 and <u>Shallow dark clay loam on limestone</u> - B5 .
		Swamp	N3B5	L	
NSF	4.8	Plain	G3G5	V	NSF Plains with deep acid sand over, often strongly acid brown clay soils; 10-30% deep clay loam to dark grey-brown clay soils. 10-20% swamps with non-peaty clay loams, peat or water filled. <10% sandy rises with deep moderately well to poorly drained, bleached siliceous sand over brown clay or coffee rock.
		Swamp	N3G3	L	
		Sandy rise	I2H3 G3	M	
NSG	0.2	Drainage depression	B7	D	



					<p>NSG Drainage depression with wet dark clay loams and black or grey cracking clay soils.</p> <p>Main soils:</p> <p>Plains: <u>Thick sand over clay - G3</u> and <u>Sand over acidic clay - G5</u>.</p> <p>Swamps: <u>Wet clay loam - N3</u>, <u>Thick sand over clay - G3</u>.</p> <p>Sandy rises: <u>Wet highly leached sand - I2</u>, <u>Bleached siliceous sand - H3</u> and <u>Thick sand over clay - G3</u>.</p> <p>Drainage depressions: <u>Sand over friable brown clay on calcrete - B7</u>.</p>
NTP	0.6	Plain Sandy rise	G3 I1H3	V L	<p>Plains with deep sand over brown clay. 10-20% sandy rises with deep, bleached, acid, siliceous sand; 10-30% moderately well drained with coffee rock in subsoils.</p> <p>Main soils:</p> <p>Plains: <u>Thick sand over clay - G3</u>.</p> <p>Sandy rises: <u>Highly leached sand - I1</u> and <u>Bleached siliceous sand - H3</u></p>
OHC	0.6	Dune Stony rise	I1H3 B3	D M	<p>OHC Dunes with deep, water repellent acid, bleached siliceous sand. <10% stony rises with shallow sandy loam, occasionally over red clay, on calcreted calcarenite, which outcrops occasionally also.</p> <p>OHF Dunes as above, with 10-20% flats with deep sand over brown clay</p> <p>OHI Co-dominant swales and low dunes; soils as above.</p> <p>Main soils:</p> <p>Dunes: <u>Highly leached sand - I1</u> and <u>Bleached siliceous sand - H3</u>.</p> <p>Flats and swales: <u>Thick sand over clay - G3</u>.</p> <p>Stony rises: <u>Shallow sandy loam on calcrete - B3</u>.</p>
OHF	2.1	Dune Flat	I1H3 G3	V L	
OHI	0.6	Swale Low dune	G3 I1H3	E E	
OND	1.2	Low dune	H3I2	D	
ONG	0.9	Low dune Swale	H3I2 B7G3	V L	<p>OND Low dunes and rises with deep bleached acid siliceous sand; 10-30% over brown clay.</p> <p>ONG Low dunes and rises, as for OND; 10-20% swales with shallow sand over poorly structured dark brown clay, often on calcrete.</p> <p>Main soils:</p> <p>Low dunes: <u>Bleached siliceous sand - H3</u> and <u>Wet highly leached sand - I2</u>.</p> <p>Swales: <u>Sand over friable brown clay on calcrete - B7</u> and <u>Thick sand over clay - G3</u>.</p>
OQJ	0.4	Sand dune Sand rise	H3 G3H3	E E	<p>Low dunes with deep bleached acid sand; co-dominant are flats and low rises with sand over brown clay as well as deep sand.</p> <p>Main soils:</p> <p>Dunes: <u>Bleached siliceous sand - H3</u>.</p> <p>Sandy rises: <u>Thick sand over clay - G3</u> and <u>Bleached siliceous sand - H3</u>.</p>
Xuf	0.2	Swamp Stony rise	N3 B2B3 B5	V C	<p>Swamps with mostly non-peaty wet dark clay loamy soils; 10-30% water filled. 20-30% stony rises and/or very shallow over calcrete, with dark, often calcareous, clay loamy soils.</p> <p>Main soils:</p> <p>Swamps: <u>Wet clay loam - N3</u>.</p> <p>Stony rises: <u>Shallow calcareous loam on calcrete - B2</u>, <u>Shallow sandy loam on calcrete - B3</u> and <u>Shallow dark clay loam on limestone - B5</u>.</p>
Xw-	0.1	Swamp	N3WW	D	<p>Swamps, often water filled, or with dark clay loam over dark clay soils.</p> <p>Main soils:</p> <p>Swamps: <u>Wet clay loam - N3</u>.</p>



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

- 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:

- B2** Shallow calcareous sandy loam on calcrete (Petrocalcic Calcarosol)
Up to 40 cm calcareous loamy sand to sandy loam with variable calcrete rubble overlying calcreted calcarenite - rises.
- B3** Shallow sandy loam on calcrete (Petrocalcic Rudosol)
Medium thickness non calcareous sandy loam, often having a slight clay increase with depth, over calcreted calcarenite shallower than 50 cm - rises.
- B4** Red sandy loam over calcrete (Petrocalcic, Red Dermosol)
Medium thickness red sandy loam grading to friable red clay loam over calcreted calcarenite within 50 cm - rises.
- B5** Shallow dark clay loam on limestone (Petrocalcic, Black Dermosol)
Black clay loam to light clay over calcreted limestone at shallow depth, grading to highly calcareous clay - flats.
- B6** Shallow sandy loam over red-brown clay on calcrete (Petrocalcic, Red Kandosol)
Medium thickness sandy loam with slight ironstone gravel overlying a weakly structured reddish brown sandy clay on calcarenite within 50 cm - rises.
- B7** Shallow sand over sandy clay on calcrete (Petrocalcic, Brown Chromosol)
Medium thickness sand overlying brown friable sandy clay to clay on limestone or calcreted sandy clay within 50 cm - flats.
- B8** Shallow sand on calcrete (Petrocalcic, Bleached-Leptic Tenosol)
Thick bleached sand over calcreted calcarenite within 50 cm - rises.
- D2** Hard loam over red clay (Calcic / Hypercalcic, Red Chromosol)
Hard setting sandy loam to clay loam (with variable quartzite stones) abruptly overlying a well structured red clay with soft Class I carbonate at depth.
- F1** Loam over brown or dark clay (Brown-Dark Chromosol-Sodosol)
Topsoil >30 cm over a poorly structured subsoil, or else, subsoil structure is good. Loamy to clay loamy texture contrast soil with brown clayey subsoil. Loamy, reasonable depth A, and OK structured clay subsoil.
- G2** Bleached sand over sandy clay loam (sandy Brown-Red Chromosol)
Sandy texture contrast soil with a bleached A2 and a friable brown-red sandy clay loam to sandy loam subsoil.
- G3** Thick sand over clay (Hypercalcic, Brown Sodosol/ Chromosol)
Thick bleached sand with an organically darkened surface abruptly overlying a massive to coarsely structured brown to reddish yellow sandy clay to clay, calcareous with depth - rises.



- G4** Sand over poorly structured clay (Sandy Brown-Red Sodosol-Chromosol)
Topsoil <30 cm over a poorly structured subsoil. Thin sandy texture contrast soil with a sodic /dispersive /poorly structured brown or red clayey subsoil. Can have some ironstone.
- G5** Sand over acidic clay (Sandy Brown Kurosol)
Sandy texture contrast soil with a friable brown strongly acidic clayey to clay loamy subsoil. Very acidic soil; incipient Bh horizons; moderate depth topsoils. Some with ironstone.
- H3** Deep bleached sand (Basic, Arenic, Bleached-Orthic Tenosol)
Grey sand over a very thick bleached sand grading to yellow sand continuing below 100 cm.
- I1** Highly leached sand (Fragic, Pipey, Aeric Podosol)
Grey sand with a very thick bleached A2 layer, over dark brown and yellow massive soft to semi-hard clayey sand (coffee rock), grading to softer yellow and brown sand to sandy clay loam from about 80 cm.
- I2** Wet highly leached sand (Fragic, Humic, Aquic Podosol)
Grey sand with a thick bleached A2 horizon, overlying a thin to thick layer of coffee rock, grading to pale brown sand sharply overlying a grey, brown and yellow mottled sandy clay loam to light clay.
- N3** Seasonally waterlogged, non to marginally saline equivalents of soils listed above, viz.:
N3c Wet **G3**
N3d Wet **B5**
N3e Wet **B7**
- RR** Bare rock
- WW** Water

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

