BJR Black Jack Range Land System

Area: 94.4 km^2

Landscape: Rocky hills and rises east of Kanyaka and south of Wilson, forming a range trending northeast to south-west.

Geology: Pre-Cambrian quartzites and massive siltstones underlie landscapes where relief is greatest, with some fine-grained rocks associated with areas of lower relief.

Topography: Steep to rolling rocky hills form the western core of this land system with extensive rolling to undulating foothills and rises and occasional pediments on the eastern edge.

Elevation: Up to 630 m asl on the Black Jack Range which is mostly at elevations around 500 m asl. The adjacent rises have elevations around 400 – 450 m asl.

Relief: Up to 200 m relief exists along the hills of the Black Jack Range. The relief changes abruptly to the east where rises have around 30 m of relief.

Annual rainfall: 250 – 350 mm average

Typical soils:

- Shallow, clayey red soils on rocky hills and rises.
- Shallow loamy calcareous soils on hills and rises, formed on calcareous basement rocks.
- Very shallow sandy loams occur on rocky quartzite ranges and rises of the main Black Jack Range.
- Stony, loam/clay-loam over red clay (pedaric Sodosols/Chromosols and associated calcareous Tenosols and Rudosols) occur on slopes of rises and low hills.
- Silty loam over pale brown clay (Sodosols) co-dominant with shallow silty calcareous loams (Calcarosols and Tenosols) occur on rises and low hills of calc-siltstone. These soils are often powdery and prone to severe erosion. Typical underlying geological materials include Tarcowie siltstone, Wonoka Formation, Tapley Hill Formation and Brachina Formation.
- Clay loam over red clay soils (Sodosols/Chromosols) occur in alluvium on pediments and plains associated with hilly land. Soils are often stony and are associated with calcareous loams to clay loams over highly calcareous clay (Calcarosols).

Main soils:

D1 (26%) Loam over clay on rock (Shallow Calcic-Hypercalcic Red Chromosol)
L1 (24%) Shallow soil on rock (Rocky Rudosol-Tenosol)
D2 (12%) Loam over red clay (Calcic-Hypercalcic Red Chromosol-Sodosol)
RR (11%) Bare rock

Minor soils:

D7 (6%) Loam over poorly structured clay on rock (Shallow Calcic-Hypercalcic Red Chromosol)
A2 (5%) Calcareous loam on rock (Paralithic Calcarosol)
D4 (4%) Loam over pedaric red clay (Pedaric Red Sodosol-Dermosol)

Summary: High, steep, rocky hills and rises on quartzites and massive siltstones form the western side of this land system, which is a northeast to southwest trending range. Extensive rolling to undulating foothills and rises occur on the eastern edge. Shallow soils over rock predominate. Red duplex soils are most common, both over rock and over soft sediments.

Soil Landscape Unit summary: Black Jack Land System (BJR)

SLU	% of area	Component	Main soils	Prop#	Notes
AAM	0.8	Undulating rises	L1RRA2	D	Undulating rises with shallow rocky calcareous soils formed on Tapley Hill Formation calc-siltstones. Relief is less than 30m, slopes are less than 10%. Main soils: Shallow stony soils on rock -**L1**, Bare rock -**RR** and Calcareous loam on rock -**A2**.
ACB	3.3	Rolling rises	D1L1	D	Hills and rises with shallow red texture contrast and clay loamy gradational soils formed on limestone. **ACB** Rolling rises. Relief is 9-30m, slopes are 10-30%. **ACC** Rolling low hills as above. Relief is 30-90m, slopes are 10-30%. **ACD** Steep low hills as above; soils are shallow and rocky, with rock outcrop common. Relief is 30-90m, slopes are 30-50%. Main soils: Clay loam over pedaric red clay on rock -**D1** and Shallow stony soils on rock -**L1**.
ACC	18.9	Rolling low hills	D1L1	D	
ACD	1.4	Steep low hills	D1L1RR	D	
ADC	0.7	Rolling low hills	L1	D	Hills and rises with very shallow stony calcareous soils formed on fine-grained calcareous rocks, including Skillagollee Dolomite. **ADC** Rolling low hills. Relief is 30-90m, slopes are 10-30%. Main soils: Shallow stony soils on rock -**L1**. **ADh** Rolling rises. Relief is less than 30m, slopes are 10-30%. Watercourses are eroded and scalding occurs on 5-10% of land. Main soils: Shallow stony soils on rock -**L1**. 10-15% red clay (Red clayey pedaric Dermosols -**C2**), and duplex soils (Clay loam over pedaric red clay on rock -**D1**) occur on fan deposits. Rock outcrop is extensive on steeper ridges. Mostly non-arable. **ADM** Undulating rises. Relief less than 30m, slopes less than 10%. Main soils: Red clayey pedaric Dermosols -**C2**, Shallow stony soils on rock -**L1** and Calcareous loam on rock -**A2**.
ADh	3.5	Rolling rises	L1	D	
ADM	1.6	Undulating rises	C2L1A2	D	
AQB	3.8	Rolling rises	L1	D	Rises formed on quartzite with shallow rocky soils. **AQB** Rolling rises. Relief is less than 30m, slopes are 10-30%. Main soils: Shallow stony soils on rock **- L1**. Minor soils: Red clayey pedaric Dermosols -**C2**. Suitable for limited grazing land use. **AQC** Rolling low hills as above. Relief is greater than 30m, slopes are 10-30%. Main soils: Shallow stony soils on rock **- L1**. Minor soils: Red clayey pedaric Dermosols -**C2**. **AQD** Steep low hills as above, with much rock outcrop. Relief is 30-90m, slopes are 30-60%. Main soils: Shallow stony soils on rock -**L1**. Limited use pastorally, scenic value is high. **AQE** Steep hills as above. Relief is greater than 90m, slopes are 30-60%. Main soils: Shallow stony soils on rock -**L1**. Limited use pastorally, scenic value is high.
AQC	1.5	Rolling low hills	L1	D	
AQD	0.6	Steep low hills	L1RR	D	
AQE	11.8	Steep Hills	L1RR	D	
DMB	7.4	Pediment	D1D7M3	V	Pediments and rises with texture contrast soils on fine-grained basement rock. Surface textures are clay-loamy. **DMB** *Gently sloping pediment and fan deposits* with slopes of 1-3%, relief is less than 9m. Incised drainage lines occur and slight scalding appears on lower slopes.
		Rocky Rises	L1	L	
DMC	0.9	Pediment	D1D7M3	V	
		Rocky Rises	L1	L	
DMn	3.5	Rolling rises	D1D7M3	D	

DMv	1.0	Gently sloping pediments	D1D7M3	D	Main soils: Loam over poorly structured clay on rock -**D7** and Deep gravelly soil -**M3**. ***Rocky rises:*** with extensive rock outcrop. Main soils are Shallow stony soils on rock -**L1**. **DMC** *Pediment* and fan deposits with slopes of 3-10%. Main soils: Clay loam over pedaric red clay on rock -**D1**, Loam over poorly structured clay on rock -**D7** and Deep gravelly soil -**M3**. ***Rocky rises*** with extensive rock outcrop. Main soils: Shallow stony soils on rock -**L1**. **DMn** Rolling rises formed from dissected fans and pediments. Gullying occurs on 20% and scalding affects up to 10% of land. Main soils: Clay loam over pedaric red clay on rock -**D1**, Loam over poorly structured clay on rock -**D7** and Deep gravelly soil -**M3**. **DMv** Gently sloping pediments with gullies affecting around 10%-20% of land. Scalding is severe and affects more than 50% of land. Main soils: Clay loam over pedaric red clay on rock -**D1**, Loam over poorly structured clay on rock -**D7** and Deep gravelly soil -**M3**.
DNI	16.1	Rolling rises	D2D1	D	Rises with shallow texture contrast soils formed on Brachina Shale Formation rocks. The soils have clay loam surface textures. **DNI** Rolling rises. Relief is 9-30m, slopes are 10-30%. Gullying affects 5-20% of land. **DNm** Undulating rises as above. Relief is 9-30m, slopes are 3-10%. Gullying affects 10-20% of land and scalding occurs on 5-50%. Main soils: Loam over red clay -**D2** and Clay loam over pedaric red clay on rock -**D1**. Associated soils include Red cracking clay -**E2**.
DNm	0.6	Undulating rises	D2D1	D	
DQw	2.6	Undulating rises	D1A4B6	D	Undulating rises with pale brown silty, sodic, texture contrast soils on rock. Relief is less than 30m, slopes are 3-10%. Main soils: Loam over clay on rock -**D1**, Deep (rubbly) calcareous loam -**A4** and Shallow loam over red-brown clay on calcrete -**B6** Gullying affects 10-20% of land and scalding occurs on more than 50%.
EHl	1.0	Gently undulating rises	A2L1	V	**EHl** Gently undulating rises and pediments with moderately shallow soils on calc-siltstone and limestone. ***Gently undulating rises***: Slopes are 1-3%, relief is less than 30m. Gullying affects up to 20% of land and scalding occurs on 5-50%. Main soils: Calcareous loam on rock -**A2** and Shallow stony soils on rock -**L1**. ***Gently undulating pediments***: Slopes are 1-3%, relief is less than 9m. Gullying affects up to 20% of land and scalding occurs on 5-50%. Main soils: Calcareous loam on rock -**A2.** **EHm** Undulating rises and pediments with moderately shallow soils on calc-siltstone and limestone. Slopes are 3-10%, relief is less than 9m on pediments and 9-30m on rises. Gullying affects up to 20% of land and scalding occurs on 5-50%. Main soils: Calcareous loam on rock -**A2** and Shallow stony soils on rock -**L1**. **EHn** Rolling rises and pediments with moderately shallow soils on calc-siltstone and limestone.
		Gently undulating pediments	A2	C	
EHm	0.4	Undulating rises	A2L1	V	
		Undulating pediments	A2	C	
EHn	0.4	Rolling rises	A2L1	V	
		Pediment	A2	C	

					Slopes are 10-30%. Relief is 9-30m on rises, less than 9m on pediments. Main soils: Calcareous loam on rock -**A2** and Shallow stony soils on rock -**L1.**
JIl	0.6	Gently sloping plain	D4D1A5	D	Gently sloping alluvial plain with red texture contrast and calcareous soils. Slopes are 1-3%, relief is less than 9m. Gullying affects 5-50% of land, severe along watercourses. Scalding affects nearly 50% of land. Main soils: Loam over pedaric red clay -**D4**, Loam over clay on rock -**D1** and Rubbly calcareous loam on clay -**A5**. Subdominant soils: Deep moderately calcareous loam -**A3** and Shallow calcareous loam on calcrete -**B2**.
JMH	0.8	Moderately sloping pediment	D2	D	Moderately sloping pediment plain with red texture contrast soils with quartz gravel on the surface. Slopes are 3-10%, relief is less than 9m. Gullying affects 10-20% of land. Main soils: quartz gravelly variants of Loam over red clay -**D2**, with subdominant (10-30%) Loam over pedaric red clay -**D4**.
JZB	1.0	Gently undulating pediments	D4D1D2	V	Pediment-basement rock complex with red texture contrast soils on pediments and 20-30% rocky rises with shallow texture contrast soils. **JZB** Gently sloping pediments with rocky rises. ***Pediments***: Slopes are 1-3%, relief is under 9m. **JZC** Pediment-basement rises complex, similar in soils and rocky rise occurrence to JZB above, pediments here have steeper slopes of 3-10%. **JZG** Pediment-basement rises complex, similar in soils and rocky rise occurrence to **JZB** above, but here gullying affects 10-20% of land. Slopes are 1-3%, relief is under 9m. **JZH** Pediment-basement rises complex, similar in soils and rocky rise frequency of occurrence to **JZB** above, pediments here have steeper slopes of 3-10% and gullying affects10-20% of the land, being severe (more than 20%) on pediments. **JZk** Pediment-basement rises complex, similar in soils and rocky rise occurrence to **JZB** above. Pediments here have very gentle slopes of less than 1%. Nevertheless, gullying affects more than 20% of the pediments and 10-20% of the rises. Scalding affects more than 50% of the pediments and 5% of the rises. **JZl** Pediment-basement rises complex, similar in soils and rocky rise occurrence to **JZB** above. Pediments have gentle slopes of 1-3%. Gullying affects more than 20% of the pediments and 10-20% of the rises. Scalding affects more than 50% of the pediments and less than 5% of the rises. Main soils: Loam over pedaric red clay - **D4**, Loam over clay on rock -**D1** and Loam over red clay -**D2** with minor Rubbly calcareous loam on clay -**A5**. ***Rocky rises:*** Main soils: Loam over clay on rock -**D1** with 10-30% bare rock.
		Rocky rises	D1	C	
JZC	4.3	Undulating pediments	D4D1D2	V	
		Rocky rises	D1	C	
JZG	0.7	Gently undulating pediments	D4D1D2	V	
		Rocky rises	D1	C	
JZH	1.2	Undulating pediments	D4D1D2	V	
		Rocky rises	D1	C	
JZk	4.1	Plains	D4D1D2	V	
		Rocky rises	D1	C	
JZl	5.6	Gently undulating pediments	D4D1D2	V	
		Rocky rises	D1	C	

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:

A2/L1 Shallow calcareous loam (Paralithic, Hypercalcic / Lithocalcic Calcarosol) (A2) **OR** Shallow stony loam (Calcareous, Paralithic, Leptic Tenosol)(L1)
Shallow stony loam, calcareous throughout or with depth, overlying weathering rock shallower than 50 cm.

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 >120cm in depth.

A5 Rubbly calcareous loam on clay (Supracalcic-Lithocalcic Calcarosol) on clay
Calcareous sandy-clay loamy topsoil grading into loamy-clay loamy subsoil on a clayey substrate. Usually rubbly. Clayey substrate occurs at >60cm and <120cm.

B6 Shallow loam over red-brown clay on calcrete (Petrocalcic Red Chromosol-Kandosol)
Shallow texture contrast or gradational soil. Usually hard setting loamy to clay loamy (sometimes sandy) topsoil over a red clayey (sometimes clay loamy) subsoil on calcrete. Surface soil can be slightly calcareous.

C2 Gradational loam on rock (Calcic / Hypercalcic Red Dermosol)
Loam to clay loam grading to a friable red clay with soft Class I carbonate within 50 cm, grading to weathering rock within 100 cm.

D1/D7 Loam over red clay on rock (Hypercalcic / Calcic, Red Chromosol / Sodosol)
Medium thickness hard gravelly loam over a red clay, friable and finely structured (D1), to hard, coarsely structured and dispersive (D7), calcareous with depth, grading to weathering basement rock within 100 cm.

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.

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.

D7 Loam over dispersive red clay on rock (Calcic / Hypercalcic, Red Sodosol)
Medium to thick hard sandy loam to clay loam sharply overlying a coarsely structured dispersive red clay, calcareous with depth, grading to highly weathered kaolinized siltstone.

L1 Shallow stony loam (Paralithic, Leptic Tenosol)
Shallow stony loam, often calcareous throughout or with depth, overlying weathering rock shallower than 50 cm.

M3 Deep gravelly soil (Gravelly Kandosol-Tenosol)
Deep uniform loamy alluvial soils with at least 50% gravel in the major part of the profile.

RR Bare rock.

Further information: DEWNR Soil and Land Program