

NEL Nelshaby Land System

Gently sloping outwash fans abutting the Southern Flinders Ranges between Nelshaby and Crystal Brook

- Area:** 271.9 km²
- Annual rainfall** 290 – 485 mm average
- Geology:** Gravelly and stony clays, sandy clays and less commonly clayey sands, eroded from the ranges to the east and deposited by streams in a more or less uniform apron abutting the range. The sediments are mantled by soft carbonate which has blown in from the west over time and has leached into the soil.
- Topography:** Alluvial plains and fans occurring as a band up to five km wide along the western side of the Southern Flinders Ranges. Slopes range from 12% near the ranges to 1% on the flatter western side. There are isolated bands of short steeper slopes to 20% abutting the ranges. The slopes are traversed by watercourses most of which originate on the frontal escarpment and are closely spaced (about 500 m apart). Several larger streams from further east in the ranges also cross the Nelshaby land system. These include Mt. Gullet Creek, Mambray Creek, Baroota Creek and Telowie Creek. Watercourses are eroded in places, particularly on the steeper slopes adjacent to the ranges. The land surface is characterized by a variable cover of quartzite stones, usually less than 20 cm across. These tend to be more concentrated (up to 20% cover), nearer the ranges. Scalding is significant in some areas.
- Elevation:** The elevation along the base of the escarpment varies from 240 m in the south (near Crystal Brook) to 50 m in the north. Elevation of the western edge varies from 120 m to 20 m.
- Relief:** As the slopes are even, there is little relief other than that associated with eroded watercourses which may be 5 - 10 m deep.
- Soils:** Most soils are deep loamy texture contrast or gradational types with red clayey subsoils. There are limited calcareous loams and minor stony sandy loams.

Main soils

Soils formed over alluvial sediments

- D2** Loam over red clay
D3 Loam over dispersive red clay
C3 Gradational loam

Minor soils

Soils formed over alluvial sediments

- A3/A6** Deep calcareous loam
M3 Stony alluvial sandy loam
M1 Deep sandy loam
M4 Gradational sandy loam
D4 Loam over friable saline-sodic red clay

Soils formed on weathering basement rock on rises

- A2** Shallow calcareous loam



Main features: The Nelshaby Land System is characterized by broad gently inclined outwash fans with deep, inherently fertile but often poorly structured soils. Hard setting surfaces are very common, causing excessive runoff and associated erosion, sub optimal workability and patchy emergence. Waterholding capacity is also reduced. Very stony (quartzite) soils are also a feature of the land. Heavy stone reduces waterholding capacity and abrades implements.

Soil Landscape Unit summary: 17 Soil Landscape Units (SLUs) mapped in the Nelshaby Land System:

SLU	% of area	Main features #
EPC	0.3	Undulating rises with slopes of 5-10% and relief to 20 m formed on calcareous rocks. Main soil: <u>shallow calcareous loam</u> - A2 (D). The shallowness of the soil is the main limitation on this land; fertility problems caused by high carbonate contents, and erosion potential are less significant.
JFB	25.1	Outwash fans and plains formed on alluvial sediments:
JFC	6.2	JFB Very gentle slopes of 2-4% crossed by weakly defined watercourses. There is up to 10% surface quartzite stone.
JFD	1.0	
JFE	0.5	JFC Gently inclined slopes of 4-12% crossed by well defined, generally stable watercourses. There is 10-20% surface quartzite stone.
JFG	3.4	
JFH	16.7	JFD Moderate slopes abutting the ranges with gradients of 12-20%, more than 20% surface quartzite stone and well defined, generally stable watercourses.
JFI	2.1	
JFK	15.4	JFE Flats of the discharge area of Telowie Creek.
JFL	4.4	JFG Very gentle slopes of 2-4% crossed by well defined, often eroded watercourses. There is up to 10% surface quartzite stone.
JFM	2.5	
JFU	3.0	JFH Gently inclined slopes of 4-12% crossed by well defined, eroded watercourses. There is 10-20% surface quartzite stone.
JFV	5.5	
JFW	3.3	JFI Moderate slopes abutting the ranges with gradients of 12-20%, more than 20% surface quartzite stone and eroded watercourses.
JFm	3.5	JFK Level to very gently inclined plains with slopes of 1-2% and occasional low sandy rises. There is up to 10% surface quartzite stone. Subsoil salinity is moderate to high.
		JFL Very gentle slopes of 2-4% crossed by weakly defined watercourses. There is up to 10% surface quartzite stone. Subsoil salinity is moderate to high.
		JFM Gently inclined slopes of 4-12% crossed by well defined, generally stable watercourses. There is 10-20% surface quartzite stone. Subsoil salinity is moderate to high.
		JFU Level to very gently inclined plains with slopes of 1-2%. There is 5-10% scalding, particularly adjacent to weakly defined watercourses. There is up to 10% surface quartzite stone.
		JFV Very gentle slopes of 2-4% and 5-10% scalding particularly adjacent to weakly defined watercourses. There is up to 10% surface quartzite stone.
		JFW Gently inclined slopes of 4-12% crossed by well defined, generally stable watercourses. 5-10% of the land is scalded. There is 10-20% surface quartzite stone.
		JFm Gently inclined slopes of 4-12% crossed by well defined, usually eroded watercourses. There is minor scalding (less than 5%) and 10-20% surface quartzite stone.
		Main soils: <u>loam over red clay</u> - D2 (E) and <u>loam over dispersive red clay</u> - D3 (C), with <u>gradational loam</u> - C3 (L) and <u>deep calcareous loam</u> - A3/A6 (L). <u>Loam over friable saline-sodic red clay</u> - D4 , <u>stony alluvial sandy loam</u> - M3 , <u>gradational sandy loam</u> - M4 and <u>deep sandy loam</u> - M1 are all minor. Soil physical problems are the main limitations to the use of this land. Hard setting surface soils (causing runoff, working restrictions and patchy emergence) and poorly structured, sometimes dispersive subsoils (impeding root growth, water holding capacity and water movement) reduce potential productivity. Excessive water runoff and erosion has been a problem in places, as indicated by the erosion in some watercourses and scalded areas.
XBT	1.9	Drainage depressions with eroded watercourses and adjacent flats. Main soils: <u>deep sandy loam</u> - M1 (E), with <u>gradational sandy loam</u> - M4 (C) and <u>loam over (dispersive) red clay</u> - D2/D3 (L). <u>Stony alluvial sandy loam</u> - M3 is common adjacent to the ranges.



XGS	5.2	Drainage depressions comprising watercourses and adjacent flood out flats formed on coarse textured sediments with extensive boulder beds – surface quartzite rocks are common. Main soils: <u>stony alluvial sandy loam</u> - M3 (E) and <u>deep sandy loam</u> - M1 (C), with <u>gradational loam</u> - C3 (L) and <u>gradational sandy loam</u> - M4 (L). The land has variable potential as some of the stonier areas are non-arable, while other areas have moderately deep, fertile soils with good cropping potential. However, the fragility of the watercourses combined with the potential for flooding and erosion restrict land use options on this land.
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PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

(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** Shallow calcareous loam (Paralithic, Hypercalcic Calcarosol)
Calcareous stony loam grading to highly calcareous clay loam overlying weathering rock within 100 cm.
- A3/A6** Deep calcareous loam (Calcic / Supracalcic Calcarosol)
Calcareous stony loam to clay loam, becoming more clayey and calcareous (sometimes rubbly) with depth.
- C3** Gradational loam (Calcic / Hypercalcic, Red Dermosol)
Medium thickness stony loam to clay loam grading to a well structured stony red clay with soft carbonate at depth.
- D2** Loam over red clay (Calcic, Red Chromosol)
Medium to thick stony fine sandy loam to clay loam over a well structured red clay with quartzite stone layers and soft carbonate deeper than 50 cm.
- D3** Loam over dispersive red clay (Calcic, Red Sodosol)
Medium to thick stony fine sandy loam to clay loam over a poorly structured red clay with quartzite stone layers and soft carbonate deeper than 50 cm.
- D4** Loam over friable saline-sodic red clay (Calcic, Pedaric, Red Sodosol)
Thin stony loam over a very friable red clay with soft carbonate at depth.
- M1** Deep sandy loam (Calcareous, Regolith, Red-Orthic Tenosol)
Thick to very thick loamy sand to sandy loam grading to a red slightly more clayey and calcareous subsoil, continuing below 100 cm.
- M3** Stony alluvial sandy loam (Basic, Fluvic, Clastic Rudosol OR Basic, Regolith, Red-Orthic Tenosol)
Thick to very thick sandy loam with more than 50% quartzite stones (paler coloured with depth in 50% of profiles) overlying boulder beds.
- M4** Gradational sandy loam (Calcic, Red Kandosol)
Thick sandy loam grading to a massive red sandy clay loam, calcareous with depth.

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

