NRN Narien Land System

Moderately steep to steep ridges along the western edge of Black Rock Plain

Total Area: 102.0 km^2

Annual rainfall: 345 - 535 mm average

Geology: Mixed sandstones, siltstones, quartzites and dolomites of the Saddleworth, Rhynie, Undalya, Auburn, Ingomar and Minburra Formations. These formations are steeply dipping, resulting in changes in lithology over distances as short as 200 m.

Topography: Moderately steep to steep north - south ridges separated by undulating to gently rolling rises, on the western edge of Black Rock Plain. The topography is a result of differential weathering and dissection of a range of parent rock types, with resistant quartzites, sandstones and tillites forming the sharp ridges, and softer siltstones forming the inter-ridge slopes. Watercourses are well defined and flow parallel to the ridges until they break through out on to the plains to the east. They are often eroded.

Elevation: Elevation varies from 470 m in the northeast to 736 m (Champion Hill) and 745 m (Mt. Lock), and several other peaks of similar elevation on the spine of the range.

Relief: Local relief varies from 30 m on the undulating inter-ridge land to 150 m on the steep escarpment slopes at the northern end of the Land System.

Soils: On hillslopes most soils are loamy and shallow to moderately deep over rock. Some have red clayey subsoils, others have highly calcareous subsoils, and others have little horizon differentiation. On lower slopes, soils are deeper and are mainly loams with red clay subsoils, with some calcareous loams.

Main soils

Soils formed on basement rock on hillslopes

L1a Shallow stony loam to sandy loam on weathering rock
A2 Shallow calcareous loam
D1 Loam over red clay on rock

Minor soils

Soils formed on basement rock on hillslopes

C2 Gradational loam on rock
L1b Shallow stony loam on hard rock

Soils formed over alluvial sediments on lower slopes and valleys

D2/C3 Loam over red clay
A3 Deep calcareous loam
D3 Loam over dispersive red clay

Main features: The Narien Land System is predominantly moderately steep to steep hill country not suited to any agricultural uses other than grazing. Fertility maintenance and erosion control are the main soil management issues. There are limited areas of semi arable to arable slopes on which the Main soils: moderately shallow loamy texture contrast types, with shallow calcareous and non calcareous loams. Poor soil structure, limited waterholding capacity and sub optimal fertility on sandier types are the main limitations. Erosion control is essential throughout.

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

SLU	% of area	Main features #
AAC AAD AAI AAK AAi AAj	21.0 1.7 3.7 6.2 2.8 2.6	Moderately steep to steep rocky land formed on mainly fine grained basement rocks with surface quartzite, tillite, siltstone and limestone. **AAC** Rolling low hills with slopes of 15-30% and relief up to 100 m. 2-10% rock outcrop and 10-20% (commonly 20-50%) surface stones. **AAD** Short, steep slopes (25-50%) with relief to 50 m. 2-10% rock outcrop and 10-20% (commonly 20-50%) surface stones. **AAI** Irregular landscape of moderately steep low hills with intervening undulating rises. Slopes range from 6-30% with relief to 70 m. 2-10% rock outcrop and 10-20% or more surface stones. Watercourses are sporadically eroded. **AAK** Strongly dissected steep escarpment slopes of 25-75% and relief to 150 m. 10-20% rock outcrop and 10-20% or more surface stones. Watercourses are sporadically eroded. **AAi** Irregular landscape of moderately steep low hills with intervening undulating rises. Slopes range from 6-30% with relief to 70 m. 2-10% rock outcrop and 10-20% or more surface stones. Watercourses are commonly badly eroded. **AAj** Strongly dissected steep escarpment slopes of 30-80% and relief to 60 m. 10-20% rock outcrop and 10-20% (commonly 20-50%) surface stones. Watercourses are commonly badly eroded. Main soils: shallow calcareous loam - **A2** (E) with loam over red clay on rock - **D1** (E) and shallow stony loam over weathering rock - **L1a** (E). This land is largely inaccessible, due to steep slopes and rockiness. Pasture productivity is limited mainly by shallow soils and the difficulty in undertaking improvements (sowing, fertilizing etc). There is considerable potential for erosion and landslip.
ABC ABD	5.7 10.9	Ridges formed on mainly fine grained basement rocks with 2-10% quartzite reefs and with 10-20% surface quartzite, tillite, siltstone and limestone. **ABC** Rounded ridges with slopes of 20-30% and relief to 80 m. **ABD** Steep ridges with slopes of 30-80% and relief to 60 m. Main soils: shallow stony loam over weathering rock - **L1a** (E) and shallow calcareous loam - **A2** (E) with loam over red clay on rock - **D1** (C). This land is too steep and rocky for easy accessibility. Pasture productivity is limited mainly by shallow soils and the difficulty in undertaking improvements (sowing, fertilizing etc).
AKC AKD	5.9 3.8	Low hills formed on mainly coarse grained basement rocks with 2-10% rock outcrop and up to 50% surface quartzite, tillite and sandstone. **AKC** Rounded low hills with slopes of 10-30% and relief to 70 m. **AKD** Steep low hills with slopes of 30-75% and relief to 90 m. Main soils: shallow stony sandy loam over weathering rock - **L1a** (E) and sandy loam over red clay on rock - **D1** (E), with shallow calcareous loam - **A2** (C). This land is largely inaccessible. Pasture productivity is limited mainly by shallow soils and the difficulty in undertaking improvements (sowing, fertilizing etc).
AQC AQD	1.5 0.3	Quartzite ridges with 20% or more linear reefs of outcropping rock and up to 50% surface quartzite. **AQC** Ridges with slopes of 20-30% and relief to 80 m. **AQD** Ridges with slopes of 30-50% and relief to 70 m. Main soils: shallow stony sandy loam over hard rock - **L1b** (E), shallow calcareous loam - **A2** (E) and shallow stony sandy loam over weathering rock - **L1a** (E). These steep rocky ridges have shallow stony soils with limited pasture productive potential. Steep slopes and rocky outcrops prevent improvement operations.
DXC	1.6	Footslope complex of basement rock rises and valleys. Slopes are 5-12%. Main soils: loam over red clay on rock - **D1** (E), shallow calcareous loam - **A2** (L) and gradational loam on rock - **C2** (M) on rises, and loam over red clay - **D2/C3** (E) in valleys. The land is characterized by hard setting surface soils, and is highly susceptible to erosion, particularly as it lies below higher ground generating run off water. The poor structure also causes workability problems and patchy emergence.

EMC	11.5	Rises and gentle slopes of 5-10% and up to 30 m high formed on mostly fine grained rocks mantled by soft carbonate. There is less than 10% surface stone and rock outcrop. Main soils: gradational loam on rock - **C2** (E) and loam over red clay on rock - **D1** (E), with shallow calcareous loam - **A2** (C) and shallow stony loam over weathering rock - **L1a** (L). This land is arable although the shallow soils are prone to moisture deficit and the slopes are susceptible to erosion.
ESD	15.3	Rises and low hills with slopes of 8-18% and relief to 50 m formed on mostly fine grained rocks mantled by soft carbonate. There is up to 10% rocky outcrop, and 10-20% surface stone. Main soils: shallow stony loam over weathering rock - **L1a** (E) with gradational loam on rock - **C2** (L), loam over red clay on rock - **D1** (L) and shallow calcareous loam - **A2** (L). This land is semi arable due to the frequency of rock outcrop and the shallowness of the soils.
JFC JFJ	1.1 4.4	Outwash fans and drainage depressions formed on fine to medium grained alluvium. **JFC** Gentle slopes of 3-7%. **JFJ** Drainage depressions with eroded watercourses. Main soils: loam over red clay - **D2/C3** (E) with deep calcareous loam - **A3** (C) and loam over dispersive red clay - **D3** (L). Poor soil physical properties are the main feature of this land. Hard setting surfaces affect infiltration, workability and seedling emergence. Erosion potential is therefore significant. Past gully erosion is still evident.

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, Calcic / Hypercalcic Calcarosol)
Calcareous stony loam to clay loam, more calcareous with depth grading to rock at about 50 cm.

A3 Deep calcareous loam (Calcic / Hypercalcic Calcarosol)
Calcareous loam to clay loam more calcareous and clayey with depth grading to alluvium.

C2 Gradational loam on rock (Calcic / Lithocalcic, Red Dermosol)
Medium thickness clay loam grading to a friable red clay with soft to rubbly carbonate at depth over weathering rock within a metre.

D1 Loam over red clay on rock (Calcic, Red Chromosol)
Medium thickness hard loam to clay loam abruptly overlying a red well structured clay, calcareous with depth grading to weathering rock within one metre.

D2/C3 Loam over red clay (Calcic, Red Chromosol / Dermosol)
Medium thickness loam to clay loam abruptly overlying (Chromosol - D2) or grading to (Dermosol - C3) a red well structured clay, calcareous with depth grading to alluvium.

D3 Loam over dispersive red clay (Calcic, Red Sodosol)
Medium to thick hard loam to clay loam sharply overlying a coarsely structured dispersive red clay, calcareous with depth grading to alluvium.

L1a Shallow stony loam to sandy loam on weathering rock (Calcareous / Basic, Paralithic, Leptic Tenosol)
Stony loam grading to a light clay loam over weathering rock (sometimes with soft carbonate) by 50 cm.

L1b Shallow stony loam on hard rock (Lithic, Leptic Rudosol)
Shallow stony sandy loam to clay loam on hard quartzite within 50 cm.

Further information: DEWNR Soil and Land Program