COH Cooke Hill Land System

Rocky hills extending from Neales Flat to Palmer

Area: 325.8 km^2

Annual rainfall: 335 – 605 mm average

Geology: The Land System is formed on a sequence of rock formations, but metasandstones of the Backstairs Passage Formation are predominant. On the eastern side of the System is a 2.5 km wide belt of mixed metagreywackes and metasiltstones of the Carrickalinga Head Formation, with a thin band of Heatherdale Shales on the eastern margin, and minor lenses of Milendella Limestones scattered throughout. In the south are some minor intrusions of younger granitic rocks. There are only minor deposits of alluvium, most of the eroded material from the hills having been washed out of the System on to the Murray Plains. About a third of the rocks are mantled by a veneer of windblown carbonate which occurs as soft segregations at the soil - rock interface.

Topography: The Land System is characterized by moderately steep rocky low hills and hills. These have been strongly dissected by east flowing water courses to produce relief commonly greater than 100 m. Most water courses have gouged gorges with steep rocky slopes of up to 100%. These are more common in the eastern parts of the system. In the western sections, and extending into the Neales Flat area, the System consists of a single range of low hills with relief of 30 - 50 m.

Elevation: 450 m (Mt. Karinya) to 170 m on the western footslopes

Relief: Maximum relief is 130 m

Soils: Most soils are shallow to moderately deep overlying basement rocks. Sandy loam to loamy sand surface textures are typical. Red or brown clayey subsoils are common, but shallow stony soils formed directly on rock are more typical. Deep soils are largely confined to lower slopes and drainage depressions.

Main soils

Soils formed on basement rock

L1a Shallow stony sandy loam
K3/D1 Hard sandy loam over red or brown clay

Minor soils

Soils formed on basement rock

K1 Shallow stony loam
D7 Sandy loam over dispersive red clay
B3 Shallow loam over calcrete
A2 Shallow calcareous loam
K4 Loamy sand over sandy clay on granite
L1b Shallow stony soil on granite

Soils formed on alluvium

F2/F1 Sandy loam over brown mottled clay
M1 Sandy alluvial soil

Main features: The Cooke Hill Land System is rough hill country with only minor areas with any potential for uses more intensive than grazing of native pastures. Shallow stony soils are typical of the area, although moderately deep sandy loam over clay soils are

extensive. Low fertility and waterholding capacity are the main soil limitations. Erosion potential is high to very high so maintenance of protective soil cover through sound grazing management is essential.

Soil Landscape Unit summary: 16 Soil Landscape Units (SLUs) mapped in the Cooke Hill Land System:

SLU	% of area	Main features #
ADD	2.1	Steep very rocky slopes and ridges formed on Milendella Limestone. Slopes are 30-100%, and relief is up to 70 m. The ridges are dissected at right angles by well defined water courses in narrow gullies. Main soils are: shallow loam over calcrete - **B3** (E) and shallow calcareous loam - **A2** (E), with shallow stony loam - **K1** (L). This land is extremely steep and rocky, with virtually no vehicular access. It is suited to rough grazing only.
AKA AKB AKC AKD AKI AKL AKY	0.3 9.2 41.4 27.8 7.6 0.2 3.0	Rough low hills and hills formed on metasandstones of the Backstairs Passage Formation and mixed metasiltstones and metagreywackes of the Carrickalinga Head Formation, with minor Milendella Limestones and Heatherdale Shales in the east. There is extensive rock outcrop and surface stone, particularly on steeper dissection slopes. **AKA** Rises up to 20 m high with slopes of 4-8%. **AKB** Rounded rises to 30 m high with slopes of 10-20%. **AKC** Rounded hills to 120 m high with slopes of 10-30% and minor water course erosion. **AKD** Steep very rocky dissection slopes of 20-100% and up to 100 m high, usually associated with incised water courses which are eroded in places. **AKI** Low hills with a well developed dissection pattern. Relief is up to 50 m and slopes are 15-30%. Water courses are commonly eroded. **AKL** Very steep eroded slopes. **AKY** Broad rounded crests (summit surfaces) with extensive rock outcrop and surface stone. Slopes are less than 10%. Main soils: hard sandy loam over red or brown clay - **K3/D1** (E) and shallow stony sandy loam - **L1a** (E), with shallow stony loam - **K1** (C), shallow loam over calcrete - **B3** (M) and shallow calcareous loam (M) in the east and hard sandy loam over dispersive red clay - **D7** (M) in the north. This land is very rocky with shallow soils and although small areas have sufficient soil depth for cropping, most of the land is only suited to rough grazing. The soils are highly erodible, so preservation of protective surface cover is essential.
AgC	1.0	Rocky moderately steep low hills up to 100 m high with slopes of 15-30% formed on granitic rocks. Watercourses are narrow and commonly gullied. Main soils are loamy sand over sandy clay - **K4** (E), and shallow stony loamy sand - **L1b** (E). This land is moderately steep and stony, with low water holding capacity, low fertility soils. It has rough grazing value only.
ETC ETD ETI	2.5 0.3 2.1	Slopes formed on metasandstones of the Backstairs Passage Formation and mixed metasiltstones and metagreywackes of the Carrickalinga Head Formation. **ETC** Semi arable slopes of 4-10% with 20% rocky outcrop. **ETD** Moderate slopes of up to 15% with 20% rock outcrop. **ETI** Moderate slopes of 8-18% with 20% rock outcrop and eroded water courses. Main soils: shallow stony sandy loam - **L1a** (E) and hard sandy loam over red or brown clay - **K3/D1** (E). This land is semi arable, with about a third of the area too steep and / or rocky for cultivation. The arable strips have generally shallow stony soils with restricted water holding capacity and which are prone to erosion because of the moderate slopes and high runoff.
LCe	0.2	Drainage depressions formed on gritty sandy clay and sandy alluvium derived from the adjacent sandstone rises and hills. Water courses are commonly eroded, and there are isolated saline seepages. Main soil: sandy loam over brown clay - **F2/F1** (D). Surface soils are sandy, stony and infertile with high acidification potential. Subsoils have low permeability, causing subsurface waterlogging. Run on water from steeper adjacent slopes creates an erosion hazard in water courses.

LVE LVJ	0.5 1.1	Valley flats and drainage depressions formed on coarse to medium grained, and usually gravelly alluvial sediments derived from coarse grained rocks. Watercourses are well defined and commonly eroded. **LVE** Creek flats with well defined but generally stable water courses. **LVJ** Creek flats with eroded water courses. Main soils: sandy alluvial soil - **M1** (V) and sandy loam over brown clay - **F2/F1** (C). These soils are deep but infertile with variable drainage conditions depending on presence of and depth to a clay layer. The occurrence of these landscapes as narrow strips of land with significant watercourses reduces their potential use. Control of water course erosion is a key element of management.
LZH	0.7	Pediments formed on mixed outwash sediments and basement rock highs. Slopes are 5-20%. Water course erosion is common. Main soils: sandy alluvial soil - **M1** (E) and sandy loam over brown mottled clay - **F2/F1** (E) on outwash sediments, with hard sandy loam over red or brown clay - **K3/D1** (L) and shallow stony loam - **K1** (M).

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:

Soils formed on basement rock

A2 Shallow calcareous loam (Paralithic, Calcic / Supracalcic Calcarosol)
15 - 20 cm calcareous loam overlying soft to rubbly carbonate grading to basement rock at 55 cm. Limited to the lower rainfall parts of the System.

B3 Shallow loam over calcrete (Petrocalcic, Leptic Tenosol)
10 - 30 cm hard loam directly overlying sheet calcrete capping calcareous basement rock. Limited on calcareous rock strata on the eastern side.

D7 Sandy loam over dispersive red clay (Calcic, Red Sodosol)
15 - 40 cm hard quartz gravelly sandy loam to clay loam abruptly overlying a coarsely structured dispersive red clay, calcareous from 45 cm grading to weathering quartzite, metasandstone or metasiltstone at 80 cm.

K1 Shallow stony loam (Lithic, Leptic Tenosol or Eutrophic, Red Dermosol)
10 - 25 cm hard stony loam to clay loam, sometimes grading to a well structured red clay loam to light clay, over weathering siltstone or phyllite at 55 cm. Common on fine grained rocks on the eastern side of the System.

K3/D1 Hard sandy loam over red or brown clay (Eutrophic / Calcic, Red / Brown Chromosol / Sodosol)
15 - 30 cm stony sandy loam abruptly overlying a stony red or brown mottled sandy clay to clay grading to weathering metasandstone at 80 cm. 50% of profiles have soft carbonate from 45 cm. Extensive throughout.

K4 Loamy sand over sandy clay on granite (Mesotrophic, Brown Chromosol)
Thick gritty and gravelly sandy surface soil overlying a brown or red gritty sandy clay loam to sandy clay, grading to weathering granitic rock by 70 cm.

L1a Shallow stony sandy loam (Lithic Rudosol)
20 - 40 cm very stony sandy loam directly overlying hard metasandstone. Extensive throughout, and particularly on steeper, rocky slopes.

L1b Shallow stony soil on granite (Lithic, Leptic Rudosol)
Thick gritty sandy to sandy loam with quartz and granitic stones throughout, grading to weathering granitic rock within 50 cm.

Soils formed on alluvium

F2/F1 Sandy loam over brown mottled clay (Brown Sodosol / Chromosol)
Thick sandy loam with a bleached A2 layer abruptly overlying a brown mottled sandy clay loam to clay continuing below 100 cm. Limited to creek flats and lower slopes.

M1 Sandy alluvial soil (Brown Kandosol)
Very thick brown sand to loamy sand with a bleached and rusty mottled A2 layer over a brown clayey sand to light sandy clay loam grading to coarse gritty alluvium.

Further information: DEWNR Soil and Land Program