

MOC Moculta Land System

Undulating rises in the Duck Ponds Creek catchment

Area: 36.7 km²

Annual rainfall: 495 – 565 mm average

Geology: The Land System is underlain by metamorphosed siltstones and fine sandstones of the Tarcowie and Tapley Hill Formations on the western side and by phyllites and metamorphosed siltstones of the Carrickalinga Head Formation on the eastern side. These two sections are separated by a discontinuous ridge of Grampus Quartzite. There are sporadic remnants of deeply weathered Tertiary land surfaces, including Bastion Hill and possibly Parrott Hill. Locally derived fine to medium grained alluvium as valley fill occurs extensively in the Duck Ponds Creek valley. Soft secondary carbonate generally occurs in subsoils, but amounts appear to diminish towards the southeast.

Topography: The Moculta Land System includes the undulating section of the Duck Ponds Creek catchment. The landscape consists of undulating rises and low hills with slopes of less than 10%, and occasional steeper rocky ridges and crests. Duck Ponds Creek flows from the southeast to the north west. Watercourse erosion is characteristic of the land. There are minor saline seepages.

Elevation: 458 m in the south to 340 m where Duck Ponds Creek flows out of the system

Relief: Maximum relief is 50 m

Soils: Sandy loam to loam surface soils overlying red or brown clay subsoils are most common. Subsoil structure varies from finely aggregated and friable to hard, coarse and dispersive. The profiles may be moderately shallow over rock, or deep over alluvium.

Main soils

Soils formed on basement rock on rises

D1 Loam over red clay on rock (extensive on rises)

D7 Hard sandy loam over dispersive red clay on rock (common on rises)

K3 Acidic sandy loam over red or brown clay on rock (common on rises in the southeast)

Soils formed on alluvium on lower slopes and flats

D2/D3 Sandy loam over (dispersive) red clay (extensive on outwash fans and creek flats)

Minor soils

Soils formed on basement rock on rises

L1 Shallow stony sandy loam (common on rocky rises)

K1 Acidic gradational loam on rock (limited on rises in the southeast)

Soils formed on alluvium on lower slopes and flats

F1 Sandy loam over brown clay (limited on lower slopes in the southeast)

Main features: The Moculta Land System is characterized by mainly arable undulating rises. In the southeast is an area of rocky land with acid - neutral soils transitional to the higher rainfall areas, but elsewhere the land is dominated by hard setting red texture contrast soils with calcareous subsoils. All the soils of the System are prone to erosion, workability problems, poor water



retention and patchy crop emergence. Poor surface condition can be alleviated by the use of gypsum and modified surface management practices. Sporadic saline seepage appears to be associated with Tertiary remnants. Extensive watercourse erosion is a result of unsound management practices in the past.

Soil Landscape Unit summary: 14 Soil Landscape Units (SLUs) mapped in the Moculta Land System:

SLU	% of area	Main features #
AEC	1.5	Rocky low hills to 40 m high with slopes of 15-25% formed on Carrickalinga Head metasilstones and phyllites. Main soil: <u>shallow stony sandy loam</u> - L1 (D). This land is too steep and rocky for uses other than rough grazing.
ARC	1.5	Low ridges up to 20 m high formed on Grampus Quartzite with extensive surface stone and outcrop. Slopes are 10-20%. Main soils: <u>hard sandy loam over dispersive red clay on rock</u> - D7 (E) and <u>shallow stony sandy loam</u> - L1 (E). This land is too rocky for agricultural uses other than rough grazing.
AXC	0.4	Parrott Hill - an abrupt conical peak 45 m high with slopes of 20-40%. No inspections made but similar to other hills formed on ferruginised siltstone with red ironstone gravelly loamy soils. Parrott Hill has not been cleared.
CSC CSD CSH	6.1 3.6 2.2	Rises formed on metamorphosed siltstones and sandstones of the Carrickalinga Head Formation. 20-50% of the land is non-arable due to rocky outcrops and stone. CSC Rises with slopes of 4-10% and relief to 30 m. CSD Rises with slopes of 10-20% and relief to 30 m. CSH Rises with slopes of 4-10% and eroded watercourses. Main soils: <u>acidic sandy loam over red or brown clay on rock</u> - K3 (E), <u>acidic gradational loam on rock</u> - K1 (E) and <u>shallow stony sandy loam</u> - L1 (E). This land is rocky and only semi arable. Soils are moderately deep but have poorly structured surfaces and low fertility.
DBC DBH	9.9 6.3	Rises formed on phyllites and metamorphosed siltstones of the Carrickalinga Head Formation. DBC Rises and low hills up to 40 m high with slopes of 3-10%. DBH Slopes of 3-10% with eroded watercourses and minor saline seepage. Main soils: <u>loam over red clay on rock</u> - D1 (E) and <u>acidic sandy loam over red or brown clay on rock</u> - K3 (E). These soils are moderately deep and fertile but generally have poorly structured surfaces. They are prone to excessive runoff and erosion, may be difficult to work and can suffer from patchy crop emergence.
DHC DHD DHH	18.4 2.4 19.3	Rises formed on metamorphosed siltstones and fine sandstones of the Tarcowie and Tapley Hill Formations. DHC Rises to 30 m high with slopes of 3-8%. DHD Isolated moderately steep rises with slopes of 10-20%. DHH Rises and low hills to 50 m high with slopes of 3-10% and eroded watercourses. Main soils: <u>loam over red clay on rock</u> - D1 (E) and <u>hard sandy loam over dispersive red clay on rock</u> - D7 (E). Deep <u>sandy loam over (dispersive) red clay</u> - D2/D3 (M) occur on lower slopes. These soils are typically poorly structured and highly erodible, although inherently fertile. High runoff, poor workability and patchy crop growth can be expected. Use of gypsum and modified surface management practices will help alleviate the problem.
DJI	4.2	Dissected Tertiary remnant (Bastion Hill) comprising small plateaux, short steep breakaway slopes and dissection slopes of 5-20% with severely eroded watercourses. There is sporadic saline seepage associated with the breakaways. Main soils: <u>hard sandy loam over dispersive red clay on rock</u> - D7 (V) with <u>shallow stony sandy loam</u> - L1 (L). This land is only semi arable due to its slope and rockiness. The soils are highly erodible. Runoff control is essential to ensure that existing watercourse erosion is stabilized.



JGJ	19.5	Outwash fans and creek flats with slopes of 2-5% and eroded watercourses. Main soil: deep <u>sandy loam over (dispersive) red clay</u> - D2/D3 (D). These soils are deep and fertile but poorly structured. Gypsum and conservation tillage practices will help to improve surface structure and water retention, and reduce erodibility and surface sealing.
LYE	4.7	Complex of fans and creek flats formed on outwash sediments, and low rises formed on metasilstones. Slopes are 2-5%. Main soils: deep <u>sandy loam over brown clay</u> - F1 (E) on fans and flats, and <u>acidic sandy loam over red or brown clay on rock</u> - K3 (L), <u>acidic gradational loam on rock</u> - K1 (L) and <u>shallow stony sandy loam</u> - L1 (L) on rises. The soils are poorly structured and infertile. Saline seepage occurs in similar country to the south - soil and stream salt levels should be monitored.

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:

Soils formed on basement rock on rises

D1 Loam over red clay on rock (Calcic, Red Chromosol)

15 - 30 cm hard loam to sandy loam abruptly overlying a well structured red clay, calcareous from 55 cm, grading to weathering metasilstone or phyllite at 75 cm. Extensive on rises.

D7 Hard sandy loam over dispersive red clay on rock (Calcic, Red Sodosol)

10 - 35 cm hard loamy fine sand to sandy clay loam abruptly overlying a coarsely structured dispersive red clay, calcareous from 60 cm, grading to weathering metasandstone or metasilstone from 90 cm. Common on rises.

K1 Acidic gradational loam on rock (Eutrophic, Brown Kandosol)

15 - 20 cm loam grading to a brown weakly structured clay loam over weathering phyllite from 50 cm. Limited on rises in the south east.

K3 Acidic sandy loam over red or brown clay on rock (Eutrophic, Red / Brown Chromosol)

30 - 40 cm hard fine sandy loam abruptly overlying a well structured red or brown clay grading to weathering metasandstone from 50 cm. Common on rises in the south east.

L1 Shallow stony sandy loam (Lithic, Leptic Tenosol)

Up to 50 cm stony sandy loam directly overlying bedrock. Common on rocky rises.

Soils formed on alluvium on lower slopes and flats

D2/D3 Sandy loam over (dispersive) red clay (Calcic, Red Chromosol / Sodosol)

20 - 50 cm hard sandy loam abruptly overlying a red well structured (Chromosol) or coarsely structured and dispersive (Sodosol) clay, calcareous at depth, continuing below 100 cm in alluvium. Extensive on fans and creek flats.

F1 Sandy loam over brown clay (Eutrophic, Brown Chromosol)

20 - 50 cm hard fine sandy loam abruptly overlying a coarsely structured brown mottled clay, continuing below 100 cm in alluvium. Limited on lower slopes in the south east.

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

