BAD Baderloo Land System

Flats and adjacent outwash fans of Baderloo Creek valley

Area: 57.0 km^2

Annual rainfall 430 – 525 mm average

Geology: Fine to medium grained alluvium derived from basement rocks of the Saddleworth Formation and Appila Tillite. Basement rock underlies the alluvium and outcrops sporadically. Both sedimentary deposits and rocks are covered by a thin layer of fine grained aeolian carbonate.

Topography: The Land System includes the flats and associated fans of Baderloo Creek. It extends from Jamestown southwards between the Campbell Range to the west and Ward Hill Range to the east. The southern extremity of the system is at Washpool where the creek leaves the plain and enters a narrow valley in the Campbell Range. The flats have a steady fall of 0.5 - 1% to the south, but on either side of the creek, fans with slopes of up to 10% grade to the adjacent ranges. There are also isolated rises where basement rock protrudes through the sedimentary cover.

Elevation: 480 m in the headwaters to 350 m at Washpool

Relief: Maximum relief from creek flat to upper margin of outwash fan is 30 m. Basement rock rises are less than 10 m high.

Soils: The characteristic soils are hard red loams over clay, associated with deep gradational loams and some shallow loams on rises.

Main soils
Soils formed on alluvium
D2 Hard loam over red clay
D3 Hard sandy clay loam over poorly structured red clay
C3 Gradational loam, highly calcareous at depth
M2 Gradational loam, weakly calcareous at depth

Minor soils
Soils formed on alluvium
M1 Alluvial soil
Soils formed over weathering rock
C2 Shallow gradational loam
L1/A2 Shallow loam over rock

Main features: The land is flat to gently sloping with deep, inherently fertile and moderately well drained soils. Poor soil structure (particularly surface soil) is the main limitation with resultant water ponding, workability and emergence problems, and water erosion potential on the sloping fans. Dispersive subsoils causing more prolonged waterlogging occur in places. Salinity is the other significant feature of the Land System, with extensive areas in the north affected to the point of being non arable, and sporadic seepages occurring throughout.

Soil Landscape Unit summary: 8 Soil Landscape Units (SLUs) mapped in the Baderloo Land System:

SLU	% of area	Main features #
DCB	1.5	Low rises less than 10 m high and with slopes of 2-4% formed on fine grained basement rocks. Rocky reefs occupy 20% of the land surface. Main soils: shallow loam over rock - **L1/A2** (E) and shallow gradational loam - **C2** (E). These soils are moderately fertile, well drained and have moderate water holding capacities. The land is arable (except for the rocky outcrops). Gradients are gentle with a consequent slight potential for water erosion. Surface soils tend to set hard and seal over thus shedding water. Other limitations caused by poor structure are difficulty in working and patchy emergence.
JBC	8.9	Gently inclined fans with slopes of 3-8% abutting the Campbell Range on the western side of the Baderloo Creek valley. Watercourses are well defined and generally stable. Surface quartzite stones are common in places. Main soils: hard loam over red clay - **D2** (E) and hard sandy clay loam over poorly structured red clay - **D3** (E) formed on gravelly alluvium. Poor soil structure is the main limitation. They have hard setting, sealing surfaces which impede water infiltration. Poorly structured dispersive subsoils in D3 soils cause temporary waterlogging and impede root growth. The soils are highly erodible, and subject to significant run-on water from the higher and steeper land to the west.
JEA JEB JEC JEP JET	20.7 31.4 10.3 16.2 1.4	Flats and fans formed on alluvial sediments. **JEA** Flats with slopes of 1-2%. **JEB** Fans with slopes of 2-4% and well defined stable watercourses. **JEC** Fans with slopes of 4-10% and well defined stable watercourses. **JEP** Marginally saline flats with areas of saline seepage. Slopes are less than 1%. Artificial drains have been installed in places to assist in water removal. **JET** Saline drainage depressions with slopes of 1-2%. Main soils: hard loam over red clay - **D2** (E), hard sandy clay loam over poorly structured red clay - **D3** (E) and gradational loam - **C3/M2** (E) all formed over alluvium. The soils are deep, inherently fertile and generally moderately well drained. The main limitations are poor surface (and subsurface in places) structure, and salinity / waterlogging in the north. Poor surface structure reduces water infiltration resulting in increased erosion potential and surface waterlogging, working difficulty and poor seedling emergence. Dispersive subsoils in D3 soils cause more prolonged waterlogging. Salinity and waterlogging, particularly of low lying flats, drainage depressions and lower slopes, is extensive in the north (JEP, JET), and sporadic seepages occur elsewhere.
XJJ	9.6	Flats associated with the main Baderloo Creek watercourse. Slopes are less than 1%. The creek has a well defined channel with banks which have been eroded in the past but which are now generally stable. Main soils: alluvial soil - **M1** (E) and gradational loam - **C3/M2** (E), with hard loam over red clay - **D2** (L) and hard sandy clay loam over poorly structured red clay - **D3** (L). The soils are deep, inherently fertile and appear to be little affected by salinity. Localized waterlogging is a problem. Flooding may occur after prolonged heavy rain.

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:

D2 Hard loam over red clay (Calcic, Red Chromosol)
Medium thickness hard massive sandy loam to clay loam (most commonly loam), abruptly overlying a red well structured clay subsoil, calcareous with depth, grading to alluvium.

D3 Hard sandy clay loam over poorly structured red clay (Calcic, Red Sodosol)
Medium thickness hard massive sandy loam to clay loam (most commonly sandy clay loam), abruptly overlying a red poorly structured and dispersive clay subsoil, calcareous with depth, grading to alluvium.

C3 Gradational loam (Hypercalcic, Red Dermosol)
Medium thickness loam to clay loam grading to a well structured red clay with abundant fine carbonate at depth, grading to alluvium.

M2 Gradational loam (Calcic, Red Dermosol)
Medium thickness loam to clay loam grading to a well structured red clay with minor fine carbonate at depth, grading to alluvium.

M1 Alluvial soil (Regolithic, Red-Orthic Tenosol / Red Kandosol)
Deep sandy loam to clay loam with distinctive sedimentary layering. These soils are highly variable and are associated with recent alluvial deposition.

C2 Shallow gradational loam (Calcic, Red Dermosol)
Medium thickness loam to clay loam grading to a well structured red clay, calcareous with depth over weathering rock within 100 cm.

L1/A2 Shallow loam over rock (Paralithic Calcarosol OR Paralithic, Leptic Tenosol)
Medium thickness loam (sometimes calcareous) overlying either weathering rock (Tenosols) or fine to rubbly carbonate grading to rock (Calcarosols).

Further information: DEWNR Soil and Land Program