

# FAR Farrell Flat Land System

Flats and low rises of the Farrell Creek valley

**Area:** 86.9 km<sup>2</sup>

**Annual rainfall:** 455 – 545 mm average

**Geology:** The land system is formed on fine grained valley floor alluvium derived from the ranges which flank it on the western and eastern sides. The alluvial beds are apparently relatively thin as basement rock rises protrude through the sediments along the length of the valley. These rocks are mostly Saddleworth Formation siltstones, with interbedded Undalya Quartzites. Both alluvial sediments and rocks are mantled by soft aeolian carbonate, although it has been leached out in some soils.

**Topography:** The Farrell Flat Land System includes the salt affected flats of the Farrell Creek catchment and a portion of the Gum Creek catchment north of the junction of the two creeks. The System comprises a) a flat valley floor containing the main water course (Farrell Creek), b) very gently inclined outwash fans grading to the hilly Land Systems to the east and west, and c) isolated basement rock rises along the length of the valley. These account for 10 - 15% of the land area. Slopes are less than 3% except on the rises where they range from 2 - 15%.

**Elevation:** 420 m at the headwaters of Farrell Creek to 370 m where Gum Creek enters the Boorowie Land System. One of the basement rock rises has a maximum elevation of 440 m.

**Relief:** Maximum 50 m from the valley floor to the crest of a basement rock rise

**Soils:** Loamy red texture contrast soils are dominant, with gradational loams. They are generally deep, but there are shallow variants.

#### Main soils

- D3** Hard loam over dispersive red clay - extensive (flats and fans)
- D2** Hard silty loam over red clay - extensive (alluvial flats)
- C3** Red gradational loam - common (fans and low rises)

#### Minor soils

- D1** Hard loam over red clay on rock - rises
- E2/E3** Red / brown cracking clay - flats and fans
- A2** Calcareous loam - rises
- L1** Shallow stony loam - stony rises

**Main features:** The characteristic feature of the Farrell Flat Land System is impeded drainage on the flats, associated with saline seepage. The distribution of salinity is erratic, with wet salty patches closely associated with non saline soils. Most of the salt is associated with streams emanating from the ranges to the east. These areas are either marginally or non-arable, but are capable of supporting productive salt tolerant pastures. Substantial proportions of the flats and most of the outwash fans and rises are arable, with deep moderately fertile soils. Waterlogging and poor surface structure are problems on the dispersive texture contrast soils particularly, but gypsum and modified surface management can alleviate these conditions. Erosion is only likely to be a problem on the more undulating rises, and in creek flats.



**Soil Landscape Unit summary:** 7 Soil Landscape Units (SLUs) mapped in the Farrell Flat Land System:

SLU	% of area	Main features #
DAB	4.8	Rises < 10 m high with slopes of 2-6% formed on siltstones of the Saddleworth Formation. Main soils: <u>hard loam over red clay on rock</u> - <b>D1</b> (E) and <u>red gradational loam</u> - <b>C3</b> (E) formed over basement siltstones. These soils are moderately deep, fertile and well drained, with few limitations other than hard setting sealing surfaces.
DCC	8.0	Rises to 40 m high with slopes 5-15%; 5-10% rocky outcrops; up to 20% surface quartzite, formed on siltstones of the Saddleworth Formation with minor reefs of Undalya Quartzite. Main soils: <u>hard loam over red clay on rock</u> - <b>D1</b> (V) with <u>shallow stony loam</u> - <b>L1</b> (L) and <u>calcareous loam</u> - <b>A2</b> (L). This land is mostly arable except for steep rocky reefs. The main limitations are poor surface structure in the D1 soils which leads to excessive runoff and erosion, and shallow stony profiles (L1 and A2 soils) with low water holding capacities.
JAK JAL JAP Jaf JAg	32.2 30.0 9.2 15.1 0.7	Flats and outwash fans formed on clayey alluvium and characterized by extensive salinization and some water course erosion. <b>JAK</b> Flats with slopes of less than 1% and saline seepages occupying 2-5% of the area. <b>JAL</b> Gently inclined fans with slopes of 1-3%, sporadic saline seepages (less than 2%) and minor water course erosion. <b>JAP</b> Flats with slopes of less than 1% and marginal to moderate salinity affecting most of the land. <b>Jaf</b> Flats with slopes of less than 1%, marginal to moderate salinity affecting most of the land, and eroded water courses. <b>JAg</b> Gently inclined fans with slopes of 1-3%, marginal to moderate salinity affecting most of the land, and eroded water courses. Main soils: <u>hard loam over dispersive red clay</u> - <b>D3</b> (E), <u>hard silty loam over red clay</u> - <b>D2</b> (E), with <u>red gradational loam</u> - <b>C3</b> (L), <u>red / brown cracking clay</u> - <b>E2/E3</b> (M). Soils deep and inherently fertile, but productive capacity is diminished by poor structure and salinity. Hard setting surfaces and dispersive subsoils in dominant D3 soil type cause waterlogging, poor root growth and workability and emergence problems. Gradational soils and cracking clays are well structured and potentially highly productive. Development of salinity over significant areas of flats and lower slopes has reduced capacity of the land for cropping, but pasture productivity can be maintained with the use of appropriate grasses.

# 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** Calcareous loam (Paralithic Calcarosol)  
Calcareous loam grading to a very highly calcareous silty loam over weathering siltstone within 50 cm.
- C3** Red gradational loam (Calcic, Red Dermosol)  
Medium thickness loam to clay loam grading to a well structured red clay with soft carbonate at depth.
- D1** Hard loam over red clay on rock (Calcic, Red Chromosol)  
Medium thickness loam abruptly overlying a well structured red clay, calcareous with depth over weathering siltstone.
- D2** Hard silty loam over red clay (Calcic / Hypocalcic, Red Chromosol)  
Thick massive silty loam overlying a coarsely prismatic red clay with minor carbonate at depth.
- D3** Hard loam over dispersive red clay (Calcic, Red Sodosol)  
Thick hard brown silty loam to loam with a paler coloured or bleached A2 layer (often containing ironstone gravel), abruptly overlying a red (sometimes mottled) coarsely structured clay, usually with minor soft or nodular carbonate in the deep subsoil.
- E2/E3** Red / brown cracking clay (Red / Brown Vertosol)  
Dark reddish brown to dark brown cracking clay with variable soft carbonate in the subsoil.
- L1** Shallow stony loam (Paralithic, Leptic Tenosol)  
Medium thickness stony sandy loam to loam overlying basement rock within 50 cm.

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

