

KPW Kappowie Land System

Undulating rises and outwash fans between Caltowie and Tarcowie

Area: 56.8 km²

Annual rainfall: 445 – 500 mm average

Geology: Siltstones and minor interbedded limestones and quartzites of the Tapley Hill Formation on rising ground, with thick alluvial clays and sandy clays on gently sloping fans and drainage depressions. Both rocks and sediments are mantled by fine windblown carbonate which has hardened to calcrete in places.

Topography: The Land System comprises a series of basement rock rises and low hills, dissected by watercourses which widen to broad outwash slopes (fans). Slopes on the rises are generally less than 10%, but reach 20% in places. Fan slopes range from 2% to 7%. Linear rock outcrops occur sporadically on rising ground, and there is patchy surface stone cover. There is no outcrop on the fans, but surface stone is common on the steeper slopes adjacent to the rises. Watercourses are commonly eroded.

Elevation: 400 m on fans in the south west, grading to 670 m on basement rock highs in the north east

Relief: Maximum relief is 50 m, but is generally less than 30 m

Soils: Shallow loam and loam over clay soils dominate the rising ground, while deep loam over clay and gradational soils are extensive on flats.

Main soils

Soils on rises formed on basement rocks

A2 Shallow calcareous loam on rock

Soils on lower slopes and flats formed on alluvium or deeply weathered rocks

D2 Hard loam over red clay

C3 Gradational loam

A3 Deep calcareous loam

Minor soils

Soils on rises formed on basement rocks

C2 Gradational loam on rock

D1/D7 Hard loam over (dispersive) red clay on rock

L1 Shallow stony loam

Soils on lower slopes and flats formed on alluvium or deeply weathered rocks

D3 Hard loam over dispersive red clay

Main features: The Kappowie Land System is fully arable and used for rotational grazing and cropping. It is characterized by basement rock rises with mainly shallow calcareous soils which are moderately fertile and well drained, but which generate substantial runoff. This flows via well defined watercourses, which are commonly eroded, on to outwash fans characterized by hard setting texture contrast soils. This land is prone to sheet and rill erosion due mainly to the poor structural characteristics of the surface, and the dispersive nature of the subsoils in sodic profiles.



Soil Landscape Unit summary: 12 Soil Landscape Units (SLUs) mapped in the Kappowie Land System:

SLU	% of area	Main features #
EGB EGC EGD EGI	2.8 20.2 1.4 11.6	Rises and low hills formed on basement siltstones. EGB Rises with slopes of 1-4%. EGC Slopes and rises with slopes of 3-10% and up to 5% rocky outcrop. EGD Upper slopes and crests with slopes of 10-20% and up to 5% rocky outcrop. EGI Rolling rises and footslopes (10-20%) with eroded watercourses. Main soils: <u>shallow calcareous loam on rock</u> - A2 (V), with <u>hard loam over red clay on rock</u> - D1/D7 (L) and <u>gradational loam on rock</u> - C2 (L). The land is fully arable (except for minor outcrop), although moisture shortages limit crops in dry finishes. Reduction of water loss and erosion through runoff is the main management issue, together with fertility maintenance. "Lime - induced" nutrient deficiencies are probable on calcareous soils.
ESD ESI	2.1 3.7	Rises and low hills with 10-20% rocky outcrops. ESD Slopes of 8-20% with generally uneroded water courses. ESI Slopes of 8-20% with eroded watercourses. Main soils: shallow <u>gradational loam on rock</u> - C2 (E) and <u>calcareous loam on rock</u> - A2 (E) formed over siltstone and containing variable amounts of soft and rubbly carbonate. <u>Shallow stony loam</u> - L1 (L) occurs in rocky areas. Rocky reefs, shallow stony soils and sometimes moderate slopes limit cropping of these areas. The arable land is generally confined to strips between the reefs of rock. Water erosion is a potential problem because of the high runoff from the shallow soils and rocky areas.
EZC	9.1	Undulating footslopes characterized by stony rises formed on basement rocks, separated by shallow valleys underlain by alluvium. Slopes are 4-10%. Main soils: <u>calcareous loam on rock</u> - A2 (E) on rises, and deep <u>hard loam over red clay</u> - D2 (C) and <u>deep calcareous loam</u> - A3 (C) in valleys. The land is fully arable, although uneven due the complex landscape pattern of rises and valleys. Water erosion potential is the chief limiting factor. Shallow calcareous soils on rises are prone to early moisture deficit and fertility problems. The deeper soils of the valleys are susceptible to surface structural problems. Subsoil salinity is moderate throughout.
JDC JDG JDH JDHA JDJ	2.4 30.0 9.4 5.3 2.0	Gently inclined outwash fans and drainage depressions formed on locally derived alluvium. JDC Slopes 3-6%. JDG Slopes 2-3%, eroded watercourses. JDH Slopes 3-7%, eroded watercourses. JDHA Slopes 3-7%, severe water course erosion. JDJ Drainage depressions with eroded watercourses. Main soils: deep <u>hard loam over red clay</u> - D2 (E) and <u>gradational loam</u> - C3 (E) with smaller areas of <u>hard loam over dispersive red clay</u> - D3 (L) and <u>deep calcareous loam</u> - A3 (L). Except for the areas immediately adjacent to watercourses, the whole unit is arable. Hard setting surface soils are the main management problem, because of their adverse effects on runoff / erosion, workability, seedling emergence, and moisture retention. Most soils are reasonably fertile, deep and moderately well drained.

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 over rock (Paralithic, Calcic / Lithocalcic Calcarosol)
Medium thickness calcareous loam over soft (Calcic or Hypercalcic) to rubbly (Supracalcic or Lithocalcic) carbonate grading to weathering siltstone within 100 cm. In 10% of soils the carbonate layer is in sheet rock form.
- A3** Deep calcareous loam (Regolithic, Calcic Calcarosol)
Medium thickness calcareous loam grading to a weakly structured clay loam to light clay with minor fine carbonate from about 70 cm grading to alluvium.
- C2** Gradational loam on rock (Hypercalcic / Supracalcic, Red Dermosol)
Medium thickness loam to clay loam grading to a well structured red clay with soft (occasionally rubbly) carbonate at depth, overlying weathering rock within 100 cm.
- C3** Gradational loam (Hypercalcic / Supracalcic, Red Dermosol)
Medium thickness loam to clay loam grading to a well structured red clay with soft (occasionally rubbly) carbonate at depth overlying alluvium.
- D1/D7** Hard loam over (dispersive) red clay on rock (Calcic, Red Chromosol / Sodosol)
Medium thickness hard massive sandy loam to clay loam abruptly overlying a red clay subsoil grading to soft carbonate overlying weathering rock. Chromosols have well structured friable clay subsoils whereas in the Sodosols the clays are poorly structured and dispersive.
- D2** Hard loam over red clay (Calcic, Red Chromosol)
Medium thickness hard massive sandy loam to clay loam abruptly overlying a well structured friable red clay grading to soft carbonate overlying alluvium.
- D3** Hard loam over dispersive red clay (Calcic, Red Sodosol)
Medium thickness hard massive sandy loam to clay loam abruptly overlying a poorly structured and dispersive red clay grading to soft carbonate overlying alluvium.
- L1** Shallow stony loam (Lithic, Leptic Tenosol / Rudosol)
Shallow stony loam grading to hard basement rock within 50 cm.

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

