

KIN Kinchina Land System

Undulating rises east of Monarto

Area: 59.3 km²

Annual rainfall: 350 – 405 mm average

Geology: The geological setting is complex. Granites are the characteristic feature of the landscape, shaping its topography and outcropping in places, particularly adjacent to watercourses. Remnant Tertiary age sediments are extensive between the outcrops, presumably deposited when the land was at least partly submerged. These sediments include clayey sands and sandy clays (commonly called Parilla Sands) and Blanchetown Clay. These sediments are capped by windblown carbonates which have hardened in places to form calcretes. Reworking by wind of coarse grained materials (granites and Tertiary sands) produced sandhills and sand spreads. Localized erosion and deposition of granitic materials produced gritty sandy clay outwash sediments on lower slopes. Creek flats associated with modern water courses are characterized by sandy sediments.

Topography: The landscape comprises gently undulating rises with slopes of up to 5%. Granite outcrops are the dominant features of the land surface. These tend to occur in clusters of large rounded boulders. Elsewhere there are calcrete outcrops and associated surface stones. Two major watercourses flow through the System from west to east. These are Preamimma Creek in the north and Rocky Gully Creek in the south. These are not deeply incised, but are typically flanked by granitic outcrop. Occasional low to moderate east-west oriented sandhills are draped over the rises.

Elevation: 70 – 140 m

Relief: 10 – 40 m

Typical soils: There is a variety of soils reflecting the range of geological materials and amounts of residual carbonate. Most soils are sandy. Those formed over granitic rocks are gritty, often with red clayey subsoils, and sometimes calcareous throughout. Where there is Tertiary sedimentary cover, bleached sands are dominant, often with sodic clay subsoils.

Main soils

Soils formed on Tertiary sediments

G4b Sand over sandy clay
H3 Deep siliceous sand on ridges of reworked sand

Soils formed on granitic rocks

D1/K3 Loamy sand over red sandy clay
L1 Shallow stony loamy sand

Minor soils

Soils formed on granitic rocks

C2/A2 Gradational sandy loam
G4a Sand over sandy clay on rock



*Soils formed on granitic outwash sediments***D2/C1** Loamy sand over red sandy clay*Soils formed on Tertiary sediments***D2/C3** Sandy loam over red clay**A6** Calcareous sandy loam**F2** Sandy clay loam over heavy clay*Soils formed on calcrete***B2/B3** Shallow loamy sand on calcrete*Alluvial plains and creek flats***D3** Sandy loam over red clay**M1** Deep loamy sand**Main features:**

The Kinchina Land System is a landscape of gently undulating rises characterized by a variety of soils reflecting the complexity of the underlying geology. The most common are shallow to moderately deep gritty loamy sands formed on granites, sand over clay soils, deep sands, loamy soils with well structured clayey subsoils, and shallow stony sands over calcrete. Most of the land, except for depressions with heavier soils, is infertile and prone to wind erosion if exposed. Low waterholding capacity is a limitation on shallow soils on granite or calcrete. Boron toxicity and subsoil salinity is limiting in soils formed on Blanchetown Clay.

Soil Landscape Unit summary: 17 Soil Landscape Units (SLUs) mapped in the Kinchina Land System:

SLU	% of area	Main features #
DgA DgB	1.7 18.7	Flats and rises underlain by granite within 100 cm of the surface. There is sporadic rock outcrop, but less than 10%. There is variable surface stone. DgA Flats with slopes of less than 2%. DgB Rises with slopes of 2-5%. Main soils: <u>loamy sand over red sandy clay - D1/K3</u> (V), with <u>shallow stony loamy sand - L1</u> (L) associated with rocky areas, and deep <u>loamy sand over red sandy clay - D2/C1</u> (L) on lower slopes. These soils are moderately deep to shallow, gritty and gravelly with consequent restricted waterholding capacity and low fertility. They are well drained but susceptible to both wind and water erosion if exposed.
EgB	12.4	Undulating rises formed on granitic rocks and gneisses, mantled by carbonates. There is minor surface stone. Slopes are 2-4%. Main soils: <u>gradational sandy loam - C2/A2</u> (V) with <u>loamy sand over red sandy clay - D1/K3</u> (L), and <u>shallow stony loamy sand - L1</u> (L). The soils are generally moderately shallow with restricted water holding capacities and marginal inherent fertility. They are well drained and slightly susceptible to wind erosion.
EtB	8.4	Rises dominated by granitic outcrops, which may occupy up to 50% of the land surface. These landscapes are most common adjacent to watercourses where dissection has exposed the underlying rocks. Main soil: <u>shallow stony loamy sand - L1</u> (D). This land is only semi arable due to the extent of rocky outcrop and shallow soils. It has very limited production potential, but is ideal for revegetation, shelter and conservation.
GGB	34.2	Undulating rises underlain by Tertiary sandy clays and clayey sands. Slopes are 2-5%. There are occasional granite outcrops. Main soils: <u>sand over sandy clay - G4b</u> (E) and <u>sand over sandy clay on rock - G4a</u> (E), with <u>deep siliceous sand - H3</u> (L) on sandy rises. These soils are infertile and prone to water repellence and wind erosion. The dispersive clayey subsoils impede water movement; so perched watertables develop in wet winters. Root growth is impeded to some extent in these subsoil clays.
HEA	3.8	Flats and depressions underlain by Tertiary sandy clays or weathering granite. Main soils: <u>sandy loam over red clay - D2/C3</u> (E), with <u>loamy sand over red sandy clay - D2/C1</u> (E) on granitic material and <u>calcareous sandy loam - A6</u> (L). These soils are deep, moderately fertile, erosion resistant and generally well drained. They are productive



		cropping soils. Possible limitations include subsoil boron and salinity.
HHK	0.4	Depression underlain by Tertiary sandy clays. Main soils: <u>sandy loam over red clay</u> - D2/C3 (E) and <u>calcareous sandy loam</u> - A6 (C), with <u>shallow loamy sand on calcrete</u> - B2/B3 (C) on low stony rises. These soils are mostly deep and inherently fertile, but the land is subject to waterlogging and subsoil salinity, which limit its productive potential. The stony rises are not wet, but land use is affected by low moisture holding capacity.
IVA IVB	1.1 3.7	Flats and rises underlain by Tertiary sandy clays and highly weathered basement rocks. There is minor surface calcrete. IVA Flats and depressions. IVB Low rises with slopes of 2-3%. Main soils: <u>calcareous sandy loam</u> - A6 (E), with <u>sandy loam over red clay</u> - D2/C3 (C) and <u>shallow loamy sand on calcrete</u> - B2/B3 (L) on stony patches. These soils are moderately deep (except the calcrete soils), and fertile, although subject to lime induced deficiencies. Drainage is good and erodibility is moderately low. Subsoil boron and salt levels are likely to be elevated, otherwise they are potentially productive soils.
JnB	5.4	Flats and alluvial fans with slopes of up to 3%, formed on gritty granitic outwash sediments, or deeply weathered granite. Watercourses are well defined but stable. There is minor surface granite. Main soils: deep <u>sandy loam over red clay</u> - D3 (V), with <u>loamy sand over red sandy clay</u> - D2/C1 (E). These soils are usually deep, moderately fertile and well drained. There is a tendency to hard setting, with associated runoff, erosion and workability problems, but subsoil boron and salinity are unlikely to be significant.
O-B O-C	3.9 1.4	Linear sandhills formed on Molineaux Sand. O-B Moderate sandhills. O-C Low sandhills. Main soils: <u>deep siliceous sand</u> - H3 (V), with <u>sand over sandy clay</u> - G4b (C). These soils are deep and well drained (G4b moderately well drained), but highly infertile, and subject to water repellence and wind erosion. Potential for dryland agriculture is low but they are suitable for well managed irrigated enterprises.
QOB	1.7	Undulating stony rises overlain by low sandhills and separated by closed depressions. Main soils: <u>shallow loamy sand on calcrete</u> - B2/B3 (V) on stony land, <u>deep siliceous sand</u> - H3 (L) and <u>sand over sandy clay</u> - G4b (M) on sandhills, and <u>sandy loam over red clay</u> - D2/C3 (L) in depressions. This complex area has features in common with QVB (rises), O-C (sandhills) and HEA (depressions).
QVB	0.5	Low stony rises formed on calcrete. There is 20% or more surface stone and areas of sheet rock at the surface. Main soil is <u>shallow loamy sand on calcrete</u> - B2/B3 (D). The land is essentially non arable due to shallow stony soils and rock.
THA	0.1	Depressions underlain by Blanchetown Clay, with gilgai microrelief. Main soil: <u>sandy clay loam over heavy clay</u> - F2 (V) with <u>sand over sandy clay</u> - G4b (C). Imperfectly drained and affected by high soil salinity and boron levels. Although arable, productivity is limited.
XBK XBN	0.8 1.8	Creek flats formed on modern alluvium and dominated by eroded watercourses, which are variably salinized. XBK Creek flats with eroded watercourses. XBN Salinized creek flats with eroded watercourses. Main soils: <u>deep loamy sand</u> - M1 (V) with <u>sandy loam over red clay</u> - D3 (L). These soils are deep and moderately fertile but the fragility of the watercourses due to past erosion, potential erosion and salinity limits their productive potential.

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 granitic rocks****D1/K3** Loamy sand over red sandy clay (Hypocalcic, Red Chromosol / Sodosol)

Medium thickness soft gritty sand to sandy loam abruptly overlying a massive red sandy clay, with variable (often none) soft carbonate from about 35 cm, grading to weathering granite at about 90 cm.

L1 Shallow stony loamy sand (Paralithic, Leptic Rudosol)

Medium to thick gravelly gritty sand to sandy loam overlying weathering granite at less than 40 cm.

C2/A2 Gradational sandy loam (Calcic, Red Kandosol / Paralithic, Calcic Calcarosol)

Medium thickness (calcareous) loamy sand to sandy loam grading to a highly calcareous reddish sandy clay loam to light clay forming in weathering granite or gneiss at about 80 cm.

G4a Sand over sandy clay on rock (Calcic, Grey Sodosol)

Medium thickness soft grey sand abruptly overlying a grey or brown mottled hard columnar structured sandy clay, calcareous with depth, grading to weathering granite within 100 cm.

Soils formed on granitic outwash sediments**D2/C1** Loamy sand over red sandy clay (Calcic, Red Chromosol / Kandosol)

Thick sand to sandy loam overlying a weakly structured red sandy clay to clay, with soft carbonate at depth. Soil continues below 150 cm.

Soils of sand ridges**H3** Deep siliceous sand (Arenic, Bleached-Orthic Tenosol)

Very thick bleached sand, organically darkened at the surface grading to a yellow sand with variable deep subsoil including loose pale sand, compact clayey sand to sandy clay loam or carbonate segregations.

Soils formed on Tertiary sediments**G4b** Sand over sandy clay (Calcic, Brown Sodosol)

Medium to thick loose grey sand with a bleached A2 layer, sharply overlying a columnar structured sandy clay loam to sandy clay, calcareous from about 60 cm and grading to Tertiary clayey sand, sandy clay or clay.

D2/C3 Sandy loam over red clay (Hypercalcic, Red Chromosol / Dermosol)

Medium thickness loamy sand to hard sandy clay loam abruptly overlying a red well structured clay with abundant soft carbonate from about 30 cm. This grades to sandy clay from about 100 cm.

A6 Calcareous sandy loam (Regolithic, Hypercalcic Calcarosol)

Medium thickness calcareous loamy sand to sandy clay loam, becoming more clayey and calcareous with depth over clayey Class I carbonate at about 30 cm. This grades to sandy clay from about 100 cm.

F2 Sandy clay loam over heavy clay (Calcic, Brown Sodosol)

Thin sandy clay loam sharply overlying a coarsely structured brown and grey mottled clay, calcareous with depth grading to Blanchetown Clay within 50 cm.

Soils formed on calcrete**B2/B3** Shallow loamy sand on calcrete (Petrocalcic Calcarosol / Petrocalcic, Leptic Tenosol)

Medium thickness loamy sand (often calcareous) with variable calcrete stone content over sheet or rubbly calcrete. This softens with depth to a white rubbly clayey sand to sandy clay loam which may be metres thick, but usually overlies Blanchetown Clay.

Alluvial plains and creek flats**D3** Sandy loam over red clay (Calcic, Red Sodosol)

Medium to thick hard red brown loamy sand to loam abruptly overlying a coarsely structured red clay, with variable fine carbonate from about 50 cm, grading to alluvial sandy clay to clayey sand.

M1 Deep loamy sand (Stratic Rudosol / Regolithic, Red-Orthic Tenosol)

Very thick sand to sandy loam with alluvial layering and gravel seams.

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

