BIN Binnum Land System

Area: 199.8 km^2

Annual rainfall: 550 – 570 mm average

Geology: Fluvial clayey sands and clays of the Pliocene Parilla Sand underlie the landscape. Aeolian derived, pale siliceous sands of the Pleistocene-Holocene Molineaux Sand overlie them. The land system is underlain by pale yellow quartz sand of inland dunes and spreads.

Landscape: This Land System is bounded on the western side by the Naracoorte Range, a moderately steep old coastal ridge up to 30 m relief with slopes up to 40%. This Land System is a complex of sand dune and rises interspersed with sand plains and heavier flats. Swamps are a minor component of this land system and are found in the sand plain areas. The sand dunes and rises are at risk of wind erosion and are prone to water repellence, as are the sandy flats.

Elevation: 70 - 100 m

Relief: Maximum relief is 30 m

Soils: The characteristic soils are deep sands and sand over clay soils.
The main soil groups are:

Sand dunes and sandy rises (main soils)
H3 Deep bleached sand
G2 Sand grading to sandy clay loam
G3 Thick sand over clay
Stony rises (minor soils)
B6 Shallow loam over red-brown clay on calcrete
B3 Shallow sandy loam over calcrete
RR Outcropping of calcrete
B7 Shallow sand over clay on calcrete
Sandy undulating flats (main soils)
G3 Thick sand over clay
G4 Sand over dispersive brown clay
F2 Sandy loam over dispersive clay
F1 Sandy loam over clay
Heavy undulating flats (minor soils)
N3 Wet soil
M2 Deep clay loam over clay
E3 Hard, cracking grey clay

Main features: The Binnum Land System is a complex with two distinct components. Firstly, the Small sand dune complexes that generally run in a NW-SE direction which are well drained, are of low fertility, prone to water repellence and soil acidity. The associated stony rises are well-drained, shallow and moderate fertility. Secondly, are the undulating plains with associated swamps and sandy rises. The soils range from deep sand with low fertility to shallow and deep sand to sandy loam over clay soils which impede drainage, with heavier soils in the low lying areas with poor drainage.

Soil Landscape Unit summary: 22 Soil Landscape Units (SLUs) mapped in the Binnum (BIN) Land System:

SLU	% of area	Main features
ONF ONI ONJ	0.5 1.8 1.3	Sandy complex with up to 90% low sand dunes and sand dunes. The dunes generally run east-west, with sandy flats interspersed. Stony rises are limited and usually occur on the western side of the sand rise. Relief is up to 30 m. **ONF** 60-90% sand dune or sandy rise coverage **ONI** 30-60% sand dune coverage **ONJ** 30-60% low dunes and sandy rise coverage Main soils: Deep bleached sand - **H3**, sand grading to sandy clay loam - **G2**, thick sand over clay - **G3**. These soils are deep with low fertility. Severe water repellence and soil acidity is a limitation for pasture and crop growth and is susceptible to wind erosion. The minor soils include outcropping of calcrete - **RR**, shallow sandy loam over calcrete - **B3**, shallow loam over red-brown clay on calcrete - **B6** and shallow sand over clay on calcrete - **B7**. The land is semi-arable as these soils are very shallow and/or stony and have moderately-low-to-low water holding capacity.
OQF OQG OQI OQJ OQt	19.4 3.3 1.5 7.0 1.9	Sandy complex with up to 90% low sand dunes and sand dunes. The dunes generally run east-west with sandy flats interspersed. This unit has minor depressions. **OQF** 60-90% sand dune or sandy rise coverage **OQG** 60-90% low dunes and sandy rise coverage **OQI** 30-60% sand dune coverage **OQJ** 30-60% low dunes and sandy rise coverage **OQt** 30-60% low dunes and sandy rise coverage with wet, non-saline swales Main soils : ***Sand dunes:*** deep bleached sand - **H3**, sand grading to sandy clay loam - **G2**, thick sand over clay - **G3**. These soils are deep with low fertility. Severe water repellence and soil acidity is a limitation for pasture and crop growth and is susceptible to wind erosion. ***Swales:*** sand over clay - **G4** and sandy loam over clay- **F2**. These soils are deep and moderately low fertility and moderate limitation for root growth and waterlogging.
PCA PCB PCb PCi	0.5 1.4 4.2 0.3	Level plains to gently undulating plains in the western part of the land system between sandy rises and dunes. **PCA** Level plains **PCB** Undulating rises **PCb** Undulating rises with 10-30% sand dunes **PCi** Level plains with 10-50%non-saline swamps Main soils: Thick sand over clay - **G3**, sand over clay - **G4**, wet soil - **N3** with deep bleached sand - **H3**, sand grading to sandy clay loam - **G2** and thick sand over clay - **G3** on the sandy rises. These soils are deep and have moderately low to low fertility. The plain soils will have water repellence and slight limitations to root growth due to poorly structured subsoil clays. Soil acidity may also be a slight limitation on all soils. The rises are limited by severe water repellence, low fertility and susceptibility to wind erosion.
PQA	2.3	Level plains with <10% swamps. Main soils: Sandy loam over poorly structured clay- **F2**, clay loam over clay - **M2** with cracking grey clay - **E3** and wet soil - **N3** in the swamps. These soils are deep and have moderate fertility but dispersive subsoils causes high limitation for free drainage and root growth. Waterlogging will be a slight limitation as will soil acidity.
PRA PRB PRa PRi	6.4 8.6 17.0 12.7	Level plains to gently undulating plain complexes with sand dunes and swamps surrounding sand dune complexes. **PRA** Level plain to gently undulating plains **PRB** Gently undulating plains to rises **PRa** Level plain to gently undulating plains with 10-30% sand dunes and <10% swamps **PRi** Level plain to gently undulating plains with 10-50% non-saline swamps Main soils: Thick sand over clay - **G3**, sand over clay - **G4** on the plains and rises with deep bleached sand - **H3**, with sandy loam over clay - **F1** and wet soil - **N3**. These soils are moderately deep to deep and have moderately low fertility. The deeper

		sandy soils have limitations including water repellence, soil acidity and moderately low potential for wind erosion. The medium thickness sand over clay soils, especially on the plains, may have slight limitation to root growth and the soils are imperfectly drained.
PWA	1.4	Level plain with <10% swamps. Main soils: thick sand over clay - **G3** and sand over clay - **G4** with sandy loam over poorly structured clay- **F2**. The soils are deep with moderate to high water holding capacity. Their limitations are moderately low fertility and wind erosion susceptibility. The low lying areas may have some restriction to root growth with dispersive subsoil clay and susceptibility to waterlogging.
PXA	0.4	Level plain with <10% swamps with heavy soils to the west of the land system adjoining the Naracoorte Range. Main soils: sand over clay - **G4**, sandy loam over poorly structured clay- **F2**, grey cracking clay - **E3** and wet soil - **N3**.
PYA PYB PYaa	3.7 2.3 2.2	Gently undulating plains to gently undulating rises with sand dunes and swamps. **PYA** Gently undulating plain with <10% swamps **PYB** Undulating rises with <10% swamps **PYaa** Undulating plain with 10-30% sand dunes and 10-50% non-saline swamps. Main soils: sand over clay - **G4**, sandy loam over poorly structured clay- **F2**, deep bleached sand - **H3**, sand grading to sandy clay loam - **G2**, grey cracking clay - **E3** and wet soil - **N3**. These soils are deep and have moderate to low fertility depending on elevation. The deep sandy soils limitations are soil acidity, water repellence, rapid drainage and susceptibility to wind erosion while the shallow sand over clay and swampy soils limitations include root growth due to dispersive subsoil clay, susceptibility to waterlogging and soil acidity.

Detailed soil profile descriptions:

B3 Shallow stony loamy sand over calcrete (Petrocalcic, Leptic Tenosol)
Loamy sand to loam with variable rubble and slight clay increase with depth overlying calcreted calcarenite shallower than 50 cm.

B6 Sandy loam over red sandy clay on calcrete (Petrocalcic, Red Kandosol)
Medium thickness loamy sand with slight ironstone gravel overlying a weakly structured reddish brown sandy clay on calcarenite within 50 cm.

E3 Brown or grey cracking clay (Brown-Grey Vertosol)

F2 Sandy loam over poorly structured brown or dark clay (Brown-Dark Sodosol-Chromosol)
Topsoil <30 cm over a poorly structured subsoil. Loamy, often sandy loam, to clay loamy texture contrast soil with a sodic/dispersive/poorly structured brown clayey subsoil. Often sandy loam, usually with a bleached horizon, and thin topsoil over a poorly structured B.

G2 Bleached sand over sandy clay loam (sandy Brown-Red Chromosol)
Sandy texture contrast soil with a bleached A2 and a friable brown-red sandy clay loam to sandy loam subsoil.

G3 Thick sand over clay (Hypercalcic, Brown Sodosol/ Chromosol)
Thick bleached sand with an organically darkened surface abruptly overlying a massive to coarsely structured brown to reddish yellow sandy clay to clay, calcareous with depth - rises.

G4 Sand over poorly structured clay (Sandy Brown-Red Sodosol-Chromosol)
Topsoil <30 cm over a poorly structured subsoil. Thin sandy texture contrast soil with a sodic /dispersive /poorly structured brown or red clayey subsoil. Can have some ironstone.

H3 Deep bleached sand (Basic, Arenic, Bleached-Orthic Tenosol)
Grey sand over a very thick bleached sand grading to yellow sand continuing below 100 cm.

M2 Deep friable gradational clay loam (Red-Brown-Grey- Black Dermosol)
Deep well structured red clay loamy soil.

N3 Wet soil - non to moderately saline (Dermosolic, Oxyaquic Hydrosol)
Medium thickness clay overlying a dispersive grey clay with increasing pH at depth.

RR Bare calcrete rock (Petrocalcic Rudosol)
Outcropping Calcrete

Deep Sands and sandy rises

H3 Deep bleached sand (Arenic, Bleached-Orthic Tenosol)
Medium thickness grey sand topsoil grading to bleached sand then to yellow sand continuing below 150 cm.

G2 Sand grading to sandy clay loam (Mesotrophic, Yellow Kandosol**)**
Grey sandy topsoil grading to bleached sand over a yellow to red massive sandy clay loam

G3 Thick sand over clay (Mottled, Eutrophic, Brown Chromosol/Sodosol)
Organically darkened sandy surface over a thick pale to yellow sand overlying a friable yellowish brown and red and brown medium clay fine sandy.

Sandy undulating plains

G3 Thick sand over clay (Mottled, Eutrophic, Brown Chromosol)
Organically darkened sandy surface over a thick pale to yellow sand overlying a friable yellowish brown and red and brown sandy clay.

G4 Sand over dispersive brown clay (Eutrophic, Mottled-Hypernatric Brown Sodosol)
Organically darkened loamy sand over a light brown sand overlying a poorly structured yellowish brown sandy clay

F2 Sandy loam over dispersive clay (Eutrophic, Mottled-Mesonatric Grey Sodosol)
Dark sandy loam to clay loam over a poorly structured grey mottled sandy clay

F1 Sandy loam over clay (Eutrophic, Brown Chromosol)
Organically darkened sandy loam surface over a pale sandy to loamy sand horizons overlying a yellowish brown to yellow clay continuing below 100 cm

Heavy undulating flats

N3 Wet soil (Bleached, Tenosolic Hydrosol)
Organically developed and darkened sandy loam surface overlying a thick bleached sand grading to yellow sand continuing below 100 cm.

M2 Deep friable gradational clay loam (Red-Brown-Grey- Black Dermosol)
Deep well structured red clay loamy soil.

E3 Brown or grey cracking clay (Brown-Grey Vertosol)

Stony rises

B6 Shallow loam over red-brown clay on calcrete
Thin thickness sandy loam to loam topsoil over a red-brown clayey subsoil on calcrete. The topsoil can be slightly calcareous and the subsoil highly calcareous (<30 cm).

B3 Shallow sandy loam over calcrete (Petrocalcic, Red Kandosol)

RR Bare calcrete rock (Petrocalcic Rudosol)
Outcropping Calcrete.

B7 Shallow sand over clay on calcrete (Petrocalcic, Brown Chromosol)
Shallow to medium thickness sand overlying brown friable clay on limestone or calcarenite within 50 cm.

Further information: DEWNR Soil and Land Program