GEE Geegeela Land System

Area: 512.6 km^2

Annual rainfall: 510 – 555 mm average

Landscape: The Land System is underlain by Tertiary/Pleistocene age clays, calcified by the input of fine grained carbonates which have been blown across the landscape over the last few hundred thousand years. The clays are overlain in turn by Recent aeolian Molineaux Sands which have been reworked into dune formations. There is no evidence any old coastal dunes remnants in the Land System.

The Geegeela Land System is gently undulating low sand hill country south of the Tatiara District, extending south into the Bangham Scrub. The landscape is a plain formed on Tertiary/Pleistocene age clays. The plains are overlain by low, jumbled to parabolic dunes, clusters of which have a roughly east-west orientation. There is some surface drainage along swales between the dunes, but no defined watercourse pattern.

Elevation: 70 m in the west to 120 m in the east

Relief: Maximum relief 50 m (less than 12 m)

Soils:

Sandy soils (dunes, sandy rises and sandy flats)
H3 Bleached siliceous sand
G2 Bleached sand over sandy clay loam
G3 Thick sand over clay
G4 Sand over poorly structured clay
Heavy soils (flats and swamps)
E3 Grey or brown cracking clay
F2 Sandy loam over poorly structured brown or dark clay
M2 Deep friable gradational clay loam
N3 Wet soil (non to moderately saline)
Loamy rises
B6 Shallow loam over red-brown clay on calcrete
D2 Loam over red clay

Main features: The Geegeela Land System is sand dune country with substantial variations in soil conditions over short distances. The dunes are characterised by deep sands with very low natural fertility. They are prone to water repellence, wind erosion and acidification. The flats are mostly shallow sandy surfaced soils over dispersive clay subsoils which cause subsurface waterlogging and restrict root growth. They have moderate fertility. Low lying areas (often gilgaied) are subject to inundation.

Soil Landscape Unit summary: 26 Soil Landscape Units (SLUs) mapped in the Geegeela Land System:

SLU	% of area	Main features #
GdA	0.70	Gently undulating flats and inter-ridge corridors formed on Tertiary clays. Main soils: sand over poorly structured clay - **G4** (E), thick sand over clay - **G3** (E) and sandy loam over poorly structured brown or dark clay - **F2** (E). These soils are moderate to deep, have moderately low to moderate fertility and moderate waterholding capacity. Drainage is imperfect due to the perching of water on dispersive subsoil clays. The sandier soils will have some water repellence and soil acidity potential.
OQC OQF OQG OQI OQJ OQp OQq OQt	0.6 11.9 8.5 9.1 11.6 2.1 1.0 2.0	Jumbled sand dune complex and associated enclosed flats. Calcified clays underlie the flats. **OQC** greater than 90% sand dune coverage **OQF** 60-90% sand dune coverage **OQG** 60-90% low dunes &/or sandy rises **OQI** 30-60% sand dune coverage **OQJ** 30-60% low dunes &/or sandy rises **OQp** 60-90% sand dune coverage with wet, non-saline swales **OQq** 60-90% low dunes &/or sandy rises with wet, non-saline swales **OQt** 30-60% low dunes &/or sandy rises with wet, non-saline swales Main soils: bleached siliceous sand - **H3** (E), thick sand over clay - **G3** (E), bleached sand over sandy clay loam - **G2** (C), sand over poorly structured clay - **G4** (L) and sandy loam over poorly structured brown or dark clay - **F2** (M). 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. Soils found in the swales are deep and have moderately low fertility. The main limitation is the dispersive subsoil clays, which are a moderate limitation for root growth and waterlogging.
PCA PCB PCb	0.05 1.4 4.2	Level plains to gently undulating rises with 10-30% low sandy rises. Flats are underlain by calcified clays **PCA** Level plains to gently undulating plains and less than 10% swamps **PCB** Gentle undulating rises with extensive flats **PCb** Gentle undulating rises with 10-30% sand dunes and minor flats Main soils: bleached siliceous sand - **H3** (E), thick sand over clay - **G3** (E), bleached sand over sandy clay loam - **G2** (C) and sand over poorly structured clay - **G4** (L). These soils are deep and have moderately low to low fertility. The plain soils will have water repellence and slight limitations to emergence and 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.
PQi	0.40	Gently undulating plain with 20-29% swamps. Main soils: sandy loam over poorly structured brown or dark clay - **F2** (V), deep friable gradational clay loam - **M2** (C), grey or brown cracking clay - **E3** (C) and wet soil - **N3** (L). These soils are deep, have moderate fertility and high waterholding capacity. Imperfect to poor drainage is a problem on the heavier low lying areas whereas the plains are slightly acidic, however the high limitation to emergence and root growth due to the dispersive subsoils is the main limitation of this soil.
PRA PRa	1.2 0.7	Level plains with 10-30% sand dunes and minor swamps. **PRA** Level plains to gently undulating plains with less than 10% swamps **PRa** Level plains to gently undulating plains with 10-30% sand rises and less than 10% swamps. Main soils: sand over poorly structured clay - G4 (V), thick sand over clay - **G3** (E), bleached siliceous sand - **H3** (M), bleached sand over sandy clay loam - **G2** (M) and wet soil - **N3** (M). These soils are deep, have moderately low fertility and moderate to high waterholding capacity. There is a moderate limitation to emergence and root growth due to the dispersive subsoil clays. Water repellence, soil acidity and the slight risk to wind erosion are other limitations.

PXA PXB PXa PXb	5.4 0.2 10.5 0.2	Level to very gently undulating plains and gently undulating sandy rises with 10-30% sand dunes and minor swamps. **PXA** Level plains to gently undulating plains **PXB** Gentle undulating rises **PXa** Level plains to gently undulating plains with 10-30% sand dunes **PXb** Gentle undulating rises with 10-30% sand dunes Main soils: sand over poorly structured clay - **G4** (C), thick sand over clay - **G3** (C), sandy loam over poorly structured brown or dark clay - **F2** (C), bleached siliceous sand - **H3** (L), bleached sand over sandy clay loam - **G2** (L), grey or brown cracking clay - **E3** (M) and wet soil - **N3** (M). The deep sands have low fertility and moderate waterholding capacity, are acidic and susceptible to water repellence. The sand over clay soils exhibit similar potential to acidification and water repellence however their main limitation is imperfect drainage due to the dispersive subsoil clays at quite a shallow depth. This will also pose emergence and root growth restrictions. These soils have moderately low to moderate fertility and have high waterholding capacity. The low lying areas are prone to inundation.
PYA PYB PYa PYb	8.1 0.2 3.7 11.4	Level to very gently undulating plains and gently undulating sandy rises with 10-30% sand dunes and minor swamps. Minor non-sandy rises **PYA** Level plains to gently undulating plains **PYB** Gentle undulating rises **PYa** Level plains to gently undulating plains with 10-30% sand dunes **PYb** Gentle undulating rises with 10-30% sand dunes Main soils: thick sand over clay- **G3** (C), sand over poorly structured clay - **G4** (C), bleached siliceous sand - **H3** (C), sandy loam over poorly structured brown or dark clay - **F2** (L), bleached sand over sandy clay loam - **G2** (L), grey or brown cracking clay - **E3** (M), wet soil - **N3** (M), shallow loam over red-brown clay on calcrete - **B6** (M) and loam over red clay - **D2** (M). The deep sands have low fertility and moderate waterholding capacity, are acidic and susceptible to water repellence. The sand over clay soils exhibit similar potential to acidification and water repellence however their main limitation is imperfect drainage due to the dispersive subsoil clays at quite a shallow depth. This will also pose emergence and root growth restrictions. These soils have moderately low to moderate fertility and have high waterholding capacity. The low lying areas are prone to inundation. The loamy soils are moderately deep, have moderate fertility and moderate waterholding capacity.
TLA	1.4	Level plain formed on heavy clays. Main soils: sandy loam over poorly structured brown or dark clay - **F2** (V), sand over poorly structured clay - **G4** (C) and wet soil - **N3** (M). This soil is moderate to deep, has moderate fertility and high waterholding capacity. Their limitations are imperfectly to poorly drained soils due to dispersive and poorly structured subsoil clays (moderate to high limitation) which will also impede emergence and root growth.
TMA	3.1	Level plain formed on heavy clays. Main soils: deep friable gradational clay loam - **M2** (E), grey or brown cracking clay - **E3** (E), sandy loam over poorly structured brown or dark clay - **F2** (L), sand over poorly structured clay - **G4** (M), and wet soil - **N3** (M). This soil is moderate to deep, has good fertility and high waterholding capacity. Their limitations are imperfectly to poorly drained soil due to dispersive and poorly structured subsoil clays (slight to moderate limitation) which will also impede emergence and root growth.
TNA	0.3	Level plain formed on heavy clays. Main soils: grey or brown cracking clay - **E3** (E), deep friable gradational clay loam - **M2** (E), sandy loam over poorly structured brown or dark clay - **F2** (L) and wet soil - **N3** (M). This soil is moderate to deep, has good fertility and high water holding capacity. Their limitations are imperfectly to poorly drained soil due to dispersive and poorly structured subsoil clays (high to severe limitation) which also impedes emergence and root growth.

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 (grouped on landscape position):

Sandy soils (dunes, sandy rises and sandy flats)

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

G2 Bleached sand over 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-Red 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.

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

Heavy soils (flats and swamps)

E3 Grey or brown cracking clay

F2 Sandy loam over poorly structured brown or dark clay (Mottled-Mesonatric, Hypocalcic, Brown Sodosol)
Dark sandy loam to clay loam over a poorly structured grey mottled sandy clay

M2 Deep friable gradational clay loam

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

Loamy rises

B6 Shallow loam over red-brown clay on calcrete

D2 Loam over red clay

Further information: DEWNR Soil and Land Program