MGO Mangalo Land System

Area: 945.2 km^2

Landscape: Undulating to rolling low hills formed over basement schists, gneisses and quartzites. There are extensive deposits of locally derived alluvium on lower slopes and valley flats. The rocks and sediments are mantled by soft carbonates of aeolian origin, which have been leached into the soil. Overlying the land surface are limited deposits of Molineaux sand, usually as sand spreads, but occasionally as low sandhills. Watercourse erosion is common, and there are sporadic saline seepages, usually on lower slopes and in drainage depressions.

Annual rainfall: 280 – 425 mm average

Main soils:

Cleve (shallow) - **D1/D7** (three variations)
Calcareous subsoil - **D1a** (Hypercalcic, Red Chromosol)
Thin to medium thickness gravelly sandy loam to clay loam over a red well structured clay, highly calcareous with depth, grading to weathering metamorphic rock within 100 cm.
Non calcareous subsoil - **D1b** (Eutrophic, Red Chromosol)
Thin to medium thickness gravelly sandy loam to clay loam over a red well structured clay, grading to weathering metamorphic rock within 100 cm.
Sodic subsoil - **D7** (Calcic, Red Sodosol)
Thin to medium thickness hard sandy loam over blocky structured, sodic red clay, calcareous with depth, forming in weathering basement rock within 100 cm.

Mangalo - **D3** (Calcic, Red Sodosol)
Medium thickness sandy loam to sandy clay loam over a coarsely structured red clay, moderately calcareous with depth grading to alluvial sediments (**D3a**) or older clayey sand / sandy clay (**D3b**).

Heggaton - **G3** (Calcic, Brown Chromosol)
Thick sand to loamy sand with a bleached A2 layer, abruptly overlying a weakly structured brown sandy clay to clay, calcareous with depth, grading to Tertiary sediments.

Skeletal soil - **L1** (Lithic / Petroferric, Leptic Tenosol / Rudosol)
Variable gravelly loamy sand to sandy clay loam over basement rock or massive ironstone at depths usually less than 50 cm.

Minor soils:

Calcareous loam (shallow) - **A2** (Paralithic, Hypercalcic / Lithocalcic Calcarosol)
Calcareous loam grading to a highly calcareous clay loam over Class III A, B or C carbonate merging with weathering rock.

Wiabuna - **A6** (Regolithic, Hypercalcic Calcarosol)
Calcareous sandy clay loam becoming more clayey and calcareous with depth over a red coarsely structured non calcareous clay from about 60 cm, grading to weathering rock below 100 cm on slopes, or alluvium on flats.

Red brown earth (clayey) - **C3** (Hypercalcic, Red / Brown Chromosol / Dermosol)
Medium thickness friable clay loam to light clay, over a well structured red or brown clay, highly calcareous from about 30 cm grading to clayey alluvium (**C3a**) or highly weathered rock (**C3b**).

Wharminda - **G4** (Hypercalcic, Brown Sodosol)
Medium to thick sand with a bleached A2 layer abruptly overlying a hard columnar dispersive brown mottled clay, highly calcareous with depth, grading to alluvial or Tertiary sediments.

Lowan - **H3** (Basic, Arenic, Bleached-Orthic Tenosol)
Thick bleached sand with a thin organically darkened surface layer, grading to a yellowish sand (often with darker lamellae), continuing below 150 cm.

Uniform alluvial soil - **M1** (Calcareous, Regolithic, Red-Orthic Tenosol)
Very thick brown loamy sand to sandy loam, continuing below 100 cm.

Gradational alluvial soil - **M4** (Calcic, Red Kandosol / Dermosol)

Medium to thick sandy loam grading to a red sandy clay loam to clay, calcareous with depth.
Saline alluvial soil - **M4/N2** (Calcic, Red Dermosol / Kandosol)
Thick sandy loam over a red clay, calcareous with depth. Saline throughout.
Wet saline alluvial soil - **N2** (Salic / Hypersalic Hydrosol)
Miscellaneous wet saline soil influenced by rising saline groundwater tables.

Summary: Most of the land is very gently to gently sloping (gradients usually less than 10%), but there are some steeper rocky slopes. These have shallow stony soils and are either semi or non arable. On the arable slopes, the most common soils are sandy loams with red clayey subsoils. These are moderately deep and reasonably fertile, although commonly prone to acidification. They are highly erodible. As a result of the combination of erodible soils and moderate slopes, erosion control is a key management issue. Sub dominant sand over clay soils are also erodible, and have the added disadvantages of lower fertility and susceptibility to wind erosion as well. These, and minor deeper sands are susceptible to water repellence. Saline seepages are widespread, although they do not account for a large area overall.

Soil Landscape Unit summary: 45 Soil Landscape Units (SLUs) mapped in the Mangalo Land System:

SLU	% of area	Component	Main soils	Prop#	Notes
AKB	3.4	Rocky slopes	Skeletal	E	Shallow stony soils - semi to non arable.
			Shallow Cleve	E	
AKBs	0.2	Rocky slopes	Skeletal / shallow Cleve	E	Shallow stony soils as for **AKB**, with low fertility, wind erosion prone sand.
		Sand spreads	Lowan	E	
AKC	5.2	Rocky slopes	Skeletal	E	Shallow stony soils and moderately steep slopes - non arable.
			Shallow Cleve	E	
ALC	0.9	Rocky slopes	Skeletal	V	Shallow stony soils and moderately steep slopes - non arable.
			Shallow Cleve	C	
ALD	1.3	Steep rocky slopes	Skeletal	D	Shallow stony soils and steep slopes - non arable.
DHB	0.4	Very gentle slopes	Shallow Cleve	D	Poor surface structure and slight erosion potential are the only significant limitations. Sporadic saline seepage.
DHC	6.0	Gentle slopes	Shallow Cleve	D	As for **DHB**, but steeper slopes increase erosion potential.
DKH	0.9	Gentle slopes (eroded)	Mangalo	D	Sandy, poorly structured surface soil (moderate fertility, prone to acidification). Highly erodible. Watercourse erosion and sporadic saline seepage.
DKM	3.5	Gentle slopes	Mangalo	D	As for **DKH**, less watercourse erosion, but more saline seepage.
DNC	1.4	Gentle slopes	RBE (clayey)	D	Deep, fertile soils - potentially productive. Erosion potential the only limitation.
DTB	0.5	Very gentle slopes	Shallow Cleve	E	Slopes with significant rocky outcrop associated with poorly structured sandy loam to sandy clay loam soils with moderate fertility, prone to acidification and highly erodible. There are minor sand over clay soils. Rocky reefs with skeletal soils restrict arable area. Up to 2% saline seepages throughout. **DTB** Slight erosion potential. **DTC** Steeper slopes and higher erosion potential. **DTCs** As for **DTC**, but with 10-20% sand over clay soils of low fertility and high erodibility (wind and water). **DTD** Steeper slopes and high erosion potential - mostly semi arable.
			Clayey RBE	C	
		Rocky reefs	Skeletal	L	
DTC	2.2	Gentle slopes	Shallow Cleve	E	
			Clayey RBE	C	
		Rocky reefs	Skeletal	L	
DTCs	0.5	Gentle slopes	Shallow Cleve	V	
		Sandy slopes	Heggaton	L	
		Rocky reefs	Skeletal	L	
DTD	3.4	Moderate slopes	Shallow Cleve	E	
			Clayey RBE	C	
		Rocky reefs	Skeletal	L	
DTH	7.0	Gentle slopes	Shallow Cleve	E	

		(eroded)	Clayey RBE	C	**DTH** As for **DTC**, with eroded watercourses. **DTc** As for **DTH**, but with 2-10% saline seepages.
		Rocky reefs	Skeletal	L	
DTc	4.1	Gentle slopes (eroded)	Shallow Cleve	E	
			Clayey RBE	C	
		Rocky reefs	Skeletal	L	
		Saline seeps	Saline alluvial	M	
DWB	5.2	Very gentle slopes	Shallow Cleve	E	Slopes with mixed sandy loam to sandy clay loam over clay soils, and sand over clay soils, with some deep sands. Sandy loams are poorly structured with moderate fertility. They are prone to acidification and are highly erodible. Sand over clay soils are infertile and prone to wind erosion, water repellence and acidification. Deep sandy soils have similar but more severe limitations. Up to 2% saline seepages throughout. **DWB** Slight erosion potential. **DWBn** Slight to moderate erosion potential with more sandy soils than **DWB** **DWC** Moderate erosion potential, with significant sand over clay soils of low fertility and high erodibility (wind and water). **DWCs** As for **DWC** with 10-20% low to moderate sandhills (highly erodible and infertile). **DWH** Moderate erosion potential, with eroded watercourses. **DWM** Moderate erosion potential, with 2-10% saline seepages.
			Mangalo	E	
			Heggaton	L	
DWBn	1.3	Very gentle slopes	Shallow Cleve	E	
			Mangalo	E	
			Heggaton	E	
DWC	4.7	Gentle slopes	Heggaton	E	
			Shallow Cleve	E	
DWCs	1.6	Gentle slopes	Heggaton	E	
			Shallow Cleve	E	
		Low sandhills	Lowan	L	
DWH	3.1	Gentle slopes (eroded)	Mangalo	V	
			Heggaton	L	
DWM	1.1	Gentle slopes (eroded)	Mangalo	V	
			Heggaton	L	
		Saline seeps	Saline alluvial	M	
DZB	1.1	Very gentle slopes	Mangalo	E	Mixture of poorly structured and erodible sandy loam over clay soils, and calcareous loams (less erodible and better structured).
			Shallow Cleve	C	
			Calc loam	C	
			Wiabuna	L	
DZC	0.1	Gentle slopes	Mangalo	E	As for **DZB**, but steeper and more susceptible to erosion.
			Shallow Cleve	C	
			Calc loam	C	
			Wiabuna	L	
DsC	0.2	Gentle slopes	Shallow Cleve	V	Fertile and moderately deep sandy clay loam over clay soils (moderate erosion potential), with 20-30% sandhills (low fertility, and prone to wind erosion and water repellence).
		Sandhills	Lowan	C	
DuB	6.3	Very gentle slopes	Shallow Cleve	E	Fertile and moderately deep sandy clay loam over clay soils, with 20-30% sand over clay soils and 10-20% sandhills (low fertility, and prone to wind erosion and water repellence).
		Sandy slopes	Heggaton	C	
		Low sandhills	Lowan	L	
		Lower slopes	Mangalo	L	
DuC	7.5	Gentle slopes	Shallow Cleve	V	As for **DuB**, but steeper and more prone to water erosion.
		Low sandhills	Lowan	L	
		Lower slopes	Mangalo	L	
ETB	0.8	Very gentle stony slopes	Skeletal / calc loam / Shallow Cleve	D	Slopes with shallow stony or calcareous sandy loams, and shallow texture contrast soils. Extensive rocky outcrop reduces arable area. **ETB** Slight erosion potential. **ETC** Moderate erosion potential. **ETD** Moderately high erosion potential (semi arable) **ETI** As for **ETD** with eroded watercourses.
ETC	3.4	Gentle stony slopes	Skeletal / calc loam / Shallow Cleve	D	
ETD	0.6	Moderate stony slopes	Skeletal / calc loam / Shallow Cleve	D	

ETI	4.0	Moderate stony slopes (eroded)	Skeletal / calc loam / Shallow Cleve	D	
GXB	4.0	Very gentle slopes	Heggaton	E	Slopes with mainly sand over clay soils of low fertility and prone to wind erosion and water repellence. Water erosion potential is slight to moderate. There is significant saline seepage. **GXB** Slight water erosion potential and up to 2% saline seepage. **GXC** Moderate water erosion potential and 2-10% saline seepage. **GXL** As for **GXB**, with 2-10% saline seepage.
			Mangalo	E	
GXC	3.1	Gentle slopes	Heggaton	E	
			Mangalo	E	
		Saline seeps	Saline alluvial	M	
GXL	2.0	Very gentle slopes	Heggaton	E	
			Mangalo	E	
		Saline seeps	Saline alluvial	M	
JWB	1.3	Very gentle slopes	Mangalo	D	Deep fertile soils with slight erosion potential, but 2-10% saline seepage.
KNE	1.4	Drainage depression	Wiabuna	E	Deep fertile soils, slight salinity.
			Mangalo	E	
O-C	0.1	Moderate sandhills	Lowan	D	Wind erosion potential, water repellence, low fertility.
OCb	0.2	Moderate sandhills	Lowan	V	Sandhills (60-90% coverage) as for **O-C**, with sandy loam, poorly structured surface soil (moderate fertility, prone to acidification). Highly erodible.
		Gentle slopes	Mangalo	E	
OCe	0.2	Gentle slopes	Mangalo	V	As for **OCb**, but with 30-60% sandhill coverage.
		Moderate sandhills	Lowan	E	
OGJ	0.1	Sandy flats	Wharminda	V	Sand over clay and deep sand - low fertility, wind erosion potential and water repellence.
		Low sandhills	Lowan	E	
XEK	0.1	Creek flats	Gradational / uniform alluvial	D	Alluvial soils deep and fertile with high productive potential. Salinity risk throughout, but variable distribution as indicated. Salt affected areas suitable for revegetation with salt tolerant species. Most watercourses eroded or at risk. Flats subject to flooding.
XEN	2.3	Creek flats with 2-10% saline seepage patches	Gradational / uniform alluvial	D	
			Saline alluvial	M	
XEp	0.1	Gentle slopes with 10-50% saline seepage	Gradational / uniform alluvial	V	
			Saline alluvial	C	
XEs	1.5	Creek flats with 10-50% saline seepage patches	Gradational / uniform alluvial	V	
			Saline alluvial	E	
ZA-	1.7	Saline creek flats	Wet saline soil	E	Mostly too saline for cropping, but suitable for revegetation with salt tolerant species for grazing, fodder or amenity.
			Saline alluvial	C	
			Alluvial	L	

PROPORTION codes assigned to Soil Landscape Unit (SLU) components:

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)

Further information: DEWNR Soil and Land Program