

# DID Didicoolum Land System

Saline flats with stony rises in the south east of Hundred of Petherick

**Area:** 61.7 km<sup>2</sup>

**Annual rainfall:** 535 – 560 mm average

**Geology:** The Land System is underlain by sediments of the Padthaway Formation, which includes clays and interbedded sands and limestones or dolomites, deposited in coastal lagoons as the sea gradually receded over the last few hundred thousand years. Protruding through the sediments are scattered calcarenites, probably islands in the old lagoons. Deposits of Molineaux Sand occur on the eastern side. Scattered across the surface of the flats along the eastern edge are very low sandy rises.

**Topography:** The Didicoolum Land System is a complex of flats and low rises bounded by a high range to the west and the broad flats of the Petherick Land System to the east. The flats have a slight fall to the north-west. Water from the south flows through the System into Jip Jip Waterhole, but north of this water course, water tends to drain into swamps on the western edge abutting the range. Scattered across the flats are stony rises between 5 and 20 m high. Along the eastern edge is a mosaic of low sandy rises (less than 5 m high) superimposed on the flats. There is a saline water table within a metre or so of the surface over most of the flats, so they are characteristically marginally to highly saline. There are occasional swamps. These are considered to be pre-European features where water tables have been at the surface for substantial periods. Seasonal inundation is a feature of non swampy lower lying areas.

**Elevation:** 20 - 40 m

**Relief:** Usually less than 10 m, occasionally 15 - 20 m

**Soils:** There is a range of soils on the flats; many are wet and saline. Sand over clay, grey clay and calcareous loam are all common. On rising ground, soils are either shallow and loamy over calcreted calcarenite, or deep and sandy.

## Main soils

*Soils of seasonally wet flats*

**N2/G4** Sand over grey mottled dispersive clay

*Soils of stony rises*

**B7/B3** Shallow stony loamy sand over calcrete

**B8** Thick sand over calcrete

*Soils of wet saline flats*

**N2a** Sand over grey mottled saline waterlogged clay

**N2b** Wet highly saline sand

**N2c** Wet highly saline grey clay

**N2d** Wet saline calcareous loam

## Minor soils

*Soils of seasonally wet flats*

**B7/N2** Sand over saline clay on calcrete

*Soils of sandy rises*

**H3** Deep bleached sand

**G2** Sand grading to sandy clay loam

**G3** Thick sand over friable clay



**Main features:**

The Didicoolum Land System consists of two distinctive elements, viz. flats and rises. The flats are generally poorly drained with saline water tables within a metre or two of the surface. Soils typically have sandy surfaces and mottled clayey subsoils which impede drainage and root growth. Fertility is moderate to low. The main limitations to productivity are waterlogging and salinity. Generally the flats are too saline for clovers or conventional perennial grasses to persist. The stony rises are well drained and not saline, but have stony and often very shallow soils of moderately low fertility. Minor low sandy rises in the east have very low fertility.

**Soil Landscape Unit summary:** 8 Soil Landscape Units (SLUs) mapped in the Didicoolum Land System:

SLU	% of area	Main features #
MJB	27.0	<p>Low stony rises of up to 10 metres (occasionally 15-20 m) relief formed on calcreted calcarenite. They are scattered across the flats, but have a general lineation parallel to the higher old coastal dunes to the west. The rises are outliers of these higher ranges, and are probably the protruding crests of very low ranges, now mostly covered by younger sediments.</p> <p>Main soils: <u>shallow stony loamy sand over calcrete</u> - <b>B7/B3</b> (E) and <u>thick sand over calcrete</u> - <b>B8</b> (E).</p> <p>Key properties:</p> <p>Drainage: Rapidly to well drained.</p> <p>Fertility: Low to moderately low.</p> <p>Physical condition: No restrictions to root growth above the calcrete.</p> <p>AWHC: Very low to moderate, depending on depth to calcrete and stone content of soil.</p> <p>Salinity: Low to moderately low.</p> <p>Erosion potential: Water: Low to moderately low. Wind: Low to moderately low.</p> <p>Water repellence: Low to moderate (sandy soils)</p> <p>Rockiness: Up to 20% surface calcrete and outcropping rock.</p> <p><u>Summary:</u> The rises are well drained and not saline, but have variable depth and often very shallow soils of moderately low fertility.</p>
OSY	1.4	<p>Undulating low to moderate sandy rises with up to 25% poorly drained and saline swampy swales and flats. The rises are formed on Molineaux Sands with Tertiary? clayey sands and sandstones. Swamp clays and marls underlie the flats. Saline water tables are at or near the surface in the low points of the landscape.</p> <p>Main soils: <u>sand grading to sandy clay loam</u> - <b>G2</b> (E) on low rises and lower slopes, <u>deep bleached sand</u> - <b>H3</b> (E) on higher ground, <u>thick sand over friable clay</u> - <b>G3</b> (L) on better drained flats, <u>sand over grey mottled dispersive clay</u> - <b>N2/G4</b> (M) on poorly drained flats, and <u>variable wet saline soils</u> - <b>N2a, N2b, N2c</b> and <b>N2d</b> (M) on swampy flats.</p> <p>Key properties:</p> <p>Drainage: Well drained (rises). Poorly drained (flats).</p> <p>Fertility: Very low to low (rises) to moderately low (flats).</p> <p>Physical condition: Surface soils are not limiting. Subsoils on rises are either sandy or friable clays, but on flats are dispersive and likely to impede root growth.</p> <p>AWHC: Moderately low to moderately high.</p> <p>Salinity: Low to moderately low (rises). High to very high (flats).</p> <p>Erosion potential: Water: Low. Wind: Low (flats). Moderately high to high (rises).</p> <p>Water repellence: High on rises. Low on flats.</p> <p>Rockiness: Nil.</p> <p><u>Summary:</u> Most of the land has deep to moderately deep low fertility sands prone to water repellence and wind erosion. Flats are saline with low productive potential unless sown to salt tolerant species.</p>
ZnJ	1.1	Flat plains with occasional small (unmappable) swamps, and minor stony or sandy rises formed on clayey and limestone sediments of the Padthaway Formation. The land is
Znj	13.4	



		<p>seasonally waterlogged and affected by saline groundwater tables. Zn<sub>j</sub> is land where salinity is higher and which is subject to inundation in wet years. Main soils: <u>sand over grey mottled dispersive clay - N2/G4 (E)</u>, <u>sand over grey mottled saline waterlogged clay - N2a (C)</u>, <u>sand over saline clay on calcrete - B7/N2 (L)</u> and <u>wet highly saline sand - N2b (L)</u>, with <u>shallow stony loamy sand over calcrete - B7/B3 (M)</u> on rises.</p> <p>Key properties:                  Drainage: Imperfectly to poorly drained, due to shallow water tables and dispersive clay subsoils.                  Fertility: Moderately low.                  Physical condition: Surface soil is not limiting. Dispersive subsoils prevent satisfactory root growth.                  AWHC: Moderate.                  Salinity: High (<b>Zn<sub>J</sub></b>) to very high (<b>Zn<sub>j</sub></b>). This land is influenced by rising saline ground water tables.                  Erosion potential: Water: Low                  Wind: Low.                  Water repellence: Nil.                  Rockiness: Nil.</p> <p><u>Summary:</u> Flats with poorly drained saline soils requiring salt tolerant species for productive pasture growth (ie clovers and conventional perennial grasses will not persist on most of this land).</p>
ZnL Znl	12.0 14.3	<p>Flats with 5-10% low stony calcreted rises. Lowest lying ground tends to be swampy. The land is formed on clayey and limestone sediments of the Padthaway Formation, with minor outcrops of calcreted Bridgewater Formation. The land is seasonally waterlogged and affected by saline groundwater tables. Zn<sub>l</sub> is land where salinity is higher and which is subject to inundation in wet years. Main soils: <u>sand over grey mottled dispersive clay - N2/G4 (E)</u>, <u>sand over grey mottled saline waterlogged clay - N2a (L)</u>, <u>sand over saline clay on calcrete - B7/N2 (L)</u> and <u>wet highly saline sand - N2b (L)</u> on flats and swampy areas, with <u>shallow stony loamy sand over calcrete - B7/B3 (L)</u> on rises.</p> <p>Key properties:                  Drainage: Flats are poorly drained due to a combination of shallow water tables and dispersive clay subsoils. Rises are well drained.                  Fertility: Moderately low on flats to low on rises.                  Physical condition: No limitation in surface soils. Dispersive subsoils on flats restrict root growth.                  AWHC: Moderate to low.                  Salinity: Flats - high (<b>ZnL</b>) to very high (<b>Znl</b>). Rises - low to moderately low.                  Erosion potential: Water: Low.                  Wind: Low.                  Water repellence: Nil.                  Rockiness: Minor (flats). Up to 20% surface calcrete stone (rises).</p> <p><u>Summary:</u> Flats with poorly drained saline soils requiring salt tolerant species for productive pasture growth (ie clovers and conventional perennial grasses will not persist on most of this land). The rises are not salt affected, but have low fertility, shallow stony soils.</p>
ZnM	6.7	<p>Very gently undulating plains with occasional small (unmappable) swamps, and approximately 25% of the area covered by sandy rises up to two metres high. The land is formed on clayey and limestone sediments of the Padthaway Formation, partially overlain by Recent windblown sands. The land is seasonally waterlogged and affected by saline groundwater tables. Main soils: <u>sand over grey mottled dispersive clay - N2/G4 (E)</u>, <u>sand over grey mottled saline waterlogged clay - N2a (L)</u>, <u>sand over saline clay on calcrete - B7/N2 (L)</u> and <u>wet highly saline sand - N2b (L)</u> on flats and swampy areas, with <u>sand grading to sandy clay loam - G2 (L)</u> on low rises and lower slopes and <u>deep bleached sand - H3 (L)</u> on rises.</p> <p>Key properties:                  Drainage: Imperfectly to poorly drained, due to shallow water tables and</p>



		<p>dispersive clay subsoils. Well drained on rises.  Fertility: Moderately low. Very low on rises.  Physical condition: Surface soil is not limiting. Dispersive subsoils prevent satisfactory root growth. No limitations on rises.  AWHC: Moderate.  Salinity: Flats: High.  Rises: Low  Erosion potential: Water: Low.  Wind: Low. High on rises.  Water repellence: Nil on flats. High on rises.  Rockiness: Nil.</p> <p><u>Summary:</u> Flats with poorly drained saline soils requiring salt tolerant species for productive pasture growth (ie clovers and conventional perennial grasses will not persist on most of this land). The rises are not salt affected, but have very low fertility, water repellent soils.</p>
ZoP	24.1	<p>Complex of saline flats (50%), low sand rises (40%) and swamps (10%), formed on limestones and clayey sediments of the Padthaway Formation, partially overlain by Recent windblown sands.  Main soils: <u>sand over grey mottled dispersive clay</u> - <b>N2/G4</b> (C) and <u>sand over saline clay on calcrete</u> - <b>B7/N2</b> (C) on flats, <u>deep bleached sand</u> - <b>H3</b> (C) and <u>sand grading to sandy clay loam</u> - <b>G2</b> (L) on sandy rises, and <u>variable wet saline soils</u> - <b>N2a, N2b, N2c</b> and <b>N2d</b> (L) in swamps.</p> <p>Key properties:  Drainage: Imperfectly to poorly drained, due to shallow water tables and low permeability subsoils. Sandy rises are rapidly drained. Swamps are very poorly drained.  Fertility: Moderately low (flats) to very low (sandy rises).  Physical condition: Surface soils - no limitations. Subsoils - dispersive clays restrict root growth.  AWHC: Moderate.  Salinity: High (flats), low (sand rises), very high to extreme (swamps). This land is affected by rising saline groundwater tables.  Erosion potential: Water: Low  Wind: Low (flats). High (sand rises)  Water repellence: Slight to nil (flats). High (sand rises)  Rockiness: Nil.</p> <p><u>Summary:</u> Imperfectly to poorly drained saline flats, with low, infertile sandy rises. Productive potential of the flats depends on establishment of salt tolerant species.</p>

# 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:**

- B7/B3** Shallow stony loamy sand over calcrete (Petrocalcic, Brown Chromosol / Petrocalcic, Leptic Tenosol)  
Loamy sand to sandy loam with variable rubble and a thin intermittent brown clay layer at the base, overlying calcreted calcarenite shallower than 50 cm.
- B7/N2** Sand over saline clay on calcrete (Petrocalcic, Sodosolic, Salic Hydrosol)  
Bleached sand overlying a coarsely structured mottled grey sandy clay loam to clay, with a calcrete pan within 50 cm and a saline water table at depth.
- B8** Thick sand over calcrete (Petrocalcic, Bleached-Leptic Tenosol)  
Thick bleached sand over calcarenite at variable depths but usually less than 100 cm.
- G2** Sand grading to sandy clay loam (Mesotrophic, Yellow Kandosol)  
Thick bleached sand, organically darkened at surface, over a yellow and red friable massive sandy clay loam.
- G3** Thick sand over friable clay (Eutrophic / Calcic, Brown Chromosol)  
Thick to very thick bleached sand to loamy sand with an organically darkened surface abruptly overlying a friable yellowish brown and red sandy clay, with or without soft carbonate accumulations.
- H3** Deep bleached sand (Basic, Arenic, Bleached-Orthic Tenosol)  
Thick to very thick bleached sand, organically darkened at the surface over yellow sand continuing below 100 cm.
- N2a** Sand over grey mottled saline waterlogged clay (Sodosolic Hydrosol)  
Medium thickness loamy sand abruptly overlying a grey and yellow brown mottled clay (seasonally saturated), with rubbly to soft carbonate at depth.
- N2b** Wet highly saline sand (Sandy Calcarosolic / Tenosolic Salic Hydrosol)  
Thick bleached (calcareous) sand over a grey and yellow mottled clayey sand in a water table at about 100 cm. Sand commonly overlain by organic mat or dark clay loam up to 10 cm thick.
- N2c** Wet highly saline grey clay (Dermosolic, Hypersalic Hydrosol)  
Medium thickness dark grey to black clay loam to clay grading to a well structured dark grey clay with minor carbonates and a water table within 100 cm.
- N2d** Wet saline calcareous loam (Calcarosolic, Hypersalic Hydrosol)  
Grey very highly calcareous loam grading to a pale grey clay loam over a white very highly calcareous silty clay loam by about 30 cm, with a water table within 100 cm.
- N2/G4** Sand over grey mottled dispersive clay (Lithocalcic/ Petrocalcic, Sodosolic, Grey Hydrosol)  
Medium thickness loamy sand abruptly overlying a grey and yellow brown mottled clay, with rubbly to hard carbonate at depth, and a water table within 100 cm.

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

