

MUN Mundoora Land System

Dunefields, plains and a few low rises, stretching from Port Broughton eastwards to Mundoora, and from Wandearah East southwards to Wokurna. These dunefields overlie gently undulating plains. Mundoora is the name of a small settlement in the central east of the system.

Area: 307.6 km²

Annual rainfall: 335 – 415 mm average

Geology: The land system includes four distinctive geological materials. Heavy Tertiary age reddish heavy clay sediments (Hindmarsh Clay) underlie the area and are exposed in low lying flats. These clays have been extensively covered by a relatively thin layer of highly calcareous medium textured wind deposited sediments (Woorinen Formation) which can include hard carbonate rubble. This material in turn is overlain by Molineaux Sand, which has been reworked by the wind into more or less parallel (longitudinal) sand dunes and sandy rises. The fourth material is an alluvial clay deposit associated with Mundoora Creek. This watercourse cut through older materials, and over time deposited clayey sediments on its flood plain. Similarly, in some low lying areas near Port Broughton, probably former courses of Mundoora Creek, brown alluvial medium clays occur. (Vry minor areas of calcrete occur - along the coast, and as a few isolated remnants where calcrete overlies clayey sediments).

Topography: Gently undulating land characterized by low dunes and sand spreads, with limited areas of larger dunes. The dunes are oriented in a NW-SE direction, and are typically 5 - 10m high. The land underlying the dunes is a pediment with a very gentle general slope of 1 - 2% from the footslopes of the Hummock Range in the SE of this system to the coast in the NW. There are some isolated rises with slopes of up to 5%. The flats or swales between the dunes are generally less than 200 m wide. However there are limited areas of broader flats up to 2 km across. There is no surface drainage except for Mundoora Creek which is an ill-defined watercourse occupying an old alluvial plain up to a kilometre wide, which extends from Mundoora township to Fisherman Bay. Some low lying areas near Port Broughton probably indicate former courses of Mundoora Creek.

Elevation: 140 m in the SE corner of this system at the base of the footslopes of the Hummock range (adjacent to the pediments of the Sharp Well Land System) to 5m where the Mundoora Creek flat joins the swamps of Fisherman Bay.

Relief: The highest of the rises is 40 m, the others are less than 20 m. Apart from the isolated rises, maximum relief is 10 m, the height of the larger dunes.

Main Soils: *Soils of sand dunes:*

H2a Calcareous siliceous sand (*sandy Calcarosol*)

H2b Siliceous sand (*sandy Tenosol*)

Soils of lower dune slopes, low rises and flats:

A4a Calcareous loam (*Hypercalcic Calcarosol*)

A4b Rubbly calcareous loam (*Supracalcic-Lithocalcic Calcarosol*)

A5 Calcareous loam on clay (*Hypercalcic-Lithocalcic Calcarosol*)



Soils of flats:

A6a	<u>Gradational calcareous clay loam over red clay</u> (<i>Pedal Hypercalcic Calcarosol</i>)
A6b	<u>Gradational calcareous clay loam over brown alluvial clay</u> (<i>Argillaceous Hypercalcic-Supracalcic Calcarosol</i>)
D3	<u>Loam over poorly structured red clay</u> (<i>Calcic-Supracalcic Red Sodosol</i>)
C1	<u>Gradational red sandy loam</u> (<i>Calcic-Hypercalcic Red Kandosol</i>)
E2	<u>Red cracking clay</u> (<i>Epipedal Red Vertosol</i>)

Main features:

The Mundooro Land System is dune - swale country. Dunes are characterized by deep calcareous and non calcareous sands with low fertility and high wind erosion potential. The flats and swale soils are variable. At higher elevations, soils tend to be loamy and rubbly, without a Hindmarsh Clay influence in the upper 100 cm. Here the main limitations are restricted waterholding capacity and fertility. Lower elevation swales influenced by Hindmarsh Clay tend to have more clayey soils with high boron, pH and salinity within the potential root zone. There are limited areas of flats with deep calcareous or texture contrast soils, where chemical subsoil limitations are significant. Non-sandy rises are characterized by loamy and rubbly calcareous soils with few limitations.

Soil Landscape Unit summary: Mundooro Land System (MUN)

SLU	% of area	Main features #
IAA	5.0	<p>Flats formed on coarsely structured reddish heavy clay (Hindmarsh Clay): soils mostly calcareous throughout; some with non-calcareous surfaces.</p> <p>Main soils: <u>Gradational calcareous clay loam over red clay A6a</u> (<i>Pedal Hypercalcic Calcarosol</i>) (E), and <u>calcareous loams on clay</u> - some rubbly A5 (<i>Hypercalcic-Lithocalcic Calcarosol</i>) (E), <u>loams over poorly structured red clay D3</u> (<i>Red Sodosol</i>) (L), and <u>red cracking clays E2</u> (<i>Vertosol</i>) (M).</p> <p>Summary: the soils are medium to fine textured and alkaline with a heavy impermeable clay at depths ranging from 50-100 cm. Average boron concentration above the clay is 33 mg/kg (double the toxic level). These concentrations are associated with moderate salinity, high sodicity and pH. The soils have high productive potential, provided that these limitations are deeper than about 75 cm. Slight limitations include: waterlogging, waterholding capacity, surface physical condition, fertility, and salinity. Moderate limitations include: subsoil physical condition, and subsoil toxicities.</p>
IDA IDP	0.5 0.4	<p>Plains with calcareous soils formed in reddish clayey sediments (Hindmarsh Clay).</p> <p>IDA - low lying level plain with slopes of 0-1%, situated between dunefields (really a wide swale area from 200-900m wide), with calcareous clay loamy topsoil (some loamy) formed in reddish clayey sediments (Hindmarsh Clay). Calcareous soils with loamy to clay loamy powdery highly calcareous surface soils occur on low rises and are of limited extent.</p> <p>IDP - low lying, marginally saline, level plain with slopes of 0-1%, situated between higher dunefields and coastal samphire swamps or the sea, with calcareous clay loamy topsoil (some loamy) formed in reddish clayey sediments (Hindmarsh Clay). Loamy highly calcareous surface soils occur on low rises, some with hard carbonate rubble, and are of limited to common extent.</p> <p>Main soils: <u>Gradational calcareous clay loam over red clay A6a</u> - medium thickness calcareous reddish clay loamy soil, sometimes over structured reddish clay, over reddish clay with abundant fine carbonate throughout: (V) [<i>Haplic-Hypervescent Argillaceous-Pedal Hypercalcic Calcarosol; clay loamy/clayey</i>]. <u>Gradational highly calcareous loam over red clay A6a</u> - medium to thick calcareous greyish loamy soil, over reddish clay with abundant fine carbonate throughout: (L-C) on low rises [<i>Hypervescent-Haplic Argillaceous Hypercalcic Calcarosol; loamy/clayey</i>].</p> <p>Summary: the IDA land unit is fully arable, while the IDP land unit is semi-arable due to saline conditions caused by the presence of saline groundwater close to the surface. Cropping, grazing, and urban settlement are the main land uses. Other than salinity, the main limitations are caused by</p>



		<p>the presence of an impermeable clay layer close to the soil surface in a moderate to low rainfall area. Seasonal waterlogging can occur in depressions after heavy rain. The clay subsoil is hard and dispersive, and typically has high levels of boron and sodium, all of which make root penetration difficult. Limiting cultivation to a minimum, to allow organic matter to build up, would improve surface soil structure, and promote improved plant germination and rainfall infiltration. Slight limitations include: waterlogging, waterholding capacity, surface physical condition, fertility, and salinity (IDA). Moderate limitations: subsoil physical condition, subsoil toxicities, and salinity (IDP).</p>
JFO	1.8	<p>Flats formed on fine grained alluvium deposited by Mundoora Creek.</p> <p>Main soils: <u>loam over poorly structured red clay D3 (<i>Red Sodosol</i>) (E)</u>, and <u>gradational red sandy loam C1 (<i>Red Kandosol</i>) (E)</u>.</p> <p>Summary: although this land is fully arable, the soils are generally poorly structured, alkaline and prone to salinity and boron toxicity (up to 85 mg/kg boron within the upper 100 cm).</p>
QHA QHP	0.1 0.1	<p>Plains with shallow soil on calcrete.</p> <p>QHA - low lying coastal bench, situated between higher elevation dunefields, and the sea. Soils are mainly highly calcareous sandy or loamy soil on calcrete.</p> <p>QHP - low lying level, salinized plain, situated between higher elevation dunefields, and a samphire swamp. Soils are mostly calcareous loamy soil on calcrete, with some (10%) calcareous clay loamy or loamy topsoil over clayey subsoil.</p> <p>Main soils:</p> <p><u>Shallow calcareous loam on calcrete B2 or calcareous loam A4a on calcrete</u> - shallow to moderate depth highly calcareous sandy or loamy soil on calcrete: coastal bench (QHA) [<i>Hypervescent Petrocalcic Calcarosol</i>].</p> <p><u>Shallow calcareous loam on calcrete B2</u> - shallow calcareous loamy soil on calcrete: salinized plain (QHP) [<i>Petrocalcic Calcarosol</i>].</p> <p><u>Gradational calcareous clay loam over brown or red clay A6b,a</u> - medium thickness calcareous loamy or clay loamy topsoil over clayey subsoil: minor part of salinized plain (QHP) [<i>Argillaceous Hypercalcic Calcarosol; loamy-clay loamy/clayey</i>].</p> <p>Summary: this land is dominated by shallow soils with poor waterholding capacities. The QHP land unit is semi-arable due to the presence of a shallow saline water table, and covered with halophytic plants. The QHA land unit is mostly urban. Slight limitations include: waterlogging (QHP), subsoil toxicities (QHP), alkalinity, salinity (QHA), and wind erosion potential. Moderate limitations include: waterholding capacity, fertility, salinity (QHP), and surface rubble.</p>
SCA SCAs SCK	2.0 1.2 0.2	<p>Plains with calcareous soils formed in medium textured wind deposited sediments with minor rubble, overlying brown alluvial clayey sediments. Probably old courses of Mundoora Creek.</p> <p>SCA - gently undulating plains with slopes of 1-2% situated between dunefields, with calcareous loamy to clay loamy topsoil (some sandy) with minor rubble over older brown alluvial light medium to light clays. There are a few isolated patches of calcrete and carbonate rubble.</p> <p>SCAs - as above but with higher subsoil salinity levels.</p> <p>SCK - gently undulating plains with slopes of about 1%, with up to 10% saline patches. This land unit is situated between higher plains, dunefields, and a samphire swamp area. Soils have mainly medium to thick highly calcareous loamy topsoil with minor rubble over brown alluvial clayey sediments with abundant fine carbonate.</p> <p>Main soils:</p> <p><u>Calcareous loam on clay A5</u> - medium to very thick calcareous loamy and usually powdery topsoil (some sandy) over clay loamy to loamy subsoil with abundant fine carbonate, overlying a brown clayey substrate: (E) [<i>Argillaceous Hypervescent Calcarosol; loamy-sandy/clay loamy-loamy</i>].</p> <p><u>Gradational calcareous clay loam over brown alluvial clay A6b</u> - medium to thick calcareous, often spongy, clay loamy to loamy topsoil over brown light medium clay with abundant fine carbonate: (E) [<i>Haplic-Hypervescent Argillaceous Hypervescent Calcarosol; clay loamy-loamy/clayey</i>].</p> <p><u>Calcareous siliceous sand H2a or sandy calcareous loam A4a</u> - thick calcareous sand over loamy sediments with abundant fine carbonate: (M) sandy rises [<i>Lutaceous Hypervescent Calcarosol; sandy/loamy</i>].</p> <p><u>Shallow calcareous loam on calcrete B2 or rubbly calcareous loams A4b-A5</u> - calcareous loamy soils over calcrete or abundant hard carbonate rubble: (M) [<i>Lithocalcic-Petrocalcic Calcarosol</i>].</p>



		<p>Summary: the SCA land unit is fully arable, while the SCK land unit has patches where no or poor crop growth occurs due to salinity (the extent of which depends on the seasonal conditions). Cropping and grazing are the main land uses. Other than salinity, the main limitations are caused by toxic subsoils, due to a build up of boron and sodium in clayey subsoils. Nutrient availability problems occur due to the soils being calcareous throughout. Also there is some potential for wind erosion with the powdery and sandy surface soils. Slight limitations include: waterholding capacity, subsoil toxicities, alkalinity, salinity (SCA and SCAs), and wind erosion potential. Moderate limitations include fertility and salinity (SCK).</p>
SGA SGP	5.3 0.3	<p>Plains with calcareous soils formed in medium textured wind deposited sediments with minor hard carbonate rubble, with some sand dunes, and some soils formed in reddish clayey sediments (Hindmarsh Clay).</p> <p>SGA - gently undulating plain or gentle slopes and gently undulating low rises (slopes 0-2.5%) situated amongst dunefields or between dunefields and the footslopes of the Hummock Range, with mainly calcareous loamy topsoils formed in medium textured wind deposited sediments with minor hard carbonate rubble, and with 10-15% calcareous clay loamy to loamy topsoils formed in reddish clayey sediments (Hindmarsh Clay) in depressions, and 10-20% longitudinal sandy rises and low sand dunes with calcareous surface soil. The sandy rises are 3-5m high and the low sand dunes 5-10m high. There is some hard carbonate rubble towards the SE end of this land unit.</p> <p>SGP - level plain situated among samphire swamps, shell grit plains, and salinized land. Soils have mainly calcareous topsoil (some sandy) over loamy to clay loamy subsoil, with some calcareous sandy to loamy topsoil over reddish clayey sediments, and about 10% low sandy rises (1-2m high). This area is marginally saline.</p> <p>Main soils:</p> <p><u>Calcareous loam A4a</u> - medium thickness calcareous loamy topsoil (sometimes sandy or clay loamy) over clay loamy or loamy subsoil with abundant fine carbonate, sometimes with some hard carbonate rubble: (V) on rises and gently undulating land [<i>Lutaceous-Arenaceous-Argillaceous Hypercalcic-Supracalcic Calcarosol</i>; <i>loamy-sandy-clay loamy/clay loamy-loamy</i>]</p> <p><u>Calcareous siliceous sand H2a</u> - deep to moderate depth calcareous siliceous brown sand: (L-M) on sandy rises and low dunes [<i>Arenaceous Hypercalcic Calcarosol</i>; <i>sandy/sandy</i>].</p> <p><u>Gradational calcareous clay loam over red clay A6a</u> - medium thickness calcareous clay loamy to loamy topsoil over reddish clay subsoil with abundant fine carbonate throughout: (L) depressions and flats [<i>Argillaceous Hypercalcic Calcarosol</i>; <i>clay loamy-loamy/clayey</i>].</p> <p><u>Rubby calcareous loams A4b-A5</u> - calcareous loamy topsoils over abundant hard carbonate rubble: (M) flats [<i>Lithocalcic Calcarosol</i>].</p> <p>Summary: this is uneven land with a mosaic of lighter textured rises, heavier textured flats, and low sand dunes. The SGA land unit is almost all arable, except for the narrow strips of semi-arable land along the crests of the low sand dunes, while the SGP land unit is semi-arable due to marginally saline conditions. Cropping and grazing are the main land uses. A few rubby areas occur. The main limitations are caused by calcareous conditions right to the soil surface. These calcareous conditions cause sub-optimal fertility. Moderate to low rainfall and clay loamy to clayey subsoils allow a build up of the toxic elements sodium and boron. Patches of waterlogging can occur. The sandy rises and low dunes are a wind erosion risk and have low fertility. Slight limitations include: waterholding capacity, subsoil toxicities, alkalinity, salinity (SGA), wind erosion potential, and water repellence (sandy rises). Moderate limitations include: waterholding capacity (sandy rises), fertility, salinity (SGP), and wind erosion potential (sandy rises).</p>
U-C	0.2	<p>Isolated sand dunes. Longitudinal sand dune (5-8m high) which is situated on low-lying plains or plains. Mostly arable.</p> <p>Main soils: <u>Calcareous siliceous sand H2a</u> - deep calcareous brown siliceous sand [<i>sandy Arenaceous Calcarosol</i>]. Possibly with some <u>siliceous sands H2b</u> [<i>sandy Tensosol</i>].</p> <p>Summary: Cropping, grazing, and urban development are the main land uses. This land consists almost entirely of deep, low fertility sands in exposed dunes, which are susceptible to wind erosion, except at Port Broughton where the dune is stabilised by housing.</p>



UEf	0.5	Plains overlain by more than 30% sand dunes or sandy rises. Swales have a mix of calcareous soils
UEF	3.1	formed in medium textured wind deposited sediments and in reddish clayey sediments.
UEG	0.2	UEf - gently inclined slope (3-5%) overlain by 30-60% longitudinal low sand dunes (up to 5m high).
UEI	3.0	The dunes are mostly arable. Swales have mostly calcareous loamy topsoil (some sandy) over loamy
UEJ	51.0	to clay loamy subsoil, with about 20-30% calcareous loamy topsoil over clayey subsoil. Some swale
UEK	13.3	areas have a potential for water erosion.
UEX	0.5	UEF - gently undulating plains overlain by 60-90% longitudinal sand dunes (5-10m high). The dunes are generally arable, but with semi-arable dune-crests. Swales have mostly calcareous loamy topsoil (some sandy) over loamy to clay loamy subsoil, with about 35% calcareous loamy topsoils over clayey subsoil.
		UEG - gently undulating plains overlain by more than 60% low sand dunes (up to 5m high). The dunes are mostly arable.
		UEI - gently undulating plains overlain by 30-60% longitudinal sand dunes (5-10m high). The dunes are generally arable, but with semi-arable dune-crests. Swales have mostly calcareous loamy topsoil (some sandy) over loamy to clay loamy subsoil, with about 10-20% calcareous loamy topsoils over clayey subsoil.
		UEJ - gently undulating plains overlain by 30-60% longitudinal low sand dunes (up to 5m high). The dunes are mostly arable. Swales have mostly calcareous loamy topsoil (some sandy) over loamy to clay loamy subsoil, with about 20-30% calcareous loamy topsoils over clayey subsoil.
		UEK - gently undulating plains with irregular low sandy rises.
		UEX - level plain overlain by about 30-40% low sandy rises (<5m high). Sandy rises mostly arable. Swales have mostly calcareous sandy topsoil (some loamy) over loamy to clay loamy subsoil, with about 10-15% calcareous sandy to loamy topsoils over clayey subsoil. Swale soils marginally saline.
		Dune soils:
		<u>Calcareous siliceous sand H2a</u> - deep calcareous brown siliceous sand: most dunes [<i>Arenaceous Hypervescent Calcarosol; sandy/sandy</i>].
		<u>Siliceous sand H2b</u> - non calcareous to slightly calcareous sand over sand with abundant fine carbonate: some dunes [<i>Hypercalcic-Calcic Arenic Orthic Tenosol-Calcarosol; sandy/sandy</i>].
		Swale soils:
		<u>Calcareous loams A5-A4a</u> - medium to thick calcareous loamy topsoil (some sandy) over clay loamy to loamy subsoil with abundant fine carbonate, many overlying a clayey substrate, some overlying calcrete at moderate depth: (E-VE in swales) on slopes, low rises, and flats [<i>Lutaceous-Argillaceous-Petrocalcic Hypercalcic Calcarosol; loamy-sandy/clay loamy-loamy</i>].
		<u>Gradational calcareous clay loam brown alluvial clay A6b</u> - medium to thick calcareous loamy topsoil over brown clayey subsoil with abundant fine carbonate: (E-C in swales) on flats [<i>Argillaceous Hypercalcic Calcarosol; loamy/clayey</i>].
		<u>Loams over poorly structured red clay D3</u> : (L-M in swales) [<i>Red Sodosol</i>].
		<u>Shallow calcareous loam on calcrete B2</u> or <u>rubbly calcareous loams A4b-A5</u> - moderate depth calcareous loamy soils over calcrete or abundant hard carbonate rubble: (M or more in swales) on flats or lower slopes [<i>Petrocalcic-Lithocalcic Calcarosol</i>].
		<u>Gradational calcareous clay loam over red clay A6a</u> - calcareous clay loamy topsoil over reddish clayey subsoil: (M in swales) in some depressions [<i>Argillaceous Hypercalcic Calcarosol; clay loamy-loamy/clayey</i>].
		<u>Red cracking clays E2</u> : (M in swales) [<i>Vertosol</i>].
		Summary: the land is mostly arable except for some dune crests. This is a typical dune-swale landscape with the inherent problem of frequent changes in soil types across the landscape. Cropping and grazing are the main land uses. The main limitations of the sand dune soils are their low fertility due to the low clay contents, and wind erosion risk due to their sandy nature. There is a need to encourage deep rooting plants to maximize water use efficiency. The main limitations of the swale soils are nutrient availability problems due to being calcareous throughout, and high salinity levels at depth (the UEX unit has marginally saline swale soils). On flats, productivity is limited by the unfavourable nature of the underlying Hindmarsh Clay (high boron and pH, and moderate salinity) which restricts rootzone depth. Patches of waterlogging can occur. Slight limitations include: waterlogging (swales), waterholding capacity (swales), surface physical condition (swales), fertility (swales), alkalinity, salinity (most swales), water erosion risk (swales UEf), wind



		erosion potential (swales), and water repellence (dunes). Moderate limitations include: waterholding capacity (dunes), subsoil physical conditions (swales), fertility (dunes), subsoil toxicities (swales), salinity (swales UEX), and wind erosion potential (dunes).
UIF UIG UIK UIc UIg	6.5 0.9 0.4 1.2 1.6	<p>Plains overlain by at least 30% sand dunes or sandy rises. Swales are dominated by calcareous soils formed in medium textured wind deposited sediments with limited rubble.</p> <p>UIF - more than 60% longitudinal sand dunes (5-10 m high). UIG - more than 60% low sand dunes (up to 5 m high). UIK - gently undulating plains with irregular low sandy rises. UIc - gentle slopes (2-4%) overlain by more than 60% low sand dunes (up to 5 m high). UIg - gentle slopes (2-4%) overlain by hummocky sand spreads.</p> <p>Dune soils: <u>Calcareous siliceous sand H2a</u> (<i>sandy Calcarosol</i>) (E), with <u>siliceous sand H2b</u> (<i>sandy Tenosol</i>) (L).</p> <p>Swale soils: <u>Calcareous loam A4a</u> (<i>Hypercalcic Calcarosol</i>) (V), with <u>rubby calcareous loam A4b</u> (<i>Supracalcic-Lithocalcic Calcarosol</i>) (L), and probably some calcareous loams overlying clay A5 (<i>Hypercalcic-Lithocalcic Calcarosol</i>) (L).</p> <p>Summary: this is a typical dune-swale landscape with the inherent problem of frequent changes in soil types across the landscape. Control of wind erosion is the main concern on the sandy rises, along with fertility maintenance and the need to encourage deep rooting to maximize water use efficiency. On the flats the main limitations are lime induced fertility problems and reduction of root zone depths by unfavourable carbonate layers, resulting in a loss of water use efficiency. Slight limitations include: waterholding capacity (swales/hummocky sand spreads), subsoil toxicities, alkalinity, wind erosion potential (swales), and water repellence (dunes). Moderate limitations include: waterholding capacity (dunes), fertility, and wind erosion potential (dunes).</p>
ZA1 ZA2 ZA3	0.5 0.04 0.05	<p>Salinized land - caused by shallow saline watertables.</p> <p>ZA1 - salinized plain covered with samphire plants. Soils are mainly calcareous with sandy to loamy topsoil over clay loamy or clayey subsoil. There are a few (minor) sandy rises. There are also some patches of arable land.</p> <p>ZA2 - salinized low lying coastal to near coastal area covered with samphire plants. Soils have calcareous sandy to clay loamy topsoil over clay loamy subsoil, some on calcrete.</p> <p>ZA3 - salinized low lying level plain covered with halophytic plants. Soils have calcareous loamy or clay loamy topsoil over brown clayey subsoil. This land unit is situated between higher elevation plains, and a samphire swamp.</p> <p>Main soils: <u>Calcareous loams A5-A4a</u> or <u>gradational calcareous clay loam on clay A6</u> - medium to thick calcareous sandy or loamy topsoil over clay loamy or clayey subsoil with abundant fine carbonate: (V in ZA1), (E in ZA2) [<i>Haplic-Hypervescent Lutaceous-Argillaceous Hypercalcic Calcarosol</i>; <i>sandy-loamy/clay loamy-clayey</i>]. <u>Gradational calcareous clay loam over brown alluvial clay A6b</u> - medium calcareous loamy or clay loamy topsoil over brown clayey subsoil with abundant fine carbonate: (V in ZA3) [<i>Argillaceous Hypercalcic Calcarosol</i>; <i>loamy-clay loamy/clayey</i>]. <u>Shallow calcareous loam on calcrete B2</u> - shallow depth soil with calcareous sandy to clay loamy topsoil over clay loamy subsoil on calcrete: (E-C in ZA2) [<i>Petrocalcic Calcarosol</i>]. <u>Calcareous siliceous sand H2a</u> or sandy <u>calcareous loam A4a</u> - thick to very thick calcareous sand over loamy or sandy sediments with abundant fine carbonate: (M in ZA1 on sandy rises) [<i>Arenaceous-Lutaceous Calcarosol</i>; <i>sandy</i>].</p> <p>Summary: this land is mostly covered by halophytic vegetation. The major limitation is the high soil salinity levels. Some patches of the ZA1 land unit are arable. Limited grazing is the main land use. Moderate limitations include: waterlogging (ZA1 and ZA3), waterholding capacity (ZA1 and ZA3), fertility, subsoil toxicities, and alkalinity. High to severe limitations include: waterlogging (ZA2), waterholding capacity (ZA2), and salinity.</p>

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

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|--|---------------------------------------|
| (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) |



Detailed soil profile descriptions:**Main soils:***Soils of Sand Dunes:***H2a** Calcareous siliceous sand (*sandy Calcarosol*).

Thick calcareous brown sand to loamy sand grading to a very highly calcareous clayey sand to light sandy clay loam below 100cm.

H2b Siliceous sand (*sandy Tenosol*).

Thick non calcareous reddish sand grading to a highly calcareous reddish sand to clayey sand.

*Soils of Lower Dune Slopes, Low Rises and Flats:***A4a** Calcareous loam (*Hypercalcic Calcarosol*).

Medium to thick calcareous sandy loam to loam (often powdery, and sometimes sandy) grading to clay loamy or loamy subsoil with abundant fine carbonate and minor amounts of hard carbonate nodules. Becoming more clayey and calcareous with depth. Sometimes overlying calcrete at moderate depth.

A4b Rubbly calcareous loam (*Supracalcic-Lithocalcic Calcarosol*).

Medium to thick calcareous sandy loam to clay loam (often powdery) grading to clay loamy or loamy subsoil with abundant fine carbonate and abundant hard carbonate rubble. The soil becomes less rubbly and more clayey with depth.

A5 Calcareous loam on clay (*Hypercalcic-Lithocalcic Calcarosol*).

Medium thickness calcareous sandy loam to clay loam (often powdery) grading to clay loamy subsoil with abundant fine carbonate and abundant hard carbonate rubble, which overlies heavy to medium clayey substrate sediments within 120 cm of the surface. The soil becomes less rubbly with depth.

*Soils of Flats:***A6a** Gradational calcareous clay loam over red clay (*Pedal Hypercalcic Calcarosol*).

Medium to thick calcareous clay loamy to clayey topsoil (some on low rises with highly calcareous loamy surface soil) grading to a well structured heavy clay with abundant fine carbonate, over red heavy clay (Hindmarsh Clay) at depths ranging from 50 to 100 cm. Especially found in depressions.

A6b Gradational calcareous clay loam over brown alluvial clay (*Argillaceous Hypercalcic-Supracalcic Calcarosol*).

Medium to thick calcareous loamy to clay loamy topsoil (often spongy and highly calcareous) grading to a massive brown alluvial medium clay with abundant fine carbonate at depths ranging from 50 to 100 cm. Often with some hard carbonate nodules. Found in low lying areas - old creek courses.

D3 Loam over poorly structured red clay (*Calcic-Supracalcic Red Sodosol*).

Medium thickness hard loam to clay loam with a bleached subsurface layer, sharply overlying a red coarsely structured dispersive clay with abundant fine carbonate, and sometimes hard carbonate rubble from about 50 cm, grading to red heavy clay (Hindmarsh Clay) or brown alluvial clay at about 100 cm. The soil can be calcareous throughout.

C1 Gradational red sandy loam (*Calcic-Hypercalcic Red Kandosol*).

Medium to thick sandy loam grading to a red massive sandy clay loam, over a very highly calcareous clay from about 75 cm.

E2 Red cracking clay (*Epipedal Red Vertosol*).

Seasonally cracking calcareous clay grading to a very highly calcareous red heavy clay over red heavy clay (Hindmarsh Clay) from about 50 cm.

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

