

BEG Bews-Glenayr Land System

Dunefields, plains, and rises, stretching from coastal rises in the west, to the edge of the Bute plateau in the east. This land system is a transition zone between the dunefields to the north, and the plains with scattered patches of dunes to the south. The land system marks the northern extent of land where soils with abundant hard carbonate rubble and/or calcrete form a significant part of the landscape - such areas continue to the very southern end of the Yorke Peninsula - to the north soils are generally free of abundant hard carbonate rubble or calcrete. Bews is the name of a locality on the northern boundary of this land system, and 'Glenayr' is the name of a homestead situated in the central-east of the system.

Area: 95.4 km²

Annual rainfall: 335 – 380 mm average

Geology: The youngest sediments are the wind deposited calcareous siliceous sands, forming longitudinal sand dunes (Molineaux sand formation) which were formed from the reworking of older materials. However, there has been much redistribution/spreading of sand since clearing and settlement, especially on the exposed rises in the west of the system. Many swales and plains are covered with a layer of older wind deposited calcareous loamy sediments (Woorinen formation). These sediments often contain hard carbonate rubble. This rubble can sometimes be cemented together to form the younger and softer Bakara Calcrete or the older and harder Ripon Calcrete. These calcretes can take the form of nodular or concretionary sheet calcrete, or calcrete rubble. Underlying all of the above sediments is a layer of reddish clay (Blanchetown Clay equivalent), which has near surface expression in places.

Topography: Rising ground in the west, to gently undulating or level plains in the centre and east. There are extensive longitudinal sand dunes oriented NW-SE, from 2-8m high. Exposed rises appear to have had former defined sand dunes flattened and partially removed. The system has no defined surface drainage.

Elevation: About 90 m in the east to 50 m in the west where the land then quickly falls away toward the coast to an elevation of 10 m.

Relief: Relief is less than 10 m, except in the very west where it reaches 20 m.

Main Soils:

H2a-H2b	Calcareous siliceous sand and siliceous sand (around 48% of area: mostly H2a soil)
A4-A5	(Rubbly) calcareous loams (around 31% of area: approx 27% A4 and 4% A5)
B2	Shallow calcareous loam on calcrete (around 10% of area)
A6	Gradational calcareous clay loam (around 8% of area)

Minor soils:

D3-C4	Loam over poorly structured red clay (approximately 2% of area)
B3	Shallow sandy loam on calcrete (approximately 2% of area)
D5	(Hard) loamy sand over red clay

Main Features: The system is mostly arable. The main soils are calcareous loams over loam or clay loam, often with hard carbonate rubble; and dune sands. Shallow soil on calcrete and soil formed in reddish clayey sediments also commonly occur. Sand dune soils need careful management due to their low fertility and potential for wind erosion: most other soils have a moderately low wind erosion potential. Calcareous soils limit the availability of certain nutrients: deficiencies of the major nutrient phosphorus and the trace element zinc are common, while deficiencies of the trace elements



manganese and iron are possible. Temporary trace element deficiencies can occur in cold and wet conditions with susceptible crops. Soil with hard carbonate rubble and shallow soil on calcrete have reduced effective waterholding capacities. Also surface rubble interferes with some farming operations. Toxic accumulations of boron and sodium can occur in subsoils, especially when clayey.

Soil Landscape Unit summary: Bews-Glenayr Land System (BEG)

SLU	% of area	Main features #
INA	4.1	<p>Plains and low lying plains with soil formed in reddish clayey sediments (mainly calcareous throughout but some with non calcareous surface soil), and with some calcareous soil formed in rubbly medium textured wind deposited sediments.</p> <p>INA - generally low lying level to gently undulating plain with slopes of 0-2% with most soils developed in reddish clayey material. Some patches of surface rubble occur. Boron and sodium levels are often high in subsoils.</p> <p>Main soils:</p> <p><i>Gradational calcareous clay loam A6</i> with some <i>loam over poorly structured red clay D3</i> or <i>hard gradational red clay loam C4</i> – medium to thick calcareous (with some non calcareous) loamy or clay loamy topsoil over reddish clayey subsoil with abundant fine carbonate: (E-V) [Argillaceous Hypercalcic Calcarosol; loamy-clay loamy/clayey with some Sodic-Effervescent Hypercalcic Red Chromosol-Sodosol-Dermosol; loamy-clay loamy/clayey].</p> <p><i>Rubbly calcareous loams A5-A4</i> - medium to thick calcareous loamy topsoil (a few sandy) over clay loamy or loamy subsoil usually with abundant hard carbonate rubble: (L-C) low rises [Lutaceous Lithocalcic Calcarosol; loamy/clay loamy-loamy].</p> <p><i>Shallow calcareous loam on calcrete B2</i> - shallow soil on calcrete: (M) low stony rises [Petrocalcic Calcarosol].</p> <p>Summary: the land is arable: cropping and some grazing are the main land uses. The soil surface can be hardsetting. Clayey subsoils are usually relatively impermeable, with toxic accumulations of sodium and boron. Significant patches of waterlogging can occur. Surface soils are generally quite fertile, and soils have moderate to high water holding capacities. These areas are likely to do well in wet years, but unlikely to perform as well as surrounding areas in dry years, because most soils have relatively high wilting points. Slight limitations include: waterlogging, water holding capacity, surface soil physical condition, fertility, alkalinity, and salinity. Moderate limitations include subsoil physical condition and subsoil toxicities.</p> <p><u>Soil descriptions</u></p> <p>Mid slope (1%): Sodic Calcic Red Chromosol; thick, non-gravelly, loamy/clayey, moderate.</p> <p>Lower slope (1%): Sodic Hypercalcic Brown Dermosol; medium, non-gravelly, clay loamy/clayey, moderate.</p> <p><u>Related soils on adjacent land units</u></p> <p>Lower slope (2%): Haplic Argillaceous Hypercalcic Calcarosol; medium, non-gravelly, loamy/clayey, moderate.</p>
QIA	4.1	<p>Plains with shallow to very shallow soil on calcrete (mainly calcareous, but some soils are non calcareous), with some soil formed in reddish clayey sediments.</p> <p>QIA - gently undulating plain with slopes of 0-2% with mainly shallow to very shallow soil on calcrete. Surface rubble of common abundance is widespread. Toxic levels of boron and sodium occur in clayey subsoils.</p> <p>Main soils:</p> <p><i>Shallow calcareous loam on calcrete B2</i> with some <i>shallow sandy loam on calcrete B3</i> - shallow to very shallow calcareous loamy soil (with some sandy surface soil) on calcrete (possibly some soils are without calcrete but have abundant hard carbonate rubble). With 0-10% non calcareous to slightly calcareous reddish soil on calcrete. (E-V) [Petrocalcic Calcarosol; loamy-sandy/loamy with some Petrocalcic Orthic Tenosol].</p> <p><i>Gradational calcareous clay loam A6</i> with some <i>loam over poorly structured red clay D3</i> or <i>hard gradational red clay loam C4</i> - medium to thick calcareous (with some non calcareous) loamy or clay loamy topsoil over reddish clayey subsoil with abundant fine carbonate: (L-C) depressions [Argillaceous Hypercalcic Calcarosol; loamy-clay loamy/clayey with some Sodic-Effervescent Hypercalcic Red Chromosol-Sodosol-</p>



		<p>Dermosol; loamy-clay loamy/clayey].</p> <p>Summary: the land is arable: cropping and some grazing are the main land uses. The main limitation is the low water holding capacity of the shallow soils. Surface rubble interferes with some farming operations. Slight limitations include fertility, subsoil toxicities, alkalinity and wind erosion potential. Moderate limitations include water holding capacities and rockiness.</p>
QCA	2.8	<p>Low lying plains with shallow to very shallow soil on calcrete (mainly calcareous, but some soils are non calcareous) and calcareous soil formed in rubbly medium textured wind deposited sediments.</p> <p>QCA - low lying level plain with shallow to very shallow soil on calcrete, and soils formed in rubbly medium textured wind deposited sediments. Surface rubble of common to moderate abundance is widespread. Toxic levels of boron and sodium occur in the subsoil or at depth.</p> <p>Main soils:</p> <p><i>Shallow calcareous loam on calcrete</i> B2 with some <i>shallow sandy loam on calcrete</i> B3 - shallow to very shallow calcareous loamy soil (with some sandy surface soils) on calcrete (possibly some soils are without calcrete but have abundant hard carbonate rubble). There are 10-20% non calcareous to slightly calcareous reddish soils on calcrete. (E) [Petrocalcic Calcarosol; loamy-sandy/loamy with some Petrocalcic Orthic Tenosol].</p> <p><i>Rubbly calcareous loam</i> A4 - medium to thick calcareous loamy topsoil over loamy or clay loamy subsoil with abundant hard carbonate rubble: (E) [Lutaceous Lithocalcic Calcarosol; loamy/loamy-clay loamy].</p> <p>Summary: the land is arable: cropping and some grazing are the main land uses. The main limitation is caused by the low water holding capacity of the shallow soils; hard carbonate rubble also reduces effective water holding capacity. Surface rubble interferes with some farming operations. Toxic accumulations of boron and sodium can occur in the subsoil, especially the lower subsoil. Slight limitations include: subsoil toxicities, alkalinity and wind erosion potential. Moderate limitations include: water holding capacities, fertility, and rockiness.</p>
QRA	2.2	<p>Low lying plains with shallow to very shallow soil on calcrete (mainly calcareous with some non calcareous soils).</p> <p>QRA - low lying stony level plain dominated by shallow to very shallow soil on calcrete. Surface rubble of moderate abundance is widespread. At depth are reddish clayey sediments.</p> <p>Main soils:</p> <p>Shallow to very shallow calcareous loamy (with some sandy surface soils) on calcrete B2: (possibly some soils are without calcrete but have abundant hard carbonate rubble). With 10-20% non calcareous to slightly calcareous reddish soil on calcrete B3: (D) [Petrocalcic Calcarosol; loamy-sandy/loamy with some Petrocalcic Orthic Tenosol].</p> <p>Summary: the land is arable: cropping and some grazing are the main land uses. The main limitation is caused by the low water holding capacity of these shallow soils. Surface rubble interferes with some farming operations. Slight limitations include alkalinity and wind erosion potential. Moderate limitations include: water holding capacities, fertility, and rockiness.</p> <p><u>Soil descriptions - QRA</u></p> <p>Slope (2%): Haplic Petrocalcic Lithocalcic Calcarosol; thick, moderately gravelly, sandy/loamy, shallow.</p> <p><u>Soil descriptions - QIA</u></p> <p>Mid slope (1%): Haplic Petrocalcic Lithocalcic Calcarosol; medium, gravelly, clay loamy/loamy, shallow.</p> <p>Flat: Epibasic Petrocalcic Lithocalcic Calcarosol; medium, slightly gravelly, sandy/loamy, very shallow.</p> <p>Flat: Haplic Lutaceous Hypercalcic Calcarosol; medium, slightly gravelly, clay loamy/clay loamy, moderate.</p> <p><u>Soil descriptions - QCA</u></p> <p>Upper slope (2%): Haplic Lutaceous Lithocalcic Calcarosol; thick, moderately gravelly, loamy/loamy, moderate.</p>
SdA	6.5	<p>Plains with mainly calcareous soil formed in rubbly medium textured wind deposited sediments, some shallow soil on calcrete, and some soil formed in reddish clayey sediments.</p> <p>SdA - gently undulating plains with slopes of 0-2% with mainly calcareous loamy topsoil over clay loamy or loamy subsoil with hard carbonate rubble. Patches of surface rubble</p>



		<p>are usual.</p> <p>Main soils:</p> <p><i>Rubbly calcareous loams A4-A5</i> - medium to thick calcareous loamy topsoil (a few sandy) over clay loamy or loamy subsoil usually with abundant hard carbonate rubble: (E) [Lutaceous Lithocalcic Calcarosol; loamy/clay loamy-loamy].</p> <p><i>Gradational calcareous clay loam A6</i> with some loam over poorly structured red clay D3 - medium to thick calcareous (with some non calcareous) loamy topsoil (some clay loamy) over reddish clayey subsoil with abundant fine carbonate: (L) depressions [Argillaceous Hypercalcic Calcarosol; loamy/clayey with some Sodic-Effervescent Hypercalcic Red Chromosol-Sodosol; loamy/clayey].</p> <p><i>Shallow calcareous loam on calcrete B2</i> - shallow calcareous loamy soil (with some sandy topsoils) on calcrete: (L) [Petrocalcic Calcarosol; shallow].</p> <p>Summary: the land is arable: cropping and some grazing are the main land uses. Soils are generally loamy, and calcareous throughout which can cause nutrient availability problems. Hard carbonate rubble limits water holding capacity; and areas with shallow soils have low water holding capacity. Toxic accumulations of sodium and boron occur in subsoils (especially when clayey) or below. Slight limitations include: water holding capacity, subsoil toxicities, alkalinity, and wind erosion potential. Moderate limitations include fertility and surface rubble.</p> <p><u>Soil descriptions</u></p> <p>Flat: Haplic Lutaceous Lithocalcic Calcarosol; thick, non-gravelly, loamy/loamy, moderate.</p> <p>Lower slope (2%): Haplic Lithocalcic Calcarosol; thick, non-gravelly, loamy/clay loamy, moderate.</p> <p><u>Related soils on adjacent land units</u></p> <p>Slope (2%): Haplic Petrocalcic Lithocalcic Calcarosol; thick, moderately gravelly, sandy/loamy, shallow.</p> <p>Mid slope (1%): Haplic Petrocalcic Lithocalcic Calcarosol; medium, gravelly, clay loamy/loamy, shallow.</p> <p>Mid slope (1%): Sodic Calcic Red Chromosol; thick, non-gravelly, loamy/clayey, moderate.</p>
SSA	2.5	<p>Plain and slope with mainly calcareous soil formed in medium textured wind deposited sediments, some soil formed in reddish clayey sediments, and some sandy rises.</p> <p>SSA - gently undulating area with slopes of 1-3%, with calcareous loamy topsoil (some sandy) over loamy or clay loamy subsoil; about 20% calcareous loamy topsoil over reddish clayey subsoil in depressions; and about 10% longitudinal sandy rises. Patches of surface rubble occur.</p> <p>Main soils:</p> <p><i>Calcareous loams A4-A5</i> - medium to thick calcareous loamy topsoil (some sandy) over loamy or clay loamy subsoil with abundant fine carbonate and often with hard carbonate rubble: (E) [Lutaceous Hypercalcic-Lithocalcic Calcarosol; loamy-sandy/loamy-clay loamy].</p> <p><i>Gradational calcareous clay loam A6</i> - medium to thick calcareous loamy topsoil over reddish clayey subsoil with abundant fine carbonate: (L-C) depressions [Argillaceous Hypercalcic Calcarosol; loamy/clayey].</p> <p><i>Calcareous siliceous sand B2</i> - very thick calcareous sandy topsoil over sandy or loamy subsoil with abundant fine carbonate: (M) sandy rises [Arenaceous-Lutaceous Hypercalcic Calcarosol; sandy/sandy-loamy].</p> <p>Summary: the land is arable: cropping and some grazing are the main land uses. Soils are generally loamy, and calcareous throughout which can cause nutrient availability problems. There is some potential for wind erosion. There are often toxic accumulations of boron and sodium in the lower subsoil, or subsoil when clayey. Slight limitations include: water holding capacity, subsoil toxicities, alkalinity, wind erosion potential, and surface rubble. Moderate limitations include: water holding capacity (sandy rises), fertility, and wind erosion potential (sandy rises).</p>
SVK	0.7	<p>Coastal plain mainly calcareous soil formed in medium textured wind deposited sediments, some shallow calcareous soil on calcrete.</p> <p>SSA - gently undulating area with slopes of 0-2% with mainly calcareous loamy or sandy topsoil over loamy or clay loamy subsoil often with hard carbonate rubble. Patches of surface rubble occur.</p> <p>Main soils:</p> <p><i>Calcareous loam A4</i> - medium to thick calcareous loamy or sandy topsoil over loamy or</p>



		<p>clay loamy subsoil with abundant fine carbonate and often with hard carbonate rubble: (V) [Lutaceous Hypercalcic-Lithocalcic Calcarosol; loamy-sandy/loamy-clay loamy]. <i>Shallow calcareous loam on calcrete B2</i> - shallow soil on calcrete: (L-C) [Petrocalcic Calcarosol].</p> <p>Summary: the land is arable: cropping and some grazing are the main land uses. Topsoils are loamy or sandy, and calcareous throughout which can cause nutrient availability problems. There is some potential for wind erosion. There are likely to be toxic accumulations of boron and sodium in the subsoil or lower subsoil. Moderate to moderately low saline seepage occurs resulting in raised subsoil salinity levels. Slight limitations include: water holding capacity, subsoil toxicities, alkalinity, wind erosion potential, and surface rubble. Moderate limitations include fertility.</p>
U-D	0.03	<p>Mappable sand dunes (dunes cover more than 90% of area). U-D - low longitudinal sand dune. Dune soils: <i>Calcareous siliceous sand H2a</i> - deep calcareous brown siliceous sand: most of area [Arenaceous Hypercalcic-Lithocalcic Calcarosol; sandy/sandy]. <i>Siliceous sand H2b</i> - medium to very thick non calcareous to slightly calcareous reddish sand over sand with abundant fine carbonate: possibly occurs [Hypercalcic-Calcic Arenic Orthic Tenosol; sandy/sandy]. Summary: the land is mostly arable: cropping and grazing are the main land uses. The main limitations of dune soils are their potential for wind erosion and low fertility.</p>
UAF	1.3	<p>Plains overlain by more than 30% sand dunes. Swales are dominated by soils formed in reddish clayey sediments. UAF - level plain with about 85% of area overlain by longitudinal sand dunes. The dunes are generally arable, but usually have semi-arable strips along the dune ridge. Swales have mainly calcareous (with some non calcareous) loamy or sandy topsoil over reddish clayey subsoil with abundant fine carbonate. Boron and sodium levels are high in clayey subsoils or lower subsoils. Dune soils: <i>Calcareous siliceous sand H2a</i> - deep calcareous brown siliceous sand: most dunes [Arenaceous Hypercalcic-Lithocalcic Calcarosol; sandy/sandy]. <i>Siliceous sand H2b</i> - medium to very thick non calcareous to slightly calcareous reddish sand over sand with abundant fine carbonate: on some dunes [Hypercalcic-Calcic Arenic Orthic Tenosol; sandy/sandy]. Swale soils: <i>Gradational calcareous clay loam A6</i> with some loam over poorly structured red clay D3 or loamy sand over red clay C4 - medium to thick calcareous (with some non calcareous) loamy or sandy topsoil over reddish clayey subsoil with abundant fine carbonate: (E-VE in swales) [Argillaceous Hypercalcic Calcarosol; loamy/clayey with Sodic-Effervescent Hypercalcic Red Chromosol-Sodosol; sandy-loamy/clayey]. <i>Calcareous loams A5-A4</i> - medium to thick calcareous loamy or sandy topsoil over loamy subsoil with abundant fine carbonate, and often with hard carbonate rubble: (L in swales) [Lutaceous-Arenaceous Hypercalcic-Lithocalcic Calcarosol; loamy-sandy/loamy]. Summary: the land is arable except for the semi-arable dune ridge strips: cropping and grazing are the main land uses. The main limitations of the dunes are their potential for wind erosion and low fertility. The main limitations of the swales is caused by the relatively impermeable clayey subsoils with toxic accumulations of boron and sodium. Slight limitations include: waterlogging (swales), water holding capacity (swales), surface physical condition (swales), fertility (swales), alkalinity, salinity (swales), and water repellence (dunes). Moderate limitations include: water holding capacity (dunes), subsoil physical condition (swales), fertility (dunes), subsoil toxicities (swales), and wind erosion potential (dunes). <u>Soil descriptions</u> Lower slope (2%): Haplic Argillaceous Hypercalcic Calcarosol; medium, non-gravelly, loamy/clayey, moderate. <u>Related soil on adjacent land unit</u> Mid slope (1%): Sodic Calcic Red Chromosol; thick, non-gravelly, loamy/clayey, moderate.</p>
UFF UFJ	6.7 8.7	<p>Plains overlain by more than 30% sand dunes. Swales have calcareous soils formed in reddish clayey sediments or in rubbly medium textured wind deposited sediments. UFF - gently undulating plain with slopes of 1-2% overlain by about 70-75% longitudinal sand dunes. The dunes are generally arable, but often have semi-arable strips along the</p>



dune ridge. Swales have calcareous loamy topsoil (with some sandy) over loamy or clay loamy subsoil with hard carbonate rubble; and calcareous loamy topsoil over reddish clay subsoil with abundant fine carbonate. There are about 10-15% shallow calcareous loamy soils on calcrete (especially on low stony rises). Boron and sodium levels are high in clayey subsoils. Patches of surface rubble are common.

UFJ - gently undulating plains with slopes of 1-3% overlain by about 40% longitudinal low sand dunes. The dunes are mostly arable. Swales have calcareous loamy topsoil (with some sandy) over loamy or clay loamy subsoil with hard carbonate rubble; and calcareous loamy topsoil over reddish clay subsoil with abundant fine carbonate. There are about 10-15% shallow calcareous loamy soils on calcrete (especially on low stony rises). Boron and sodium levels are high in clayey subsoils. Patches of surface rubble are common.

Dune soils:

Calcareous siliceous sand H2a - deep calcareous brown siliceous sand: most dunes [Arenaceous Hypercalcic-Lithocalcic Calcarosol; sandy/sandy].

Siliceous sand H2b - medium to very thick non calcareous to slightly calcareous reddish sand over sand with abundant fine carbonate: some dunes [Hypercalcic-Calcic Arenic Orthic Tenosol; sandy/sandy].

Swale soils:

Rubbly calcareous loams A4-A5 - medium to thick calcareous loamy or sandy topsoil over loamy or clay loamy subsoil usually with hard carbonate rubble: (E in swales) [Lutaceous Lithocalcic-Hypercalcic Calcarosol; loamy-sandy/loamy].

Gradational calcareous clay loam A6 with some loam over poorly structured red clay **D3** or loamy sand over red clay **C4** - medium to thick calcareous (with some non calcareous) loamy or sandy topsoil over reddish clayey subsoil with abundant fine carbonate: (E in swales) usually in depressions [Argillaceous Hypercalcic Calcarosol; loamy/clayey with Sodic-Effervescent Hypercalcic Red Chromosol; sandy-loamy/clayey-clay loamy].

Shallow calcareous loam on calcrete B2: (L-M in swales) often on low stony rises [Petrocalcic Calcarosol].

Summary: the land is arable except for the semi-arable dune ridge strips: cropping and grazing are the main land uses. The main limitations of the dunes are their potential for wind erosion and low fertility. The main limitation of the swales is caused by the relatively impermeable clayey subsoils with toxic accumulations of boron and sodium. Water holding capacity is restricted by hard carbonate rubble. Waterlogging can occur in patches. Nutrient availability problems are likely to occur where soils are calcareous throughout. Slight limitations include: waterlogging (swales), water holding capacity (swales), surface physical condition (swales), fertility (swales), alkalinity, salinity (swales), wind erosion potential (swales), water repellence (dunes), and surface rubble. Moderate limitations include: water holding capacity (dunes), subsoil physical condition (swales), fertility (dunes), subsoil toxicities (swales), and wind erosion potential (dunes).

Soil descriptions - **UFF**

Flat: Haplic Lutaceous Hypercalcic Calcarosol; medium, slightly gravelly, clay loamy/clay loamy, moderate.

Related soils on adjacent land units

Upper slope (2%): Haplic Arenaceous Lithocalcic Calcarosol; thick, moderately gravelly, loamy/loamy, moderate.

Slope (2%): Haplic Petrocalcic Lithocalcic Calcarosol; thick, moderately gravelly, sandy/loamy, shallow.

Slope (1%): Haplic Lutaceous Lithocalcic Calcarosol; thick, non-gravelly, loamy/loamy, moderate.

Lower slope (1%): Haplic Argillaceous Hypercalcic Calcarosol; medium, non-gravelly, loamy/clayey, moderate.

Soil descriptions - **UFJ**

Dunecrest: Calcareous Arenic Orthic Tenosol; thick, non-gravelly, sandy/sandy, moderate.

Slope (1%): Haplic Argillaceous Hypercalcic Calcarosol; thick, non-gravelly, loamy/clayey, moderate.

Slope (2%): Sodic Hypercalcic Red Chromosol; thick, non-gravelly, sandy/clay loamy, moderate.

Slope (2%): Haplic Lutaceous Hypercalcic Calcarosol; thick, non-gravelly, sandy/loamy, moderate.

Related soils on adjacent land units

Slope (2%): Haplic Lithocalcic Calcarosol; thick, non-gravelly, loamy/clay loamy,



		moderate.
ULJ	15.6	<p>Slopes and rises overlain by more than 30% sand dunes. Swales are dominated by calcareous soil formed in non rubbly medium textured wind deposited sediments.</p> <p>ULJ - Gently undulating rises with slopes of 1-3% overlain by 40-45% longitudinal sandy rises and low sand dunes. The dunes and sandy rises are mostly arable. A few patches of soil with abundant hard carbonate rubble occur on dunes and swales; and a few patches of surface rubble occur. Swales have calcareous sandy topsoil (some loamy) over clay loamy or loamy subsoil. Boron and sodium levels are usually high in lower subsoils or at depth in swales. This rise is on an exposed position.</p> <p>ULI - Gently inclined slopes of 2-5% overlain by about 40% longitudinal low sand dunes. The dunes are generally arable, but often have semi-arable dune ridge strips. Swales have calcareous sandy or loamy topsoil over clay loamy or loamy subsoil. Occasionally these soils are underlain by calcrete. Lower subsoils or subsoils in swales usually have high levels of boron and sodium. Moderate levels of saline seepage also affect swales. Some swale areas have a slight water erosion risk.</p> <p>ULP - Gently inclined slopes of 2-3% overlain by 45-50% longitudinal low sand dunes. The dunes are generally arable, but often have semi-arable dune ridge strips. Swales have calcareous sandy or loamy topsoil over clay loamy or loamy subsoil. Occasionally these soils are underlain by calcrete. Lower subsoils or subsoils in swales usually have high levels of boron and sodium. Moderate levels of saline seepage also affect swales.</p> <p>Dune soils: <i>Calcareous siliceous sand H2a</i> - dunes and sandy rises [Arenaceous Hypercalcic Calcarosol; sandy/sandy].</p> <p>Swale soils: <i>Deep calcareous loam A4</i> - medium to thick calcareous sandy or loamy topsoil over clay loamy or loamy subsoil with abundant fine carbonate: (D in swales) [Lutaceous-Arenaceous Hypercalcic Calcarosol; sandy-loamy/clay loamy-loamy].</p> <p>Summary: the land is mostly arable except for some semi-arable dune ridge strips: cropping and grazing are the main land uses. The main limitations of the dunes are their low fertility and potential for wind erosion. The swale soils have high boron and sodium levels in subsoils, lower subsoils, or at depth. Some saline seepage occurs in swales. Nutrient availability problems occur through soils being calcareous throughout. Slight limitations include: water holding capacity (swales), fertility, subsoil toxicities and salinity (swales ULJ), alkalinity, water erosion potential (swales ULI); water repellence (dunes); salinity (ULs and ULP swales); water erosion potential (ULs), wind erosion potential (swales), and water repellence (dunes). Moderate limitations include: water holding capacity (dunes), fertility, subsoil toxicities and salinity (swales ULP, ULI), wind erosion potential (dunes and sandy rises), and exposure (especially ULJ).</p> <p><u>Soil descriptions - ULI</u> Dunecrest: Haplic Arenaceous Hypercalcic Calcarosol; medium, non-gravelly, sandy/sandy, moderate. Dunecrest: Haplic Arenaceous Hypercalcic Calcarosol; medium, non-gravelly, sandy/sandy, moderate. Slope (1%): Haplic Lutaceous Hypercalcic Calcarosol; medium, non-gravelly, sandy/clay loamy, moderate. Slope (1%): Haplic Lutaceous Calcic Calcarosol; thick, non-gravelly, sandy/clay loamy, moderate.</p> <p><u>Related soils on adjacent land units</u> Dunecrest: Haplic Arenaceous Hypercalcic Calcarosol; medium, non-gravelly, sandy/sandy, moderate. Dunecrest: Haplic Arenaceous Hypercalcic Calcarosol; thin, non-gravelly, sandy/sandy, moderate. Duneslope: Haplic Arenaceous Hypercalcic Calcarosol; very thick, non-gravelly, sandy/sandy, moderate. Flat: Haplic Petrocalcic Hypercalcic Calcarosol; thick, non-gravelly, sandy/loamy, moderate. Slope (2%): Haplic Lutaceous Hypercalcic Calcarosol; medium, non-gravelly, loamy/loamy, moderate.</p> <p><u>Soil descriptions - ULJ</u> Dunecrest: Haplic Arenaceous Hypercalcic Calcarosol; medium, non-gravelly, sandy/sandy, moderate. Slope (2%): Haplic Lutaceous Hypercalcic Calcarosol; medium, non-gravelly, loamy/clay</p>
ULI	6.7	
ULP	5.3	



		<p>loamy, moderate. Dunecrest: Haplic Arenaceous Hypercalcic Calcarosol; medium, non-gravelly, sandy/sandy, moderate. Dunecrest: Low dune eroded to carbonate nodules Lower duneslope: Haplic Arenaceous Hypercalcic Calcarosol; thick, non-gravelly, sandy/loamy, moderate. Slope (2%): Haplic Lutaceous Hypercalcic Calcarosol; thick, non-gravelly, sandy/clay loamy, moderate. Flat: Haplic Arenaceous Supracalcic Calcarosol; thick, non-gravelly, sandy/loamy, moderate. Flat: Haplic Arenaceous Lithocalcic Calcarosol; thick, non-gravelly, loamy/loamy, moderate. <u>Soil descriptions - ULP</u> Slope (2%): Haplic Lutaceous Hypercalcic Calcarosol; medium, non-gravelly, loamy/clay loamy, moderate.</p>
ULK	4.0	<p>Rise with sand spreads/rises and calcareous soil formed in non rubbly wind deposited medium textured sediments. ULK - gently undulating rise with slopes of 1-3% with sand spreads/rises and soils formed in calcareous medium textured wind deposited sediments. High boron and sodium levels are likely in the lower subsoil. Indications are that this exposed rise area has experienced significant wind erosion since settlement, with spreading and loss of sand evident. Sand spread/rises soils: <i>Calcareous siliceous sand H2a</i> - (C-E) low rises [Arenaceous-Lutaceous Hypercalcic Calcarosol; sandy/sandy]. Other soils: <i>Calcareous loam A4</i> - medium to thick calcareous sandy or loamy topsoil over loamy or clay loamy subsoil with abundant fine carbonate: (E) [Arenaceous-Lutaceous Hypercalcic Calcarosol; sandy-loamy/loamy-clay loamy]. Summary: the land is arable: cropping and grazing are the main land uses. The main limitations of this area are caused by relatively light textured surface soil resulting in wind erosion risk and reduced fertility. Nutrient availability problems result from soils being calcareous throughout. Toxic accumulations of boron and sodium can occur in non sandy lower subsoils. Slight limitations include: water holding capacity, subsoil toxicities, alkalinity, and salinity in soils without sandy subsoil; and water repellence on sandy rises. Moderate limitations include: water holding capacity (sandy rises), fertility, and wind erosion potential.</p>
UQF UQI	3.0 9.5	<p>Rises and plains overlain by more than 30% sand dunes. Swales mainly have calcareous soil formed in rubbly medium textured wind deposited sediments, with some soil formed in reddish clayey sediments, and some shallow soil on calcrete UQF - gently undulating rise with slopes of 1-3% overlain by about 75% (somewhat disturbed) longitudinal sand dunes. The dunes are generally arable, but usually have semi-arable strips along the dune ridge. Swales have mainly calcareous loamy or sandy topsoil over loamy or clay loamy subsoil with hard carbonate rubble. There are some calcareous soils with loamy topsoil over reddish clay subsoil with abundant fine carbonate (especially in depressions); and some shallow calcareous loamy soils on calcrete (especially on low stony rises). Boron and sodium levels are high in clayey subsoils. A few patches of surface rubble occur. UQI - gently undulating plain with slopes of 1-2% overlain by 30-35% longitudinal sand dunes. The dunes are generally arable, but often have semi-arable strips along the dune ridge. Swales have mainly calcareous loamy topsoil over loamy or clay loamy subsoil with hard carbonate rubble. There are about 10-15% calcareous soils with loamy topsoils over reddish clay subsoil with abundant fine carbonate (especially in depressions); and about 10-15% shallow calcareous loamy soils on calcrete (especially on low stony rises). Boron and sodium levels are high in clayey subsoils. Patches of surface rubble are common. Dune soils: <i>Calcareous siliceous sand H2a</i> - deep calcareous brown siliceous sand: found on most dunes [Arenaceous Hypercalcic-Lithocalcic Calcarosol; sandy/sandy]. <i>Siliceous sand H2b</i> - medium to very thick non calcareous to slightly calcareous reddish sand over sand with abundant fine carbonate: found on some dunes [Hypercalcic-Calcic Arenic Orthic Tenosol; sandy/sandy]. Swale soils: <i>Rubbly calcareous loams A4-A5</i> - medium to thick calcareous loamy or sandy topsoil over</p>



		<p>loamy or clay loamy subsoil usually with hard carbonate rubble: (E in swales) [Lutaceous-Argillaceous Lithocalcic-Hypercalcic Calcarosol; loamy-sandy/clay loamy-loamy]. <i>Gradational calcareous clay loam A6</i> - medium thickness calcareous loamy topsoil (some clay loamy) over clayey subsoil with abundant fine carbonate: (L-C in swales) depressions [Argillaceous Hypercalcic Calcarosol; loamy/clayey]. <i>Shallow calcareous loam on calcrete B2</i> - shallow calcareous loamy (with some sandy) soil on calcrete: (L in swales) usually found on low stony rises [Petrocalcic Calcarosol]. Summary: the land is arable except for the semi-arable dune ridge strips: cropping and grazing are the main land uses. The main limitations of the dunes are their potential for wind erosion and low fertility. Boron levels are high in clayey subsoils. Nutrient availability problems are likely to occur where soils are calcareous throughout. Water holding capacity of many swale soils is limited by the presence of hard carbonate rubble. Slight limitations include: water holding capacity (swales), subsoil toxicities (swales), alkalinity, wind erosion potential (swales), water repellence (dunes), and surface rubble (swales UQF). Moderate limitations include: water holding capacity (dunes), fertility, wind erosion potential (dunes), and surface rubble (swales UQI). <u>Soil descriptions - UQI</u> Flat: Haplic Lutaceous Lithocalcic Calcarosol; thick, non-gravelly, loamy/loamy, moderate. Slope (2%): Haplic Argillaceous Hypercalcic Calcarosol; medium, non-gravelly, loamy/clayey, moderate. <u>Related soils on adjacent land units</u> Slope (1%): Haplic Petrocalcic Lithocalcic Calcarosol; medium, gravelly, clay loamy/loamy, shallow.</p>
<p>UUF</p>	<p>16.3</p>	<p>Plains overlain by more than 30% sand dunes. Swales mainly have shallow soil on calcrete, and calcareous soil formed in rubbly medium textured wind deposited sediments. UUF - gently undulating to level plain overlain by about 75% longitudinal sand dunes. The dunes are generally arable, but usually have semi-arable strips along the dune ridge: cropping and grazing are the main land uses. Swales have mainly shallow calcareous loamy to sandy topsoil over loamy subsoil on calcrete, or else, calcareous soils with abundant hard carbonate rubble. Surface rubble is common. Dune soils: <i>Calcareous siliceous sand H2a</i> - deep calcareous siliceous brown sand: on most dunes [Arenaceous Hypercalcic-Lithocalcic Calcarosol; sandy/sandy]. <i>Siliceous sand H2b</i> - medium to very thick non calcareous to slightly calcareous reddish sand over sand with abundant fine carbonate: on some dunes [Hypercalcic-Calcic Arenic Orthic Tenosol; sandy/sandy]. Swale soils: <i>Shallow calcareous loam on calcrete B2</i> - shallow calcareous loamy or sandy topsoil over loamy subsoil on calcrete or with abundant hard carbonate rubble: (E in swales) [Petrocalcic-Lithocalcic Calcarosol; loamy-sandy/loamy; very shallow-moderate]. <i>Calcareous loams A4-A5</i> - medium to thick calcareous loamy or sandy topsoil over loamy subsoil with abundant fine carbonate with minor rubble: (L-C in swales) [Lutaceous-Arenaceous Hypercalcic Calcarosol; loamy-sandy/loamy]. <i>Gradational calcareous clay loam A6</i> - medium thickness calcareous loamy topsoil over clayey subsoil with abundant fine carbonate: (M in swales) [Argillaceous Hypercalcic Calcarosol; loamy/clayey]. Summary: the land is arable except for the semi-arable dune ridge strips: cropping and grazing are the main and uses. The main limitations of the dunes are their potential for wind erosion and low fertility. The main limitations of the swale soils are their poor water holding capacities, since many are shallow or rubbly. Nutrient availability problems are likely to occur where soils are calcareous throughout. Some surface rubble occurs. Slight limitations include: subsoil toxicities (swales), alkalinity, wind erosion potential (swales), and water repellence (dunes). Moderate limitations include: water holding capacity, fertility, wind erosion potential (dunes), and rockiness (swales). <u>Soil descriptions</u> Duneslope: Haplic Arenaceous Hypercalcic Calcarosol; medium, non-gravelly, sandy/sandy, moderate. Duneslope: Calcareous Arenic Orthic Tenosol; medium, non-gravelly, sandy/sandy, moderate. Lower duneslope: Arenic Orthic Tenosol; very thick, non-gravelly, sandy/sandy, moderate. Lower duneslope: Haplic Petrocalcic Calcic Calcarosol; thick, non-gravelly, sandy/loamy,</p>



	<p>moderate.</p> <p>Lower duneslope: Arenaceous Hypocalcic/Hypercalcic Calcarosol; thick, non-gravelly, sandy/loamy, moderate.</p> <p>Slope (1%): Petrocalcic Orthic Tenosol; medium, gravelly, sandy/loamy, very shallow</p> <p>Flat: Haplic Arenaceous Lithocalcic Calcarosol; thick, non-gravelly, loamy/loamy, moderate</p>
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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:

Main Soils:

- H2a-H2b** *Calcareous siliceous sand* (Arenaceous Calcarosol) and *siliceous sand* (Arenic Tenosol).
Calcareous brown siliceous sand over sand with abundant fine carbonate. On many sand dunes. Variants with non to slightly calcareous topsoils occur on some dunes. Medium to very thick non calcareous to slightly calcareous reddish sand over sand with abundant fine carbonate: **H2b** *siliceous sand* (Arenic Tenosol).
- A4-A5** (*Rubbly*) *calcareous loams* (Lutaceous-Arenaceous Calcarosol).
Medium to thick greyish brown calcareous loamy or sandy topsoil over loamy or clay loamy subsoil with abundant fine carbonate, and often with abundant hard carbonate rubble. Often underlain by a heavy to medium clayey substrate (soil **A5**). On gently undulating land and on very low rises.
- B2** *Shallow calcareous loam on calcrete* (Petrocalcic Calcarosol).
Shallow to very shallow greyish brown calcareous loamy or sandy topsoil over loamy subsoil on calcrete. Gently undulating land, flats, and low stony rises.
- A6** *Gradational calcareous clay loam, with some D3 loam over poorly structured red clay, or C4 hard gradational red clay loam* (Argillaceous Calcarosol with some Sodic-Effervescent Red Chromosol-Sodosol-Dermosol).
Medium to thick brown to reddish brown calcareous (with some non calcareous) clay loamy, loamy or sandy topsoil over reddish clay subsoil with abundant fine carbonate. Plains, flats, and depressions.

Minor soils:

- H2b** *Siliceous sand* (Arenic Tenosol).
Medium to very thick non calcareous to slightly calcareous reddish sand over sand with abundant fine carbonate. On some sand dunes.
- B3** *Shallow sandy loam on calcrete* (Petrocalcic Tenosol).
Shallow to very shallow non calcareous to slightly calcareous reddish loamy or sandy topsoil over loamy subsoil on calcrete. Flats and low stony rises.
- D5** (*Hard*) *loamy sand over red clay* (Red Chromosol).
Medium to thick non calcareous to slightly calcareous reddish sandy or loamy topsoil over reddish clay subsoil with abundant fine carbonate. Found on broad dune slopes, especially on lower slopes.

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

