

BCW Bubla Cowie Land System

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Area: 71.7 km²

Landscape: Mostly a relatively low lying land system consisting of low lying plains, low rises, and numerous drainage depressions, most of which are salinised. There are two relatively major salt lakes, and some 'sand over clay' dunes. The system is mostly underlain at depth by Permian age sediments associated with glacial activity (Crawford, A.R., 1965). Soils are mostly underlain by clayey to clay loamy sediments, or a calcrete layer. 'Sand over clay' soil profiles are the most common – much of the area was once overlain by 'sand over clay' dunes – and most of the calcrete present today is remnant dune core material. Accessions of wind-deposited carbonate dust have infused into profiles in relatively recent geological times – most profiles have calcareous lower subsoils.

The northern half of the system forms a shallow gently undulating valley (and is the most southerly part of the valley that can be followed from the North Maitland Flat almost 70 kilometres away). Salinised drainage depressions in this area largely arise from the Stansbury Scrub area to the west. A few non saline drainage depressions feed from the land to the east. The southern half of the system consists of a series of low rises interspersed by saline depressions. The saline depressions arise from the Stansbury Scrub area to the northeast, and have a general northeast-southwest orientation.

Salinity in the low lying area in the very northeast of the system has worsened in recent times. This area was probably naturally saline to some degree before settlement and clearing. However, it is likely that when the adjacent Stansbury Scrub area was cleared, increased recharge into groundwater caused saline watertables to rise, and thereby increased salinity levels in discharge areas such as this.

Annual rainfall: 420 - 440 mm average

Main soils:

- B7** Shallow sand over clay on calcrete (around 37% of area)
- G4** Sand over clay (around 24% of area)
- N2** Saline soil (around 13% of area)
- B3** Shallow loam on calcrete (around 8% of area)
- B6** Shallow loam over clay on calcrete (around 7% of area)

Minor soils:

- D3** Loam over clay (around 5% of area)
- B2** Shallow calcareous loam on calcrete (around 5% of area)
- G3** Thick sand over clay (around 1% of area)
- A4** Calcareous loam (around 1% of area)

Main features: The system has arable, semi arable, and non arable areas. The highly saline land is non arable, as is some land with very stony and shallow soils, while the few dunes which occur are semi arable to non arable. Low lying marginally saline areas and some other stony areas are semi arable. Many arable areas are affected by saline seepage to some degree, resulting in raised subsoil salinity levels. Flooding is a risk in drainage depressions and other low lying areas. The most common soils are texture contrast soils with sandy topsoils. Many of these soils are underlain by calcrete at shallow depth. The presence of calcrete and/or hard carbonate rubble, limits profile waterholding capacity and hence productive potential. Surface stones also interfere with many farming practices.



Most soils have dispersive subsoils, many strongly so. Clayey subsoils are often coarsely structured. Dispersive clayey to clay loamy subsoils restrict soil internal drainage and can lead to waterlogged conditions, particularly when situated in low lying areas. Dispersive, hard, and coarsely structured subsoils also limit potential root exploration.

Topsoils are mostly sandy to loamy. Many topsoils have low nutrient retention capacities, since they allow soluble nutrients to be readily leached. Clayey subsoils restrict the downward movement of these nutrients, however, they may seep laterally along clay surfaces. Wind erosion is a significant issue with sandy soils, especially the loose and infertile sands on dunes. The water repellent nature of these topsoils compounds this problem. Care needs to be taken with surface management in these areas to minimise the potential for wind erosion.

Soil Landscape Unit summary: Bubla Cowie Land System (BCW)

SLU	% of area	Main features #
GJT	1.7	Land dominated by sandy texture contrast soil. Main soils: sand over clay G4 grading to loam over clay D3 . Probably with some shallow loam over clay on calcrete B6 . GJT – marginally saline drainage depression and low lying plains with several small highly saline depressions (slopes <1%).
GMO GMT	0.9 4.5	Land dominated by sandy texture contrast soil. Main soils: sand over clay G4 grading to loam over clay D3 , with some shallow sand over clay on calcrete B7 grading to shallow loam over clay on calcrete B6 . GMO – gently undulating low lying plain with patches of marginal salinity (slopes 0-1.5%). GMT – marginally saline depression: some small salt lake depressions in places (slopes <1%).
GTT	6.3	Land dominated by sandy texture contrast soil. Main soils: shallow sand over clay on calcrete B7 grading to shallow loam over clay on calcrete B6 and shallow loam on calcrete B3 , and sand over clay G4 grading to loam over clay D3 . GTT – relatively low lying gently undulating plains/drainage depressions, with non arable stony areas, drainage lows, mostly marginal salinity, and a few small highly saline depressions in places (slopes 0-1%).
GUA GUB GUK GUL	0.7 0.3 4.3 16.7	Land dominated by sandy texture contrast soil. Main soils: sand over clay G4 and shallow sand over clay on calcrete B7 . Probably including some shallow loam over clay on calcrete B6 . With a few low sandy rises in places with some thick sand over clay G3 . GUA – somewhat elevated plains (slopes 0-1%). GUB – slopes (1-2.5%). GUK – gently undulating slightly elevated plains: patches of marginal salinity (slopes 0-1%). GUL – gently undulating low rises and slopes with some drainage lows, a few sandy rises, and patches of marginal salinity (slopes 0-2.5%).
HIE HIO HIT	0.8 0.9 0.3	Land dominated by loamy texture contrast soil. Main soils: loam over clay D3 grading to some sand over clay G4 in places, and shallow loam over clay on calcrete B6 grading to shallow sand over clay on calcrete B7 in places. HIE – low lying plain/drainage area (slopes 0-1%). HIO – drainage depressions (slopes 0-1.5%). HIT – marginally saline depression (slopes <1%).
ObD	0.5	Sand over clay dunes. Main soils: thick sand over clay G3 grading to sand over clay G4 . Sometimes with some shallow sand over clay on calcrete B7 . ObD – low sand dune.
OfQ	1.2	Sand over clay dunefields. Dune soils: thick sand over clay G3 grading to sand over clay G4 . Swale soils: sand over clay G4 grading to shallow sand over clay on calcrete B7 . OfQ – gently undulating land with 30-60% sand dunes and low sand dunes.
QnL	0.3	Land dominated by shallow soil on calcrete. Main soils: shallow loam on calcrete B3 and shallow calcareous loam on calcrete B2 . QnL – gently undulating somewhat elevated stony plain/slight slopes (slopes 0-1.5%).
QsK QsT	1.5 1.9	Land dominated by shallow soil on calcrete. Main soils: shallow loam on calcrete B3 ; shallow calcareous loam on calcrete B2 ; some



		shallow loam over clay on calcrete B6 grading to shallow sand over clay on calcrete B7 . QsK – gently undulating low rise (slopes 0-2%). QsT – marginally saline low lying plain/drainage area/drainage depression (slopes 0-1%).
QTB QTL QTT QTTs	1.6 5.1 0.2 0.4	Land dominated by shallow soil on calcrete. Main soils: shallow loam on calcrete B3 and shallow calcareous loam on calcrete B2 , and probably grading to some shallow sand over clay on calcrete B7 and shallow loam over clay on calcrete B6 . Also possibly with some calcareous loam A4 . QTB – gently undulating slopes (slopes 0-2%). QTL – gently undulating low rises with patches of marginal salinity (slopes 0-2%). QTT – marginally saline drainage depressions (slopes <1%). QTTs – marginally saline drainage depression: patches of highly saline land (slopes <1%)
RIK	4.5	Land dominated by shallow soil on calcrete. Main soils: shallow sand over clay on calcrete B7 grading to shallow loam over clay on calcrete B6 , and shallow calcareous loam on calcrete B2 grading to shallow loam on calcrete B3 . Also with some sand over clay G4 grading to loam over clay D3 in lows. RIK – gently undulating plain with patches of marginal salinity (slopes 0-1.5%).
RMK RML	0.3 3.0	Land dominated by shallow soil on calcrete. Main soils: shallow loam on calcrete B3 , with some shallow loam over clay on calcrete B6 grading to shallow sand over clay on calcrete B7 . RMK – low stony rise (slopes 0-1%). RML – low stony rise (slopes 0-3%).
RRA RRB	0.8 0.6	Land dominated by shallow soil on calcrete. Main soils: shallow sand over clay on calcrete B7 grading to shallow loam on calcrete B3 . There may be minor areas of sand over clay G4 grading to loam over clay D3 in lows. RRA – low stony rise (slopes 0-1.5%). RRB – low stony rise (slopes 0.5-2.5%).
RSA RSB RSK RSL RSO RST	2.7 1.9 6.2 6.0 4.7 0.3	Land dominated by shallow soil on calcrete. Main soils: <i>shallow sand over clay on calcrete</i> B7 grading to <i>shallow loam over clay on calcrete</i> B6 and probably some <i>shallow loam on calcrete</i> B3 . With some <i>sand over clay</i> G4 grading to <i>loam over clay</i> D3 in lows. RSA – somewhat elevated gently undulating plain (slopes 0-1%). RSB – low rise (slopes 0.5-2%). RSK – low rises with patches of marginal salinity (slopes 0-1%). RSL – slight slopes and low rises with patches of marginal salinity (slopes 0.5-2%). RSO – gently undulating low lying plains, with many low stony rises, and with many areas grading to marginal salinity (slopes 0-1%). RST – marginally saline to highly saline depression (slopes <1%).
RTK	5.7	Land dominated by shallow soil on calcrete. Main soils: <i>shallow sand over clay on calcrete</i> B7 . With some <i>sand over clay</i> G4 grading to <i>loam over clay</i> D3 in lows. And a few low sandy rises with some <i>thick sand over clay</i> G3 . RTK – gently undulating plain with some drainage lows (slopes 0-1.5%).
ShL	0.6	Land dominated by soils formed in rubbly calcareous loess. Main soils: <i>rubbly calcareous loam</i> A4 grading to <i>shallow calcareous loam on calcrete</i> B2 . ShL – low rise with patches of marginal salinity (slopes 0-1.5%).
ZA- ZB- ZC- ZD- ZE-	6.6 1.2 0.5 1.0 3.6	Saline land and salt lakes. Main soils: <i>saline soil</i> N2 : saline variants of various soils, typically shallow soils on calcrete in marginally saline to highly saline areas. ZA- – saline to marginally saline depression/drainage depression: some small salt lakes may occur in places (5-4s). ZB- – very highly saline to highly saline drainage depression/depression (7-5s). ZC- – small salt lake depression: sometimes with some adjacent highly saline to marginally saline land (7s). ZD- – major salt lake depression (8s): the southern one is an ancient salt lake, corresponding to those in the adjacent Weaver and Bookamurray land systems. ZE- – complex of saline land in drainage depressions: with very highly saline to saline flats, small salt lakes, and a few marginally saline flats.

Classes in the 'Soil Landscape Unit summary' table (eg. 2-1e, 3w, 2y, etc) describe the predominant soil and land conditions, and their range, found in Soil Landscape Units. The number '1' reflects minimal limitation, while increasing numbers reflect increasing limitation. Letters correspond to the type of attribute:

a - wind erosion e - water erosion f - flooding g - gullyng
r - surface rockiness s - salinity w - waterlogging y - exposure



Detailed soil profile descriptions:**Main soils:**

- B7** *shallow sand over clay on calcrete* [Petrocalcic Red-Brown Sodosol]
Medium thickness to thin sandy to light sandy loam topsoil overlying a red to brown clayey or occasionally clay loamy subsoil, which is underlain by calcrete at shallow depth. Profiles often contain hard carbonate rubble in the layer directly overlying the calcrete. Surfaces range from hard to loose, and subsoils are often dispersive. Topsoils are often water repellent.
- G4** *sand over clay* [Hypercalcic-Lithocalcic Red-Brown Sodosol]
Medium thickness to thin sandy to light sandy loam topsoil overlying red to brown clayey subsoil which becomes calcareous with depth. Surfaces range from hard to loose. Profiles can contain hard carbonate rubble. Subsoils are usually dispersive, and typically coarsely structured. Profiles are sometimes underlain by calcrete at moderate depth. Topsoils are often water repellent.
- N2** *saline soil* [Salic-Hypersalic Hydrosol]
Saline variants of a number of soils: often saline variants of shallow soils on calcrete, such as soils **B7**, **B6** and **B3**. Deeper saline soils occur in salt lakes and other wet saline areas.
- B3** *shallow loam on calcrete* [Petrocalcic Tenosol]
Red to brown loamy to clay loamy soil, with calcrete at very shallow to shallow depth. Surfaces textures are most often sandy loam or loam, and surfaces are typically hardsetting. Subsoils can be dispersive. Profiles often contain abundant hard carbonate rubble. These soils are often non arable, and are found on low stony rises or in saline depressions.
- B6** *shallow loam over clay on calcrete* [Hypercalcic Red-Brown Sodosol-Chromosol]
Medium thickness to thin sandy loam to loam overlying a red to brown clayey or occasionally clay loamy subsoil, which is underlain by calcrete at shallow depth. Profiles can contain hard carbonate rubble in the layer directly overlying the calcrete. Surfaces range from hard to firm, and subsoils are often dispersive. Can occur in drainage depressions.

Minor soils:

- D3** *loam over clay* [Hypercalcic-Lithocalcic Red-Brown Sodosol-Chromosol]
Medium thickness to thin sandy loam to loam topsoil overlying a red to red brown clayey subsoil which becomes calcareous with depth. Profiles can contain hard carbonate rubble. Subsoils can be coarsely structured, and are often dispersive. Surfaces are typically hardsetting. These often occur in drainage depressions.
- B2** *shallow calcareous loam on calcrete* [Petrocalcic Calcarosol]
Grey brown to red brown calcareous loamy to clay loamy soil, with calcrete at very shallow to shallow depth. Surfaces textures are most often sandy loam or loam, and surfaces are typically hardsetting. Subsoils can be dispersive. Profiles often contain abundant hard carbonate rubble. These soils are often non arable, and are occasionally found on low stony rises.
- G3** *thick sand over clay* [Hypercalcic-Calcic Red-Brown Sodosol]
These soils are similar to **G4** soils but have thick to very thick loose sandy topsoils. Topsoils are strongly water repellent, and have subsurface layers which are often bleached. Subsoils are dispersive, and are typically calcareous in their lower part. Usually found on sand dunes and sandy rises.
- A4** *calcareous loam* [Regolithic Hypercalcic-Lithocalcic Calcarosol]
Grey brown to red brown medium thickness calcareous loamy to clay loamy topsoil grading to clay loamy or loamy subsoil with abundant fine carbonate. Surfaces are hardsetting. Profiles can contain abundant hard carbonate rubble. Subsoils are typically strongly alkaline and dispersive. These soils occur infrequently in this system.

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

