

CBE Carribie Land System

A relatively low lying land system, dominated by gently undulating to level plains overlain with carbonate sand deposits and calcreted calcarenite; and also including coastal sand dunes, relict coastal dune rises, and saline depressions.

Area: 231.1 km²

Landscape: The land system consists of relatively low lying gently undulating to level plains, with some low rises, coastal sand dunes, relict coastal dune rises, and saline depressions. Many low rises are relict jumbled dunes. The land is almost completely overlain by calcrete and carbonate sand deposits. In recent geological times deep carbonate sands blanketed this area. Leaching of carbonate has led to the formation of a calcreted calcarenite core. Many areas have lost much of their cover of carbonate sand, exposing the calcrete core. Soil depth varies from very shallow to deep. Soil depth can vary drastically over short distances due to the 'mobile nature' of the carbonate sand and the presence of the underlying calcreted calcarenite core. Significant areas of recently deposited jumbled coastal sand dunes occur. Some saline backswamps lie behind the sand dunes in the very northwest of the system. Relict coastal dune rises occur inland of, and parallel to, present coastal sand dunes. A particularly large example of this occurs behind the sand dunes of Marion Bay. The low lying area just to the west and northwest of Marion Bay is an old lake floor with white clayey sediments, largely overlain by a relatively thin layer of wind-deposited carbonate sand and calcrete deposits. A significant proportion of the system is non arable and is covered with perennial native vegetation.

Annual rainfall: 430 – 490 mm average

Main soils:

H1	Carbonate sand (around 51% of area)
B1	Shallow carbonate dominant soil on calcrete (around 45% of area)

Minor soils:

N2	Saline soil (approximately 3% of area)
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Main features: Soils range from deep to shallow over calcrete, with textures ranging from loamy sand to loam. Soils are dominantly composed of finely ground shell fragments. The main issues are the highly infertile nature of carbonate sand, wind erosion, saline seepage, stoniness and soil depth, and some water repellence. High carbonate levels reduce the availability of phosphorus, manganese, zinc and iron. Regular applications of manganese are needed for productive agriculture. Copper is also commonly deficient but can be corrected by occasional applications.

Sandy soils, especially when situated on dunes, need adequate vegetative cover at all times to minimise the risk of wind erosion. Deep sands on dunes are typically only semi arable due to infertility and wind erosion risk. Many areas are too stony and shallow for cropping. Saline seepage commonly occurs in this low lying system, with numerous moderately high to highly saline depressions which are marginally arable to non arable. Water repellence in surface soils is not particularly severe, but is common. Much of this land system is covered by native vegetation, so nature conservation is an important issue.

Soil Landscape Unit summary: Carribie Land System (CBE)

In this land system report, soil landscape areas with a '1' as the fourth character of the label are deemed to be non arable. This may be due to deep sandy soils, stony soils, or such areas may just be covered with native vegetation.



SLU	% of area	Main features #
MbA	0.1	Relict coastal dune rises with shallow, and some deeper, carbonate sand.
MbYA	0.1	Main soils: shallow carbonate sand on calcrete (soil B1). With areas of moderate depth to deep carbonate sand (soil H1).
MbYb	0.1	
MbYC	1.2	MbA – mostly arable moderate height dune rise (slopes 0-2%, 3-4r, 3-2a, 1-2s, 2-1y).
MbZ	0.02	MbYa – non arable low relict dune rise (slopes 0-2%, 4-3r, 3-2a, 2-3s, 1-2y). MbYb – non arable moderate height to low relict coastal dune rises (slopes 0-4%, 4-3r, 3-2a, 2-3s, 2-1y). MbYC – non arable high to moderate height relict coastal dune rises (slopes 0-5%, 1-2e, 4-3r, 3-2a, 1-2s, 2-3y).
VoG	1.5	Old lake floor areas.
VoC	1.1	Main soils: shallow carbonate dominant soil on calcrete (soil B1). With some deeper calcareous soils, especially in depression areas, with loamy topsoils overlying white clayey subsoils (soil A6). With moderate depth to deep carbonate sand occur on minor areas of low sand dune (soil H1). VoG – semi arable flats with marginal salinity; some more saline depressions, and a few very low sand dunes (slopes 0-1%, 2-3a, 4-5s, 3-4r, 1y). VoC – non arable to semi arable saline depressions (slopes <1%, 2-1a, 5-4s, 4-3r, 1y).
WAB	0.1	Coastal cliffs (mostly calcarenite), with minor rocky reef areas and sandy beaches (cliff slopes mostly >100%, cliffs up to 50m high, 3y).
WGa	1.6	Coastal dunes and flats.
WGb	0.3	Main soils: mostly deep carbonate sands with little profile development (soil H1). With some shallow carbonate sand on calcrete, especially on inter-dune flats (soil B1).
WGC	4.0	
WGc	1.9	WGa – non arable mostly bare sandy beaches and foredunes (7-5a, 3y).
WGD	1.2	WGb – sandy beaches, coastal cliffs, sand spreads on cliff-slopes, and rocky reefs (5-7a, 3y).
WGd	0.1	
WGE	0.4	WGC – non arable high to moderate height jumbled coastal sand dunes (dune height to over 20m, approx. 2-10% flats, 7-5a, 3-2y).
WGe	0.2	
WGK	0.3	WGc – non arable mostly bare high to moderate height jumbled coastal sand dunes (7a, 3y).
WGT	0.02	
WGTx	0.02	WGD – non arable mostly moderate height jumbled coastal sand dunes (7-5a, up to 30% bare sand, 3-2y).
WGU	0.1	
WGV	0.3	WGd – non arable and mostly bare moderate height to low jumbled coastal sand dunes and sand spreads (7a, 3y). WGE – non arable low coastal sand dunes (5a, 3-2y). WGe – non arable mostly bare clifftop low jumbled coastal sand dunes (7-5a, 3y). WGK – non arable very low jumbled coastal sand dunes and flats (2-3-1s, 5-4a, 1-2y). WGT – non arable coastal flats and slopes with sand spreads and very low jumbled coastal sand dunes, and with significant bare areas (slopes 0-4%, 5-4a, 3-2y, approx. 40% of area is bare sand). WGTx – non arable clifftop slopes and flats with sand spreads and some very low to low jumbled coastal sand dunes (5-7a, 3-2y, approx. 5-20% of areas is bare sand). WGU – non arable low lying coastal flats with sand spreads and very low jumbled coastal sand dunes, and with significant bare areas (3-2s ⁺ , 5-4a, 3-2y, approx. 30% of area is bare sand). WGV – coastal flats, with some very low coastal sand dunes, and some marginally saline flats/depressions (slopes 0-1%, 3-4s, 1r, 3-4a, 2y).
WN-	2.1	Swampy coastal flats.
WO-	0.7	Main soils: saline soil (soil N2). In land unit WN-: with stony patches with shallow carbonate dominant soil on calcrete (soil B1), and patches of very low dunes with moderate depth to deep carbonate sand (soil H1). WN- – coastal swampy back-flats: mostly melaleuca covered (slopes <1%, 4-3w, 1-3r, 2-1a, 5-4s, 1y). WO- – coastal back-swamps: mostly samphire covered (slopes <1%, 5w, 1r, 1-2a, 7s, 1y).
WT-	0.3	Rocky reefs, with some low coastal cliffs and some bare sandy beaches.
YaL1	1.3	Land with very shallow to shallow carbonate dominant soil.
YaU1	1.2	Main soils: very shallow to shallow carbonate dominant soil on calcrete (soil B1). With minor to limited areas of moderate depth to deep carbonate sand (soil H1). YaL1 – non arable stony plains and low rises (slopes 0-1.5%, 5r, 2a, 2-1s, 1-2y). YaU1 – non arable low lying plains (slopes <1%, 5r, 2a, 3-2s, 1y).
YAX	0.9	Land dominated by deep to moderate depth carbonate sand.



YALs	0.8	<p>Main soils: deep to moderate depth carbonate sand (soil H1). With minor to common areas of shallow carbonate sand on calcrete (soil B1).</p> <p>Depressions:</p> <p>YAX – semi arable old lake floor areas overlain with relatively thin carbonate sand deposits: gently undulating low lying plains/depressions with marginal salinity (slopes 0-1%, 1-2r, 3-4a, 4-3s⁺, 1y). Possibly with some deeper and heavier textured calcareous soils in lowest lying areas, with loamy topsoils overlying clayey subsoils (soil A6).</p> <p><i>Land with less than 30% jumbled low sand dunes:</i></p> <p>YALs – mostly arable rises and slopes (slopes 0-3%, 1-2r, 3-4a, 2-1s, 2-1y).</p> <p>YAU – mostly arable gently undulating plains (slopes 0-1.5%, 1-4r, 3a, low rises/raised plains/dunes 2s, flats/depressions 3-4s, 1-2y).</p> <p>YAg – arable to semi arable gently undulating plains with saline seepage: carbonate sand deposits overlie old lake floor areas (slopes 0-1%, 1-2r, 3a, 3-4s, 1-2y).</p> <p><i>Land with 30-60% jumbled low sand dunes:</i></p> <p>YAI – semi arable areas with gently undulating plains to rises overlain with approx. 50-60% jumbled low dunes (slopes 0-3%, 1-2r, 4-5a, dunes 1s, flats 2-3s, 2-1y).</p> <p>YAI – non arable gently undulating plains, slight slopes, and raised plains overlain with 30-60% jumbled very low to low dunes (slopes 0-2.5%, 1-2r, 4-5a, dunes 1s, flats 2-3s, 1-2y).</p> <p>YARI – non arable relatively low lying gently undulating plains overlain with 30-60% jumbled low to very low dunes and sand spreads (slopes 0-2%, 1-2r, 4-3a, dunes 1-2s, flats 2-3s, 1-2y).</p> <p><i>Land with 60-90% jumbled low sand dunes:</i></p> <p>YAF – semi arable areas with gently undulating plains overlain with 60-90% jumbled low dunes (slopes 0-3%, 1r, 4-5a, 1-2s, 2-1y).</p> <p>YAF1 – mostly non arable areas with gently undulating plains overlain with 60-90% jumbled very low to low dunes (slopes 0-2%, 1-2r, 5-4a, dunes 1-2s, flats 3-2s, 2y).</p> <p>YAN – semi arable areas with relatively low lying plains and slight slopes overlain with 60-90% jumbled moderate height to low dunes (slopes 0-2.5%, 1-2r, 4-5a, dunes 1-2s, flats 3-2s, 1-2y).</p> <p>YAO – semi arable areas with relatively low lying plains overlain with 60-90% jumbled very low to low dunes (slopes 0-2%, 1-2r, 4-3a, dunes 2-1s, flats 3-2s, 1-2y).</p> <p>YAO1 – mostly non arable areas with low lying plains overlain with 60-90% jumbled very low dunes (slopes 0-1.5%, 1-3r, 4-3a, 3-2s, 1-2y): close to a 'YE' land unit.</p> <p><i>Land with >90% jumbled dunes:</i></p> <p>YAB1 – non arable jumbled moderate height sand dunes (slopes 0-5%, 1r, 1s, 5a, 2-1y).</p> <p>YAC – semi arable to non arable jumbled low sand dunes (slopes 0-2%, 1-2r, 2-1s, 4-5a, 1-2y).</p> <p>YACx – arable to non arable near-coastal jumbled low sand dunes (slopes 0-2%, 1-2r, 2-1s, 4-5a, 2y).</p> <p>YAC1 – non arable jumbled low sand dunes (slopes 0-2.5%, 1-2r, 1-2s, 5-4a, 1-2y).</p>
YAU	0.9	
YAg	0.3	
YAI	0.8	
YAI1	6.1	
YAR1	4.0	
YAF	0.1	
YAF1	0.4	
YAN	0.3	
YAO	2.3	
YAO1	1.0	
YAB1	0.5	
YAC	0.3	
YACx	0.1	
YAC1	1.4	
YdB1	0.3	
YdL	0.2	
YdL1	1.4	
YdLs	4.6	
YdU	1.4	
YdUs	2.2	
YdU1	8.8	
Ydg	2.5	
Ydg1	2.8	
Ydp1	0.02	
YEI	1.2	<p>Land with shallow, moderate depth, and deep carbonate dominant soil.</p> <p>Main soils: moderate depth to deep carbonate sand (soil H1). With limited to extensive areas of shallow to very shallow carbonate sand on calcrete (soil B1).</p> <p>YEI – mostly arable gently undulating to undulating rises and raised plains with 30-60%</p>
YER	1.5	
YER1	6.5	
YEL	3.1	



YELs	2.7	jumbled low to very low dunes (slopes 0-3%, 2-1r, 3-4a, 1-2s, 2-1y).
YELx	2.6	YER – semi arable gently undulating to undulating plains with 30-60% jumbled low to very low dunes (slopes 0-2%, 2-3-4r, 3-4a, dunes 2-1s, flats 3-2s, 1-2y).
YEU	8.5	YER1 – non arable gently undulating to level plains with 30-60% jumbled low to very low dunes (slopes 0-1.5%, 2-3-1r, 3-4a, dunes 2-1s, flats 3s, 1-2y).
YEU	6.5	YER1 – non arable gently undulating to level plains with 30-60% jumbled low to very low dunes (slopes 0-1.5%, 2-3-1r, 3-4a, dunes 2-1s, flats 3s, 1-2y).
YEV	0.1	YEL – arable to semi arable gently undulating to level plains and a few low rises (slopes 0-1.5%, 2-3-4r, 3a, 2-1s, 1-2y).
YEg	0.8	YELs – mostly arable level to gently undulating plains (slopes 0-1%, 2-1r, 3-2a, 2-3s, 1-2y).
YEp	0.8	YELx – mostly arable near-coastal gently undulating plains to low rises (slopes 0-1.5%, 2-3r, 3a, 2-1s, 2y).
		YEU – arable to semi arable low lying level to gently undulating plains (slopes 0-1.5%, 1-2w, 2-3r, 3-2a, 3-2s, 1y): with very low rises mostly with deeper soils and intervening flats mostly with shallower soils.
		YEU s – arable to semi arable depressions or low lying plains with saline seepage (slopes <1%, 2-1w, 2-3r, 3-2a, 3-4s ^o , 1y).
		YEV – mostly arable slight depressions (slopes 0-1%, 1-2w, 2-3r, 2-3a, 1-2s, 1-2y).
		YEg – semi arable depressions and low lying plains with marginal salinity (slopes <1%, 3-2w, 2-1r, 2a, 4s ^o , 1y).
		YEp – arable to semi arable rises and slopes (slopes 0-3%, 1-2e, 2-3r, 3-4a, 1-2s, 2-1y).
ZA-	0.6	Saline depressions.
ZB-	0.1	Main soils: saline soil (soil N2). In land unit ZA- shallow carbonate dominant soil on calcrete occur (soil B1). ZA- – saline depressions (5-4s): closely related to WN- land units. ZB- – highly saline depressions with some saline margins: mostly samphire covered (7-5s): closely related to WO- land units.

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:

- H1** *Carbonate sand* [Shelly Calcarosol, and some Shelly Rudosols]
Loose to powdery, grey brown loamy sand to light fine sandy loam, overlying calcreted calcarenite at moderate depth or more. Dominantly composed of finely divided shell fragments. Grey organic stained topsoils overlie light coloured subsoils (pale brown to very pale brown). Very recently deposited variants with very little profile development are found on coastal dunes. Found on jumbled sand dunes, slopes, rises, plains, in some low lying areas, and on coastal dunes.
- B1** *Shallow carbonate dominant soil on calcrete* [Petrocalcic Shelly Calcarosol, some Petrocalcic Supravescant Calcarosols, and some Petrocalcic Shelly Rudosols]
Loose to powdery, highly calcareous to very highly calcareous grey brown loamy sand to loam, overlying calcreted calcarenite at shallow or very shallow depth. Topsoil textures of loam, and subsoil textures as heavy as silty clay loam, can be found in flats and other low lying areas. The soils are dominantly composed of finely divided shell fragments, although, some topsoils have experienced some leaching of carbonate, especially in low lying areas. Variants with very little profile development are found on calcreted coastal dunes. Many of these soils are too stony and shallow to be cropped. Mostly found on jumbled dunes, slopes, flats, and relict dunes.

Minor soils:

- N2** *Saline soil* [Hypersalic-Salic Hydrosol, often with Gypsic subsoil horizons]
Saline to extremely saline calcareous soils. Shallow variants over calcrete are common. Deeper variants also occur, especially in the wettest and most saline areas. Topsoil textures are usually loamy. Subsoils textures range from loamy to clayey. Gypsum and salt crystals accumulations commonly occur. Found in coastal backswamps and saline depressions.

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

