

CNR Coonarie Land System

Rising ground dominated by carbonate sands. The system consists of a series of isolated rises. Many areas are overlain with low jumbled dunes. The intervening plains form the Happy Valley Land System.

Area: 91.5 km²

Landscape: This land system consists of a series of isolated rises. The rises are mostly bedrock highs which are completely overlain by calcrete and carbonate sand deposits. However, some of the lower rises are actual dune cores.

In recent geological times these bedrock rises were covered by carbonate sands. Subsequent leaching lead to the formation of calcreted calcarenite cores. The carbonate sand has been greatly reworked by wind. Many areas lost sand cover, exposing the calcrete core. More recently, further carbonate sand deposits have occurred. This has resulted in landscapes where there are low jumbled sand dunes, and calcreted relict low dunes, slopes, and rises with shallow soils on calcrete (mostly carbonate sand). Soil depth typically varies drastically over short distances - from deep to very shallow - due to the mobile nature of the carbonate sand and the presence of the underlying calcreted calcarenite core. Sheet calcrete occurs in places.

Annual rainfall: 440 – 495 mm average

Main soils: **B1** shallow carbonate sand on calcrete (around 52% of area)
H1 carbonate sand (around 44% of area)

Minor soils: **B2** shallow calcareous loam on calcrete (approximately 3% of area)

Main features: Soils range from deep to very shallow over calcrete, with textures of fine loamy sand to light fine sandy loam. These soils are composed almost entirely of finely ground shell fragments. [A few very shallow to shallow siliceous calcareous loams occur, which are very stony and non arable.] The main issues are the highly infertile nature of carbonate sand, wind erosion, water repellence, stoniness and soil depth. 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 need adequate vegetative cover at all times to minimise the risk of wind erosion. Water repellence in surface soils is common and exacerbates the potential for wind erosion. Many soils are too stony and shallow for cropping. Conversely, deep sands occur on some low dunes, and these are semi arable at best due to infertility and wind erosion risk. There is a slight risk water erosion on some slopes. Some saline seepage occurs as raised subsoil salinity levels, especially in lower lying areas. Many areas of native vegetation exist - some quite extensive areas - so nature conservation is an issue.



Soil Landscape Unit summary: Coonarie Land System (CNR)

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 #
YAC YAC1	1.6 4.1	Land dominated by deep to moderate depth carbonate sands. Main soils: carbonate sand (soil H1). Minor to limited areas of shallow carbonate sand on calcrete can occur (soil B1). <i>Land with >90% jumbled low sand dunes:</i> YAC – semi arable to non arable gently undulating rises, slopes, and raised plains overlain with >90% jumbled low sand dunes (slopes 0-3%, 4-5a, 1s, 1-2r, 2y). YAC1 – non arable gently undulating rises and raised plains overlain with >90% jumbled low sand dunes (slopes 0-3%, 5-4a, 1s, 1-2r, 2y).
YEL YEL1 YEU YEV YEV1 YEW YEW1 YEp YEI YER YER1 YEm	6.3 2.0 4.1 0.05 0.8 0.1 0.03 0.6 29.4 0.8 1.7 0.9	Land dominated by deep, moderate depth, and shallow carbonate sands. Main soils: carbonate sand (soil H1) and limited to extensive shallow carbonate sand on calcrete (soil B1). Many relict calcreted low dunes are non arable due to shallow stony soils. Some low sand dunes are non arable; the rest are semi arable. <i>Land with 0-30% jumbled low sand dunes:</i> YEL – mostly arable gently undulating rises, slopes, and raised plains with 0-30% jumbled low sand dunes and usually some relict calcreted low dunes (slopes 0-3%, 2-20% non arable stony areas, 2-10% non arable deep sand, 1-2e, 3-4a, 1-2s, 2-3-4r, 2y). YEL1 – non arable gently undulating rises and raised plains with 0-30% jumbled low sand dunes (slopes 0-1.5%, 3-4a, 1-2s, 2-3-4r, 2-1y). YEU – mostly arable, lower lying gently undulating plains and lower slopes with 0-30% jumbled low sand dunes and a few areas of relict calcreted low dunes (slopes 0-1.5%, 1-2e, 3a, 2-1s, 2-3r, 1-2y). YEV – mostly arable depression (slopes 0.5-1.5%, 1-2e, 2-3a, 2-3s, 2-3r, 1-2y). YEV1 – non arable depression (slopes 0-1.5%, 2-3a, 2-3s, 2-3r, 1-2y). YEW – mostly arable depression with some saline seepage (slopes <1%, 2a, 3-2s, 2r, 1y). YEW1 – non arable depression with some saline seepage (slopes <1%, 2a, 3-2s, 2r, 1y). YEp – mostly arable slopes with 0-30% jumbled low sand dunes (slopes 1-3.5%, 2-5% non arable stony areas, 2-1e, 3a, 1-2s, 2-3r, 2-1y). <i>Land with 30-60% jumbled low sand dunes:</i> YEI – arable to semi arable rises, slopes, and raised plains overlain with 30-60% jumbled low sand dunes (slopes 0-2.5%, 5-10% non arable stony areas, 5-20% non arable deep sand, 1-2e, 4-3a, 1-2s, 2-1r, 2-1y). YER – arable to semi arable, lower lying gently undulating plains and lower slopes overlain with 30-60% jumbled low sand dunes (slopes 0-1.5%, 5-10% non arable stony areas, 5-20% non arable deep sand, 4-3a, 2-1s, 2-1r, 1-2y). YER1 – non arable lower lying gently undulating plains and lower slopes overlain with 30-60% jumbled low sand dunes (slopes 0-2%, 5-20% non arable stony areas, 4-3a, 2-1s, 2r, 1-2y). YEm – arable to semi arable slopes overlain with 30-60% jumbled low sand dunes (slopes 1-3.5%, 2-1e, 4-3a, 1-2s, 2-1r, 2-1y).
YdI YdL YdL1 YdU Ydp Ydp1 Ydz1	0.4 17.5 5.6 1.0 0.8 0.5 0.3	Land dominated by shallow to moderate depth carbonate sands. Main soils: shallow carbonate sand on calcrete (soil B1), with limited to common areas of moderate depth to deep carbonate sand (soil H1). YdI – semi arable rises with 30-60% jumbled low relict dunes (slopes 0-3%, 1-2e, 3-2a, 1-2s, 3-4r, 2-1y). YdL – mostly arable to semi arable gently undulating plains, slopes, and rises (slopes 0-2.5%, 1-2e, 0-20% stony non arable, 0-10% semi arable to non arable jumbled low sand dunes, 3-2a, 1-2s, 3-4r, 2-1y). YdL1 – non arable gently undulating plains, slopes, and rises (slopes 0-2.5%, 1-2e, 3-2a, 1-2s, 4-3r, 2-1y). YdU – mostly arable to semi arable, lower lying gently undulating plains (slopes 0-1%, 2-3a,



		2s, 3-4r, 1-2y). Ydp – mostly arable lower slopes with <10% jumbled low sand dunes (slopes 1-3.5%, 2-5% non arable stony areas, 2-1e, 3-2a, 2s, 3-4r, 2-1y). Ydp1 – non arable upper slopes with <10% jumbled low sand dunes (slopes 1-6%, 2-3e, 3-2a, 1-2s, 4-3r, 2y). Ydz1 – non arable gently undulating summit surface (slopes 0-1.5%, 3a, 1s, 4-3r, 3-2y).
YaL YaL1 YaU1 YaV1 Yap1	1.7 10.8 0.8 0.04 4.0	Land dominated by very shallow to shallow carbonate sands. Main soils: shallow carbonate sand on calcrete (soil B1). With some areas of shallow calcareous loam on calcrete in a few areas (soil B2). YaL – mostly arable gently undulating raised plains, slopes, and rises (slopes 0-2%, 1-2e, 2-3a, 1-2s, 4-5r, 2-1y). YaL1 – non arable level to gently undulating plains and slopes (slopes 0-2%, 1-2e, 2-3a, 1-2s, 5-4r, 2-1y). YaU1 – non arable gently undulating lower slopes (slopes 0.5-1.5%, 1-2e, 2a, 2-1s, 5-4r, 1-2y). YaV1 – non arable depression (slopes <1%, 2-1w, 2-1a, 2-3s, 4-5r, 1y). Yap1 – non arable slopes and rises (slopes 0.5-3.5%, 2-3-1e, 2a, 1-2s, 5-4r, 2y).
QHB1	4.2	Land dominated by very shallow to shallow calcareous loams. Main soils: shallow calcareous loam on calcrete (soil B2). With minor to common areas of shallow carbonate sand on calcrete (soil B1). QHB1 – non arable stony rises and slopes (slopes 0-2%, 2-1e, 2-1a, 1-2s, 5r, 2-1y).

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 - gullying
r - surface rockiness	s - salinity	w - waterlogging	y - exposure

Detailed soil profile descriptions:

Main soils:

B1 *shallow carbonate sand on calcrete*

[Petrocalcic Shelly Calcarosol, or sometimes Petrocalcic Supravescant Calcarosol]

Loose to powdery, grey brown fine loamy sand to light fine sandy loam, composed of finely divided shell fragments, overlying calcreted calcarenite at shallow or very shallow depth. Many of these soils are too stony and shallow to be cropped. Found on slopes, rises, plains, and on relict low dunes.

H1 *carbonate sand* [Shelly Calcarosol]

Loose to powdery, grey brown fine loamy sand to light fine sandy loam, composed of finely divided shell fragments, overlying calcreted calcarenite at moderate depth or more. Grey organic stained topsoils overlie light coloured subsoils (very pale brown to pale brown). Found on low dunes, slopes, rises, plains, and in some low lying areas.

Minor soils:

B2 *shallow calcareous loam on calcrete* [Petrocalcic Hypervescent-Ceteric Calcarosol]

Mostly very shallow, or sometimes shallow, very stony brown or reddish calcareous loam on calcrete. These soils are dominated by siliceous particles. They are invariably non arable. In these areas the core of calcreted calcarenite is exposed or very close to the land surface, and the carbonate sand has long since been blown away.

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

