

COW Cowell Land System

Area: 424.3 km²

Landscape: Very gently undulating outwash fans formed on alluvial / colluvial sediments, overlain by highly calcareous aeolian Woorinen Formation sediments, hardened in places to calcrete plains and benches. There are some siliceous sands as low parallel dunes. A discontinuous strip of coastal sand dunes and salt flats separate the outwash fans from the sea.

Annual rainfall: 270 – 325 mm average

Main soils:

Cleve - D3 (Hypercalcic, Red Sodosol)
Thin to medium thickness hard loamy sand to sandy clay loam over a red clay with coarse prismatic structure, highly calcareous from about 25 cm, grading to alluvial clay.

Wiabuna - A6 (Hypercalcic Calcarosol)
Calcareous loam becoming more clayey and calcareous with depth, grading to a very highly calcareous clay (Class I carbonate) over alluvial sediments.

Wiabuna (sandy loam) - A4 (Regolithic, Lithocalcic Calcarosol)
Calcareous sandy clay loam over carbonate rubble grading to sheet calcrete.

Shallow Wiabuna - B2 (Petrocalcic Calcarosol)
Calcareous light sandy loam to light sandy clay loam with variable nodular calcrete, over rubbly or sheet calcrete.

Minor soils:

Yamba - N2a (Hypersalic Hydrosol)
Variable highly saline sand and clay of coastal flats and swamps.

Semaphore - H1 (Shelly Rudosol)
Very thick sand comprising mixed shell and quartz grains.

Moornaba - H2 (Calcareous, Arenic, Red-Orthic / Yellow-Orthic Tenosol)
Very thick red to brown sand, becoming weakly calcareous and often grading to an orange clayey sand with depth, overlying variable carbonate (fine to rubbly, occasionally sheet).

Cleve (shallow) - D1 (Calcic, Red Chromosol)
Thin to medium thickness gravelly sandy loam to clay loam over a red well structured clay, calcareous with depth, grading to weathering metamorphic rock within 50 cm.

Gradational alluvial soil - M4 (Eutrophic, Red Kandosol)
Medium to thick sandy loam grading to a red sandy clay loam to clay, sandier with depth.

Uniform alluvial soil - M1 (Calcareous, Regolithic, Red-Orthic Tenosol)
Very thick brown loamy sand to sandy loam, continuing below 100 cm.

Saline alluvial soil - M4/N2 (Calcic, Red Dermosol / Kandosol)
Thick sandy loam over a red clay, calcareous with depth. Saline throughout.

Wet saline alluvial soil - N2b (Salic / Hypersalic Hydrosol)
Miscellaneous wet saline soil influenced by rising saline groundwater tables.

Summary: Calcareous loamy sands to sandy loams dominate the landscape. These are moderately shallow with restricted waterholding capacities and moderate fertility. Associated sandy loam texture contrast soils are deeper and more fertile. All soils are at least slightly susceptible to wind erosion. Low sandhills are scattered across the landscape. These have low fertility soils and are susceptible to wind erosion. Shallow stony soils over rubbly or sheet calcrete occur where the calcareous sediments are indurated. Magnesia patches occur sporadically. Saline seepage is associated with minor watercourses. The coastal areas are characterized by sand dunes which are highly susceptible to wind erosion, and salt flats which are potentially sulfidic.



Soil Landscape Unit summary: 19 Soil Landscape Units (SLUs) mapped in the Cowell Land System:

SLU	% of area	Component	Main soils	Prop#	Notes
JJG	14.2	Outwash fans	Cleve	D	Moderately deep and fertile soils, slightly susceptible to water and wind erosion. Eroded water courses.
KLA	55.9	Flats	Wiabuna	E	Mixture of soil as for JJG and calcareous sandy loams which are somewhat more susceptible to wind erosion. Magnesia patches occur sporadically.
			Cleve	E	
KQH	0.5	Eroded outwash slopes	Wiabuna Shallow	V	Moderate slopes with eroded water courses.
			Cleve	E	
KVA	7.4	Flats	Wiabuna	D	Moderately fertile calcareous sandy loams and loamy sands with slight to moderate potential for wind erosion, and limited waterholding capacity.
QaA	10.5	Stony flats	Shallow Wiabuna	E	Shallow calcareous soils with low water holding capacity. Sandhills cover 10-20% of the land. They are infertile and susceptible to wind erosion.
			Wiabuna (Sandy loam)	E	
		Low sandhills	Moornaba	L	
U-D	0.1	Low sandhills	Moornaba	D	Low fertility and wind erosion potential.
UMJ	1.0	Swales	Shallow Wiabuna	E	Shallow calcareous soils with restricted water holding capacity, and sandhills as for U-D.
			Wiabuna (sandy loam)	E	
		Low sandhills	Moornaba	E	
WFE	1.1	Low coastal dunes	Semaphore	D	Very low fertility, very high wind erosion potential.
Wfd	0.6	Bare coastal dunes	Semaphore	D	Extreme erosion hazard.
WM-	1.5	Mangrove swamps	-	D	Potentially acid sulfate soils.
WR-	1.8	Salt flats	Yamba	V	Fragile complex of potentially acid sulfate soils, and land with severe wind erosion hazard.
		Coastal dunes	Semaphore	E	
WT-	2.4	Tidal flats	Yamba	D	-
WXH	0.1	Coastal dunes	Semaphore	V	As for WR- .
		Salt flat	Yamba	E	
XDJ	0.6	Creek flats	Gradational / uniform alluvial	D	Alluvial soils deep and fertile with high productive potential. Salinity risk throughout, but variable distribution as indicated. Salt affected areas suitable for revegetation with salt tolerant species. Most water courses eroded or at risk. Flats subject to flooding.
XDM	1.0	Creek flats with 2-10% saline seepage patches	Gradational / uniform alluvial	D	
			Saline alluvial	M	
XDN	0.3	Gullied creek flats with 2-10% saline seepage patches	Gradational / uniform alluvial	D	
			Saline alluvial	M	
XDr	0.1	Flats with 10 -50% saline seepage patches	Gradational alluvial	E	
			Saline alluvial	E	
ZB-	0.9	Salt flat	Saline soil	D	Potential for establishment of salt tolerant vegetation.
ZD-	<0.1	Salt lake	-	D	-

PROPORTION codes assigned to Soil Landscape Unit (SLU) components:

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)

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