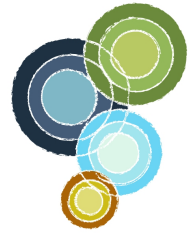


# Brown Lake

## North Stradbroke Island



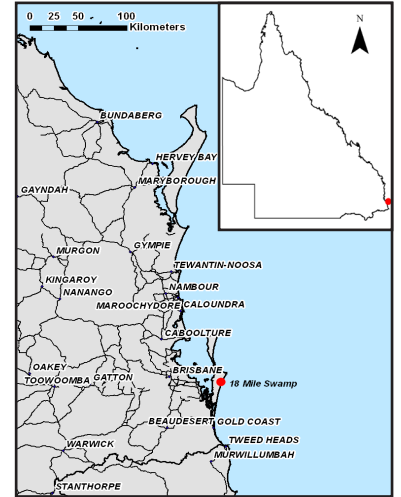
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Wetlands Program

### Study Area

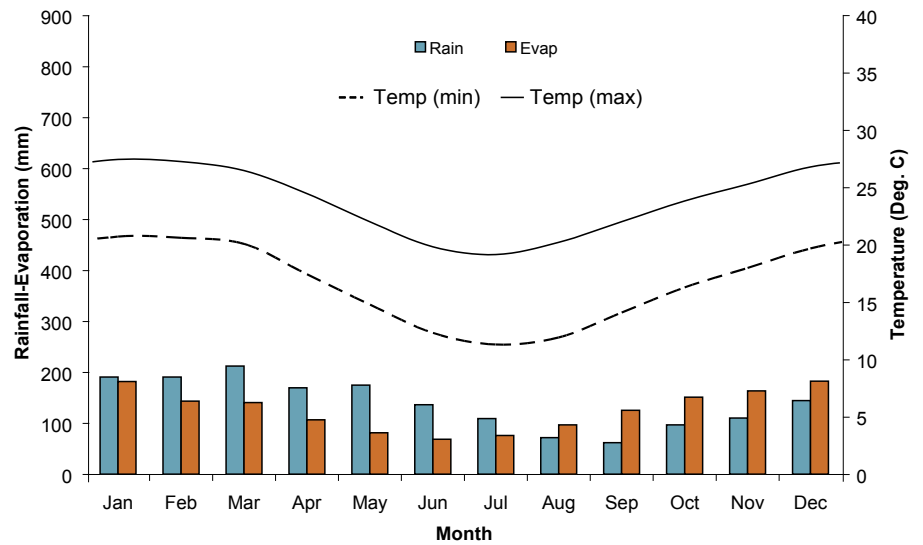
Brown Lake is located approximately 4 km east of Dunwich on North Stradbroke Island, South-East Queensland.

Brown lake is a perched lake which form when an impermeable layer of sand become cemented. This cemented layer, known as coffee rock prevents rainwater from percolating through to the regional aquifer<sup>1</sup>.

This is an example of a coastal and sub-coastal non-floodplain sand lake (perched) in the South-East Queensland Bioregion.



### Climate<sup>2</sup>



The study area is situated within a subtropical climatic region with a wet and dry season. Rainfall exceeds evaporation in the majority of months. The average annual rainfall for the area is 1668 mm.

<b>Landform and Inundation</b>	Perched Lake Permanent freshwater inundation from overland flow
<b>Soils<sup>3</sup></b>	Podsolis and Organosols
<b>Vegetation<sup>4</sup></b>	Swamps with <i>Baumea</i> spp., <i>Juncus</i> spp. and <i>Lepironia articulata</i> (RE 12.2.15)
<b>Geology<sup>5</sup></b>	Pleistocene beach ridge systems (quartz sand)
<b>Disturbance</b>	Little to no disturbance



Australian Government



Queensland Government

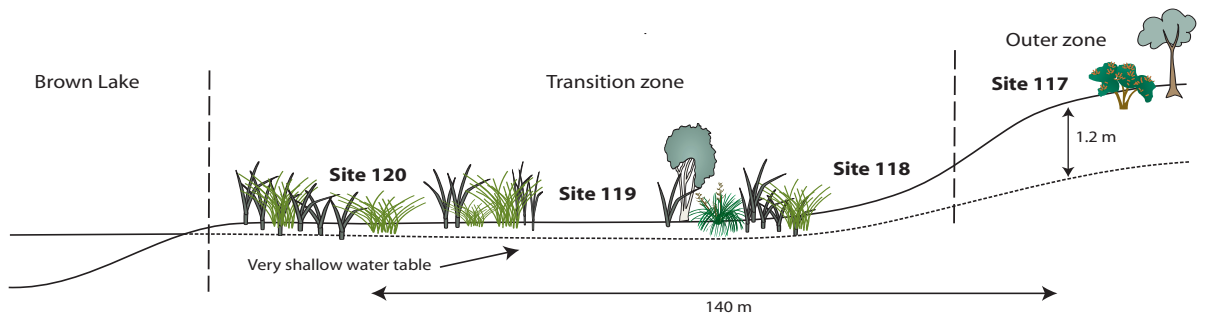
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## Location

GDA94 • MGA Coordinates : 542618 E, 6958599 N, Zone 56 • Lat/Long : -27.49557 S, 153.43145 E

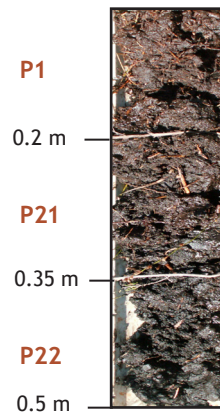


## Landscape Diagram



## Soil Profiles

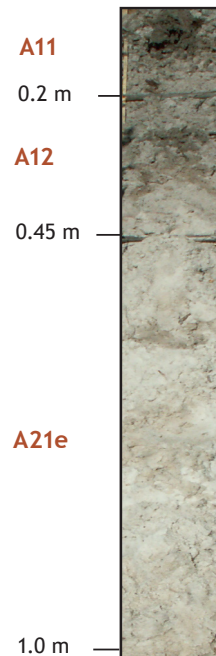
Site 118



Fibric loam textures, very high organic carbon content, dark colours and shallow water table all indicate a permanently waterlogged environment

Sites 119 and 120 (not shown) similar to this profile

Site 117



Low chroma values in the surface 0.3 m is the only wetland soil indicator observed

For soils dominated by sand textures, low chroma values alone are not considered good indicators of wetland soils without additional indicators such as organic materials, redox features (like mottles) or ferruginous root channels and pore linings<sup>6</sup>

## Soil Indicators Present (within 0.3 m of surface)

Indicator <sup>7</sup>	Site 117	Site 118
Organic materials and organic carbon (OC)*	No organic materials OC: 1.04%	Organic materials to 0.3 m OC: 34.6%
Matrix colour	Greyish brown to dark grey	Dark brown to black
Chroma (thickness of layer)**	Present (0.3 m)	Present (0.3 m)
Mottles and Segregations	Not present	Not present
Depth to groundwater	Not present	0.1 m
Ferruginous root channel and pore linings	Not present	Not present
pH* <sup>8</sup>	Very strongly acid	Very strongly acid
Texture	Sand	Loam
Acid sulfate material	Not present	Not present
Electrical Conductivity (EC) <sup>8</sup>	Non saline	Non saline
Indicator <sup>7</sup>	Site 119	Site 120
Organic materials and organic carbon*	Organic materials to 0.3 m OC: 25%	Organic materials to 0.3 m OC: 36.3%
Matrix colour	Black	Black
Chroma (thickness of layer)**	Present (0.3 m)	Present (0.3 m)
Mottles and Segregations	Not present	Not present
Depth to groundwater	0.01 m	0.01 m
Ferruginous root channel and pore linings	Not present	Not present
pH* <sup>8</sup>	Very strongly acid	Very strongly acid
Texture	Loam	Loam
Acid sulfate material	Not present	Not present
Electrical Conductivity (EC) <sup>8</sup>	Non saline	Non saline

\*Organic carbon % (Dumas method) and pH taken from surface (0-0.1 m)

\*\*Chroma value is less than or equal to 2

## Summary of Field Observations

- The presence of swamp hummock microrelief is typical of a saturated environment
- Fibric and sapric materials indicative of a waterlogged environment (Figure 1)
- High water table with poor external drainage suggests a permanently inundated area
- No evidence of sulfidic materials
- Organic acids produced from organic materials create a very acidic environment (pH range from 3.5 in the saturated zone to 4.5 in the outer zone)



Figure 1: Fibrous mat of roots which sit on a shallow water table



Soil Morphology

Site 117			Classification			Australian Soil Classification			Aquic Podosol		
			Boundary			Landform Element			Duneslope		
			Texture			Morphological Type			Lower slope		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence		
A11	0 to .2	gradual to	sand	very dark greyish brown (10YR32)	none	none	single grain	none	very weak dry		
A12	.2 to .45	clear to	sand	dark grey (10YR41)	none	none	single grain	none	very weak moderately moist		
A21e	.45 to 1	diffuse to	sand	light brownish grey (10YR62)	none	none	single grain	none	very weak moderately moist		
A22e	1 to 1.2	diffuse to	sand	light brownish grey (10YR62)	none	none	single grain	none	very weak moist		
A23e	1.2 to 1.35	-	sand	light grey (10YR72)	few (2-10%) fine (<5 mm) faint brown mottles	none	single grain	none	very weak wet		

Site 118			Classification			Australian Soil Classification			Regolithic, Acidic, Sapric Organosol		
			Boundary			Landform Element			Swamp		
			Texture			Morphological Type			Simple slope		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence		
P1	0 to .2	gradual to	fibric loam	very dark brown (10YR22)	none	none	-	none	weak wet		
P21	.2 to .35	gradual to	sapric loam	black (10YR21)	none	none	-	none	weak wet		
P22	.35 to .5	-	sapric loam	black (10YR21)	none	none	-	none	weak wet		

Site 119			Classification			Australian Soil Classification			Regolithic, Acidic, Hemic Organosol		
			Boundary			Landform Element			Swamp		
			Texture			Morphological Type			Flat		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence		
P11	0 to .1	gradual to	fibric loam	black (10YR21)	none	none	-	none	very weak wet		
P12	.1 to .3	-	fibric loam	black (10YR21)	none	none	-	none	very weak wet		

Site 120		Classification			Australian Soil Classification				Regolith, Acidic, Hemic Organosol		
					Landform Element				Swamp		
					Morphological Type				Flat		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence		
P11	0 to .1	-	fibric loam	black (10YR21)	none	none	-	none	very weak wet		
P12	.1 to .2	-	fibric loam	black (10YR21)	none	none	-	none	very weak wet		

## Soil Chemistry

Site	Depth (m)	pH*	EC (dS/m)	Cl (mg/kg)	NO3-N (mg/kg)	TC%**	TN%**
117	0.00-0.10	4.8	0.01	<20	<1	1.04	<0.03
	0.20-0.30	4.6	0.01	22	<1	0.65	<0.03
	0.40-0.50	4.9	0.01	<20	<1	0.12	<0.03
118	0.00-0.10	3.6	0.7	526	<1	34.6	1.04
	0.20-0.30	3.4	0.47	309	1	35	1.47
	0.40-0.50	3.4	0.36	223	<1	32.2	1.29
119	0.00-0.10	3.6	0.22	150	<1	25	0.93
	0.20-0.30	3.7	0.26	208	1	26.7	1.23
120	0.00-0.10	3.6	0.52	398	2	36.3	1.29
	0.10-0.20	3.6	0.28	254	5	31.4	1.36

\*Aqueous 1:5

\*\*Total carbon and total nitrogen

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