Soil Indicators of Queensland Wetlands

Double Lagoon

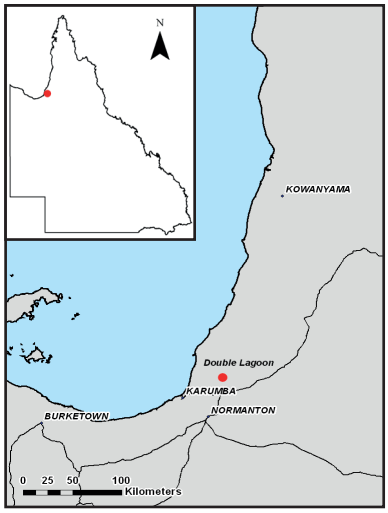
Queensland Wetlands Program

Study Area

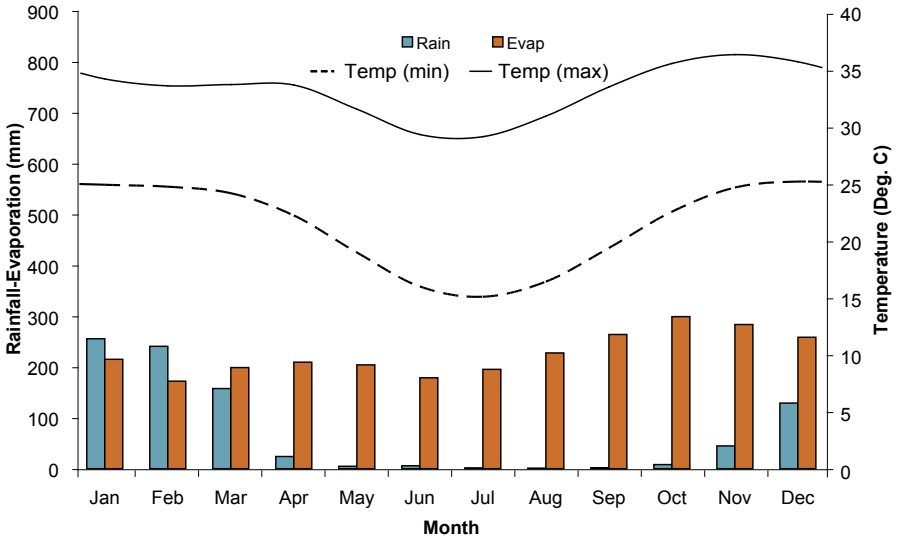
Double Lagoon is located approximately 50 km north of Normanton, Northern Queensland.

Double Lagoon is part of a series of closed depression clay swamps on a level plain that are seasonally inundated. At the time of sampling the lagoons were dry.

Double Lagoon is an example of a coastal and sub-coastal floodplain tree swamp (melaleuca and eucalyptus spp.) in the Gulf Plains Bioregion.



Climate[1]



The study area is situated within a tropical/equatorial climatic region with a distinct wet and dry season. Evaporation exceeds rainfall in the majority of months The average annual rainfall is 874 mm.

Landform and Inundation	Closed depression on level plains with old sandy infilled channels Seasonal freshwater inundation from overland flow
Soils[2]	Vertosols and Sodosols
Vegetation[3]	Coolibah (*Eucalyptus microtheca*), box (*Eucalyptus chlorophylla*) low open woodland, and broad-leaved tea tree (*Melaleuca viridiflora*) woodlands and savannahs on plains (RE **2.3.10**)
Geology[4]	Quartzose sand
Disturbance	No effective disturbance except grazing by hoofed animals

Australian Government

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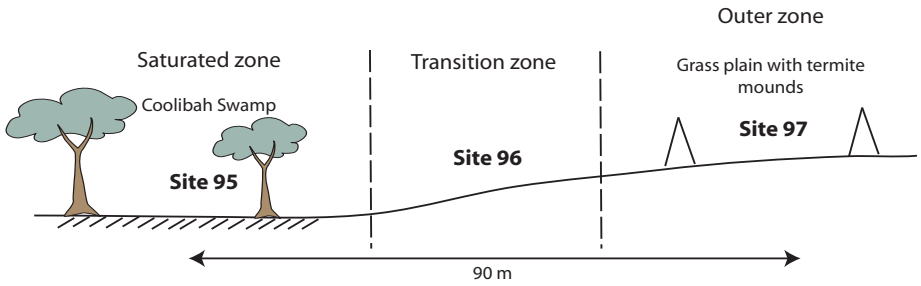
Location

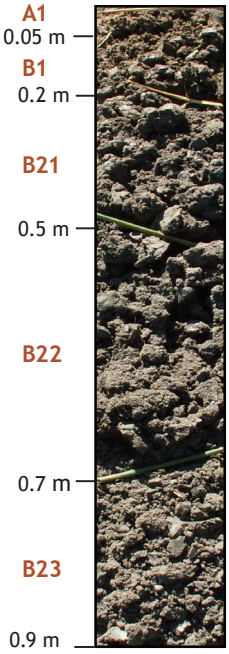
GDA94 • MDA Coordinates : 521504 E, 8089239 N, Zone 54 • Lat/Long : -1728198 S, 141.20232 E

Landscape Diagram



Soil Profiles

Site 95



Dark grey surface colours, low chroma values, mottling and ferruginous root channel linings all suggest water fluctuation and an inundated environment

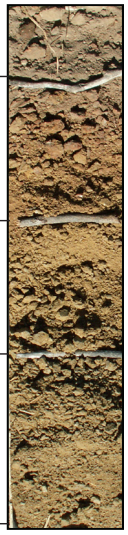
Floodmarks on trees at site implies that these indicators are reflective of a current hydrologic regime

Site 96

Dark grey surface colours, low chroma values, mottling and ferruginous root channel linings all suggest water fluctuation and inundated environment

Floodmarks on trees at site implies that these indicators are reflective of a current hydrologic regime

Site 97



Low chroma values, mottling and ferruginous root channel linings all suggest water fluctuation throughout profile

Indicators may be reflective of the regional hydro-pedological environment

Soil Indicators Present (within 0.3 m of surface)

Indicator[5]	Site 95	Site 96	Site 97
Organic materials and organic carbon (OC)*	Organic materials layer 0.05 m thick starting within 0.3 m of the soil surface OC: 0.97%	No organic materials OC: 1.12%	No organic materials OC: 2.52%
Matrix colour	Dark grey to greyish brown	Dark grey	Brown to brownish grey
Chroma (thickness of layer)**	Present (0.3 m)	Present (0.3 m)	Present (0.2 m)
Mottles and Segregations	Common <5 mm distinct orange mottles Few <5 mm faint orange mottles	Common <5 mm faint orange mottles Few 5-15 mm distinct orange mottles	Many 5-15 mm distinct red mottles Few <5 mm faint orange mottles
Depth to groundwater	Not present	Not present	Not present
Ferruginous root channel and pore linings	Present	Present	Present
pH*[6]	Very strongly acid	Very strongly acid	Moderately alkaline
Texture	Clay loam to medium heavy clay	Sandy light medium clay to light medium clay	Clay loam, sandy to sandy light medium clay
Acid sulfate material	Not present	Not present	Not present
Electrical Conductivity (EC)[6]	Non saline	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

- Ferruginous root channel linings indicative of a saturated environment
- Mottling present within 0.3 m of soil surface and at depth suggests water fluctuation throughout all soil profiles.
- Dark grey colours and low chroma values suggest a reduced environment in the saturated and transition zone
- Vertosol soils (sites 95 and 96) appear to define the boundary of the wetland
- *Eucalyptus microtheca* (Coolibah) in wetland and floodmarks on base of trees (Figure 1) indicates area is subject to inundation

Figure 1. Floodmarks on cooibah trees indicate that water levels reach approximately 0.4 m

References

1. Queensland Department of Natural Resources and Water (2008). SILO [online]. Available at http://www.longpaddock.qld.gov.au/silo/ [accessed 5/11/2007].

2. Isbell RF (2002). The Australian Soil Classification. CSIRO Publishing, Collingwood, Victoria, revised edition.

3. EPA (2008) Regional Ecosystems. [online]. Available at http://www.epa.qld.gov.au/nature_conservation/biodiversity/regional_ecosystems/ [accessed 28/06/08].

4. Bureau of Mineral Resources (1972). Normanton: Australia 1:250,000 Geological Series, Bureau of Mineral Resources, Canberra.

5. Bryant KB, Wilson PR, Biggs AJW, Brough DM and Burgess JW (2008). Soil Indicators of Queensland Wetlands: State-wide assessment and methodology. Queensland Department of Natural Resources and Water. Brisbane.

6. Hazelton P and Murphy B (2007). Interpreting Soil Test Results: What do all the numbers mean?. [2nd ed]. CSIRO publishing. Collingwood Victoria

Soil Morphology

Site 95		Classification		Australian Soil Classification			Endohypersodic, Epipedal, Black Vertosol		
				Landform Element			Swamp		
				Morphological Type			Closed depression		
Horizon	**Depth (m)**	**Boundary**	**Texture**	**Colour**	**Mottles**	**Coarse Fragments**	**Structure**	**Segregations**	**Consistence**
A1	0 to .05	gradual to	sapric clay loam	very dark grey (2.5Y31)	none	none	strong 10-20 mm subangular blocky, strong 5-10 mm subangular blocky	few (2-10%) fine (<2 mm) ferruginous root linings	firm dry
B1	.05 to .2	gradual to	light medium clay	very dark greyish brown (10YR32)	few (2-10%) fine (<5 mm) faint orange mottles	none	subangular blocky moderate 5-10 mm	very few (<2%) fine (<2 mm) ferruginous root linings	very weak moderately moist
B21	.2 to .5	gradual to	medium heavy clay	very dark grey (10YR31)	common (10-20%) fine (<5 mm) distinct orange mottles	none	-	none	very firm moist
B22	.5 to .7	gradual to	medium heavy clay	dark grey (10YR41)	very few (<2%) fine (<5 mm) faint orange mottles	none	-	none	very firm moist
B23	.7 to .9	-	medium heavy clay	dark grey (10YR41)	none	none	-	none	firm moderately moist

Site 96		Classification		Australian Soil Classification			Endohypersodic, Crusty, Grey Vertosol		
				Landform Element			Swamp		
				Morphological Type			Simple slope		
Horizon	**Depth (m)**	**Boundary**	**Texture**	**Colour**	**Mottles**	**Coarse Fragments**	**Structure**	**Segregations**	**Consistence**
A1	0 to .07	clear to	fine sandy light medium clay	dark greyish brown (10YR42)	none	none	moderate 20-50 mm angular blocky	common (10-20%) fine (<2 mm) ferruginous root linings	very strong dry
B21	.07 to .3	gradual to	light medium clay	dark grey (10YR41)	common (10-20%) fine (<5 mm) faint orange mottles, few (2-10%) medium (5-15 mm) distinct orange mottles	none	moderate 10-20 mm angular blocky	none	very firm moderately moist
B22	.3 to 1	-	medium heavy clay	dark grey (10YR41)	few (2-10%) medium (5-15 mm) faint dark mottles	none	moderate 10-20 mm lenticular	none	strong moderately moist

Site 97		Classification		Australian Soil Classification			Vertic, Mottled-Mesonatric, Grey Sodosol		
				Landform Element			Plain		
				Morphological Type			Flat		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence
A1	0 to .1	clear to	clay loam, sandy	dark brown (10YR33)	few (2-10%) fine (<5 mm) faint orange mottles	few (2-10%) subangular quartz medium pebbles (6-20 mm)	platy weak 10-20 mm	common (10-20%) fine (<2 mm) ferruginous root linings	very firm dry
B21	.1 to .3	clear to	sandy light medium clay	light brownish grey (10YR62)	many (20-50%) medium (5-15 mm) distinct red mottles, few (2-10%) fine (<5 mm) faint orange mottles	none	strong 20-50 mm angular blocky, strong 10-20 mm angular blocky	none	rigid dry
B22	.3 to .5	clear to	sandy light medium clay	greyish brown (10YR52)	common (10-20%) medium (5-15 mm) distinct orange mottles	few (2-10%) subangular quartz medium pebbles (6-20 mm)	strong 10-20 mm angular blocky, moderate 5-10 mm lenticular	none	very strong dry
B23	.5 to .7	-	sandy light medium clay	grey (10YR61)	common (10-20%) medium (5-15 mm) distinct orange mottles	none	angular blocky strong 10-20 mm	none	very strong dry

Soil Chemistry

Site	Depth (m)	pH*	EC (dS/m)	Cl (mg/kg)	NO3-N (mg/kg)	TC%**	TN%**
95	0.00-0.10	4.6	0.03	<20	<1	0.97	0.09
	0.20-0.30	5.9	0.02	<20	8	0.42	0.04
	0.40-0.50	6.5	0.02	<20	1	0.37	0.03
96	0.00-0.10	4.7	0.03	25	1	1.12	0.11
	0.20-0.30	5.3	0.01	<20	4	0.34	0.03
	0.40-0.50	5.8	0.01	25	1	0.29	<0.03
97	0.00-0.10	8.1	0.12	<20	1	2.52	0.08
	0.20-0.30	8.3	0.1	<20	<1	0.48	<0.03
	0.40-0.50	8.2	0.1	<20	1	0.28	<0.03

*Aqueous 1:5
**Total carbon and total nitrogen

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