Soil Indicators of Queensland Wetlands

Lagoon

Lakefield National Park

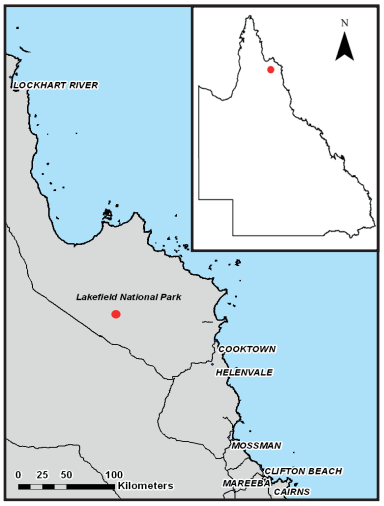
Queensland Wetlands Program

Study Area

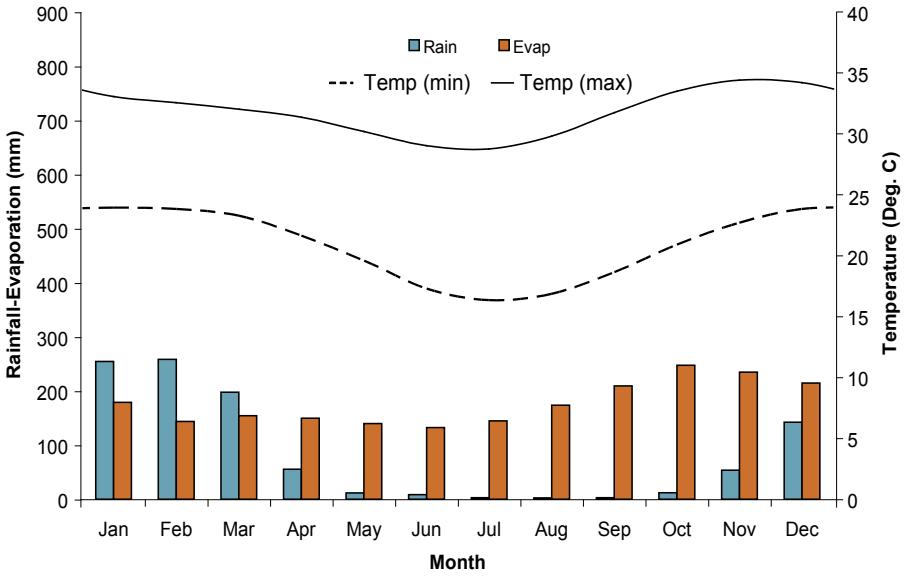
Lakefield National park is the second largest national park in Queensland. It center is approximately 160 km north-west of Cooktown.

The area is predominantly alluvial plains, old stream channels, infilled prior stream channels and shallow lagoons which are seasonally inundated[1].

This study site is an example of a coastal and sub-coastal floodplain grass, sedge, herb swamp within the Cape York Peninsula Bioregion.



Climate[2]



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 1002 mm.

Landform and Inundation	Lagoon Freshwater permanently inundated areas from overland flow
Soils[3]	Hydrosols and Dermosols
Vegetation[4]	Ephemeral lakes and lagoons on alluvial plains and depressions (RE 3.3.65)
Geology[5]	Quaternary alluvium and interfluvial sand
Disturbance	Little to no disturbance except grazing by hoofed animals

Australian Government

Queensland Government

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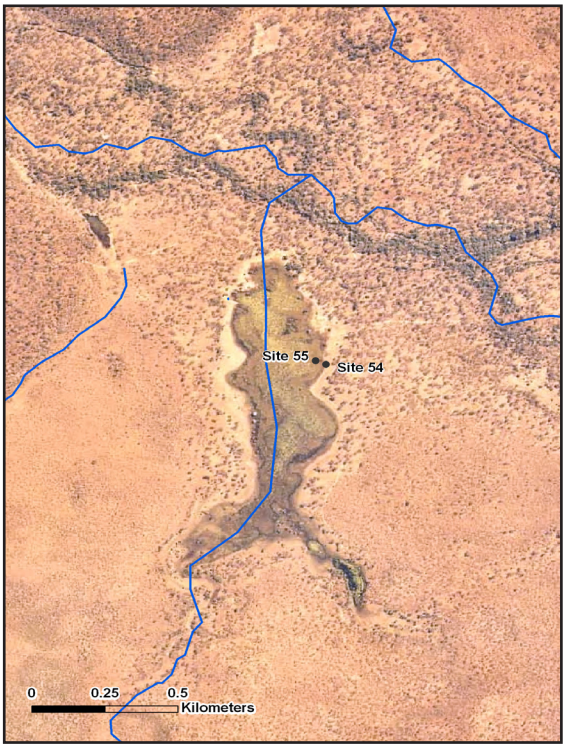
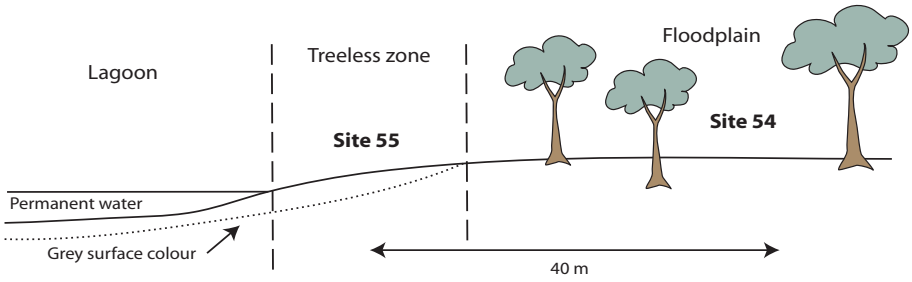
Location

GDA94 • MGA Coordinates : 213046 E, 8318121 N, Zone 55 • Lat/Long : -15.19708 S, 144.32922 E

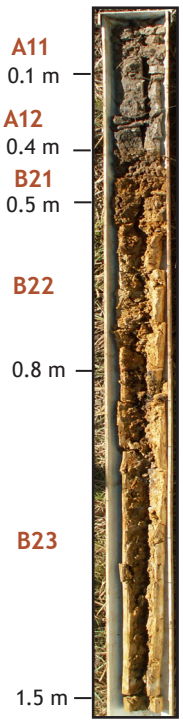


Landscape Diagram



Soil Profiles

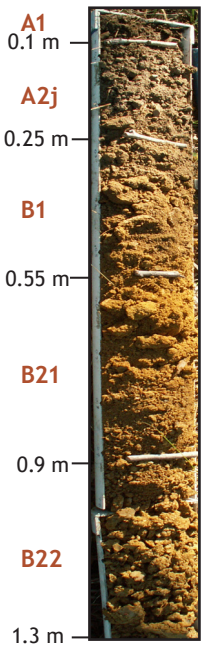
Site 55



Dark grey surface colours, low chroma values and presence of ferruginous root channel linings suggest a periodically reduced environment

Dark grey surface colours disappear after treeless zone indicating the wet season high water mark

Site 54



No wetland soil indicators observed

Few faint mottles present however these can be attributed to the regional hydropedological environment given the whole region is seasonally saturated

Soil Indicators Present (within 0.3 m of surface)

Indicator[6]	Site 54	Site 55
Organic materials and organic carbon (OC)*	No organic materials OC: 3.56%	No organic materials OC: 1.67%
Matrix colour	Brown	Dark grey
Chroma (thickness of layer)**	Not present	Present (0.3 m)
Mottles and Segregations	Common <5 mm faint yellow mottles	Few <5 mm faint orange mottles
Depth to groundwater	Not present	Not present
Ferruginous root channel and pore linings	Not present	Present
pH*[7]	Very strongly acid	Very strongly acid
Texture	Silty light clay to light medium clay	Silty light clay
Acid sulfate material	Not present	Not present
Electrical Conductivity (EC)[7]	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

- Site 54 is a typical floodplain soil, faint mottling throughout the soil profile suggests water fluctuation, this however is attributed to the seasonally saturated environment and does not appear to be influenced by the wetland
- Site 55 indicates at least a periodically reduced environment with dark soil surface colours, mottling, low soil chroma values and the presence of ferruginous root channel linings
- Outside the treeless transition zone there are no evidence of wetland soil features
- High organic carbon measured in the transition zone appears to be an anomaly as there is no readily identifiable reason for such a high level
- Grey soil colours in surface appear to correspond to the high water mark at the lagoon

References

1. DEWHA (2008). Australian Wetlands Database. [online]. Available at http://www.environment.gov.au/water/publications/environmental/wetlands/database/ [accessed 21/08/08]

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

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

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

5. Bureau of Mineral Resources (1966). Cooktown: Australia 1:250,000 Geological Series, Bureau of Mineral Resources, Canberra.

6. 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.

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

Soil Chemistry

Site	Depth (m)	pH*	EC (dS/m)	Cl (mg/kg	NO3-N (mg/kg)	TC%**	TN%**
54	0.00-0.10	4.6	0.09	48	23	3.56	0.26
	0.25-0.35	4.4	0.05	34	2	0.89	0.08
	0.40-0.50	4.7	0.05	29	2	0.55	0.06
55	0.00-0.10	4.6	0.03	32	4	1.67	0.14
	0.20-0.30	4.8	0.03	33	<1	0.83	0.05
	0.40-0.50	5.3	0.03	25	1	0.53	0.04

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

Soil Morphology

Site 54		Classification		Australian Soil Classification			Mottled, Mesotrophic, Brown Dermosol		
				Landform Element			Plain		
				Morphological Type			Flat		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence
A1	0 to .1	-	silty light clay	dark brown (7.5YR33)	none	none	weak 10-20 mm angular blocky	none	-
A2j	.1 to .25	gradual to	silty light clay	dark brown (10YR33)	very few (<2%) fine (<5 mm) faint yellow mottles	none	weak 5-10 mm angular blocky	none	-
B1	.25 to .55	gradual to	light medium clay	dark yellowish brown (10YR44)	common (10-20%) fine (<5 mm) faint yellow mottles, common (10-20%) fine (<5 mm) faint grey mottles	none	moderate 2-5 mm angular blocky	none	-
B21	.55 to .9	-	medium clay	yellowish brown (10YR55)	many (20-50%) fine (<5 mm) distinct red mottles, common (10-20%) fine (<5 mm) faint grey mottles	none	moderate 5-10 mm angular blocky, strong 2-5 mm angular blocky	none	-
B22	.9 to 1.3	-	medium heavy clay	yellowish brown (10YR56)	many (20-50%) fine (<5 mm) faint grey mottles, common (10-20%) fine (<5 mm) distinct red mottles	common (10-20%) fine (<2 mm) manganiferous nodules, very few (<2%) fine (<2 mm) manganiferous soft segregations	moderate 20-50 mm lenticular, moderate 5-10 mm angular blocky	-	-

Site 55		Classification		Australian Soil Classification			Mesotrophic, Dermosolic, Redoxic Hydrosol		
				Landform Element			Swamp		
				Morphological Type			Flat		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence
A11	0 to .1	clear to	silty light clay	grey (10YR51)	common (10-20%) fine (<5 mm) distinct orange mottles	none	weak 2-5 mm subangular blocky	none	-
A12	.1 to .4	gradual to	silty light clay	dark grey (10YR41)	few (2-10%) fine (<5 mm) faint orange mottles	none	weak 2-5 mm angular blocky	none	-
B21	.4 to .5	clear to	silty light medium clay	dark yellowish brown (10YR44)	common (10-20%) fine (<5 mm) distinct pale mottles, few (2-10%) fine (<5 mm) distinct orange mottles	none	moderate 2-5 mm angular blocky	none	-
B22	.5 to .8	gradual to	light medium clay	light grey (10YR71)	few (2-10%) fine (<5 mm) prominent red mottles, few (2-10%) medium (5-15 mm) distinct orange mottles	none	moderate 2-5 mm angular blocky	few (2-10%) coarse (6-20 mm) manganiferous laminae	-
B23	.8 to 1.5		medium heavy clay	yellowish brown (10YR56)	common (10-20%) medium (5-15 mm) prominent pale mottles, few (2-10%) fine (<5 mm) distinct red mottles	none	strong 2-5 mm angular blocky	few (2-10%) medium (2-6 mm) manganiferous laminae	-

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