Soil Indicators of Queensland Wetlands

Hogarths Swamp

Condamine

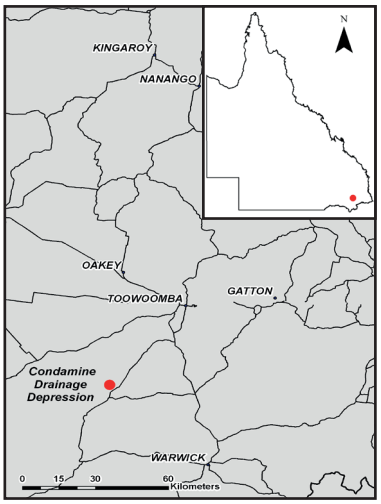
Queensland Wetlands Program

Study Area

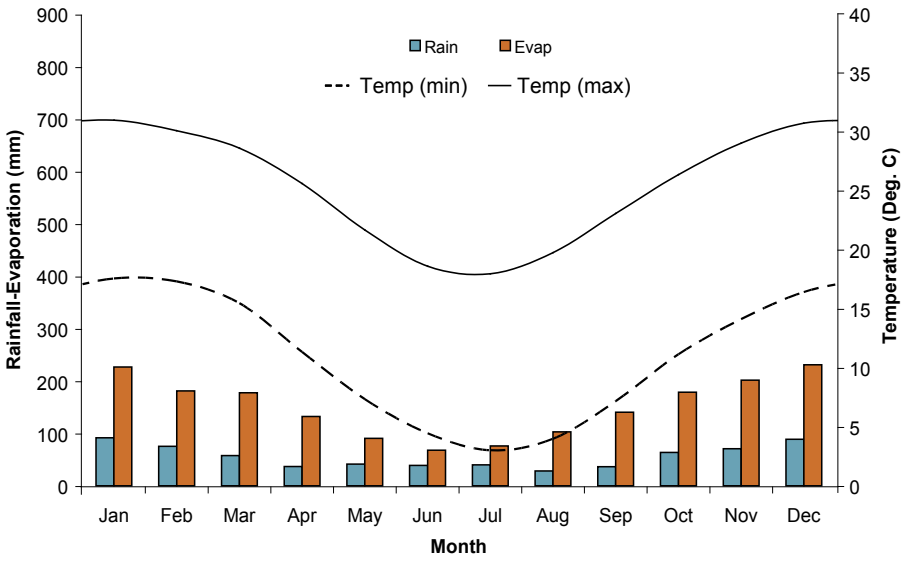
Hogarths swamp is located approximately 50 km south-west of Toowoomba, south-east Queensland.

This area is extensively cultivated with few remaining natural wetlands. The transect was located in a drainage depression on land used primarily for pasture and is a representation of what the majority of wetland soils may have been like prior to drainage and cultivation.

This study area is an example of a coastal and sub-coastal floodplain tree swamp (melaleuca and eucalyptus spp.) in the Brigalow Belt Bioregion.



Climate[1]



The study area is situated within a subtropical climatic region with no distinct wet and dry season. Evaporation exceeds rainfall in every month. The average annual rainfall for the area is 669 mm.

Landform and Inundation	Drainage depression on very gently sloping plains Freshwater intermittent inundation from overland flow
Soils[2]	Vertosols
Vegetation[3]	*Eucalyptus* spp. tall woodland on alluvial plains (RE 11.3.4)
Geology[4]	Floodplains and river terraces
Disturbance	Completely cleared for pasture but never cultivated

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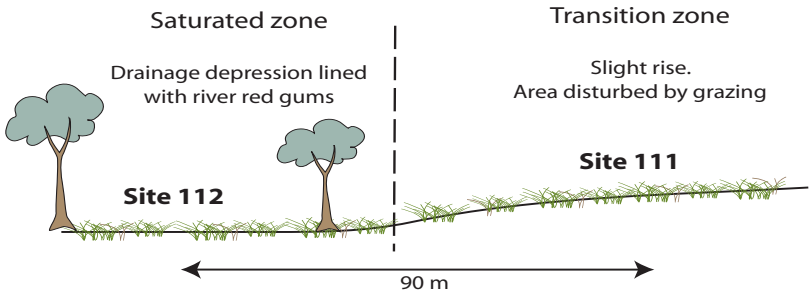
Location

GDA94 • MGA Coordinates : 369173 E, 6913924 N, Zone 56 • Lat/Long : -27.89314 S, 151.67078 E

Landscape Diagram

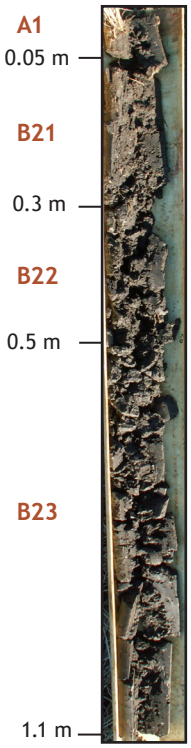


Soil Profiles

Site 112

Increased organic carbon content and presence of ferruginous root channel linings suggest that this site has been inundated

Site 111



Lower organic carbon and no ferruginous root channel linings imply the area is either not inundated or inundated for short periods of time

Although there are darker soil colours and lower chroma values in both profiles, this is reflective of the soil type in the area (dark Vertosols) and not because the soil is saturated and reduced

Soil Indicators Present (within 0.3 m of surface)

Indicator[5]	Site 111	Site 112
Organic materials and organic carbon (OC)*	No organic materials OC: 1.87%	No organic materials OC: 3.09%
Matrix colour	Very dark grey	Very dark grey
Chroma (thickness of layer)**	Present (0.3 m)	Present (0.3 m)
Mottles and Segregations	Not present	Not present
Depth to groundwater	Not present	Not present
Ferruginous root channel linings	Not present	Present
pH*[6]	Mildly alkaline	Neutral
Texture	Medium heavy clay	Medium heavy clay
Acid sulfate material	Not present	Not present
Electrical Conductivity (EC)[6]	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

- Dark soil colours and low chroma are present in both soil profiles however the landscape is primarily dark Vertosol soils which makes using soil colours and chroma for wetland identification unreliable for this location
- Presence of ferruginous root channel linings in the saturated zone and not in the transition zone is a positive soil indicator of intermittent waterlogging
- Increased organic carbon content within the saturated zone implies the area is subject to saturated conditions
- Presence of *Eucalyptus camaldulensis* is indicative of intermittent waterlogging

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 (1978). Moreton: 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 Chemistry

Site	Depth (m)	pH*	EC (dS/m)	Cl (mg/kg)	NO3-N (mg/kg)	TC%**	TN%**
111	0.00-0.10	7.5	0.1	<20	6	1.87	0.11
	0.20-0.30	8.2	0.11	55	1	1.26	<0.03
	0.40-0.50	8.5	0.12	56	2	1.2	<0.03
112	0.00-0.10	6.7	0.12	27	20	3.09	0.17
	0.20-0.30	7.6	0.12	35	9	1.34	0.06
	0.40-0.50	8.4	0.14	111	2	0.99	<0.03

*Aqueous 1:5

**Total carbon and total nitrogen

Soil Morphology

Site 111		Classification		Australian Soil Classification			Haplic, Self-Mulching, Black Vertosol		
				Landform Element			Drainage depression		
				Morphological Type			Flat		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence
A1	0 to .1	-	medium heavy clay	very dark grey (10YR31)	none	none	strong 2-5 mm granular, strong <2 mm granular	none	firm moist
B21	.1 to .3	-	medium heavy clay	very dark grey (10YR31)	none	none	strong 2-5 mm subangular blocky	none	firm moist
B22	.3 to .7	-	medium heavy clay	very dark grey (10YR31)	none	none	strong 10-20 mm lenticular, strong 5-10 mm angular blocky	none	very firm dry
B23	.7 to 1	-	medium heavy clay	very dark grey (10YR31)	none	none	moderate 20-50 mm prismatic, strong 10-20 mm angular blocky	few (2-10%) medium (2-6 mm) calcareous soft segregations, very few (<2%) fine (<2 mm) calcareous soft segregations	very firm dry

Site 112		Classification		Australian Soil Classification			Haplic, Self-Mulching, Black Vertosol		
				Landform Element			Drainage depression		
				Morphological Type			Flat		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence
A1	0 to .05	-	medium heavy clay	very dark grey (10YR31)	none	none	strong 2-5 mm granular	few (2-10%) fine (<2 mm) ferruginous root linings	firm dry
B21	.05 to .3	-	medium heavy clay	very dark grey (10YR31)	none	none	strong 2-5 mm subangular blocky,	very few (<2%) medium (2-6 mm) ferruginous root linings	firm moist
B22	.3 to .5	-	medium heavy clay	very dark grey (10YR31)	none	none	strong 10-20 mm lenticular	few (2-10%) fine (<2 mm) calcareous concretions	very firm dry
B23	.5 to 1.1	-	medium heavy clay	very dark grey (10YR31)	none	none	moderate 10-20 mm lenticular	few (2-10%) medium (2-6 mm) calcareous concretions	very firm dry

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