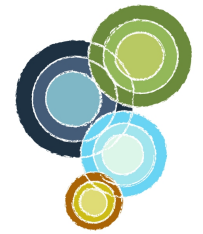


# Licuala Palm Forest

## Tam O Shanter



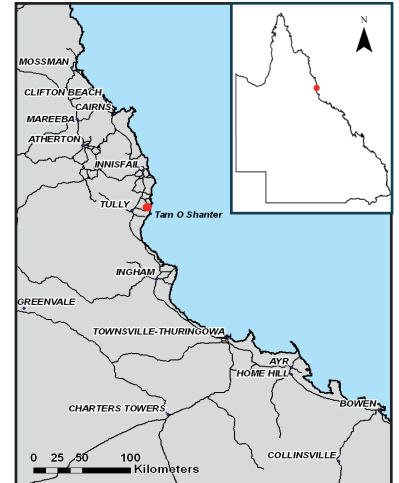
Queensland  
Wetlands Program

### Study Area

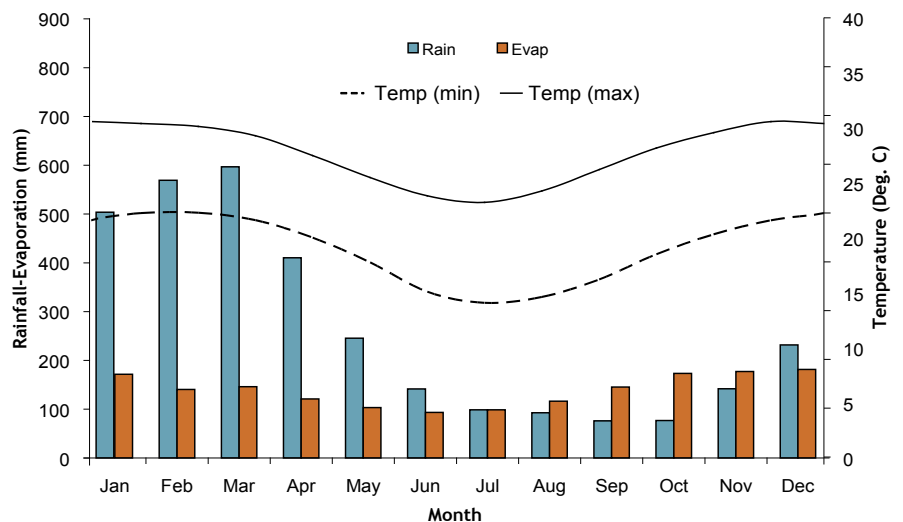
Tam O Shanter National Park is located approximately 8 km west of Mission Beach, Northern Queensland.

This site is important ecologically as it contains one of the few patches of the rare licuala fan palm forest (*Licuala ramsayi*).

Tam O Shanter is an example of a coastal and sub-coastal non-floodplain tree swamp (palm) within the lowlands of the Wet Tropics Bioregion.



### Climate<sup>1</sup>



The study area is situated within a tropical/equatorial climatic region with a distinct wet and dry season. Rainfall exceeds evaporation in the majority of months. The average annual rainfall for the area is 3179 mm.

<b>Landform and Inundation</b>	Low lying land subject to seasonal inundation Freshwater seasonally inundated areas from overland flow
<b>Soils<sup>2</sup></b>	Kandosols and Hydrosols
<b>Vegetation<sup>3</sup></b>	Mesophyll vine forest with <i>Licuala ramsayi</i> on poorly drained alluvial plains and alluvial areas of uplands (RE 7.3.4)
<b>Geology<sup>4</sup></b>	Quaternary alluvial and minor colluvial deposits
<b>Disturbance</b>	Little to no disturbance



Australian Government

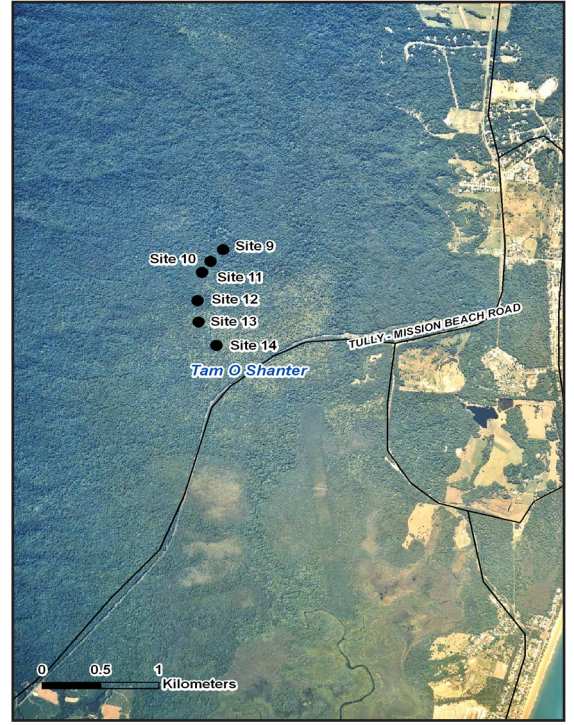


Queensland Government

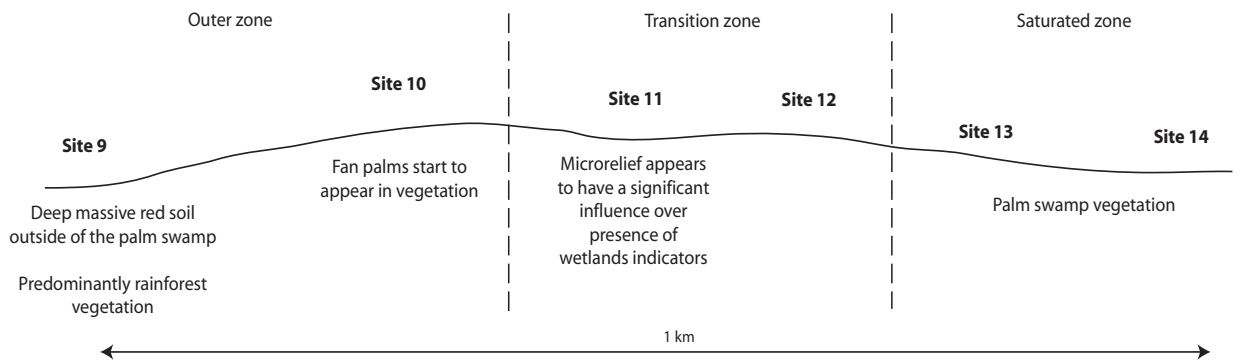
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## Location Map

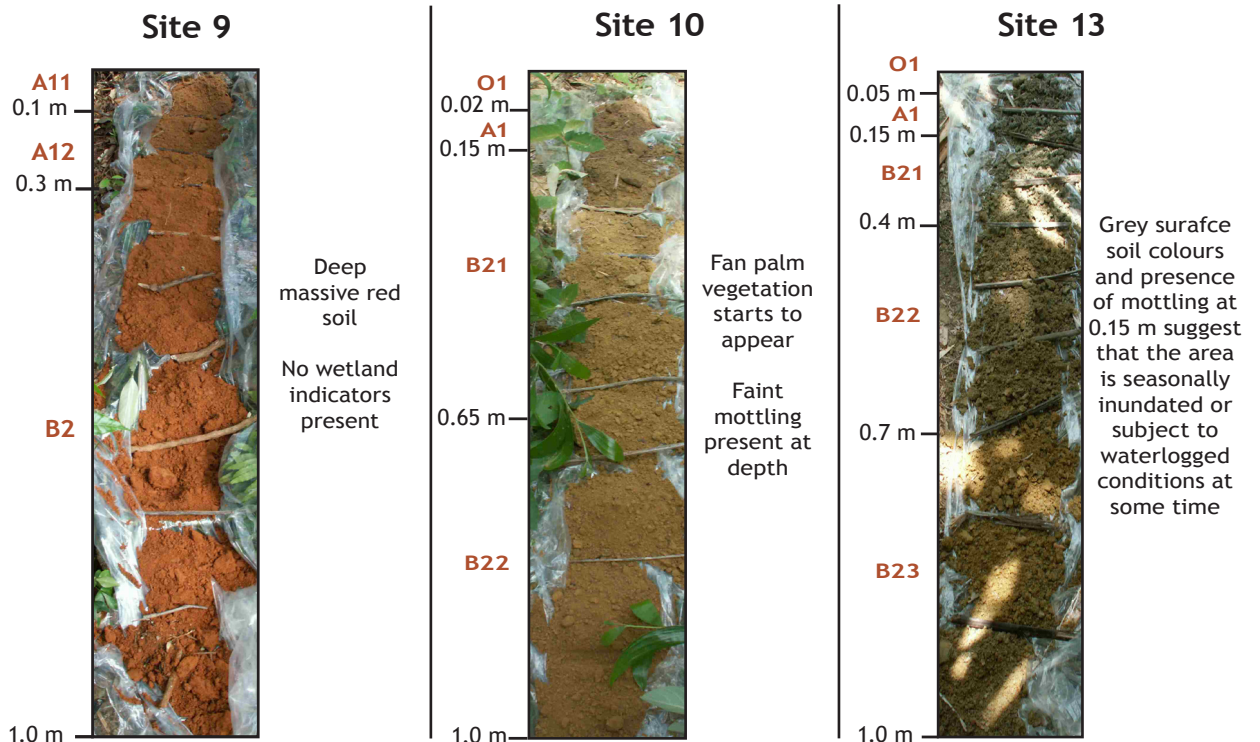
GDA94 • MGA Coordinates : 401532 E, 8020261 N, Zone 55 • Lat/Long: -17.90335 S, 146.07030 E



## Landscape Diagram



## Soil Profiles



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

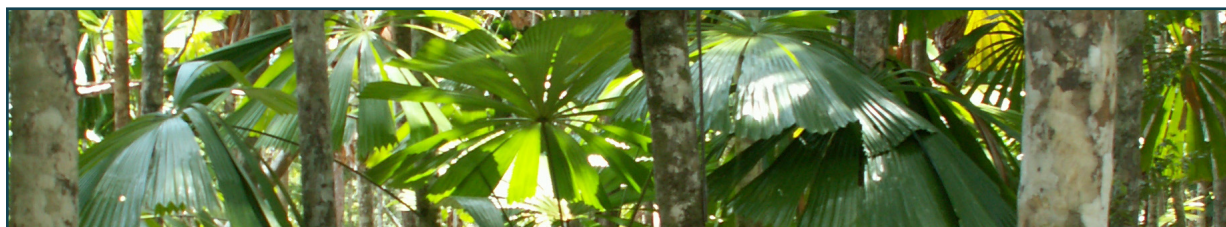
Indicator <sup>5</sup>	Site 9	Site 10	Site 11
Organic materials and organic carbon (OC)*	No organic materials OC: 2.76%	No organic materials OC: 3.13%	No organic materials OC: 2.69%
Matrix colour	Reddish brown to yellowish red	Brown	Greyish brown to brownish grey
Chroma (thickness of layer)**	Not present	Not present	Present (0.2 m)
Mottles and Segregations	Not present	Not present	Few <5mm faint orange mottles, Few 2-6mm ferruginous nodules, Few <2mm ferruginous soft segregations
Depth to groundwater	Not present	Not present	Not present
Ferruginous root channel and pore linings	Not present	Not present	Not present
pH* <sup>6</sup>	Very strongly acid	Very strongly acid	Very strongly acid
Texture	Clay loam	Clay loam to light clay	Silty clay loam to silty light clay
Acid sulfate material	Not present	Not present	Not present
Electrical Conductivity (EC) <sup>6</sup>	Non saline	Non saline	Non saline
Indicator <sup>5</sup>	Site 12	Site 13	Site 14
Organic materials and organic carbon (OC)*	No organic materials OC: 2.23%	No organic materials 1.15%	No organic materials 2.44%
Matrix colour	Yellowish to greyish brown	Grey to brownish grey	Greyish brown to brownish grey
Chroma (thickness of layer)**	Not present	Present (0.25 m)	Present (0.3 m)
Mottles and Segregations	Not present	Few 5-15mm faint orange mottles	Few<5mm faint orange mottles
Depth to groundwater	Not present	Not present	Not present
Ferruginous root channel and pore linings	Not present	Not present	Not present
pH* <sup>6</sup>	Very strongly acid	Very strongly acid	Very strongly acid
Texture	Clay loam	Clay loam to light clay	Light clay
Acid sulfate material	Not present	Not present	Not present
Electrical Conductivity (EC) <sup>6</sup>	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

- Faint mottling and soft ferruginous segregations and nodules within 0.3 m of the soil surface indicative of intermittent waterlogging within the saturated and transition zone
- Grey surface colours and lower chroma values within the saturated and transition zone suggest reduced conditions and a seasonally inundated environment
- Thin layer of organic matter on surface is mainly leaf litter from canopy and does not appear to have accumulated from a saturated environment
- Microrelief appears to have a significant influence over the presence of wetland soil indicators, small depressions in the landscape (site 11) are saturated long enough to form wetland soil indicators
- Presence of fan palms indicate wetter soil conditions



Soil Morphology

Site 9		Classification			Australian Soil Classification			Haplic, Dystrorphic, Red Kandosol		
		Landform Element			Landform Element			Hillslope		
		Morphological Type			Morphological Type			Lower slope		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence	
A11	0 to .1	-	clay loam	reddish brown (5YR4/4)	none	none	massive	none	-	
A12	.1 to .3	-	clay loam	yellowish red (5YR5/6)	none	none	massive	none	-	
B2	.3 to 1	-	light clay	yellowish red (5YR5/8)	none	none	massive	none	-	

Site 10		Classification			Australian Soil Classification			Haplic, Dystrorphic, Yellow Kandosol		
		Landform Element			Landform Element			Plain		
		Morphological Type			Morphological Type			Flat		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence	
O1	0 to .02	-	-	-	none	none	massive	none	-	
A1	.02 to .15	-	clay loam	brown (10YR5/3)	none	none	massive	none	-	
B21	.15 to .65	-	light clay	light yellowish brown (10YR6/4)	none	none	massive	none	-	
B22	.65 to 1	-	light clay	yellow (10YR7/6)	common (10-20%) fine (<5 mm) faint grey mottles	none	massive	none	-	

Site 11		Classification			Australian Soil Classification			Sodic, Kandosolic, Redoxic Hydrosol		
		Landform Element			Landform Element			Plain		
		Morphological Type			Morphological Type			Flat		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence	
O1	0 to .05	-	-	-	none	none	massive	none	-	
A1	.05 to .25	-	silty light clay	greyish brown (10YR5/2)	none	none	massive	none	-	
A3	.25 to .6	-	silty clay loam	light brownish grey (2.5Y6/3)	few (2-10%) fine (<5 mm) faint orange mottles	none	massive	few (2-10%) medium (2-6 mm) ferruginous nodules, very few (<2%) fine (<2 mm) ferruginous soft segregations	-	
B21	.6 to .8	-	silty light clay	light yellowish brown (10YR6/4)	common (10-20%) medium (5-15 mm) distinct orange mottles	none	massive	few (2-10%) medium (2-6 mm) ferruginous nodules, very few (<2%) fine (<2 mm) ferruginous soft segregations	-	
B22	.8 to 1	-	silty light clay	yellow (10YR7/6)	common (10-20%) medium (5-15 mm) distinct orange mottles	none	massive	common (10-20%) medium (2-6 mm) ferruginous nodules, few (2-10%) fine (<2 mm) ferruginous soft segregations	-	

Site 12		Classification			Australian Soil Classification				Acidic-mottled, Dystrophic, Red Kandosol		
		Landform Element			Plain				Plain		
		Morphological Type			Flat				Flat		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence		
O1	0 to .05	-	-	-	none	none	massive	none	-		
A1	.05 to .15	-	clay loam	dark greyish brown (10YR4/2)	none	none	massive	none	-		
A3	.15 to .4	-	light clay loam	dark yellowish brown (10YR4/4)	none	none	massive	none	-		
B21	.4 to .8	-	light clay loam	reddish yellow (5YR6/6)	none	none	massive	none	-		
B22	.8 to 1.1	-	light clay loam	yellowish red (5YR4/6)	few (2-10%) fine (<5 mm) faint grey mottles	none	massive	few (2-10%) fine (<2 mm) ferruginous nodules, very few (<2%) fine (<2 mm) ferruginous soft segregations, very few (<2%) fine (<2 mm) manganiferous nodules	-		

Site 13		Classification			Australian Soil Classification				Acidic-mottled, Dystrophic, Grey Kandosol		
		Landform Element			Plain				Plain		
		Morphological Type			Flat				Flat		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence		
O1	0 to .05	-	-	-	none	none	massive	none	-		
A1	.05 to .15	-	clay loam	grey (10YR5/1)	none	none	massive	none	-		
B21	.15 to .4	-	light clay	light brownish grey (2.5Y6/2)	few (2-10%) medium (5-15 mm) faint orange mottles	none	massive	none	-		
B22	.4 to .7	-	silty light medium clay	light brownish grey (2.5Y6/3)	common (10-20%) medium (5-15 mm) faint orange mottles	none	massive	none	-		
B23	.7 to 1	-	silty light medium clay	light yellowish brown (10YR6/4)	few (2-10%) fine (<5 mm) distinct grey mottles	none	massive	few (2-10%) fine (<2 mm) ferruginous soft segregations	-		

Site 14		Classification			Australian Soil Classification				Acidic, Kandosolic, Redoxic Hydrosol		
		Landform Element			Swamp				Swamp		
		Morphological Type			Depression				Depression		
Horizon	Depth (m)	Boundary	Texture	Colour	Mottles	Coarse Fragments	Structure	Segregations	Consistence		
O1	0 to .05	-	-	-	none	none	massive	none	-		
A11	.05 to .15	-	light clay	greyish brown (10YR5/2)	few (2-10%) fine (<5 mm) faint orange mottles	none	massive	none	-		
A12	.15 to .4	-	light clay	light brownish grey (2.5Y6/2)	few (2-10%) fine (<5 mm) faint orange mottles	none	massive	none	-		
B21	.4 to .75	-	silty light medium clay	light brownish grey (2.5Y6/3)	common (10-20%) medium (5-15 mm) distinct orange mottles	none	massive	very few (<2%) fine (<2 mm) ferruginous nodules	-		
B22	.75 to 1	-	silty medium clay	light yellowish brown (2.5Y6/4)	few (2-10%) medium (5-15 mm) distinct grey mottles, few (2-10%) fine (<5 mm) distinct orange mottles	none	massive	few (2-10%) fine (<2 mm) ferruginous soft segregations	-		

## Soil Chemistry

Site	Depth (m)	pH*	EC dS/m	Cl mg/kg	NO3-N mg/kg	P mg/kg	S mg/kg	TC** %	TN** %	Ca meq/100g	Mg meq/100g	Na meq/100g	K meq/100g	Na corr meq/100g	Cu mg/kg	Zn mg/kg	Mn mg/kg	Fe mg/kg
9	0.00-0.10	4.3	0.08	35	7	11	40	2.76	0.27	0.297	0.624	0.105	0.229	<0.012	1.1	1.7	18.6	125
	0.20-0.30	4.4	0.04	25	4	7	34	1.08	0.12	0.073	0.22	0.044	0.152	<0.012	0.8	1.8	11.8	65.5
	0.40-0.50	4.5	0.02	24	<1	5	32	0.46	0.06	0.25	0.211	0.026	0.084	<0.012	0.4	0.5	6	27.4
10	0.00-0.10	4.7	0.06	30	9	7	21	3.13	0.26	0.397	0.598	0.134	0.155	0.05	0.4	1.6	9.5	42.1
	0.20-0.30	4.5	0.02	<20	1	3	30	0.76	0.09	0.038	0.114	0.038	0.061	0.038	0.2	0.8	0.8	34
	0.40-0.50	4.6	0.01	<20	<1	2	25	0.49	0.06	<0.026	0.076	0.03	0.033	0.03	0.1	0.9	0.7	21.4
11	0.00-0.10	4	0.05	20	4	8	12	2.69	0.21	0.1	0.529	0.058	0.079	0.058	0.4	2.6	2.2	169
	0.20-0.30	4.1	0.03	<20	3	4	9	1.37	0.12	<0.026	0.146	0.027	0.058	0.027	0.2	1.5	0.6	151
	0.40-0.50	4.5	0.01	<20	<1	2	16	0.38	0.04	<0.026	0.076	0.019	0.024	0.019	0.1	0.5	0.3	62.6
12	0.00-0.10	4.7	0.05	26	5	4	37	2.23	0.2	0.256	0.434	0.095	0.165	0.021	0.7	2.2	53.9	45.7
	0.20-0.30	4.8	0.03	29	<1	3	55	0.9	0.1	<0.026	0.256	0.09	0.042	<0.012	0.3	1.2	13.1	21.8
	0.40-0.50	4.6	0.02	22	<1	2	84	0.44	0.05	<0.026	0.082	0.054	0.023	<0.012	0.1	0.3	6.6	11.8
13	0.00-0.10	4.3	0.04	27	<1	2	12	1.15	0.1	0.047	0.301	0.086	0.049	<0.012	0.2	1.5	1.6	65
	0.20-0.30	4.4	0.02	24	<1	1	11	0.41	0.05	<0.026	0.089	0.084	0.028	0.016	0.1	1.6	0.3	60.9
	0.40-0.50	4.4	0.02	<20	<1	1	17	0.4	0.05	<0.026	0.056	0.058	0.029	0.058	0.1	1	0.4	60.9
14	0.00-0.10	4	0.08	47	<1	5	20	2.44	0.18	0.16	0.652	0.146	0.143	0.013	0.5	2.4	10	138
	0.20-0.30	4.2	0.04	30	<1	2	10	0.76	0.07	0.028	0.34	0.146	0.097	0.062	0.2	1	1.1	113
	0.40-0.50	4.4	0.02	29	<1	1	10	0.3	0.04	<0.026	0.101	0.062	0.038	<0.012	<0.1	0.6	0.5	34

\*Aqueous 1:5

\*\*Total carbon and total nitrogen

## References

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