

**Littoral vegetation monitoring of the Peel-Yalgorup
Ramsar Site
2008**



Department of Environment and Conservation

Introduction

Following the monitoring recommendations of the Ecological Character Description for the Peel-Yalgorup Ramsar Site (Hale and Butcher 2007), a study was established in 2008 to monitor changes in composition and extent of littoral vegetation. This is a documentation of the establishment of the monitoring program.

Methods

Eighteen transects were established within littoral vegetation surrounding the Peel-Yalgorup Ramsar Site (Peel Inlet, Harvey Estuary, Yalgorup Lake System, Lakes McLarty and Mealup) in November 2008. Also included were Goegrup and Black Lakes, which are located in a proposed extension to the Peel-Yalgorup Ramsar Site. All transects are located within conservation reserves.

The following factors were considered with regards to site selection: site access, spatial representation, habitat representation, likelihood of impact and historical studies. The precise locations of existing transects (Monks and Gibson 2000; Murray 1995) were unable to be ascertained prior to the commencement of the program and as such could not be used.

The transects ran from the water's edge (or edge of vegetation) upland to the edge of littoral vegetation and varied in length from 37 to 146 metres. The transects were permanently marked with a star picket at the 0 metre mark and a fence dropper at the opposite end. Point intercepts were recorded at 50cm intervals for all vegetation strata. Percentage cover across the transect was calculated using these data. This method is comparable to that documented in Monks and Gibson (2000).

In addition, vegetation zonation along the transect was recorded. Each vegetation community was described according to the classification system of McDonald *et. al.* (1998) and its range along the transect was recorded. Vegetation condition was scored for each community along the transect according to the Keighery (1994) system.

The locations of the transects were recorded using a GPS reading taken from both ends (WGS84 datum). The transect bearing from the water's edge was also recorded. Photographs were taken five metres from both transect ends, looking along the transect.

Results

As 2008 was the first year of monitoring, it is not yet possible to detect any changes in vegetation. The data collected as part of this study should be considered a baseline against which comparisons can be made from future monitoring. Data collected in 2008 is summarised below, all data is included in the accompanying Excel file.

Table 1. Transect Attributes (WGS84 datum).

Transect	Location	Start		Finish		Bearing (°)	Length (m)
		mE	mN	mE	mN		
T1	Goegrup Lake North	385080	6402540	385067	6402606	350	66.5
T2	Goegrup Lake South	385694	6400263	385700	6400211	170	54
T3	Creery Wetland	381279	6396902	381333	6396972	45	78
T4	Len Howard Reserve	378646	6396435	378619	6396457	315	37
T5	Samphire Cove	379243	6398319	379205	6398293	235	42
T6	Lake Preston West	374952	6360928	374927	6360935	275	38
T7	Lake Preston East	375684	6360873	375779	6360910	75	77.5
T8	Lake Clifton Nth	373829	6376566	373880	6376578	75	49.5
T9	Lake Clifton Sth	374391	6374819	374429	6374843	75	41.5
T10	Island Point Sth	377589	6374773	377529	6374787	285	56.5
T11	Lake McLarty Sth	380081	6379896	380133	6379862	120	67.5
T12	Lake McLarty Nth	378980	6381617	378925	6381636	290	63.5
T13	Kooljaranup	379459	6377937	379603	6377955	85	146
T14	Lake Mealup	378930	6383525	378915	6383530	235	42.5
T15	Carrabungup	379887	6388272	379945	6388280	83	58
T16	Austin Bay Sth	384706	6389626	384745	6389530	60	103.5
T17	Western Harvey Estuary, South of Chapman Road	373078	6387568	373028	6387554	253	59
T18	Black Lake	386991	6399352	386940	6399377	298	60.5

Table 2. Summary of transect cover in 2008.

Comments	Weed	Species/Cover	Transect % Cover																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		Algal mat	1.5		7.69	1.35									2.4		6.03	4.83	4.24	0.83
		Bare ground		0.93	5.77	6.76	11.9	6.58	56.1	1.01	4.82	6.19			18.8		7.76	11.1	9.32	4.13
		Lichen															0.86			
		Litter	13.5	6.48	15.4	8.11	17.9	28.9	10.3	5.05	2.41	2.65			16.1	1.18	28.4	9.66	13.6	4.13
		Moss							1.29	5.05					0.34	2.35	0.86			
		Water	46.6	26.9						6.06	4.82	0.88	80	78.7	0.68	35.3	10.3			0.83
		<i>Acacia cyclops</i>							3.23											
		<i>Acacia pulchella</i>													0.68					
		<i>Acacia saligna</i>		1.85													3.45			
		<i>Agonis flexuosa</i>											5.19							
	*	<i>Anagallis arvensis</i>							1.94											
		<i>Angianthus preissianus</i>				8.11			4.52			2.65						0.48		
		<i>Aotus gracillima</i>													0.34					
		<i>Apium annuum</i>		1.85								2.65					0.86	7.25	0.85	
		<i>Apium prostratum</i>								1.01										
	*	<i>Arctotheca calendula</i>																1.45		
		<i>Astartea leptophylla</i>		1.85											8.9					
		<i>Atriplex hypoleuca</i>													0.68				1.69	
	*	<i>Atriplex prostrata</i>	5.26															0.97		
		<i>Banksia littoralis</i>											2.22							
dead		<i>Baumea juncea</i>								11.1										
		<i>Baumea juncea</i>	4.51							44.4				9.45	3.42		13.8			17.4
dead		<i>Bolboschoenus caldwellii</i>	0.75																	
		<i>Bolboschoenus caldwellii</i>		1.85									1.48							
	*	<i>Briza maxima</i>											3.7			15.3	4.31			0.83
	*	<i>Briza minor</i>		3.7					0.65				1.48	1.57		8.24				
	*	<i>Bromus diandrus</i>											0.74	0.79						
		? <i>Callitriche</i> sp.											14.8							
		<i>Cassytha racemosa</i>											1.48			15.3				

Comments	Weed	Species/Cover	Transect % Cover																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		<i>Cassytha racemosa</i> forma <i>pilosa</i>													1.03					
		<i>Cassytha racemosa</i> forma <i>racemosa</i>												2.36						
dead		<i>Casuarina obesa</i>			0.64													3.86		
		<i>Casuarina obesa</i>	18		27.6	25.7	36.9							1.37		6.9	16.4			
		<i>Centella asiatica</i>											14.8		2.35					
		<i>Centrolepis polygyna</i>		0.93																
		<i>Chaetanthus aristatus</i>																		0.83
		<i>Conostylis aculeata</i>																		0.83
	*	<i>Cotula coronopifolia</i>		1.85										5.51		2.35				
		<i>Cotula cotuloides</i>															0.86	8.7		
	*	<i>Crassula glomerata</i>								3.23										
	*	<i>Cyperus tenellus</i>		1.85																
		<i>Dasyogon bromeliifolius</i>												0.68						
	*	<i>Desmazeria rigida</i>								3.23										
		<i>Dryandra dallaneyi</i> subsp. <i>dallaneyi</i>															0.86			
	*	<i>Ehrharta longiflora</i>		1.85												8.24			0.85	
		<i>Ficinia nodosa</i>												2.05		0.86				
dead		<i>Frankenia pauciflora</i>			3.85															
		<i>Frankenia pauciflora</i>			21.2													0.97		0.83
		<i>Gahnia trifida</i>	4.51				8.33	9.21	1.29	29.3	22.9									13.6
	*	<i>Hainardia cylindrica</i>						5.26	1.29											
		<i>Hakea prostrata</i>															2.59			
		<i>Hakea sulcata</i>												1.37						
		<i>Hakea varia</i>												1.03						
	*	<i>Hordeum geniculatum</i>			0.64															
		<i>Hypocalymma angustifolium</i>												5.48						
	*	<i>Hypochaeris radicata</i>											3.7						0.48	
		<i>Hypolaena exsulca</i>												0.68						
		<i>Hypolaena pubescens</i>												2.74						0.83
		<i>Isolepis cernua</i> var. <i>setifolia</i>		3.7				3.95	1.94			1.77				8.24				
		<i>Jacksonia furcellata</i>												1.37						
		<i>Jacksonia sternbergiana</i>															0.86			

Comments	Weed	Species/Cover	Transect % Cover																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	*	<i>Moraea flaccida</i>																	0.48	
	*	<i>Ornithopus pinnatus</i>																	1.45	
dead	*	<i>Orobanche minor</i>																	0.48	
	*	<i>Parapholis incurva</i>			1.92														0.48	
	*	<i>Paspalum vaginatus</i>												31.5						
		<i>Pericalymma ellipticum</i>													8.22					
dead		<i>Poaceae sp.</i>							1.32										2.42	
		<i>Poaceae sp.</i>							1.32											
		<i>Pogonolepis stricta</i>																1.72		
	*	<i>Polypogon monspeliensis</i>							5.26	0.65									0.85	
	*	<i>Ranunculus muricatus</i>												1.48						
dead		<i>Regelia ciliata</i>													0.68					
		<i>Regelia ciliata</i>													9.93					
		<i>Rhagodia baccata subsp. baccata</i>								0.65										
		<i>Samolus junceus</i>		0.93															0.85	
		<i>Samolus repens var. paucifolius</i>								6.45										
		<i>Samolus repens var. repens</i>											0.88							
dead		<i>Sarcocornia quinqueflora</i>	24.8	3.7		6.76	8.33	3.95	1.29				5.31		4.45		5.17	0.48	0.85	15.7
		<i>Sarcocornia quinqueflora</i>	27.1	34.3	14.7	29.7	51.2	14.5	12.9		1.2	55.8			16.8		23.3	6.76	19.5	24.8
		<i>Schoenus ?subfascicularis</i>																		4.13
		<i>Schoenus efoliatus</i>													0.68					
		<i>Schoenus nitens</i>							1.29											
		<i>Schoenus subfascicularis</i>		3.7											17.1					
	*	<i>Senecio ?diaschides</i>												0.74						
dead	*	<i>Silene gallica</i>																	4.35	
	*	<i>Silene gallica</i>															0.86	0.48		
	*	<i>Sonchus oleraceus</i>							1.32					0.74		2.35				
		<i>Sporobolus virginicus</i>					5.95					1.2		0.74					2.54	0.83
		<i>Spyridum globulosum</i>							0.65											
dead		<i>Suaeda australis</i>	3.01	1.85	1.28								2.65		0.34				3.39	0.83
		<i>Suaeda australis</i>	3.76	0.93	1.28	6.76							11.5		1.03		0.86	2.9	4.24	4.13
dead		<i>Tecticornia halocnemoides</i>			0.64	4.05												0.48		

Discussion

If possible, future monitoring should include extra transects to increase replication and coverage. The use of historical transects (Monks and Gibson 2000) would be ideal for this purpose if the exact location of these can be ascertained.

This monitoring program used 50cm point intercepts to establish percentage cover across the transects. By using smaller increments for the point intercepts the accuracy and detail of data will be increased. The use of 10cm increments should be considered for future monitoring.

References

Hale J, Butcher R (2007) *Ecological Character Description of the Peel-Yalgorup Ramsar Site*. Report to the Department of Environment and Conservation and the Peel-Harvey Catchment Council, Perth, Western Australia.

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Monks L, Gibson N (2000) *Changes in peripheral vegetation of the Peel-Harvey Estuary 1994-1998*. Unpublished Report. Department of Conservation and Land Management, Perth, Western Australia.

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Appendix 1. Transect photographs



Transect 1 Lake Goegrup North: Looking north from the 0 metre mark at the waters edge towards the 66.5 metre mark.



Transect 1 Lake Goegrup North: Looking south from the 66.5 metre mark towards the 0 metre mark.



Transect 2 Lake Goegrup South: Looking south from the 0 metre mark at the waters edge towards the 54 metre mark.



Transect 2 Lake Goegrup South: Looking north from the 54 metre mark towards the 0 metre mark.



Transect 3 Creery Nature Reserve: Looking northeast from the 0 metre mark at the waters edge towards the 78 metre mark.



Transect 3 Creery Nature Reserve: Looking southwest from the 78 metre mark towards the 0 metre mark.



Transect 4 Len Howard Reserve: Looking northwest from the 0 metre mark at the waters edge towards the 37 metre mark.



Transect 4 Len Howard Reserve: Looking southeast from the 37 metre mark towards the 0 metre mark.



Transect 5 Samphire Cove: Looking southwest from the 0 metre mark at the waters edge towards the 42 metre mark.



Transect 5 Samphire Cove: Looking northeast from the 42 metre mark towards the 0 metre mark.



Transect 6 Lake Preston West: Looking west from the 0 metre mark at the waters edge towards the 38 metre mark.



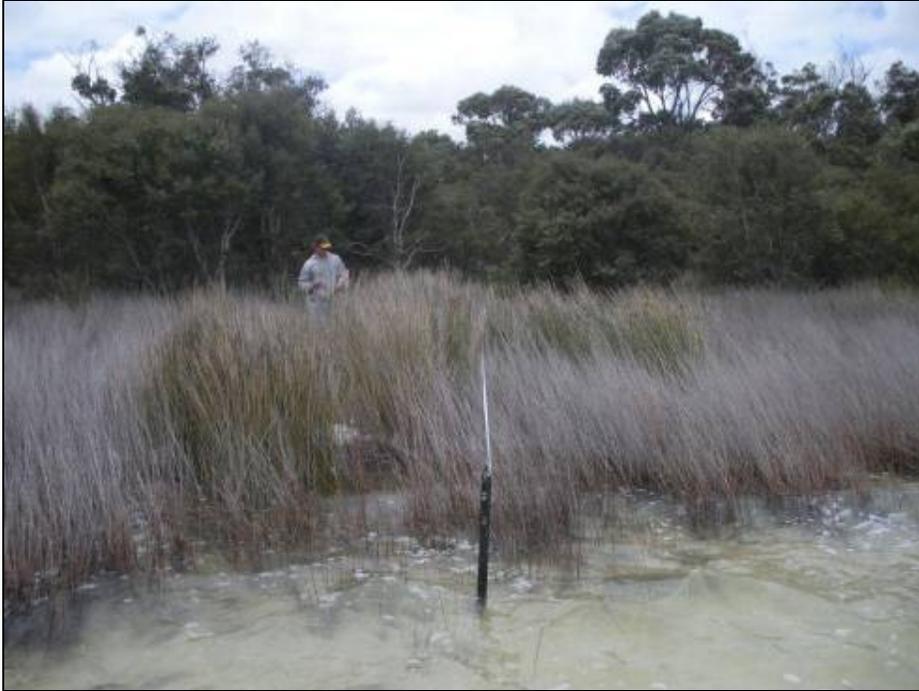
Transect 6 Lake Preston West: Looking east from the 38 metre mark towards the 0 metre mark.



Transect 7 Lake Preston East: Looking east from the 0 metre mark at the waters edge towards the 77.5 metre mark.



Transect 7 Lake Preston East: Looking west from the 77.5 metre mark towards the 0 metre mark.



Transect 8 Lake Clifton North: Looking east from the 0 metre mark at the waters edge towards the 49.5 metre mark.



Transect 8 Lake Clifton North: Looking west from the 77.5 metre mark towards the 0 metre mark



Transect 9 Lake Clifton South: Looking east from the 0 metre mark at the waters edge towards the 41.5 metre mark.



Transect 10 Island Point South: Looking west from the 0 metre mark at the waters edge towards the 56.5 metre mark.



Transect 10 Island Point South: Looking east from the 56.5 metre mark towards the 0 metre mark.



Transect 11 Lake McLarty South: Looking southeast from the 0 metre mark at the waters edge towards the 67.5 metre mark.



Transect 11 Lake McLarty South: Looking northwest from the 67.5 metre mark towards the 0 metre mark.



Transect 12 Lake McLarty North: Looking northwest from the 0 metre mark at the waters edge towards the 63.5 metre mark.



Transect 12 Lake McLarty North: Looking southeast from the 63.5 metre mark towards the 0 metre mark.



Transect 13 Kooljaranup: Looking east from the 0 metre mark at the waters edge towards the 146 metre mark.



Transect 13 Kooljaranup: Looking west from the 146 metre mark towards the 0 metre mark.



Transect 14 Lake Mealup: Looking southwest from the 0 metre mark towards the 42.5 metre mark.



Transect 14 Lake Mealup: Looking northeast from the 42.5 metre mark towards the 0 metre mark.



Transect 15 Carrabungup: Looking east from the 0 metre mark at the waters edge towards the 58 metre mark.



Transect 15 Carrabungup: Looking west from the 58 metre mark towards the 0 metre mark.



Transect 16 Austin Bay: Looking northeast from the 0 metre mark at the waters edge towards the 103.5 metre mark.



Transect 16 Austin Bay: Looking southwest from the 103.5 metre mark towards the 0 metre mark.



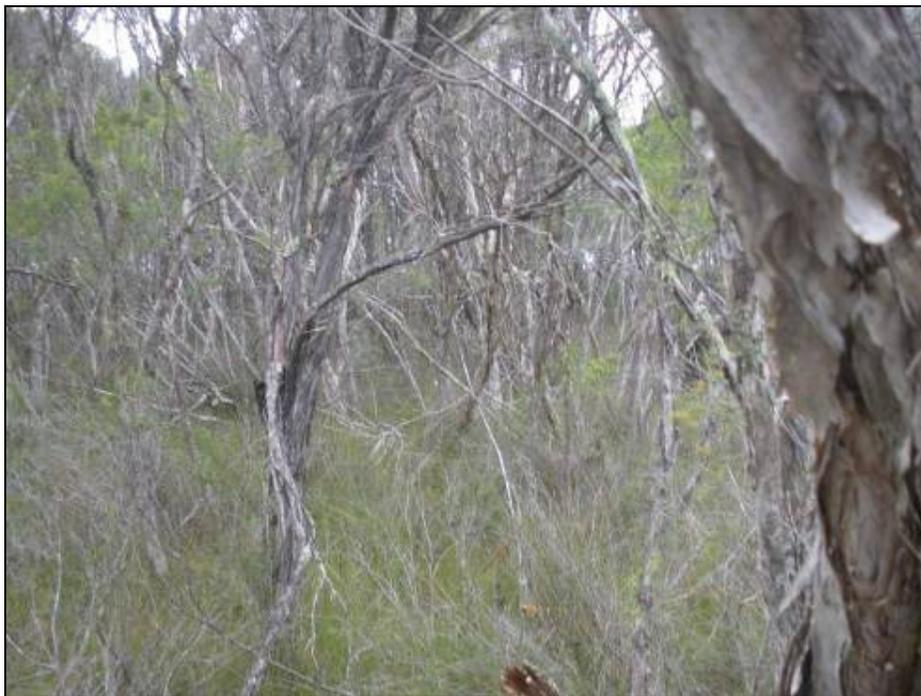
Transect 17 West Harvey Estuary, south of Chapman Road: Looking west from the 0 metre mark at the waters edge towards the 59 metre mark.



Transect 17 West Harvey Estuary, south of Chapman Road: Looking east from the 59 metre mark towards the 0 metre mark.



Transect 18 Lake Black: Looking northwest from the 0 metre mark at the waters edge towards the 60.5 metre mark.



Transect 18 Lake Black: Looking southeast from the 60.5 metre mark at the waters edge towards the 0 metre mark.