WETLAND VEGETATION MONITORING
1998 SURVEY - GNANGARA WETLANDS

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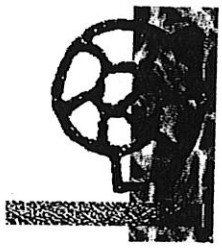

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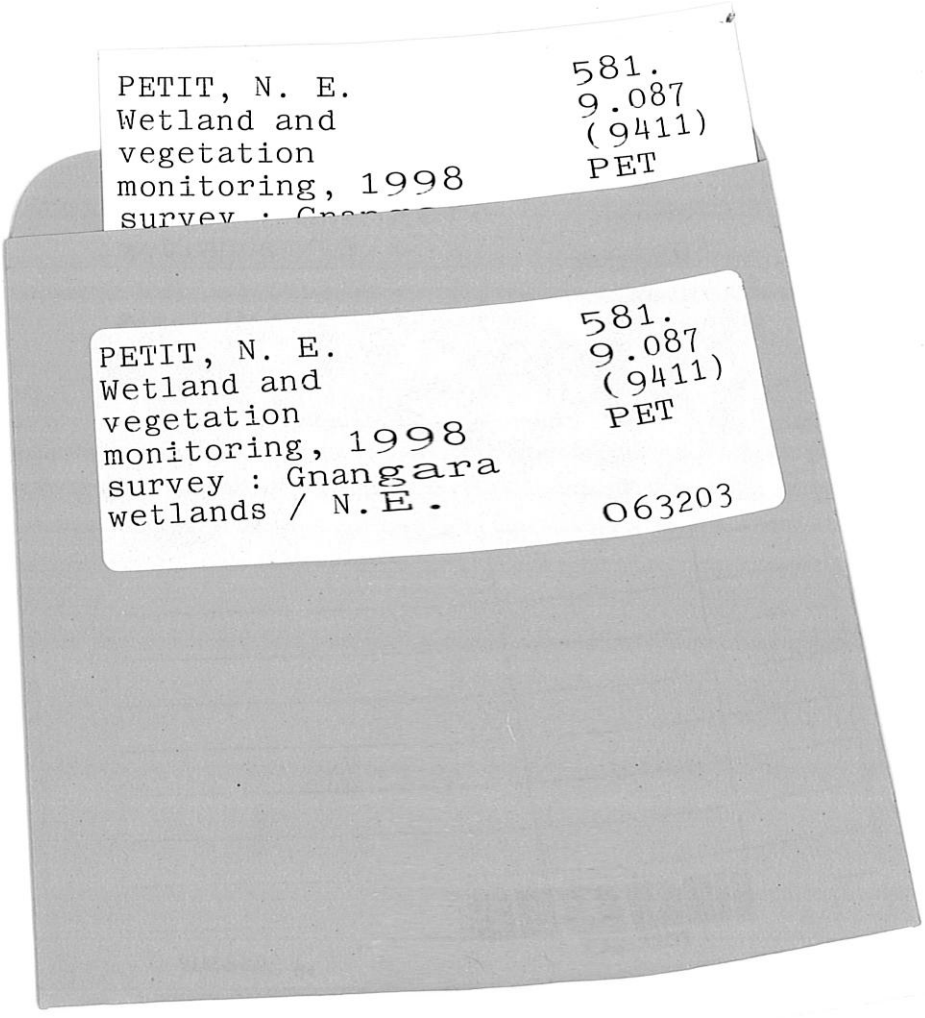

INTRODUCTION

Water regimes, both groundwater and surface water components directly effect distribution, health and species composition of wetland fringing vegetation. In the area of the northern Swan Coastal Plain overlying the Gnangara groundwater mound, wetland water levels and therefore the vegetation can be intimately connected to underlying groundwater levels. The Water Corporation (formerly Water Authority of Western Australia) has been drawing water from the Gnangara mound for domestic water supply for a number of years. The main objective of this study is to monitor the changes in the vegetation fringing these wetlands and to determine if this is related to changes in groundwater or other factors affecting the lakes. Wetlands of specific interest in 1998, because of breached guidelines for groundwater drawdown through abstraction, have been summarized in detail in this report. These wetlands include Lakes Joondalup, Jandabup, Mariginup and Nowergup. Raw data from the 1998 survey for the other wetlands monitored in 1997, as well as the wetlands mentioned above, are presented in Appendix 1.

METHODS

All lakes monitored in this study are located on the Gnangara mound in the northern metropolitan region of the northern Swan Coastal Plain. A full description of the lakes can be found in Froend et al. (1993) for Lake Joondalup, Lake Janadabup and Lake Nowergup, Arnold (1990) for Lake Mariginiup and Water and Rivers Commission (1997) for the remaining wetlands. These wetlands have been monitored annually over the period 1995 to 1997. Further vegetation monitoring transects were established in 1997 at Wilgarup Lake, Yonderup Lake, Lake Goollelal, Melaleuca Park and the Lexia wetlands.

The 1998 surveys of the lakes took place in December and January. At each site a 10 m wide belt transect was established in 1995 or 1997. The transect was divided into usually 4 plots (5 at Lake Mariginup) which were 10 m or 20 m long depending on the density of trees and 10 m wide. Within each plot the position of each tree was recorded as a co-ordinate within the plot (i.e. distance along and across the plot). The diameter of each tree was measured at 1.5 m above the ground (i.e. diameter at breast height (DBH)) and an assessment of the health of the crown was made. Health assessment was recorded by assessing 3 aspects of the tree crown; density, number of dead branches and presence of epicormic growth. For each of these components a score was given (9, 7, 5, 3 or 1 for crown density and number of dead branches and 5, 4, 3, 2 or 1 for epicormic growth), and these scores were totaled to give a health assessment score for each tree (Ladd 1996). Within each plot all species were identified and an estimate of their cover was made using the Domin-Krajina scale of cover and abundance (Kent & Coker 1992). For each plot a weediness index was calculated as the cover of exotic species divided by the cover of native species plus the number of exotic species divided by the number of native species (Ladd 1996). This gives an indication of the importance of weeds within a plot. Also in each plot, the presence of seedling, saplings or resprouts were recorded for the overstorey species. A regeneration index was then calculated for each plot by dividing the number of seedlings by the number of trees (plus one) in the plot.

RESULTS AND DISCUSSION

A summary of the parameters measured along each transect at each monitoring site for the wetlands of interest are given in Tables 1 - 7. Full details for each plot on each transect for all wetlands are provided in Appendix **1**.

Lake Joondalup (south)

On this transect, the water level was much lower than for the previous years with the water level at a distance of 2 metres before the start of the first plot (Plot A) compared with a distance of 6.4m along the transect in 1997 and 13 metres in 1996. Therefore open water size at this site has reduced by 15 metres since 1996 and for the first time the transect is completely dry. The most obvious consequence of this is an increase in the number and abundance of ephemeral annual herbs (mainly exotics) in the exposed bare sediments that in previous years was under water. These ephemerals include such species as the exotic annual herbs *Sonchus oleraceus, Conyza albida* and *Aster subulatus* which has resulted in a large increase in the weediness index (Table 1). The overstorey comprised of *M. rhaphiophylla* with a sparse understorey of the native jointed twig rush *Baumea articulata* with the native herb *Centella cordifolia* and the tufted annual grass *Agrostis avenacea* on the drier margin. A number of the larger trees at the lower end of the transect had fallen over, although still living and apparently healthy. The health of the overstorey has changed little since the last survey (Figure 1a).

Plot B and to a greater extent Plot C represent the transition from wetland to dry-land vegetation with some *Melaleuca. rhaphiophylla* as well as *Acacia saligna* in the overstorey with *Centella. cordifolia* and *Agrostis avenacea* in the understorey and the exotic perennial grass *Ehrharta calycina* becoming dominant in both plots. In both these plots understorey composition and abundance has generally changed little. The health of the overstorey has declined slightly over the past 12 months with the death of 1 sapling of *M. rhaphiophylla* and 2 trees of A. saligna in plot B and 7 trees of *A. saligna* in Plot C. The death of the mature trees of *A. saligna* may be natural as this species is fairly short lived.

Plot D is located in the terrestrial vegetation dominated at this site by *Banksia prionotes*. A fire has gone through this area killing the majority of adult trees, however there is a large number of *B. prionotes* seedlings indicating successful recruitment, providing fire can be excluded from this site for a number of years. The understorey in this plot is dominated by *Ehrharta calycina*, which may cause some further problems with survival of these seedlings due to competition for moisture and the increased fire risk. Health range of live trees for each plot does not differ significantly from the values assessed in the 1997 survey. The numbers of seedlings present in this plot has diminished from the 1997 to the 1998 survey with numbers of *Acacia saligna* seedlings (20 to 19), *Jacksonia furcellata* (59 to 25) and *Banksia prionotes* (35 to 23). This may be natural attrition of seedlings by may be exacerbated by the competition with *E. calycina* and a drier than average year.

Lake Joondalup (north)

Water level has changed significantly from the 1997 survey with the water's edge two metres from the start of the transect, thus the edge has receded 10 metres from 1997 levels. The is plot dominated by *M. rhaphiophylla* and an understorey of *Baumea articulata* with *B. juncea* and *Lepidosperma longitudinale* at the drier end of the plot. As for the previous site the exposure of bare moist sediment has allowed the establishment of annual

herbaceous species including the native semi-aquatic annual herb *Halogaris brownii* and the exotic annual herbs *Sonchus asper, Chenopodium glaucum Lactuca serriola* and *Solanum nigrum.* This accounts for the increase in species richness and weediness index seen at this plot (Table 2). Health of the overstorey of M. rhaphiophylla is similar to 1997 levels (Figure 1b).

Plot B forms the transition from wetland to dry-land vegetation with a *M. rhaphiophylla* overstorey and an understorey dominated by *Ehrharta calycina.* The understorey remains dominated by *E. calycina* and *Pelargonium capitatum* with no new species recorded. Health of the trees remains unchanged.

Plots C and D were in the dry-land vegetation with a mixed overstorey with *Banksia prionotes* the most common species. The understorey in these plots was once again dominated by *Ehrharta calycina* but also had a number of native species including the native geophyte *Arthropodium capillipes,* the shrubs *Corynotheca micrantha* and *Ptilotis stirlingii.* Dominance of exotic species (particularly *Ehrharta calycina*) is apparent in Plots C and D as indicated by the slight increase in the weediness index (Table 2). In 1998 survival of seedlings of *A. saligna* (2 seedlings) and *Eucalyptus calophylla* (8 seedlings). There has been little change in the health of the overstorey species since 1997 (Figure 1b).

Lake Joondalup (east)

Plot A started at the water's edge and comprised an overstorey of *Banksia littoralis* and *Melaleuca rhaphiophylla* with an understorey dominated by the exotic perennial grass *Ehrharta calycina* with the sedge *Lepidosperma longitudinale* the most important native species. Results from the 1998 survey are very similar to 1997 results with little change in cover and occurrence of species. Health rating of the overstorey species has remained steady over the monitoring period.

Plot B is on the area of highest ground along the transect and is dominated by terrestrial species including *Jacksonia furcellata* and *Acacia saligna* with *Ehrharta calycina* and *Lepidosperma longitudinale* the dominant species in the understorey. Comparison with 1996 results show little change except for the lack of seedlings in 1998 and therefore the failure of seedlings recorded in 1996 to develop. One *Eucalyptus rudis* sapling (dbh < 2 cm) has died since the last survey, otherwise health of the overstorey has changed little over the monitoring period (Figure 1c).

Plots C and D are in a depression away from the lake's edge with an overstorey of *B. littoralis, M. rhaphiophylla* and *Eucalyptus rudis.* There is a dense understorey of *Lepidosperma longitudinale,* which, along with increased frequency of saturated soil conditions, has reduced the invasion of exotic species (particularly *Ehrharta spp*) although there has been some invasion of the exotic perennial grass *Cynodon dactylon.* This is indicated by the weediness index for each plot. Health ratings for the overstorey has not varied greatly between surveys. One large tree of *E. rudis* has fallen over in Plot C in the past 12 months. Regeneration in the form of saplings was seen for *B. littoralis* and *E. rudis* in Plot D these have all survived and are in a healthy condition but no new seedlings were seen.

Lake Mariginiup

The area around this transect was burnt sometime in 1997 which has resulted in the loss of cover of *Baumea articulata* which formed a dense stand in Plot A and the lower portion of Plot B in 1995. The fire has also killed a large proportion of the *E. rudis* saplings that where recorded on this transect in 1995. However *B. articulata* is resprouting extensively in all plots and many of the *E. rudis* saplings have resprouted from the lignotuber and existing trees have resprouted from epicormic buds. Regeneration from seed of the *Acacia* sp as well as Viminaria juncea contribute to the high regeneration index, especially for plots D and E. Adult plants of *E. rudis* and *Melaleuca teretifolia* defoliated in the fire of 1996 have continued to survive through epicormic and lignotuber resprouting.

Plots A & B have shown a continued dominance of annuals in the understorey including the exotics *Hypochaeris glabra, Lotus suaveolens* and *Vulpia myuros* and the native herb *Podelepsis lessonii* and native grass *Agrostis avenacea*. Surviving saplings of *E. rudis* have continued to recover and are in a healthy condition with only two saplings having died in the past 12 months.

Melaleuca teretifolia in Plot C continues to hang on through epicormic resprouts but is still in poor condition. There are also some seedlings of *Acacia saligna* (2), *Acacia longifolia* (3), *M. teretifolia* (2) and *Viminaria juncea* (3). Resprouting *E. rudis* and *M. teretifolia* are still surviving in Plot D with the native perennials *A. saligna* and *Baumea articulata* most prominent in the understorey with seedlings of *A. saligna* (2) and *A. longifolia* (2) recorded. A total of 12 new seedlings of *A. saligna* were recorded for Plot E and this species along with *Viminaria juncea* are the dominant natives. Annual exotics that are also very prominent include *Hypochaeris glabra* and *Vulpia myuros*. This transect remains in a highly disturbed condition with a firebreak ploughed through part of the transect affects 30% of Plots C, D, & E. There is also evidence of driving through this area and it may be useful, if possible, to relocate this transect to a less disturbed site on the lake.

Lake Nowergup (north)

On this transect, Plot A forms the transition from wetland to dry-land vegetation with a stand of *M. rhaphiophylla* and an understorey of Baumea articulata in the lower one third of the plot. In the upper two thirds of the plot *Ehrharta calycina* becomes dominant in the understorey and *Acacia saligna* occurs in the overstorey. Beyond the transect a belt of *Typha orientalis* extends out into the lake approximately 30 metres. The boundary between *B. articulata* and *T. orientalis*, which extends further out into the lake and in deeper water was 8 metres from the beginning of the plot. Average health of the overstorey has remained steady compared to 1997 (Figure 1e) with the range of health ratings were similar (Table 5). Understorey has not changed greatly since last year and continues to be dominated by the exotic perennial grasses *Ehrharta calycina* and *Cynodon dactylon* and the exotic annual herb *Pelargonium capitatum*.

Plot B contains some mature *M. rhaphiophylla* with the understorey dominated by *Ehrharta calycina* and *Pelargonium capitatum*. Health rating for overstorey species has reduced from 1997 levels with only a single large E. rudis not having a health score lower than 1997

In Plots C and D, overstorey consisted of Jacksonia sternbergiana with health of the overstorey has reduced slightly in 1998 (Figure 1e) with the death of 2 trees in Plot C and 5 trees in Plot D contributing to this. The understorey is dominated by *Ehrharta calycina* with *Pelargonium capitatum* and to lesser extent the native annual grass *Stipa compressa*. No regeneration from seedlings was seen for the overstorey species in any of the plots.

Lake Nowergup (south)

Plot A was a mixture of wetland and terrestrial species with *M. rhaphiophylla* with an understorey dominated by *Baumea articulata*, and *Typha orientalis*, *Jacksonia furcellata* and *J. sternbergiana* with an understorey of *Ehrharta calycina* and *Pelargonium capitatum* on the drier parts. Beyond Plot A, the fringing emergent macrophyte vegetation was 40 m wide with *B. articulata* dominating the shallower area with this species no longer present after 4.5 m and a pure stand of T. orientalis for a further 35 m. In 1998 the Typha /Baumea boundary was 4.5 metres indicating a further advance of *T. orientalis* of 3.5m and a reduction in the area of *B. articulata* of .12 m. Understorey was dominated by *T. orientalis* and *B. articulata* with *Cynodon dactylon* and *Ehrharta calycina* becoming dominant at the drier end as was the case last year. Health of the understorey has not changed since the 1997 survey (Figure 1f).

In Plots B, C and D, dry-land species dominated including *Jacksonia furcellata, J. sternbergiana, Banksia grandis* and *Eucalyptus gomphocephela* at the higher elevation in Plots C & D. Understorey in these plots continues to be dominated by the exotic species *Ehrharta calycina* and *Pelargonium capitatum* and the native perennial grass *Stipa compressa*. The only native perennial herbs or shrubs recorded in 1997 were the halophyte *Rhagodia buccata*, *Conostylis candicans* and *Acanthocarpus priessii*. Health rating have not varied greatly from 1997 for species, with the longer lived *M. rhaphiophylla*, and *E. gomphocephela* showing reasonably good health while shorter lived *Banksia grandis* (1 dead), *Jacksonia furcellata* (2 dead) and *J. sternbergiana* (2 dead) have shown some mortality. There was also no seedlings or young saplings of any of the overstorey species seen in any of the plots.

Lake Jandabup

The location of the transect on this lake was the least disturbed of any of the lakes surveyed with high species richness for all plots and low weediness index. Not included in the transect is a wide area of sedgeland including *Baumea articulata, B. juncea, Leptocarpus scarious* and *Lepyrodia muirii,* stretching some 150 metres toward the centre of the lake . Plot A is only sparsely covered with trees of *Melaleuca preissiana* (4 trees/4002m) with a dense understorey dominated by *Beaufortia elegans* and other shrubs such as *Hypoclayma angustifolium, Adenanthos cygnorum* and Astartea fascicularis and the perennial herb Hypolena excelsa. There is some invasion of weeds such as *Ehrharta calycina* and *Gladiolus caryophyllaceus* near a track and also in other areas of disturbance near rabbit diggings. Results in 1998 have not changed greatly from 1997 results in terms of health of overstorey or cover or composition of understorey. There was 4 seedlings of *Astartea fasiculata* recorded in the 1998 survey.

The other plots also have not changed greatly in the structure or composition of the understorey and are very similar to each other. The cover of understorey species was dense with dominant species including *Beaufortia*

elegans, Hypocalyma angustifolium, Loxocarya flexuosa and *Xanthorrhoea priessii.* There was some invasion of weeds (particularly *Ehrharta calycina* and *Gladiolus caryophyllaceus*) in these plots particularly Plot D which was close to the reserve boundary and a road. There was also some regeneration from seedlings with 2 *Banksia attenuata* in plot B, 3 *B. attenuata* and 1 *Banksia menziesii* in Plot C. Health of the trees was generally good with little variation from the previous year's survey results in Plots B & C. Average health of trees in Plot D has declined from 1997 levels (Figure 1g). This is due mainly to the death of 4 *B. menziesii* trees and also 1 *Melaleuca preissiana*, this represents 36% of the trees in the plot and may be considered greater than normal rates of senescence.

SUMMARY TABLES

Table 1: Lake Joondalup (south) - Summary of transect data including total species richness and diameter, health and density of overstorey species.

	Species[1]	Plot A				Plot B				Plot C				Plot D			
		1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995
Plot size (m)		20 x 10				10 x10				10x10				10x10			
Elevation (m)		16.8-17.4				17.4-18.3				19.5-20.6				20.7-21.2			
Species richness		15	9	11		14	13	15		9	9	14		20	17	18	
No. of exotics		6	3	3		7	5	8		3	3	6		7	7	11	
Weediness index		1.42	0.73	0.3		1.09	1.2	1.04		1.3	9.6	1.09		1.3	2.8	3.74	
Regen. index		0	0	0		0	0	0		0	0	0		17.5	22.8	0.7	
Dia. range[2]	M. r.	11.3 - 77.8				2.3 - 22.2					4.5-24						
	A. s.									3.2-20.9						13.1	
	B. p.													1.6-9.8			
	B. a													11-18.1			
Health Mean[3]		15.1	14.6	14.0	15.6	10.6	13.7	12.3	13.1	11.2	15.5	12.4	11.9	18.5	19	13.7	15
Health Range		8-19	8-21	7 - 21	13-19	3-16	4-17	4-18	7-19	5-19	12-21	10-17	5-19	17-19	19-21	11-18	15-18
Density[4]	M. r.	33	25	35		19(1)	20	14 (2)		4	4	4					
	A. s.					2(2)	3	5(2)		16(10)	16(12)	20(8)				1(1)	
	B.p.									1	1	1		2(1)	1	55(53)	
	B.a.													2(2)	3	3(2)	

[1] Overstorey species - M.r. = *Melaleuca rhaphiophylla*; A. s. = *Acacia saligna*; B.p = *Banksia prionotes*; B.a. = *Banksia attenuata*.

[2] Dia. range is the stem diameter (cm) at breast height (1.3 m).

[3] Mean health rating for all overstorey species.

[4] Number in bracket is No. of dead trees.

Table 2: Lake Joondalup (north) - Summary of transect data including total species richness and diameter, health and density of overstorey species.

	Species[1]	Plot A				Plot B				Plot C				Plot D			
		1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995
Plot size (m)		10 x 10				10 x10				10x10				10x10			
Elevation (m)		16.7-18.5				18.6-19.5				19.9-21.4				21.5-23.5			
Species richness		11	4	5		11	10	11		15	10	17		15	12	18	
No. of exotics		5	0	0		4	4	4		5	4	7		4	5	8	
Weediness index		1.15	0	0		1.2	.47	0.74		1.15	2.3	0.99		0.88	1.2	0.16	
Regen. index		0	0	0		0	0	0		0.17	1	0			1	0.22	
Dia. range[2]	M. r.	10 - 74.9				20.1-37.5											
	A. s.													15.3			
	B. p.									8-18.2				8.3-25.2			
	E. g													38.2			
	E. c													4.5			
	B. a													19			
Health Mean[3]		15.1	16.8	14.0	15.3	17	17	17	10	14.3	17.2	14	14	13.7	16.7	14.2	11.7
Health Range		11-17	13-21	8-19	8-19	17	15-19	17	2-18	13-17	14-19	7-20	7-20	5-19	15-20	8-19	7-19
Density[4]	M. r.	9	9	9		2	2	2									
	A. s.														1(1)		
	E. g													1	1		
	E. c													1	1		
	B.p.									6	6	6		1	4(1)		
	B.a.													1	1		

[1]Overstorey species - M.r. = *Melaleuca rhaphiophylla*; A. s. = *Acacia saligna*; B.a. = *Banksia attenuata*; B.p = *Banksia prionotes*; E.c. = *Eucalyptus calophylla*; E.g. = *Eucalyptus gomphocephala.*

Table 3: Lake Joondalup (east) - Summary of transect data including total species richness and diameter, health and density of overstorey species.

	Species[1]	Plot A				Plot B				Plot C				Plot D			
		1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995
Plot size (m)		10 x 10				10 x10				10x10				10x10			
Elevation (m)		17.1-18.7				17.2-18.6				17.5-17.9				17.7-19.2			
Species richness		12	10	11		11	10	12		7	7	7		8	5	12	
No. of exotics		3	3	5		5	5	6		1	1	2		1	1	2	
Weediness index		0.7	0.32	1.26		1.4	2.5	0.42		0.47	0.14	0.1		0.21	0.11	0.03	
Regen. index		0	0	0		0	0	0.08		0	0	0.08		0.58	0.36	0.35	
Dia. range[2]	M. r.	13.6-54.6				4.3-38.8				18.9-32.6				10.6-28.5			
	E.r.					1.3				70.1				3.5-49.8			
	A. s.													3.9-9.6			
	B. l.	4.3-15.7								5.4-6.4				1.1-63.8			
	J.s.	5-10.2				4-12											
Health Mean[3]		13.8	12.8	13.6		11.75	13.5	11.8		12.1	12	14.2		13	14.2	13.4	
Health Range		9-17	5-16	12-18		9-19	8-19	17-16		3-19	4-17	7-16		3-17	4-19	7-21	
Density[4]	M. r.	4	4	3		3	3	5		11	11	7		6	5	2	
	A. s.													1	1	2	
	E. r					1(1)	1	1		3	2	3		4	2	5	
	B.l.	3	3	4				1		1	1	2		10	3	4	
	J.f.	1	1	6(5)		5	5	5									

[1] Overstorey species - M.r. = *Melaleuca rhaphiophylla*; A. s. = *Acacia saligna*; B.l = *Banksia littoralis*; ; E.r. = *Eucalyptus rudis*; J.s. = *Jacksonia furcellata.*

[2] Dia. range is the stem diameter (cm) at breast height (1.3 m).

Table 4: Lake Mariginiup - Summary of transect data including total species richness and diameter, health and density of overstorey species.

	Species[1]	Plot A				Plot B				Plot C				Plot D			
		1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995
Plot size (m)		10 x 10				10 x10				10x10				10x10			
Elevation		16.5-16.7				16.9-17.4				17.5-17.8				17.9-17.6			
Species richness		13	14	18		15	13	14		12	11	18		14	14	18	
No. of exotics		7	9	4		8	6	5		7	6	6		8	7	8	
Weediness index		2.38	4.4	0.09		2.7	1.6	0.13		3.6	2.5	0.12		2.7	1.7	0.16	
Regen. index		0	0	0.71		0.07	0.2	0.54		4	2.6	1.4		1.25	5.75	0.5	
Dia. range[2]	E. r.	0.4-8.2				0.5-2.9				1.0-4.3				2.9-17			
	M.t.									4.3				2.9-3.2			
Health Mean[3]		19	21	-		18.8	17	16.8	12.7	4		-	10.2	6.2	6	-	5.7
Health Range		15-21	21	5		17-21	13-19	12-19	6-15	3-5		-	6-15	5-8	6	3	3-9
Density[4]	E. r.	5	3	17(11)		13(2)	12	25(13)				2(2)		1		1	
	M.t.									2	2	2		2	1	2	

	Species[1]	Plot E			
		1998	1997	1996	1995
Plot size (m)		10 x 10			
Elevation					
Species richness		16	21	18	
No. of exotics		10	12	4	
Weediness index		2.6	1.6	0.09	
Regen. index		2.3	19.7	0.71	
Dia. range[2]	E. r.				
	M.t.				
Health Mean[3]		8.3	5.5	-	
Health Range		5-11	3-8	5	
Density[4]	E. r.	3(1)	2	17(11)	
	M.t.		1		

[1]Overstorey species – E.r. = *Eucalyptus rudis*, M.t. = *Melaleuca tertefolia*
[2]Dia. range is the stem diameter (cm) at breast height (1.3 m).
[3] Mean health rating for all overstorey species.
[4]Number in bracket is No. of dead trees.

Table 5: Lake Nowergup (north) - Summary of transect data including total species richness and diameter, health and density of overstorey species.

	Species[1]	Plot A				Plot B				Plot C				Plot D			
		1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995
Plot size (m)		10 x 10				10 x10				10x10				10x10			
Elevation (m)		17.5-18.5				18.9-19.4				19.4-20.9				20.9-21.9			
Species richness		9	7	14		8	6	13		5	6	8			7	10	
No. of exotics		4	3	5		3	3	4		2	3	4			3	4	
Weediness index		2.4	1.15	0.29		1.6	6	0.33		1.5	10.16	0.51			1.3	0.36	
Regen. index		0	0	0		0	0	0		0	0	0			0	0	
Dia. range[2]	M. r.	15.4-38.2				30-36											
	E.r.	65.5				76.6											
	A. s.	9.2-13.9				2.1-10.3											
	J.s.					2.2-12.8				3.2-12.1				6.2-12.5			
Health Mean[3]		13.8	14.6	16.1		12.6	15.4	14.6		11.1	12	11.9		8.6	12.3	11.9	
Health Range		11-19	11-19	11-19		8-19	12-19	10-21		3-18	3-18	9-16		3-11	5-19	5-16	
Density[4]	M. r.	6	6	7		2	2	2									
	A. s.			4(4)				6(4)									
	E. r	1	1	1		1	1	1									
	J.s.					1	1	4		11(2)	13	14(2)		14(4)	20	12	

[1] Overstorey species - M.r. = *Melaleuca rhaphiophylla*; A. s. = *Acacia saligna*; E.r. = *Eucalyptus rudis*; J.s. = *Jacksonia sternbergiana.*

[2] Dia. range is the stem diameter (cm) at breast height (1.3 m).

[3] Mean health rating for all overstorey species.

[4] Number in bracket is No. of dead trees.

Table 6: Lake Nowergup (south)- Summary of transect data including total species richness and diameter, health and density of overstorey species.

	Species[1]	Plot A				Plot B				Plot C				Plot D			
		1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995
Plot size (m)		20 x 10				20 x10				20x10				20x10			
Elevation (m)		16.4-18.2				18.75-21.42				21.5-23.2				23.5-25.7			
Species richness			9	12		12	10	10		10	8	11		10	9	11	
No. of exotics			6	5		5	5	3		5	5	5		4	4	6	
Weediness index			6.94	0.51		1.7	2.9	0.35		3.6	7.8	0.7		1.7	3.8	1.89	
Regen. index			0	0		0	0	0		0	0	0		0	0	0	
Dia. range[2]	M. r.	70															
	E.r.					85.8											
	A. s.					21.5-22.7											
	B.g.									9.9-42							
	E.g.													39-90.8			
	J.f.	3.5-9.5				4.9-10.9											
	J.s.	3.5-10.9				5.6-11.2											
Health Mean[3]		19	19	10	6.1	10.4	13.3	13.6		16	18.7	18	16	17.2	16.4	15.2	12
Health Range		19	19	8-16	2-15	7-21	6-21	10-17		13-19	16-21	13-21	14-19	14-19	12-21	13-19	8-19
Density[4]	M. r.	1	1	1	4												
	A. s.							2(2)									
	E. r					1	1	1									
	B.g.									1(1)	2	5	4				
	E.g.									1	1			5	5	4	3
	J.f.	4	4	4	4	4(2)	8	5	2								
	J.s.	1	1	6(5)	9	5(2)	8	7	5								

[1]Overstorey species -M.r. = *Melaleuca rhaphiophylla*; A. s. = *Acacia saligna*; E.g. = *Eucalyptus gomphocephala*; E.r. = *Eucalyptus rudis*; J.s. = *Jacksonia sternbergiana*; J.f. = *Jacksonia furcellata*.

Table 7: Lake Jandabup - Summary of transect data including total species richness and diameter, health and density of overstorey species.

	Species[1]	Plot A				Plot B				Plot C				Plot D			
		1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995	1998	1997	1996	1995
Plot size (m)		20 x 10				10 x10				10x10				10x10			
Elevation (m)		16.5-16.8				17.1-18.1				18.6-18.5				17.3-17.9			
Species richness		18	18	18		23	22	29		27	25	26		25	24	34	
No. of exotics		5	5	4		3	2	3		4	4	2		5	4	7	
Weediness index		0.05	0.07	0.04		0.007	0.004	0.006		0.006	0.05	0.003		0.06	0.07	0.04	
Regen. index		0	0	0		0.2	0.3	0.17		0.2	0	0.05		0	0	0	
Dia. range[2]	M. p.	9.9-55.2				12.9-26.5				15.8-31.7				7.5-9.7			
	E.r.													52.2			
	A. f.					46.7											
	M.r.																
	B.i.													1.8-11.7			
	B. a.					9				11.2-22							
	B.m.									0.4-42				6.4-24.7			
Health Mean[3]		17	15.7	15.5	12.8	17.2	15.6	17.4	18.6	15.4	15.6	16.8	16.1	9.3	13	15.4	16.2
Health Range		15-19	13-19	13-17	7-19	14-19	14-17	15-19	17-20	13-19	14-17	14-21	6-19	8-21	7-19	10-20	12-19
Density[4]	M. p.	4	3	4		3	3	3		5	5	5		4(1)	6	4	
	A. f.			1		1	1	1									
	E. r													1	1	1	
	M.r																
	B.i.													2	2	2	
	B.a.			1		1	1	1		7	7	7					
	B.m.									5	5	5		2(5)	7	6	

[1]Overstorey species - M.r. = *Melaleuca rhaphiophylla*; M.p. = *Melaleuca priessiana*; A. s. = *Allocasuarina fraseriana*; B.l = *Banksia menziesii*; B.a. = *Banksia attenuata*; B.i. = *Banksia ilicifolia*; E.r. = *Eucalyptus rudis*.

[2]Dia. range is the stem diameter (cm) at breast height (1.3 m).

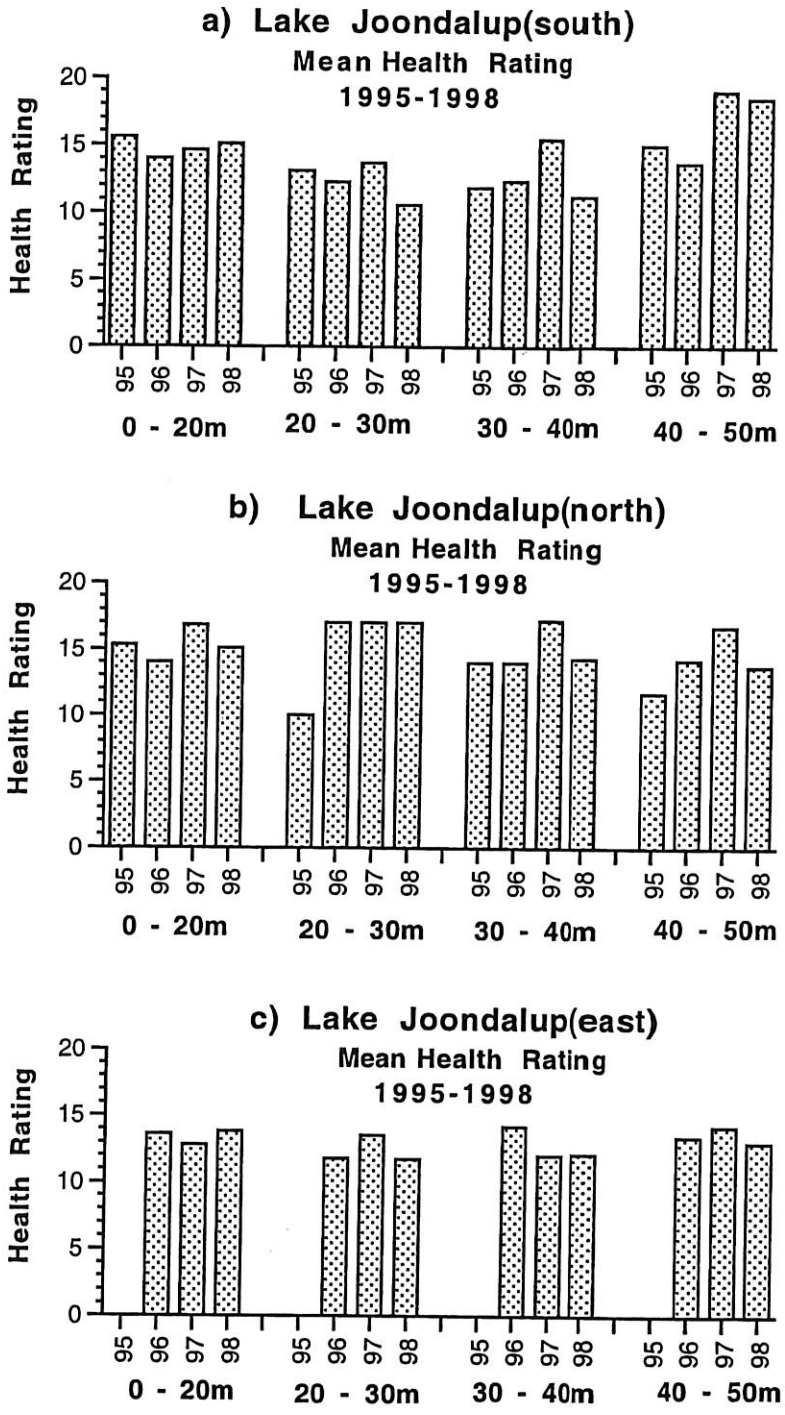

Figure 1: Changes in mean health rating for overstorey species along the transects for Gnanagara wetlands from 1995 to 1998.

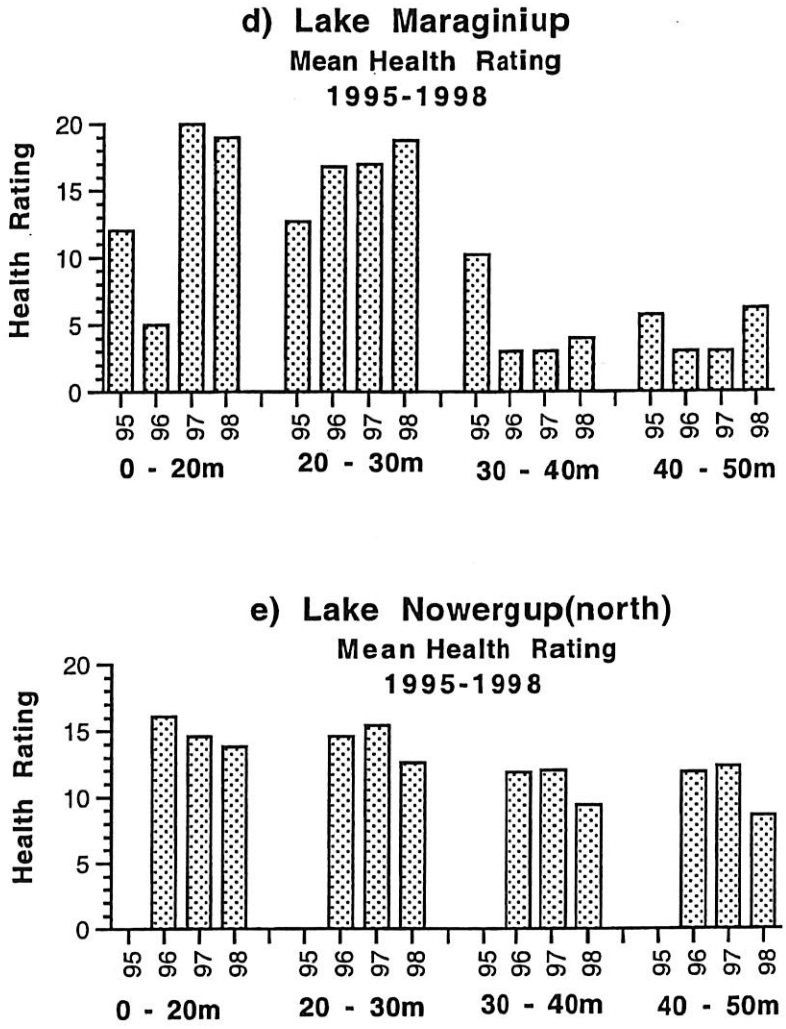

Figure 1: Changes in mean health rating for overstorey species along the transects for Gnanagara wetlands from 1995 to 1998.

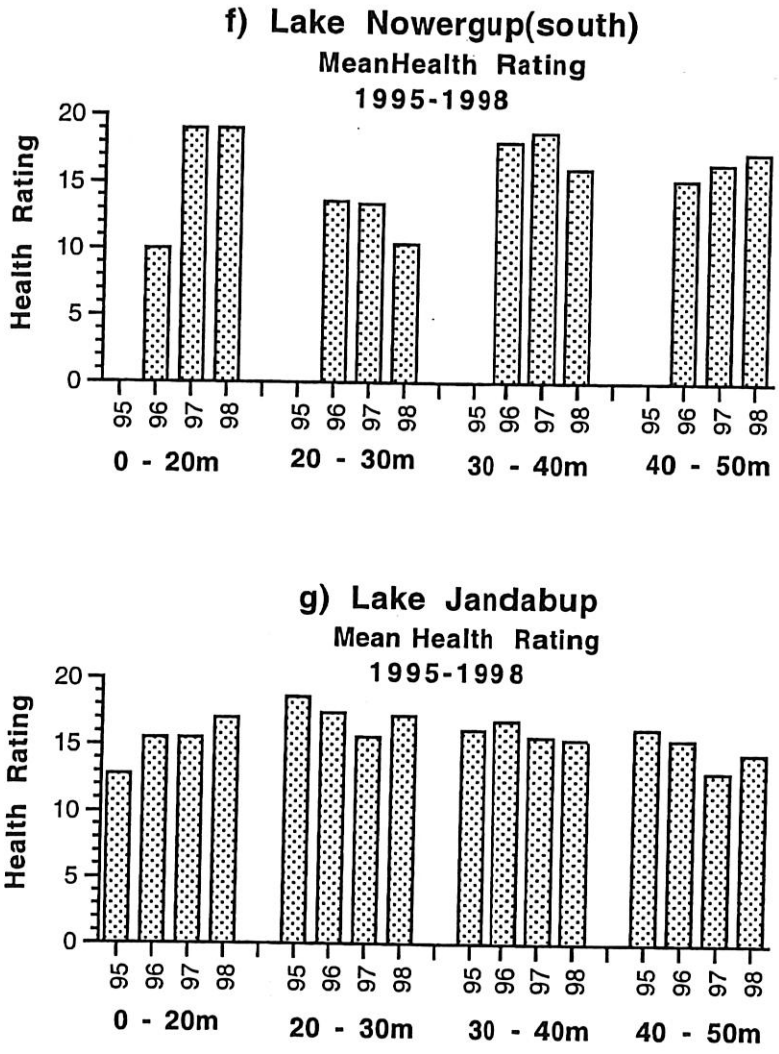

Figure 1: Changes in mean health rating for overstorey species along the transects for Gnanagara wetlands from 1995 to 1998.

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APPENDIX 1 Raw Data

Raw data for overstorey and understorey species found in plots along each transect. Including species (exotic species marked with an asterisk), distance along transect (L) and across plot (W) for each tree measured, total health rating (crown + branches + epicormic growth); species and and anestimate of cover/ abundance using the Domin scale.

Lake Joondalup (south) (East: 385322 North: 6484983)

Species	Distance (m) L, W.	DBH (cm)	Health 1997	Health 1996	Health 1998	Species	Cover (Domin) 1998
PLOT A						**PLOT A**	
Melaleuca rhaphiophylla	0.6,1	35	17	19	19	*Melaleuca rhaphiophylla*	9
	1.5, 1.5	21.5	16	12	15	*Baumea articulata*	1
	0.5, 2.5	24	16	15	16	*Villarsia capitata*	1
	2, 2	17.1	17	10	18	*Centella cordifolia*	7
	3.8, 2	28.5	8	9	10	*Sonchus oleraceus**	5
	5, 2	28	12	13	18	*Phyla nodiflora**	3
	1, 9.4	11.3	10	15	18	*Agrostis avenacea*	4
	0.5, 10	16.3	18	14	17	*Lobelia alata*	1
	2, 10	15	9	14	17	*Myoporum capraroides*	2
	6,10	35.1	17	16	18	*Chenopodiumglaucum*	1
	6, 6	30.4	17	21	18	*Conyza albida**	2
	6, 6	25.2	19	15	18	*Aster subulatus**	2
	7, 8	26	15	17	18	*Spyridium gloulosum*	1
	8, 8	16.3	19	7	8	*Pelargonium capitatum**	1
	8, 9	15.9	17	13	15	*Lactuca serriola**	1
	8, 10	57.8	17	17	17		
	9, 10	59.5	15	13	15		
	11, 9.5	44.8	15	15	12		
	12, 9	22.5	8	8	7		
	12.5, 9	35.5	17	17	19		
	14, 9	27.8	19	14	15		
	14, 8	29.9	8	5	13		
	14, 5	18.9	17	11	14		
	10, 4	54.5	19	19	15		
	7.5, 4	27.6	17	15	15		
	8.5, 1	29.6	16	17	16		
	15.5, 0.5	32.1	19	21	19		
	13.5, 2.5	40.8	11	8	13		
	13.5, 4	30.5	16	14	15		
	16, 10	67.5	19	21	18		
	18, 10	16.5	12	8	7		
	17, 5	77.8	17	17	17		
	17, 7	46.2	19	19	19		
	17, 7	38.4	15	18	13		
	15, 2	41.2	11	7	9		

PLOT B						PLOT B	
Melaleuca rhaphiophylla	24, 4	17.4	15	17	11	*Melaleuca rhaphiophylla*	7
	24, 4	17.9	10	15	11	*Acacia saligna*	2
	24, 6	21	8	17	13	*Centella cordifolia*	7
	24, 7	14.3	17	15	14	*Agrostis avenacea* *	5
		10.5				*Sonchus asper**	2
	24, 7.5	4.2	11	9	9	*Lobelia alata*	2
		3.9				*Ehrharta calycinus**	5
	22, 8	2.3		dead		*Spyridium gloulosum*	4
	23, 9	13.5	6	4	6	*Pelargonium capitatum**	1
	23.5, 9	11	16	16	16	*Hibbertia sp*	1
	23, 9.5	18.1	14	18	13	*Orobanche minor**	1
	25, 9.5	7.6	10	4	9	*Myoporum capraroides*	4
		4.8				*Ehrharta longiflora**	1
	27, 7	4	9	8	3	*Solanum laciniatum**	1
		4					
		3.5					
	26, 7	4.9	13	10	dead		
Acacia saligna	27, 6	15.2	14	13	7		
Melaleuca rhaphiophylla	27, 5	10.3	13	13	11		
	28, 4.5	22.2	13	17	15		
	28, 4	11.9	17	15	11		
	28, 4	3.1		dead			
	27, 3	11	13	15	10		
	6.5, 1	10	17	17	15		
	28, 2	4.4	14	13	12		
		5					
	28, 3	3.5	10	9	8		
Acacia saligna	28, 5	15.2	15	15	dead		
	28, 5.5	10.8	11	13	dead		
	29, 5.5	7.4		dead			
	29, 9	9.5		dead			

PLOT C						PLOT C	
Melaleuca rhaphiophylla	30, 0	24	18	18	19	*Melaleuca rhaphiophylla*	3
	30.5, 2	6.9	15	10	14	*Acacia saligna*	2
	31.5, 2	4.5	17	10	11	*Jacksonia furcellata*	2
Acacia saligna	32, 4	7	13	15	5	*Spyridium globulosum*	2
	32.5, 4	7.5	13	14	dead	*Dianella divaricata*	2
	33, 4	5.8	15	15	dead	*Ehrharta calycina**	9
	32.5, 6	7.5		dead		*Macrozamia riedlei*	1
	34, 6.5	15.2		dead		*Pelagonium capitatum**	2
	34, 7	8.3		dead		*Sonchus asper**	1
	31, 7.5	7.5		dead			
	31.5, 8.5	20.9	15	12	dead		
	32, 10	13.3	15	10	7		

	34, 10	13.2	17	13	14		
	35, 9	9.8		dead			
	34, 8.5	6.1		dead			
	36, 8	10.1	12	14	5		
	37, 6	12	13	10	dead		
	37, 5.5	5.5	10	10	9		
Melaleuca rhaphiophylla	35, 4.5	21	10	10	9		
		5.8					
Acacia saligna	36, 0	11.8	14	17	dead		
	39, 2	9		dead			
		6.5					
	39, 4	6.2	12	12	dead		
	39, 5	10	10	14	dead		
	40, 3	5.7		dead			
Banksia prionotes	40, 3.5	8.9		15	19		
Acacia saligna	38, 7	4.4		dead			
	38, 8	4.5		dead			
	39, 6	7.5		17	dead		
	40, 6	9		10	dead		
	38, 7	3.2		dead			
	38, 7.5	6.8		16	dead		
	39, 9.5	8.5		dead			
	38.5, 9.5	5.9		dead			
	38.5, 10	9		dead			
	37.5, 8.5	5.7		8	dead		
PLOT D						**PLOT D**	
Banksia prionotes	40.5, 1	8.5		dead		*Banksia prionotes*	2
	41.5, 1	3.0		dead		*Banksia attenuata*	4
	41.5, 1.5	4.2		dead		*Acacia saligna*	2
	42, 2	8.5		dead		*Jacksonia furcellata*	5
	41, 4	5.9		dead		*Ehrhata calycina**	9
	41.5, 4.5	7.5		dead		*Gladiolus caryophyllaceus**	1
	41.5, 10	6.0		dead		*Romulea rosea**	1
	42, 6	3.0		dead		*Pelagonium capitatum**	2
	42.5, 6	6.8		dead		*Dianella divaricata*	2
	42.5, 6	7.6		dead		*Macrozammia riedlii*	2
	42.5, 6.5	4.2		dead		*Stipa compressa*	1
	42.5, 5.5	4.8		dead		*Solanum laciniatum**	1
	42.5, 5	3.8		dead		*Gompholobium tomentosum*	2
	42.5, 5	3.2		dead		*Lepidosperma longitudinale*	1
Banksia attenuata	40, 6	14.1	21		dead	*Conyza bonariensis*	2
		15.4				*Thysanotus patersonii*	1
	48.5,4	28			19	*Haemodorum spicatum*	1
	47.5, 6	18.1	19	11	17	*Solanum nigrum**	1
	48, 4	11.0	17		dead	*Danthonia sp*	1

		6.4				*Viminea juncea*	1
Banksia prionotes	42, 8	4.3			dead		
	44.5, 8	9.2	19	12	19		
		6.1					
	44.5, 7	6.7		dead			
	48.5, 0.5	9.8		18	19		
	49.5, 0	3.4		dead			

Lake Joondalup (north) (E: 383512 N: 6489548)

Speices	**Distance (m) L, W.**	**DBH (cm)**	**Health 1997**	**Health 1996**	**Health 1998**	**Species**	**Cover (Domin) 1998**
PLOT A						**PLOT A**	
Melaleuca rhaphiophylla	0, 0	10	13	8	12	*Melaleuca rhaphiophylla*	5
	2.5, 1	13.8	17	16	15	*Baumea articulata*	7
	2.5, 1	10.5	16	17	15	*Baumea juncea*	5
		7.6				*Triglochin sp*	1
	2, 1.5	12.2	17	17	15	*Lepidosperma longitudinale*	2
	2.5, 2.5	16.4	17	17	15	*Haloragis brownii*	5
	1, 5	12.5	17	11	13	*Solanum nigrum**	1
	7, 3.5	74.9	21	19	17	*Cynodon dactylon**	1
	9.5, 8.5	38.1	19	17	17	*Sonchus asper**	1
	9.5, 8	22.7	21	19	17	*Lactuca erriola*	3
		16.8				*Chenopodiumglaucum*	2
		21.9					
		23.5					
PLOT B						**PLOT B**	
Melaleuca rhaphiophylla	19.5, 3	21.4	15	17	17	*Melaleuca rhaphiophylla*	6
		24.1				*Acacia cyclops*	2
	19, 4	37.5	15	17	17	*Baumea articulata*	2
		25.9				*Baumea juncea*	2
		22.6				*Lepidosperma longitudinale*	5
		20.1				*Bromus diandrus**	1
		30.2				*Ehrharta calycina**	8
						*Pelagonium capitatum**	5
						Acacia saligna	1
						Stipa compressa	3
PLOT C						**PLOT C**	
Banksia prionotes	38,0.5	18.9	17		15	*Banksia prionotes*	5
	38,4.2	19.1	19		13	*Jacksonia furcellata*	3
	39,0.5	11.8	17		15	*Ehrharta calycina**	9
		8.5				*Pelagomium capitatum**	1

		11				*Haemodorum sp*	
	39,2.5	8.7	17		13	*Arthropodium capillipes*	2
	44.6,0.5	6.9	14		13	*Ptilotus stirlingii*	1
		9.6				*Romulea rosea**	1
	38.5,10	14.4	19		17	*Conostylis candicans*	2
						Stipa compressa	3
						*Gladiolus caryophyllaceus**	1
						*Euphorbia peplus**	1
						Macrozamia riedlei	1
						Pimelea argentea	1
						Acacia saligna	1
PLOT D						**PLOT D**	
Eucalyptus calophylla	53,10	4.5	46.6	15	5	*Banksia prionotes*	4
Banksia attenuata	51,2	20	20	17	19	*Banksia attenuata*	5
Banksia prionotes	55, 5	21.3	15	19	17	*Eucalyptus calophylla*	2
						Arthropodium capillipes	5
						Jacksonia furcellata	5
						*Euphorbia peplus**	1
						*Ehrharta calycina**	9
						Microlena stipoides	1
						Macrozamia riedlei	2
						*Solanum linneanum**	2
						Acacia saligna	1
						Dianella divaricata	1
						Haemodorum sp	1
						*Romulea rosea**	1
						Corynotheca micrantha	1

Lake Joondalup (east) (E: 384641 N: 6488627)

Species	Distance (m) L, W.	DBH (cm)	Health 1997	Health 1996	Health 1998	Species	Cover (Domin)
PLOT A						**PLOT A**	
Melaleuca rhaphiophylla	8.1,1.8	54.6	16	17	18	*Melaleuca rhaphiophylla*	6
		22.1				*Banksia littoralis*	3
		29				*Jacksonia furcellata*	1
	8.1,4	10.4	14	18	15	*Ehrharta calycina**	9
		20.2				*Dianella divaricata*	3
		10.2				*Lepidosperma longitudinale*	5
		16.5				*Briza maxima**	3
		18.1				*Avena fatua**	1
		46.0				*Baumea articulata*	5
	11,7.6	19.2	13	15	17	*Baumea juncea**	5
	10.5,9	50.9	16	9	15	*Lobelia alata*	2
Banksia littoralis	6.4,7	13.3	15	17	14	*Acacia saligna*	2
	4.9,8.3	16.9	13	7	14		
	5,9	6	13	16	11		
Exocarpus sparteus	6, 4	18.5	5	12	dead		
Jacksonia furcellataa	7, 8	10.2	10	12	7		
		8		x5 dead			
PLOT B						**PLOT B**	
Jacksonia furcellata	27, 1.5	6	12	10	9	*Jacksonia furcellata*	3
		3.5				*Cynodon dactylon**	3
	27, 3	4.6	16	14	9	*Melaleuca rhaphiophylla*	3
	27, 6	10.1	19	16	13	*Eucalyptus rudis*	1
	26.5, 7	6.7	13	12	11	*Centella cordifolia*	5
	25, 9	7.3	13	10	9	*Lepidosperma longitudinale*	7
						*Ehrharta calycina**	7
Melaleuca rhaphiophylla	30,3	38.9	17	14	19	*Dianella divaricata*	2
	29.5,1.4	17.8	14	13	15	*Avena fatua**	1
	29.5,2	6.4,2.1	8	7	9	*Briza maxima**	3
		4.4,2.3				*Gladiolus caryophyllaceus**	1
						Baumea juncea	2
Eucalyptus rudis	28, 4	<2	5	7	dead		
PLOT C						**PLOT C**	
Melaleuca rhaphiophylla	32.8,2.6	34.9	11	16	14	*Melaleuca rhaphiophylla*	4
	36,0.5	29	9	14	15	*Banksia littoralis*	2
	37,3.8	24	13	16	11	*Eucalyptus rudis*	2
Banksia littoralis	30.7,8.8	12.5	17	16	19	*Lepidosperma longitudinale*	9
Eucalyptus rudis	37,10	49.5	17	13	17	*Cynodon dactylon**	6

		30.1				*Centella cordifolia*	4
	40, 10	0.7m ht		seedling	9	*Baumea juncea*	5
	38.8,7	51.3	13		5		
		22.2					
Melaleuca rhaphiophylla	39.8,8.8	8.4	12	10	12		
	36.2,2.8	18.9	10	16	12		
	37,3.8	24	13	16	12		
	37.2,7.5	18	13	16	12		
	35,10	6	5		6		
	30.1,0	5.4	4		3		
	30.1,5	37.6	17		17		
	34,8.2	20.3	13		17		
PLOT D						**PLOT D**	
Eucalyptus rudis	41.6,5.2	42.1	11	15	13	*Eucalyptus rudis*	3
Melaleuca rhaphiophylla	43.2,3.9	28.5	17	16	15	*Melaleuca rhaphiophylla*	5
	45.6,3.8	13,5.5	14	15	11	*Banksia littoralis*	5
	46.1,3.3	9.6	13	14	15	*Acacia saligna*	1
	46.7,1.6	17.9,18	19		15	*Centella cordifolia*	3
	48.2,0	33.7	17		17	*Lepidosperma longitudinale*	10
	40.2,0.1	21.9	11		11	*Baumea juncea*	3
Banksia littoralis	47, 2.5	1.1		15		*Cynodon dactylon**	7
	44.5,8.5	13	15	19	11		
	45, 6	1.4m ht		15(seed)			
Acacia saligna	45, 10	9.6		19	11		
Eucalyptus rudis	44, 9.5	3.5		13	11		
	48.9,1.3	5.7	4	9	5		
	50, 2	0.9m ht		13(seed)	3		
Banksia littoralis	45.6,4.3	<2	17	12	17		
	48.6,9	26	18	16	17		
	48, 8	2.2		14	13		
	48, 8.5	1.3m ht		15(seed)	15		
	48, 9	1.8m ht		15(seed)	15		
	48, 9	2.2m ht		11(seed)	13		
	47, 9	1.6m ht		15(seed)	15		
	49, 9.5	1.8m ht		15(seed)	13		

Lake Mariginiup (E: 387535 N: 6488881)

Species	Distance (m)	DBH (cm)	Health 1997	Health 1996	Health 1998	Species	Cover (Domin) 1998
PLOT A						**PLOT A**	

Eucalyptus rudis	3.2,10	1.5,1.6	21	resprout	21	*Eucalyptus rudis*	5
	3.2,10	1	21	resprout	15	*Baumea articulata*	4
	4.8,2.4	<1	21	resprout	21	*Hypochaeris glabra**	6
	6, 5	0.5		dead		*Agrostis avensis*	4
	6, 6	0.5		dead		*Villarsia capitata*	1
	6, 6	0.5		dead		*Lobelia alata*	1
	6, 7	0.5		dead		*Lotus suaveolens**	4
	3, 7	0.5		dead		*Lepyrodia muirii*	1
	2, 9	0.4		dead		*Sonchus asper**	1
	1, 9	3.1		dead		*Conyza bonariensis**	1
	0.5, 9	1.5		dead		*Briza minor**	2
	7, 7	1.2		dead	19	*Vulpia myuros**	4
	8.5, 10	8.2		5	19	*Podolepsis lessonii*	6
PLOT B						**PLOT B**	
Eucalyptus rudis	14, 2	4.1	19	resprout	21	*Eucalyptus rudis*	3
	14, 2.5	0.5		resprout	21	*Baumea articulata*	3
	12.5, 6	1.5		resprout	dead	*Agrostis avensis*	6
	13, 6	0.4		dead		*Centella cordifolia*	2
	13, 5.5	0.5		dead		*Lotus suaveolens**	3
	15, 10	3.5	19	resprout	19	*Briza minor**	1
	15.5, 10	1.6	17	resprout	19	*Hypochaeris glabra**	6
	17, 5	0.5		dead		*Podolepsis lessonii*	5
	17, 5.5	0.5		dead		*Lobelia alata*	1
	14.1,10	4.1	19	resprout	19	*Acacia saligna*	1
	17.5, 9	6	19	resprout	19	*Viminaria juncea*	1
	18.9,10	<1	15	dead		*Conyza bonariensis*	1
	19.3, 10	<1	15	resprout	19	*Acacia longifolia**	1
	19.3 10	1.2	15	resprout	17	*Briza maxima**	4
	16.5, 10	3.8	17	12	17	*Pentaschistis airiodies**	3
	16, 9	<1	19	dead			
	16, 9	1.0		dead			
	16, 8	1.5		dead			
	15, 10	2.5	19	19	17		
	14.5, 10	1.8	13	17	17		
	14, 7	2.2		dead			
	13.5, 8	1.5		dead			
	13.5, 10	1.3		17	17		
	12, 10	1.8		19	15		
	12, 9	1.1		dead			
	15, 7	0.8		resprout	dead		
PLOT C						**PLOT C**	
Eucalyptus rudis	22, 9	2.0		dead		*Eucalyptus rudis*	1
	22.5, 9	1.0		dead		*Melaleuca teretefolia*	2

Melaleuca teretefolia	21, 2	4.3(x14)		resprout	5	*Agrostis avensis*	6
	29, 9	3.7(x10)		resprout	3	*Hypochaeris glabra**	4
						*Briza minor**	5
						Baumea articulata	2
						Podolepsis lessonii	2
						Viminaria juncea	4
						*Lotus suaveolens**	2
						*Vulpia myuros**	5
						*Acacia lonifolia**	3
						Conyza bonariensis	1
PLOT D						**PLOT D**	
Eucalyptus rudis	36, 5	17	6	3	10	*Eucalyptus rudis*	1
Melaleuca teretifolia	38, 8	3.2(x20)		resprout	5	*Melaleuca teretifolia*	1
	39, 10	2.9(x2.9)		resprout	5	*Agrostis avensis*	3
						Lotus suaveolens	2
						*Hypochaeris glabra**	2
						*Sonchus olearus**	1
						Baumea articulata	5
						*Avena fatua**	1
						*Pelargonium capitatum**	2
						Viminaria juncea	4
						Acacia saligna	5
						Podolepsis lessonii	2
						*Acacia longifolia**	5
PLOT E						**PLOT E**	
Eucalyptus rudis	49.5, 1.5	2.8	dead	resprout	9	*Eucalyptus rudis*	5
	49.5, 1	1.8	dead	resprout	dead	*Viminaria juncea*	3
	47.5, 1	7.3	dead	dead		*Agrostis avensis*	3
	50, 5	29.4	3	3	5	*Lotus suaveolens**	1
	46, 7	25.5	8	3	11	*Baumea articulata*	4
		22.5				*Acacia saligna*	6
Melaleuca teretifolia	48, 8	4	8	resprout	dead	*Briza minor**	1
						*Ehrhata calycinus**	1
						*Hypochaeris glabra**	5
						*Vulpia myuros**	3
						*Sonchus asper**	1
						*Bromus diandrus**	2
						*Solanum nigrum**	1
						*Pelagonium capitatum**	1
						Dianella divaricata	1
						Baumea juncea	1

Lake Nowergup (North) (E: 379485 N: 6498954)

Species	Distance (m) L, W	DBH (cm)	Health 1997	Health 1996	Health 1998	Species	Cover (Domin) 1998
PLOT A						**PLOT A**	
Melaleuca rhaphiophylla	-2,9.8	25.7	11	15	11	*Melaleuca rhaphiophylla*	3
	-2, 9	28.5	14	17	11	*Eucalyptus rudis*	4
	-2, 10	20.8	14	17	11	*Lepidosperma longitudinale*	2
	-1.5,12.5	26.9	14	11	11	*Ehrhata calycinus**	9
		25.4				*Cynodon dactylon**	5
	2,5	31.6,35.1	16	17	17	*Pelagonium capitatum*	6
	4,4	41.4	16	19	17	*Baumea articulata*	2
Eucalyptus rudis	8,12	65.5	17	21	21	*Bromus diandrus*	3
		37.9				*Rhagodia baccata*	3
PLOT B						**PLOT B**	
Eucalyptus rudis	13.8,3.2	39.7,28.5	19	21	19	*Melaleuca rhaphiophylla*	3
						Eucalyptus rudis	3
Melaleuca rhaphiophylla	14.9,5.3	30.8	14	16	8	*Jacksonia sternbergiana*	3
	13.8,9	10.5,2.6			11	*Ehrhata calycina**	9
		3.1,6.5				*Pelagonium capitatum**	4
		9.6,3.5				*Stipa compressa*	2
		5				*Rhagodia baccata*	3
						*Bromus diandrus**	1
Jacksonia sternbergiana	19.5,9.5	4.2	17	19	13		
Gyrostemon ramulosus	17.6,9.5	11.7	15	16	11		
PLOT C						**PLOT C**	
Jacksonia sternbergiana	21.5, 10	14.5	15	13	15	*Jacksonia sternbergiana*	8
	26,8	9.7	18	15	18	*Ehrhata calycina*	9
	25, 6.4	6.7	9	12	dead	*Stipa compressa*	3
	24.5,6	5.9	14	16	12	*Pelagonium capitatum*	2
	24.5,5.1	6.8	15	14	13	*Conostylis candicans*	2
	24, 7.5	7.3		dead			
		9.1					
	24.5,1.8	7.7,6	13	14	13		
	26,1	7.5	9	14	7		
	27.2,2	4.3	15	12	16		
	27.6,2.1	<2	9	12	9		
	26.2,4.5	4.4	5	12	3		
	29,0.5	6.3,5.8	3		dead		

	28,5.5	10.8,6.5	14	9	5		
		6.5					
	29.8,2.8	3.4,3.4	17	12	11		
PLOT D						**PLOT D**	
Jacksonia sternbergiana	32.3,0	8.7	12	5	dead	*Jacksonia sternbergiana*	7
	33.5,1.5	3.5,2.6	11	11	9	*Gyrostemon ramulosus*	2
						*Ehrharta calycina**	9
	34.4,0.7	13.2	11	11	9	*Conostylis candicans*	2
		7.2				*Pelagonium capitatum**	3
	32.3,4.6	8.9	19	16	11	*Thysanotus patersonii*	1
	33,6.5	7.4	15	16	10	*Acanthocarpus priessii*	3
	32,8.3	<2	9	10	dead	*Stipa compressa*	3
	33.5,7.6	12.5	17	12	7	*Briza maxima**	2
						Dianella divaricata	1
	34,7.6	3.1	11	13	dead	*Rhagodia buccata*	2
	34.8,8.9	7	12	13	dead		
	34.5,7.8	7.2	13	11	3		
	35,7.6	10	13	11	5		
	35.6,7.2	9	9		7		
	36.4,7.5	12.3	14		11		
	38.5,9	11.8	14		11		
	37.6,8.5	<2	8		7		
	39,7.4	9.6	18		8		
	39,6	9.2	11		11		
	39.8,3.8	9.9,7.9	9		11		
	38,3	9.2	5		dead		
Gyrostemon ramulosus	34.5,3.3	23.5,3.3	15	14	9		

Lake Nowergup (south) (E: 379781 N: 6498827)

Species	Distance (m) L, W	DBH (cm)	Health 1997	Health 1996	Health 1998	Species	Cover (Domin) 1998
PLOT A						**PLOT A**	
Melaleuca rhaphiophylla	18, -1	18.3	19	16	19	*Melaleuca rhaphiophylla*	3
		28.3				*Typha orientalis**	6
		24.6				*Baumea articulata*	5
						*Pelagonium capitatum**	3
						*Ehrhata calycinus**	3
						*Carpobrotus edulis**	3
						Lepidosperma longitudinale	1
						*Bromus diandrus**	2
						Rhagodia buccata	3
						*Cynodon dactylon**	5

PLOT B						**PLOT B**	
Eucalyptus rudis	20, 10	85.8	21	16	21	*Eucalyptus rudis*	2
Jacksonia furcellata	24, 8.5	10	19	16	dead	*Jacksonia furcellata*	4
	25.5,8.4	9.3	13	16	7	*Jacksonia sternbergiana*	4
	26,7.5	4.9	dead	12	dead	*Ehrhata calycinus*	9
	34.5,7.3	5.9,3.1	15	14	9	*Rhagodia buccata*	2
	30.8,2	11.9	13	15	14	*Pelagonium capitatum*	5
	24.4,2	12.5	13		14	*Stipa compressa*	4
Jacksonia sternbergiana	27.8,7	10.3	9	11	9	*Dianella divaricata*	1
	29.3,7	8.6	13	13	7	*Macrozamia riedlei*	1
	30,8	11.6	17	16	7	*Lupinus sp*	2
	30.7,9	8.9,10.5	4	10	9	*Bromus diandrus*	3
	28.7,6	12.9	19	17	9	*Lepidosperma longitudinale*	1
	26.5,5.2	11.5,7.3	6	10	dead		
	28,4.5	6.8,6.3	17	11	dead		
PLOT C						**PLOT C**	
Banksia grandis	48.2,2.5	36.8	21	21	19	*Banksia grandis*	3
	63.5,9.8	23.5	16	16	dead	*Eucalyptus gomphocephala*	2
Eucalyptus gomphocephala	59.8,5	23.5	16		13	*Acacia saligna*	1
						Jacksonia furcellata	1
						Stipa compressa	6
						*Ehrhata calycinus**	10
						*Lupinus sp**	6
						*Pelagonium capitatum**	6
						Macrozamia riedlei	1
						*Bromus diandrus**	3
						*Rumex crispus**	1
PLOT D						**PLOT D**	
Eucalyptus gomphocephala	46,1.8	80.2	13	15	17	*Eucalyptus gomphocephala*	4
	52.6,-1	65.1	12	13	14	*Stipa compressa*	4
	50,4.6	90.8	16	14	17	*Ehrharta calycina**	9
	58.1,9.6	18.6,11.2	20	19	19	*Lupinus sp**	4
		8.1				*Bromus diandrus**	2
	60.8,5	13.3	21		19	*Arthropodium capilles*	2
						*Pelagonium capitatum**	4
						Acanthocarpus preissii	3
						Macrozamia reidlei	3
						Rhagodia baccata	1

Lake Jandabup (E: 391077 N: 64486570)

Species	Distance (m) L, W.	DBH (cm)	Health 1997	Health 1996	Health 1998	Species	Cover (Domin) 1998
PLOT A						**PLOT A**	
Melaleuca priessiana	0, 0	29.5	19	16	19	*Melaleuca priessiana*	2
	2, 7	10.2	15	16	17	*Beaufortia elegans*	6
		9.9				*Adenanthos cygornum*	4
		10.5				*Ehrharta calycina**	1
	2.25, 7	9	13	13	15	*Hypocalyma angustifolium*	6
		9.7				*Briza maxima**	1
		15.7				*Acacia pulchella*	1
		10.5				*Astartea fasiculata*	5
		12.1				*Hypolaena exsulca*	3
	20, 0	55.2	17	17	17	*Alexgeorgia nitens*	2
						Cassytha sp	6
						*Pentaschistis airoides**	1
						Lepidosperma sp	2
						Hibbertia subvaginata	2
						*Gladiolus caryophyllaceus**	1
						Dianella revoluta	1
						Jacksonia furcellata	1
						Lyginia barbata	3
						*Carpobrotus edulis**	1
PLOT B						**PLOT B**	
Melaleuca preissiana	0.8,1.7	12.3,13.4	17	19	19	*Melaleuca preissiana*	4
	1.5,6.4	13.6	17	17	19	*Allocasuarina fraseriana*	2
						Banksia attenuata	2
Allocasuarina fraseriana	1.7,8.8	27,20.6	15	19	14	*Beaufortia elegans*	3
						Hypocalymma angusifolium	6
Banksia attenuata	6.2,9.5	9.5	15	17	17	*Astartea fasicularis*	3
Melaleuca priessiana	8.4,9	14.5,11.8	14	15	17	*Stylidium repens*	1
						Lechenaultia floribunda	1
						Acacia pulchella	1
						Dampiera linearis	2
						Hypolaena exsulca	2
						Lepidosperma sp	1
						Euchilopsis linearis	6
						Adenanthos cygonum	5
						Hibbertia subvaginata	2
						Loxocarya flexuosa	2
						Dianella divaricata	2
						*Briza maxima**	1

						Microtis alba	1
						Gompholobium tomentoseum	1
						*Gladiolus caryophyllaceus**	1
						Ehrharta calycina	1
						Lyginia barbata	1
PLOT C						**PLOT C**	
Melaleuca priessiana	10.3,0.3	18.9	17	15	15	*Melaleuca priessiana*	4
	14,6.3	13.6,13	17	16	14	*Banksia attenuata*	3
		9				*Banksia menziesii*	3
						Adenanthos cygornum	2
	13.2,10	9.5,6.4	12	15	13	*Hypocalymma angustifolium*	4
		8.5				*Hibbertia subvaginata*	4
						Stylidium repens	1
	12,9	7.5	13	17	9	*Dampeira linearis*	4
		8.3				*Lomandra priessii*	1
	12,10	10.2	15	19	13	*Hypolena exculsa*	1
		5.7				*Loxocarya flexuosa*	7
Banksia attenuata	13.9,1.5	23.2	17	21	17	*Leucopogon* sp	2
	16,0.3	18.5	15	19	17	*Briza maxima**	2
	18,4.6	12.9,10.6	15	15	14	*Lechenaultia floribunda*	1
						Dianella divaricata	1
	16.4,9.9	5.9	18	19	17	*Gompholobium tomentoseum*	2
		5.7				*Acacia pulchella*	1
	11,9.5	20.6	17	16	16	*Gladiolus caryophyllaceus**	1
	19,9.5	18.1	17	16	18	*Ehrharta calycina*	3
	19.4,6.5	20.6,21	21	14	19	*Lomandra sp*	1
Banksia menziesii	19.1,3	25.2,16.6	19	17	19	*Astartea fasiculata*	2
						Jacksonia furcellata	2
	15.3,10	10	19	17	15	*Xanthorrhoea priessii*	1
	11,7.6	9.7	19	17	13	*Corynotheca micrantha*	1
	17,6.1	2.4	15	19	19	*Lomandra haemaphrodita*	1
	17.6,9.9	13.2	19	14	15	*Pinus pinaster**	1
						Acacia huegelii	1
PLOT D						**PLOT D**	
Banksia menziesii	22.4,1.4	6.4	13	18	15	*Banksia menziesii*	2
	23.6,0	11.5	17	17	dead	*Banksia attenuata*	4
		11.6				*Banksia ilicifolia*	2
	30,6.4	18.2	17	18	dead	*Melaleuca preissiana*	3
	24.4,1.8	15,11.2	17	13	dead	*Patersonia occidentalis*	1
	25.3,9	12	14	11	13	*Eucalyptus rudis*	1
		12.7				*Xanthorrhoea preissii*	6

	24.4,3.1	15.6,11.6	17		dead	*Loxocarya flexuosa*	6
Banksia ilicifolia	24,7	2.4		seedling	21	*Dianella divaricataa*	2
	29.8,9.7	11.6	19	19	19	*Jacksonia furcellata*	3
Melaleuca preissiana	28.5,7	5.5,8.2	11	17	17	*Ehrharta calycina**	6
	27.4,2.7	7.5	9	11	11	*Calytrix fraserii*	1
	29.8,7.2	10.8	12	18	dead	*Damperia linearis*	2
	27.4,1.7	6.6	7	14	13	*Gompholobium tomentoseum*	2
	27.7,1.7	5.1	11		13	*Gladiolus caryophyllaceus**	1
						Leucopogon sp	1
Eucalyptus rudis	23,9.5	52.2	9	10	8	*Lepidosperma tenue*	1
						Hibbertia subvaginata	2
						*Briza maxima**	3
						Lechenaultia floribunda	1
						*Ursinea anthemoideis**	2
						Corynotheca micrantha	1
						Lomandra preissii	2
						Stylidium repens	1
						Alexgeorgeia nitens	1

Lake Goolellal (E:

Species	Distance (m) L, W.	DBH (cm)	Elevation m AHD	Health 1997	Health 1998	Species	Cover (Domin) 1998
PLOT A						**PLOT A**	
Melaleuca priessiana	2.5,1	11	26.69	13	15	*Melaleuca priessiana*	4
	2.6,1.6	10.6	26.71	11	15	*Eucalyptus rudis*	2
	2.2,2.5	26.6	26.78	19	19	*Cynodon dactylon*	9
	2.1,2.3	22.4	26.8	17	19	*Centella cordifolia*	5
	2.5,3.4	6	26.73	11	13	*Baumea articulata*	4
	1,1.6	31.6,18.9, 10.1	26.72	17	17	*Typha orientalis*	1
						Phyla nodiflora	3
	0.5,2.2	19.6	26.63	15	17	*Lepidosperma longitudinale*	4
	1.3,2.9	11.5,23.1, 12.5,27.7, 22.5,22.8	26.76	14	19	*Aster subulatus**	1
	1.3,3.9	8.2	26.74	11	13		
	0.8,3.9	6.3	26.72	13	10		
	2.1,5.2	33.8	26.81	19	19		
	1.8,5.6	17.6	26.72	18	18		
	2.1,6.8	4.5,3.3, 7.3	26.7	15	14		
	3.6,6.9	4.2	26.76	13	14		
	3,7.6	44.9	26.67	17	17		

	6,8.5	3.5	26.71	7	4		
	8,2.5	20.2,11.2, 17.4,30, 23.7,12.4,	26.78	16	15		
Eucalyptus rudis	9.6,5.3	26.5	26.81	11	9		
PLOT B						**PLOT B**	
Melaleuca preissiana	12.7,4.8	4.2	26.86	13	9	*Melaleuca preissiana*	7
	13,5.4	5.9	26.86	13	11	*Eucalyptus rudis*	3
	11,7.4	17.7	26.75	19	16	*Paspalum distichum**	10
	14.5,5.5	5.9,8.3	26.78	17	18	*Phyla nodiflora**	3
	13.3,2	14.4	26.82	15	15	*Centella cordifolia*	5
	14.4,0	21	26.86	15	19	*Isolepsis prolifera**	2
	16.4,5	15.8	26.78	14	15	*Acacia saligna*	1
	16.6,4.9	26.7	26.76	17	17	*Cyperus sp**	1
Eucalyptus rudis	13.4,7	14,7.5	26.73	6	9	*Juncus pallidus*	2
	14.9,6.2	26.7	26.78	12	10		
	13.5,5.1	27.1	26.84	7	5		
	18,0.8	20.7,25.9, 8.7	26.78	8	3		
PLOT C						**PLOT C**	
Melaleuca priessiana	23.6,10	21.3,6, 15.6,11.1, 20,7.4, 28.4	26.85	18	19	*Melaleuca priessiana*	4
						Centella cordifolia	6
						Acacia saligna	1
						*Rumex crispus**	3
	23.9,8.6	12.5,10.5, 13.3,21.5, 18.6	26.91	16	19	*Phyla nodiflora**	4
						*Paspalum distichum**	8
						Juncus pallidus	1
	26.4,6.4	18.0,24.5, 13.0	26.91	15	17	*Agrostis avenacea*	4
						*Cyperus sp**	5
	25.4,8.2	7.6,8.0, 4.5	26.9	16	17	*Isolepsis prolifera**	1
						*Conyza bonariensis**	1
	27.4,8	6.5,15.9,1 9.5	26.9	16	15	*Lactuca serriola**	2
						*Solanum nigrum**	1
	28,7.8	4.5	26.9	9	14		
	28.2,7.8	5.1,6.2	26.93	10	9		
	28.6,7.6	14	26.93	17	17		
	28.6,3.8	27.8	26.93	16	19		
	28,4	10.7	26.93	15	15		
	30,4	10.4,8.5	26.94	11	7		
	29.5,2.7	20.4,24	26.94	18	18		
Eucalyptus rudis	29.5,2.9	18.7,17.4,	26.94	14	6		

		10.3,14.7, 26.3					
PLOT D						**PLOT D**	
Melaleuca rhaphiophylla	30,5.5	4.2	26.9	7	13	*Melaleuca rhaphiophylla*	4
	30,6.5	12.5,11.8, 5.8	26.94	14	10	*Eucalyptus rudis*	2
						*Cyperus sp**	5
	33.3,8.5	18.2	26.89	15	17	*Centella cordifolia*	7
	33.8,9.2	11.1,6	26.93	11	13	*Paspalum distichum **	8
	34.5,9	14.5	26.95	15	17	*Juncus pallidus*	2
	36.7,8.3	15,8.5	26.99	9	13	*Rumex cripus**	1
	36.7,6.4	14	26.96	15	15	*Phyla nodiflora**	2
	35,4.4	15.7,10.1	26.99	16	17	*Anagallis arvensis**	1
	36,4.2	3.5	27.01	5	3	*Agrostis avenacea*	2
	35.5,3.7	3.2,3.9, 3.6	27.01	5	5	*Sonchus oleraceus**	1
						*Solanum nigrum**	3
	36.1,2.5	14.5,4.8	27.01	13	17	*Lactuca serriola**	3
	36.6,2.5	3.4	26.99	4	3	*Pelargonium capitatum**	2
	36.6,2	15.2	26.99	17	17	*Aster subulatus**	1
	37.2,0.5	16.7,11.3, 6.5	27.04	12	13	*Hypochaeris glabra**	3
						*Lotus suaveolens**	2
	38.7,1.3	13.4,13.6, 5.1	27.00	17	17	*Briza maxima**	2
	37.9,4.5	14.7	27.02	19	17		
	38,4.9	8.4	26.99	13	13		
	37.9,5.7	8.5	26.99	10	9		
	40,6.5	8	26.96	8	10		
	40,5.6	6.7	26.98	12	14		
Eucalyptus rudis	30,8.8	15.4,15.3	26.9	8	7		
	36.7,8.5	6.8	26.99	7	11		
	38.7,6.6	12.2	26.88	9	9		

Yonderup Lake (E: 375469 N: 6507135)

Species	Distance (m) L, W.	DBH (cm)	Elevation m AHD	Health 1997	Health 1998	Species	Cover (Domin) 1998
PLOT A						**PLOT A**	
Melaleuca priessiana	1,4.9	29.6,38.5	7.67	13	17	*Melaleuca priessiana*	5
	2,7.5	15	7.42	15	11	*Carex divisa**	9
	1.5,10	15.6,18.1	7.34	15	13	*Rumex crispus**	1
	7.7,6	23,12.8	7.35	13	15	*Xanthorrhoea priessii*	4
	7.7,7.4	5.6	7.33	7.33	13	*Lotus suaveolens**	1
	8.4,5.8	36	7.36	36	15	*Sonchus olearus**	1

	9.5,7.8	19.5,24.3, 17	7.35	13	13	*Cirsium vulgare**	3
						*Typha oreintalis**	2
	9.7,2.4	33, 19.6, 44.6	7.56	11	11	*Cyperus sp**	2
						*Plantago major**	3
						*Epilobium ciliatum**	6
						*Briza minor**	1
						Lobelia alata	5
						Lepidosperma gladiatum	4
						Acacia saligna	1
						Centella cordifolia	4
						Baumea juncea	2
						*Paspalum distichum**	4
						Agrostis avenacea	1
						Epilobium billardierianum	2
						*Paspalum dilatatum**	1
						*Trifolium sp**	1
PLOT B						**PLOT B**	
Melaleuca rhaphiophylla	11.8,2	20.4	7.5	15	18	*Melaleuca rhaphiophylla*	7
	11,8	14	7.3	15	15	*Carex divisa**	8
	11,9	21.9	7.3	16	17	*Paspalum distichum**	7
	12,6.5	7.5	7.33	17	15	*Epilobium ciliatum**	6
	12,6.6	3.1	7.33	7	3	*Centella cordifolia*	4
	15.4,9.5	2.6	7.34	12	15	*Cirsium vulgare**	4
	14,5	12.1	7.4	14	16	*Acacia saligna*	2
	18.6,3.2	6.6,5.1	7.44	15	19	*Sonchus olearus**	1
	19,3.8	6.5	7.43	12	9	*Agrostis avenacea*	1
	19,4	4.5	7.43	12	9	*Xanthorrhoea priessii*	4
	18.2,5.8	13.8,14.2, 14.3,9.8	7.5	13	15	*Opercularia hispida*	3
						*Typha orientalis**	2
	20,10	55.5, 14.4 10.5	7.42	18	18	*Gahnia trifida*	2
						Lobelia alata	4
						*Briza minor**	1
						*Holcus lanatus**	1
						*Rumex crispus**	1
						Baumea juncea	1
						Epilobium billardierianum	4
						*Paspalum dilatatum**	3
PLOT C						**PLOT C**	
Melaleuca rhaphiophylla	20.9,3.5	22.2,14.9, 7.5	7.46	16	17	*Melaleuca rhaphiophylla*	5
						Banksia littoralis	2
	21.7,7	26.7,14	7.42	13	17	*Epilobium ciliatum**	6
	24.6,0	33.8	7.63	19	17	*Rumex crispus**	2
	25,5.8	9.2	7.49	16	19	*Agrostis avenacea*	4

	25,7.3	4.1,4.4	7.32	18	17	*Acacia saligna*	5
	25,8	5,4.9	7.32	18	17	*Opercularia hispida*	5
	27.7,3.5	4.2,3.4	7.47	14	11	*Gahnia trifida*	4
Banksia littoralis	29.2,10	30	7.39	17	19	*Xanthorrheoa priessii*	6
						*Plantago major**	2
						Lobelia alata	2
						*Paspalum distichum**	4
						*Pelagonium capitatum**	1
						*Paspalum dilatatum**	1
						*Aster subulatus**	2
						Spyridium globulosum	1
						*Sonchus olearus**	1
						Baumea juncea	3
						*Briza minor**	1
						*Anagalis arvensis**	1
						*Romulea rosea**	1

PLOT D						**PLOT D**	
Melaleuca rhaphiophylla	31.8,0.5	28.8	7.46	14	14	*Melaleuca rhaphiophylla*	4
	37.5,3.6	16.8	7.55	13		*Banksia littoralis*	2
	37.5,3.6	3.4	7.51	15		*Eucalyptus gomphocephala*	2
Banksia littoralis	31.8,6.5	18.9	7.48	12	19	*Banksia attenuata*	2
	33.1,2.5	29.4	7.5	18	19	*Spyridium globulosum*	7
	31.6,7.4	5.6	7.42	19		*Xanthorrhoea preissii*	5
	35.2,3.7	20.6	7.53	13	15	*Ficus carica**	1
	38.5,8.5	19.3	7.56	11	15	*Acacia saligna*	3
Eucalyptus gomphocephala	40,7	16.2	7.56	13	15	*Lepidosperma gladiatum*	6
	39,9.5	32.2	7.56	15	19	*Gahnia trifida*	4
Banksia littoralis	39,10	25.4	7.56	14	11	*Baumea juncea*	3
						Agrostis avenacea	2
						Lobelia alata	3
						Opercularia hispida	2
						Cassytha sp	2
						*Epilobium capitatum**	2
						*Paspalum distichum**	2
						*Sonchus olearus**	1
						*Pelargonium capitatum**	1

Wilgarup Lake (E: 375827 N: 6505628)

Species	Distance (m) L, W.	DBH (cm)	Elevation m AHD	Health 1997	Health 1998	Species	Cover (Domin)

							1998
PLOT A						**PLOT A**	
Melaleuca priessiana	1,2.1	3.3	6.1	3		*Melaleuca priessiana*	9
	1.1,2.1	11.9	6.1	15	15	*Baumea articulata*	6
	1,2.6	17.1	6.1	18	19	*Lepidosperma longitudinale*	3
	0.5,3.3	3.7	6.1	3	3	*Triglogin sp*	1
	1.2,3.3	11,12.2	6.1	14	17		
	1.2,3.6	5.3	6.1	7			
	1.8,2.5	4.1	6.03	3			
	2.4,1.5	8.4	6.03	12	17		
	2.2,1.6	4.6	6.03	7	9		
	2.3,1.7	5.5	6.03	14	13		
	2.9,1.6	10.5	6.14	16	17		
	2.5,1.5	9	6.14	15	17		
	2.2,1.5	7	6.14	13	14		
	2.3,1.4	4.9	6.14	11			
	2.2,3	12.5	6.14	17	17		
	3.2,3.2	13.5,9.8	6.14	15	15		
	3.2,3.3	2.4	6.14	3	9		
	3.4,3.4	12.3	6.14	16	17		
	3.3,3.4	3.4	6.14	5	3		
	3.2,3.4	14	6.14	19	17		
	2.4,3.2	5		15	15		
	2.3,3.2	4.2		9	9		
	2.3,5.2	8.4		16	17		
	3.3,5.2	2.8		3	dead		
	3.4,5.3	7.6		17	13		
	2.2,7	<2		6	3		
	2.5,7.8	9.9,20.1	5.98	5			
	0.8,8.5	2.8		8	3		
	0.9,8.7	2.4		10	5		
	1,9.5	<2		9	9		
	1.5,9.4	2.3		12	9		
	2.1,8	3.7		13	9		
	2.2,8.7	3.6		8	9		
	2.3,7.9	<2		3	3		
	2.4,7.9	4.4		15	15		
	2.7,7.4	3.5		12	9		
	2.7,7.8	8.3		17	17		
	2.8,8.1	4.6		14	9		
	2.8,8.3	<2		5	3		
	3.7,9	3.5		8	9		
	3.5,9	<2		3	dead		
	3.2,9.2	<2		5	dead		
	2.7,9.1	<2		4	dead		
	4,6.7	4.9		13	11		

	3.8,7.9	8.4,3.6		14	19		
	4.5,8.6	3.3		10	9		
	5,8.6	<2		3	dead		
	5.7,7.4	<2		3	dead		
	5.7,7.2	2.8		3	3		
	5.7,7.2	<2		3	3		
	5.5,7.1	4.5		13	3		
	5.4,7.1	4.9		10	3		
	5.2,5.7	5.7		11	9		
	5.2,4.7	2.6		3	dead		
	5.2,4.7	<2		3	dead		
	5.2,4.7	10.8		17	14		
	5.1,4.7	3.9		8	9		
	3.8,0.6	2.9		3	3		
	4.2,0.7	4		7	9		
	4.4,0.6	3		3	3		
	4.4,0.8	3.7		3	3		
	4.7,1.6	2.7		3	dead		
	5.1,1.6	8.6		15	19		
	5.1,2	5.1		12	17		
	5.5,1.9	3.3		10	7		
	5.5,1.8	9.6		17	19		
	6.6,0.7	2.1		3	dead		
	7,0.8	4.4		8	5		
	6.8,2.1	2.8		7	3		
	6.1,2.9	2.7		4	3		
	6.1,2.9	<2		3	3		
	5.2,3	2.7		3	dead		
	5.2,3.1	6.5,3.1		14	13		
	5.1,3.8	3.5		11	3		
	5.2,3.8	2.7		3	dead		
	5.2,3.9	3.5		7	3		
	5,3.9	<2		3	3		
	4.8,4	2.6		3	3		
	5.1,6.2	<2		3	dead		
	6.6,3.9	2.8		3	dead		
	9.9,3	19.9,4.0, 6.6		15	9		
	8.9,9.2	23.7,22.2	6.33	16	16		
PLOT B						**PLOT B**	
Melaleuca rhaphiophylla	10,0.6	28.9,25.5, 27.3,11.4, 33.4	6.23	18	17	*Melaleuca rhaphiophylla*	7
						Baumea articulata	8
						Lepidosperma longitudinale	6

	13.4,2	30.9	6.45	19	17	*Baumea vaginalis*	4
	13.8,1.9	31.0	6.45	17	17	*Sonchus oleraceus*	1
	15.5,1	24.5,22.5, 13.3	6.47	17	17		
	16.6,3.2	5.4	6.5	4	dead		
	18,4	13.0,14.8	6.58	12	5		
	13.7,4.1	20	6.35	15	16		
	13.6,4.1	27	6.35	17	17		
	15.7,6.6	9.4	6.5	13	7		
	15.7,7.3	6.2	6.55	3	3		
	15.7,7.4	7.8	6.55	9	12		
	18.9,8	17.9,18	6.57	15	17		
	19.8,9.8	10.5,11.9, 9.1	6.59	13	9		
	14.7,8.1	22,18.3	6.5	8	11		
	14.6,7.8	20	6.47	19			
	15,7.7	16,14.8, 15.2,8.1, 11.1	6.47	15	17		
	13,8.4	8	6.46	3	dead		
	10.1,8	4.5	6.27	5	3		
	11,7.9	21.7	6.28	13	11		
	11,7.5	5.5,3.9	6.31	9	5		
PLOT C						**PLOT C**	
Melaleuca rhaphiophylla	20.5,3.3	6.1	6.59	4	3	*Melaleuca rhaphiophylla*	8
	21.9,2.2	58.8	6.77	19	17	*Banksia littoralis*	3
	23.1,2.8	45	6.65	17	17	*Baumea articulata*	9
	24.5,2	36.2	6.72	17	13	*Lepidosperma longitudinale*	6
	26.7,4.8	20.7	6.8	11		*Baumea vaginalis*	3
	24.7,5	29.9	6.7	17	11	*Baumea juncea*	3
	27,7.8	27.6	6.83	3	5	*Centella cordifolia*	3
	28.2,8.9	35.9,19.5	6.77	11	11	*Xanthorrhoea priessii*	1
	26,9.9	23.2	6.77	9	9	*Spyridium globosum*	2
	25,9.9	35.2	6.83	9	9	*Patersonia occidentalis*	1
	21.6,9.1	<2	6.63	3	dead	*Lobelia alata*	1
	20.9,6.8	7.8	6.61	11	dead		
	20,0.5	57	6.62	16	17		
Banksia littoralis	24.3,0.5	11.1	6.73	17	13		
	29.2,9.6	9.5	6.8	9	15		
	28,7	10			9		
PLOT D						**PLOT D**	
Melaleuca rhaphiophylla	32.3,1	16.0,9.4, 13	6.86	10	11	*Melaleuca rhaphiophylla*	2
						Eucalyptus gomphocephala	5

Eucalyptus gomphocephala	34.7,1.5	38.8	7.17	19	19	*Spyridium globosum*	2
	35.2,2	43.0	7.17	14	15	*Xanthorrhoea priessii*	5
	37.3,2	14.6,13.2	7.02	11	11	*Lepidosperma longitudinale*	4
	39.1,1.5	5.2	6.99	11	11	*Cassytha sp*	5
	38.7,0.8	<2	6.99	11	11	*Opercularia hispida*	4
	37.3,5.8	34.5	7.03	16	17	*Lepidosperma gladiatum*	3
	38.6,7.4	18.7	7.01	14	11	*Pelagonium capitatum**	2
	33.4,7.4	14	6.96	13	19	*Arthropodium capillipes*	1
	32.4,9.5	5	6.85	11	15	*Daucus glochidiatus*	1

Lexia 94 (E: 402747 N: 6486079)

Species	Distance (m) L, W.	DBH (cm)	Health 1997	Health 1998	Species	Cover (Domin) 1998
					PLOT A	
PLOT A						
Melaleuca preissiana	0.6, 1.7	<2	13	19	*Pericalymma ellipticum*	8
	0.2, 2	<2	17	17	*Calothamnus lateralis*	3
	1, 5.6	<2	15	17	*Schoenus sp*	8
	7.6, 7	7.2	13	14	*Astartea fascicularis*	2
	6.8 ,10	6	17	17	*Melaleuca viminea*	1
	7.3, 10	6.5, 4.0	17	17		
					PLOT B	
PLOT B						
Melaleuca preissiana	11.4, 0.4	6.8, 6.8	10	14	*Astartea fascicularis*	3
	11.4, 1	4.9, 4.9	9	12	*Pericalymma ellipticum*	8
	18.3, 1.5	7.5, 16.6, 4.8	15	11	*Schoenus sp*	7
	18.2, 0.9	8.4	11	11	*Calothamnus lateralis*	4
	17.2, 0.1	7.0	15	13	*Melaleuca viminea*	3
	17, 1	<2	10	9	*Melaleuca uncinata*	1
	17, 1.1	<2	9	8	*Hypocalymma angustifolium*	1
	16.3, 1.5	8.8	8	10		
	15.9, 0.5	9.9	9	11		
	15.9, 1	19.2	9	11		
	17, 2.3	8.2	9	11		
	16.8, 2.3	8.5	7	11		
	12.2, 1.5	7.4, 8	13	15		
	14.7, 7.5	<2	15	18		
	10.5, 7.5	5.1	14	18		
	16.9, 9.5	5.3, 3.7,	11	13		

		4.1				
	17, 4.8	<2	13	14		
	17.5, 4.8	<2	13	14		
	19.5, 8	<2	14	16		
PLOT C					**PLOT C**	
Melaleuca preissiana	21.6, 6.1	9	12	15	*Astartea fascicularis*	3
					Schoenus sp	8
					Pericalymma ellipticum	5
					Hibbertia sp	1
					Hypocalymma angustifolium	1
					Beaufortia elegans	1
					Calothmnus lateralis	4
					Melaleuca viminia	1
PLOT D					**PLOT D**	
Melaleuca preissiana	31, 1	58, 45.9, 12.9, 13.2	17	17	*Patersonia occidentalis*	1
					*Ursinea anthemoides**	1
					Hibbertia subvaginalis	1
	31.4, 4	70.8	19	17	*Astartea fascicularis*	4
	31, 8.5	56.6	17	15	*Schoenus sp*	7
	35.2, 9	42.9	19	15	*Hypocalymma robustum*	3
	35.2, 8.5	33.5	15	10	*Hypolaena exsulca*	1
	39.5, 9	33.9, 53.9, 40.4	17	12	*Euchilopsis linearis*	1
	36.5, 3.5	35.7, 37.8, 41.8	9	11		
	38.5, 2.5	34	19	19		
	39, 0.5	61.4	21	21		

Lexia 186 (E: 401858 N: 6487241)

Species	Distance (m) L, W.	DBH (cm)	Health 1997	Health 1998	Species	Cover (Domin) 1998
PLOT A					**PLOT A**	
Melaleuca preissiana	1.9, 6.7	10.9, 5.5, 8.0	19	15	*Astartea fascicularis*	5
					Hibbertia subvaginalis	1
	5, 1.7	3.4, 3.2, 4.1, 3.6	15	17	*Pericalymma ellipticum*	5
					Banksia ilicifolia	1
					Hypocalymma angustifolium	1
					Schoenus sp	2

PLOT B					**PLOT B**	
Melaleuca preissiana	12.1, 2	2.9, 3.7, 5.6	18	17	*Astartea fascicularis*	7
					Banksia ilicifolia	1
	16.4, 4	20.7, 30.5, 10.6	16	16	*Schoenus sp*	5
					Stylidium brunonianum	1
	19.2, 2.4	29.9, 31	20	191	*Pericalymma ellipticum*	4
	17.5, 6.4	23.1	18	15	*Hibbertia subvaginata*	1
	17.5, 6.5	16.5, 14.1	13	17	*Lepidosperma longitudinale*	4
	15.8, 7.8	24.7, 23.2	16	16	*Hypolaena exsulca*	1
	15.3, 7.8	4.5, 3.5	15	15	*Beaufortia elegans*	1
	16.3, 9.6	24, 11.1, 15.5	15	16	*Hypocalymma angustifolium*	2
					Lomandra sp	1
	13.4, 9.8	25.3, 15.1	16	16		
PLOT C					**PLOT C**	
Melaleuca preissiana	22.6, 1	10.3, 15.4	18	17	*Astartea fascicularis*	7
	27, 0.8	14.2, 6.6	13	15	*Lepidosperma longitudinale*	6
	27.6, 2.3	16.1	15	12	*Pericalymma ellipticum*	4
	27.1, 2.8	28.5, 26.5	15	14	*Xanthorrhoea preissii*	1
	24.6, 4.1	12.7	10	9	*Petrophile sp*	1
	25.8, 4.2	12.5, 15	17	12	*Hypocalymma angustifolium*	1
	26.5, 5.4	6.5	17	17	*Hypolaena exsulca*	1
	26.5, 6.4	6.0	12	8	*Schoenus sp*	2
	26.5, 7.1	13.5, 18.1	16	15	*Restio sp*	4
	27.9, 7.1	6.1	9	10	*Patersonia occidentalis*	1
	29, 7.3	12.9	11	12	*Macrozamia riedlei*	1
	29.5, 7.6	6.8	13	15	*Banksia ilicifolia*	1
	30, 8.0	18.1	12	13	*Gompholobium tomentoseum*	1
	29.2, 5.3	7.5	8	13	*Stylidium brunonianum*	1
	27.9, 7.6	<2	16	9		
PLOT D					**PLOT D**	
Melaleuca preissiana	31.5, 3.6	14, 10.5	13	13	*Pericalymma ellipticum*	5
	31.8, 4.9	2.5	17	13	*Hypocalymma angustifolium*	3
	34.4, 4.9	12.2, 16.1	11	11	*Xanthorrhoea preissii*	4
	34.4, 4.7	13	13	11	*Astartea fascicularis*	4
	38, 5.7	7.6	10	8	*Schoenus sp*	2
	32.4, 7.8	13.5, 8.6, 20, 22.1	15	13	*Lepidosperma longitudinale*	4
					Dasypogon bromeliifolius	1
	31, 8.9	10.1	10	11	*Hibbertia hypericoides*	1
	31, 8.4	12.5	13	11	*Stylidium brunonianum*	1
					Adenanthos obovatus	1

Lexia 86 (E: 401500 N: 6486286)

Species	Distance (m) L, W.	DBH (cm)	Health 1997	Health 1998	Species	Cover (Domin) 1998
PLOT A					**PLOT A**	
Baumea articulata	0-4 m				*Astartea fascicularis*	6
Astartea fascicularis	4-9.5 m				*Schoenus sp*	7
Schoenus sp	9.5-16 m				*Pericalymma ellipticum*	4
Pericalymma ellipticum	16-20 m				*Baumea articulata*	2
					Banksia littoralis	1
					Restio sp	1
					Hypocalymma angustifolium	1
PLOT B					**PLOT B**	
Melaleuca preissiana	29.8, 7.4	21.3	19	19	*Astartea fascicularis*	6
	28.5, 6.4	29.3, 26.9, 26	20	19	*Hypocalymma angustifolium*	4
					Leucopogon sp	1
	29.9, 9.9	2.8	14	15	*Agonis linearifolia*	3
	29.8, 9.9	17.5	18	17	*Verticordia sp*	1
	29, 9.8	4.8	18	11	*Pultenaea reticulata*	1
	28.8, 9.5	4.4	17	15	*Hibbertia subvaginata*	2
	28.3, 9	7.4	15	15	*Schoenus sp*	4
	28.3, 8.4	7.4, 5.3	14	13	*Pericalymma ellipticum*	6
	26.7, 7.6	4.5	13	11	*Cassytha racemosa*	3
	26.7, 4.1	21.1	17	13	*Euchilopsis linearis*	1
	26, 3.7	19	12	12	*Lomandra sp1*	1
	27.4, 2.9	3.5, 3.0	13	11		
	27.3, 2.9	4.5	13	15		
	27, 2.6	10.4	15	15		
	27.5, 2	7.5	3	3		
	27.5, 2.5	4.1	7	8		
	26.8, 0.5	15.2	11	15		
	25.5, 0.1	8, 11	15	11		
	24.5, 0.1	13	17	17		
PLOT C					**PLOT C**	
Melaleuca preissiana	39.2, 0.5	10.5	13	12	*Hypocalymma angustifolium*	5
	39.2, 1	19.5	14	14	*Astartea fascicularis*	7
	38.3, 2.5	11.5	14	14	*Calothamnus lateralis*	2
	39.1, 3.2	10	16	14	*Agonis linearifolia*	3
	38.2, 3.2	4.5	13	15	*Casytha racemosa*	4

	39.8, 3.9	5.7	17	16	*Leucopogon propinquus*	1
	39.3, 5.5	12.1	11	13	*Restio sp*	5
	39.8, 9.5	4.1	11	8	*Euchilopsis linearis*	1
	36.2, 8.6	4.3	8	9	*Pultenaea reticulata*	1
	36.2, 7.4	15	17	15		
	35.8, 5.9	12.2	10	9		
	35.6, 5.3	7.5	16	17		
	34.9, 4.4	3.1	7	8		
	34.5, 4.4	5.5	16	13		
	34.1, 4.4	4.8	7	11		
	34.1, 4.8	<2	17	11		
	35.9, 3.7	13.8	15	11		
	36, 3	3.4	13	13		
	35.2, 2.8	4.4	13	13		
	34.5, 3.6	9.7	13	15		
	34.5, 2.4	11.5	11	15		
	34.3, 2.6	<2	15	11		
	33.4, 3.1	6.8	3	3		
	33.6, 10	13.5	18	17		
	31.5, 9.5	<2	13	13		
PLOT D					**PLOT D**	
Melaleuca preissiana	50, 8.5	140.4	21	20	*Astartea fascicularis*	8
	49.5, 4.5	<2	13	11	*Restio sp*	6
	49, 5.1	6.2	11	13	*Pultenaea reticulata*	4
	45.2, 8	13.1	14	12	*Cassytha racemosa*	4
	41, 8.8	34.5	19	17	*Leucopogon propinquus*	3
	42.6, 9.6	<2	11	11	*Hypocalymma angustifolium*	2
	43.6, 6	3.7	12	13	*Agonis linearifolia*	1
	43.6, 3.5	5.8	10	11		

EPP 173 (E: 401813 N: 6491534)

Species	Distance (m) L, W.	DBH (cm)	Health 1997	Health 1998	Species	Cover (Domin) 1998
PLOT A					**PLOT A**	
Baumea articulata	0-3 m				*Baumea articulata*	4
Leptocarpus scariosus *s*	3-11 m	water level	at	11 m	*Leptocarpus scariosus*	7
Astartea fascicularis	11-20 m				*Astartea fascicularis*	7
					Casytha racemosa	4
					Lepidosperma longitudinale	4

PLOT D					**PLOT D**	
Melaleuca preissiana	40.5, 8	21.2, 29.6, 8.9, 7.1	16	15	*Astartea fascicularis*	4
					Drosera sp	1
	41.2, 2	29.5, 25.8	15	14	*Xanthorrhoea preissii*	4
	40.1, 1.7	3.8	15	9	*Patersonia occidentalis*	3
	48.3, 7	12.2	12	9	*Cassytha sp*	3
	47.8, 7.5	19.1	9	11	*Loxocarya flexuosa*	4
	48.7, 8.5	16	18	15	*Hibbertia sp*	1
	48, 9.8	9.3, 35.5, 12.9	13	19	*Stylidium brunonianum*	1
					Corymbia calophylla	4 seedlings
	47, 9.6	12.7	18	14	*Amphipogon sp*	2
	45.3, 8.5	3.8, 6.2	3	5	*Restio sp*	4
					Hypocalymma angustifolium	2
					Pericalymma ellipticum	1
					Lepidosperma longitudinale	3

Dampland 78 (E: 387535 N: 6488881)

Species	**Distance (m) L, W.**	**DBH (cm)**	**Health 1997**	**Health 1998**	**Species**	**Cover (Domin) 1998**
PLOT A					**PLOT A**	
Melalueca preissiana	2, 2.5	5,3, 4.8, 9.1	15	17	*Beaufortia elegans*	7
					Astartea fascicularis	1
	0, 0	10.3, 11, 13.8	17	17	*Kunzea ericifolia*	5
					Baumea articulata	1
	2.1, 4.3	2.4	17	19	*Pultenaea reticulata*	3
	2.1, 7	8.2, 5	18	19	*Comesperma virgatum*	3
	3.7, 8.6	17.8	13	17		
	5.8, 7.9	14.2	19	17		
	5.5, 10.5	3.7, 3.7	12	15		
	3.6, 10.5	20.5, 11.6	13	11		
PLOT B					**PLOT B**	
Melaleuca preissiana	19, 1	6	15	8	*Beaufortia elegans*	9
					Pultenaea reticulata	5
					Comesperma virgatum	3
					Adenanthos cygnorum	1
					Hibbertia sp	1
					Schoenus sp	1
					Kunzea ericifolia	1
					Banksia menziesii	1 seedling (70cm)

PLOT C					PLOT C	
Melaleuca preissiana	29.6, 0.8	29.9, 20.1	11	8	*Beaufortis elegans*	8
	29.9, 5	47.6	13	12	*Astartea fascicularis*	3
	29.9, 10	43.8	11	11	*Kunzea ericifolia*	4
	24.1, 10	26.5	15	15	*Pultenaea reticulata*	3
	24, 8	12.7	16	11	*Regelia inops*	1
	24, 7.5	12.5	18	11	*Dasypogon sp*	1
Banksia attenuata	22, 5	9.5	21	19	*Restionaceae sp*	1
					Stylidium repens	1
					Hibbertia subvaginalis	1

PLOT D					PLOT D	
Melaleuca preissiana	30.5, 8	27.2	10	13	*Beaufortia elegans*	8
Banksia ilicifolia	35, 3	17.7	19	17	*Pultenaea reticulata*	4
Banksia attenuata	36.5, 6.8	7.5, 3	19	17	*Dasypogon bromeliifolius*	4
					Patersonia occidentalis	1
					Hibbertia sp	1
					Restionaceae sp	1
					Kunzea ericifolia	3
					Astartea fascicularis	1
					Regelia inops	1
					Banksia ilicifolia	2 seedlings (98, 64cm)
					Banksia attenuata	2 seedlings (60, 59cm)