Vegetation of depth-gauged wetlands in nature reserves of south-west Western Australia

by

S.A. Halse[1], G.B. Pearson[1] and S. Patrick[2]

[1]Department of Conservation and Land Management
Wildlife Research Centre
PO Box 51
Wanneroo WA 6065

[2]Department of Conservation and Land Management
Western Australian Herbarium
PO Box 104
Como WA 6152

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Abstract

Brief descriptions are given of the wetland-associated vegetation around gauge sites in 106 depth-gauged wetlands in south-west Western Australia that are monitored by the Department of Conservation and Land Management. The common species at each site are listed, their distribution in relation to water levels is categorized and vegetation structure of the wetland is quantified. This information is intended to be used as a baseline for long-term monitoring.

One hundred and fifty plant species are recorded. Most species occur on the margins of wetlands, few grow where they are exposed to long periods of inundation. Salinity does not appear to affect the number of species recorded per wetland in undisturbed sites but species richness is reduced by the salinization that results from land clearing. Grazing also reduces species richness.

INTRODUCTION

Wetlands can be defined as '... areas of seasonally, intermittently or permanently waterlogged soils or inundated land whether natural or otherwise, fresh or saline, e.g. waterlogged soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and their tributaries'.[1]

Agricultural and urban development have caused loss or alteration of many wetlands in south-west Western Australia. Complete disappearance of wetlands has been common on the Swan Coastal Plain (Fig. 1) where drainage, land-fill and clearing of vegetation have affected approximately 70 per cent of the wetlands that occurred prior to European settlement (Riggert 1966; Arnold and Sanders 1981; Halse 1989). The planned increase in groundwater extraction to supply Perth with potable water has the potential to reduce water levels in many remaining wetlands so that vegetation in them will experience drought (Muir 1983; Ventriss 1989). Human activity has not always caused declines in water levels, however. Increased run-off from urban and agricultural land has sometimes increased water levels on the Swan Coastal Plain and wetland vegetation has died because of waterlogging (Halse 1989).

In contrast to the coastal plain, there probably has been little complete loss of wetlands in the Wheatbelt or on the South Coast (Fig. 1). Although extensive networks of drains have sometimes been installed on individual farming properties, it is more common for water levels to have risen (Watson 1978) than for wetlands to have been drained. Nevertheless, agricultural clearing has removed the band of fringing vegetation from many Wheatbelt and South Coast wetlands and has caused the majority of them, including those in nature reserves, to become saline (Schofield *et al.* 1988). High salinities kill many wetland plant species (Froend *et al.* 1987; Sanders 1991). The whole process of land-clearing leading to an increase in the amount of salt in the landscape, especially wetlands, is usually termed 'salinization' (Mulcahy 1978) and constitutes one of the most important ecological disturbances in south-west Western Australia (see Mulcahy 1978; Schofield *et al.* 1988).

The amount of salinized land in agricultural areas is still increasing (Schofield *et al.* 1988), which means that wetlands will continue to become saline and there will be concomitant changes in wetland vegetation. When conservation areas are being altered by external influences, it is important for management purposes to have a quantified record of change (Hopkins *et al.* 1987; Clark 1990). The primary purpose of this paper is to present baseline data on the vegetation of 106 wetlands in south-west Western Australia as the initial step in a long-term monitoring program to record changes in vegetation. Data on depth, salinity and pH of these wetlands have been collected since approximately

1 Definition used by Wetlands Advisory Committee, set up by Environment Protection Authority of Western Australia in 1975.

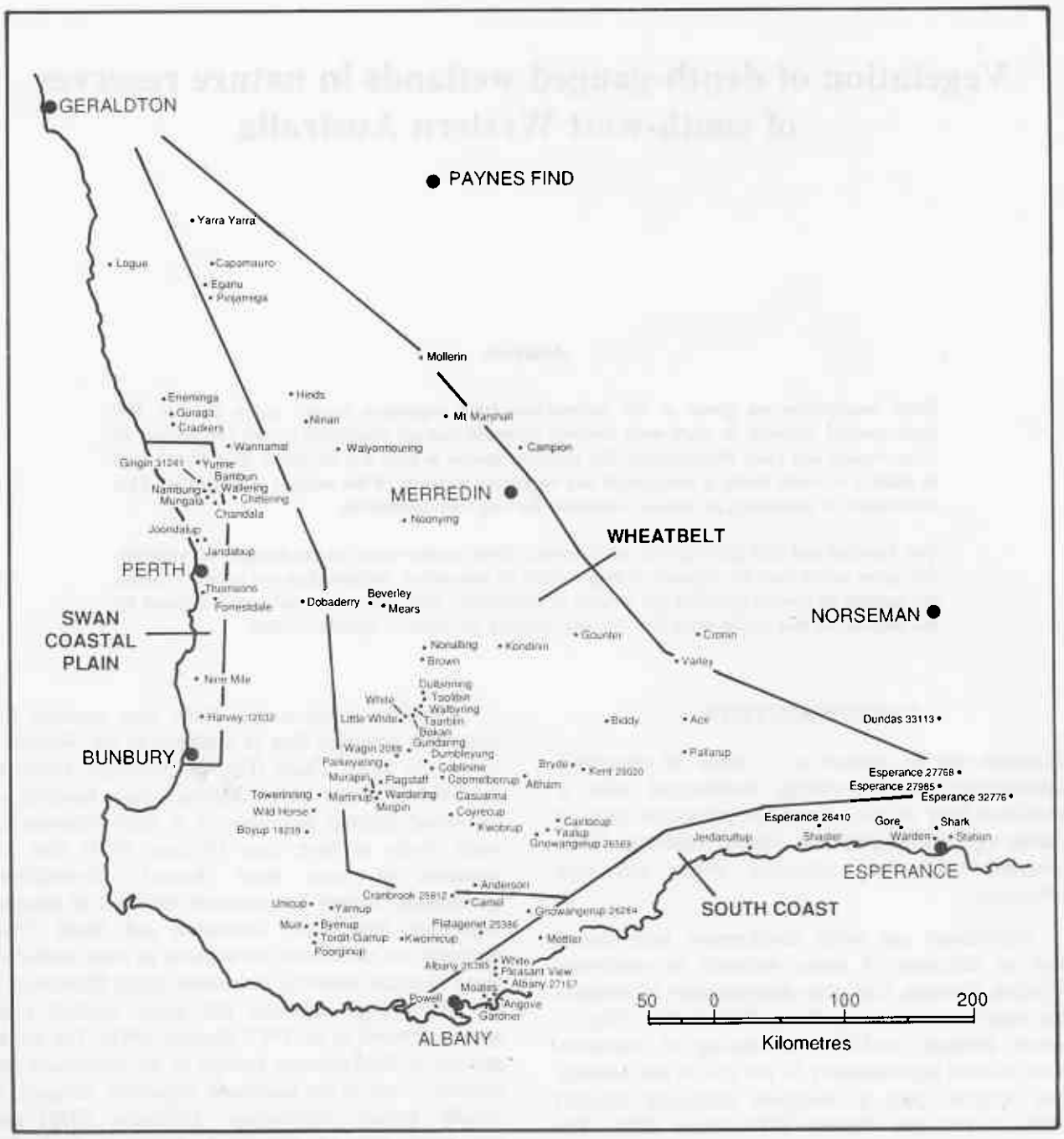

Figure 1

Wetlands surveyed in south-west Western Australia (after Lane and Munro 1983). Location of the Swan Coastal Plain, Wheatbelt and South Coast (as referred to in text) are indicated.

1980 as part of a continuing program by the Department of Conservation and Land Management (Lane and Munro 1983).

The paper also provides general information about wetland vegetation in south-west Western Australia and the effect of salinity on wetland plant species. These data supplement previous, more detailed investigations at individual wetlands to provide some idea of the types of wetland plant communities that occur in the south-west, and their distribution. Previous studies on the Swan Coastal Plain include McComb and McComb (1967), Congdon and McComb (1976), Atkins *et al.* (1977), Bell *et al.* (1978), Backshall and Bridgewater (1981), Crook and Evans (1981), Pen (1983), Speck and Baird (1984), Keighery and Alford (1990) and the comprehensive work of Arnold (1990). Generalized accounts of the different plant communities that occur on the coastal plain are given by Seddon (1976), Heddle *et al.* (1980) and Semeniuk *et al.* (1990); information about individual species is given by Marchant *et al.* (1987).

There have been fewer studies of the vegetation of inland wetlands and they are mostly unpublished (Mattiske 1978; Burgman 1985; Newbey 1985; Keating and Trudgen 1986; Watkins and McNee 1987; Froend *et al.* 1987; Lyons 1988; Froend and van der Moezel 1991). The only general accounts of the communities that occur are those of Beard (1972 and subsequent publications) and Smith (1972 and subsequent publications).

This paper describes only the emergent aquatic vegetation in wetlands and wetland-associated plants growing on the shore. The submerged aquatic flora of most of the wetlands has been described by Brock and Lane (1983).

METHODS

One hundred and six depth-gauged wetlands in the South West and Eucla Land Divisions were surveyed between December 1987 and February 1988. All but two occurred in nature reserves (Appendix 1). The depth-gauged wetlands were not representative of the types of wetland that occur in south-west Western Australia (see earlier definition): most were lakes; only one river and no estuary nor tidal flat was included. The location of each wetland is shown in Figure 1. The approximate position of the depth gauge in each wetland (sometimes there were several gauges to cover the full range of water depths) is shown in maps accompanying each wetland account[2] (Appendix 1).

Accounts for each wetland give geographical co-ordinates and information about vesting, period of inundation, salinity[3] and total areas of wetland, vegetation and open water. Areas were calculated from aerial photography. Names by which the wetlands are known within the Department of Conservation and Land Management have been used in the wetland accounts. These sometimes differ from the name of the reserve in which the wetland is situated and often differ from names used locally. Reserve name is given if a name exists.

Definitions of the wetland zones and categories of inundation and salinity used in the wetland accounts are given in Table 1. In the maps accompanying the wetland accounts (Appendix 1), open water is shown in black and vegetated areas are marked with a vegetation symbol.

Table 1

Zones used to describe the position of plants in a wetland and categories of salinity and inundation.

Parameter	Category/Zone	Description
Salinity	fresh	water <3 ppt TDS all year
	brackish	water <10 ppt TDS all year, <3 ppt after inflow
	saline	water <50 ppt TDS all year, <10 ppt after inflow
	hypersaline	water often 100 ppt, >25 ppt after inflow
Inundation	permanent	holds water throughout year in 80% of years
	semi-permanent	holds water throughout year in 61-80% of years
	seasonal	holds water throughout year in 21-60% of years, receives inflow most years
	ephemeral	holds water throughout year in ≤20% of years, frequently does not receive inflow
Zones	1 (sublittoral)	plant grows from below low watermark where it is constantly inundated (except for rare drying events) to highwater mark
	2 (littoral)	plant grows between low and high watermarks
	3 (littoral/ supralittoral)	plant grows around highwater mark
	4 (supralittoral)	plant grows above highwater mark

Vegetation surveys

The vegetation survey of each wetland consisted of three components.

(1) Vegetation description at the depth gauge site. The major plant species in the vicinity of the depth gauge(s) were collected from 105 wetlands by G.B. Pearson and S.A. Halse for subsequent identification by S. Patrick. The vegetation was described, starting from the centre of the lake and extending across highwater mark to the beginning of the surrounding 'dryland' vegetation. A species list, indicating wetland zones in which species occurred, is included with the description. Names of genera and species follow Green (1985, 1988); exotic species are marked with an asterisk.

(2) Structure of the vegetation. The highwater mark (maximum extent of flooding in years of average

2 Exact positions of depth gauges are given in Department of Conservation and Land Management files.

3 Calculated from wetland depth and salinity monitoring data supplied by J.A.K. Lane and D.R. Munro, Department of Conservation and Land Management.

rainfall) was located and the structure of vegetation *on the lake side of the highwater mark* was quantified using eight life-forms : grasses, herbs, samphires, sedges (and other sedge-like plants), shrubs, trees, dead shrubs and dead trees. Two additional categories - seedlings and saplings - were occasionally used to describe regenerating trees.

The average height of vegetation in each life-form was estimated (when the distribution of heights was obviously bimodal two classes were recognized, e.g. 5 m high trees and 10 m high trees) and the extent of coverage was determined using two measures - percentage area and percentage cover.

Percentage area was a measure of how widespread a life-form was within the vegetation of a wetland. It was calculated by assuming the wetland vegetation consisted of a solid band and then estimating the proportion of the band in which the life-form occurred (e.g. in a wetland with a narrow, sparse band of vegetation that contained trees throughout and sedges only near the highwater mark, the percentage area of trees would be 100 per cent whereas it might be only 30 per cent for sedges - Fig. 2a).

Percentage cover was a measure of projected canopy cover of a life-form within the area(s) in which it occurred (e.g. if sedges occurred in 20 per cent of the area of wetland vegetation but had a projected canopy cover of 100 per cent within their area of occurrence, then percentage cover was 100 per cent - Fig. 2c). Further examples of calculations of percentage area and percentage cover are given in Figure 2.

(3) Area of vegetation. Using 1:40 000 or 1:50 000 aerial photographs taken between 1969 and 1978[4], each wetland was mapped and the area of vegetation was calculated. Because highwater mark could not always be distinguished from aerial photographs, the outer limit of wetland-associated vegetation was taken as the boundary of the wetland when calculating wetland area and the wetland-associated vegetation above highwater was included in the calculation of vegetation area. Consequently, *data on vegetation areas cannot be reconciled with vegetation structure data*, which refer only to vegetation below the highwater mark.

4 1985 photography was used for Forrestdale, Jandabup, Joondalup and Thomsons Lakes because the vegetation boundaries were known to have changed in recent years.

Vegetation type

Using results of the surveys, each wetland was assigned to a particular 'vegetation' type, mainly according to which life-form was visually dominant, although percentage area and percentage cover values were also taken into account. Except for the vegetation type 'dead tree', which often consisted of a few dead trees over much more abundant samphire, vegetation type usually corresponded with the most extensive life-form. The vegetation types were live tree, dead tree, shrub, sedge, samphire and open, which was the term used when no vegetation was present.

Occurrence of species in relation to salinity

The number of species recorded in each salinity class and the mean species richness of wetlands in each salinity class were calculated. The effects of salinity and disturbance (either salinization or grazing) on species richness were examined using two-way ANOVA after checking that the data were normally distributed and variances were equal (Wadsworth 1990).

The occurrence of 44 taxa recorded at least three times was examined graphically in relation to salinity class.

RESULTS

Wetland vegetation

Detailed information about the vegetation of each wetland is given in the wetland accounts (Appendix 1). Altogether 150 wetland-associated species were recorded (Appendix 3)[5]. Fifteen of these were exotic. Three taxa that were only identified to genus were regarded as exotic because they belonged to genera containing some exotic species.

Ninety-five species were recorded from fresh wetlands, 40 from brackish, 47 from saline and 36 from hypersaline wetlands. Eight species were recorded in the sublittoral zone, 41 in the littoral, 85 in the littoral/supralittoral and 81 in the supralittoral. Most species were recorded from very few wetlands (Table 2). The 10 most commonly occurring species are listed in Table 3.

The most common wetland vegetation type at the time of survey was 'dead tree' (Table 4), which reflects the prevalence of salinization. Prior to European settlement 53 per cent of wetlands would have been

5 The number of species was probably under-estimated because not all plants were identified to species level.

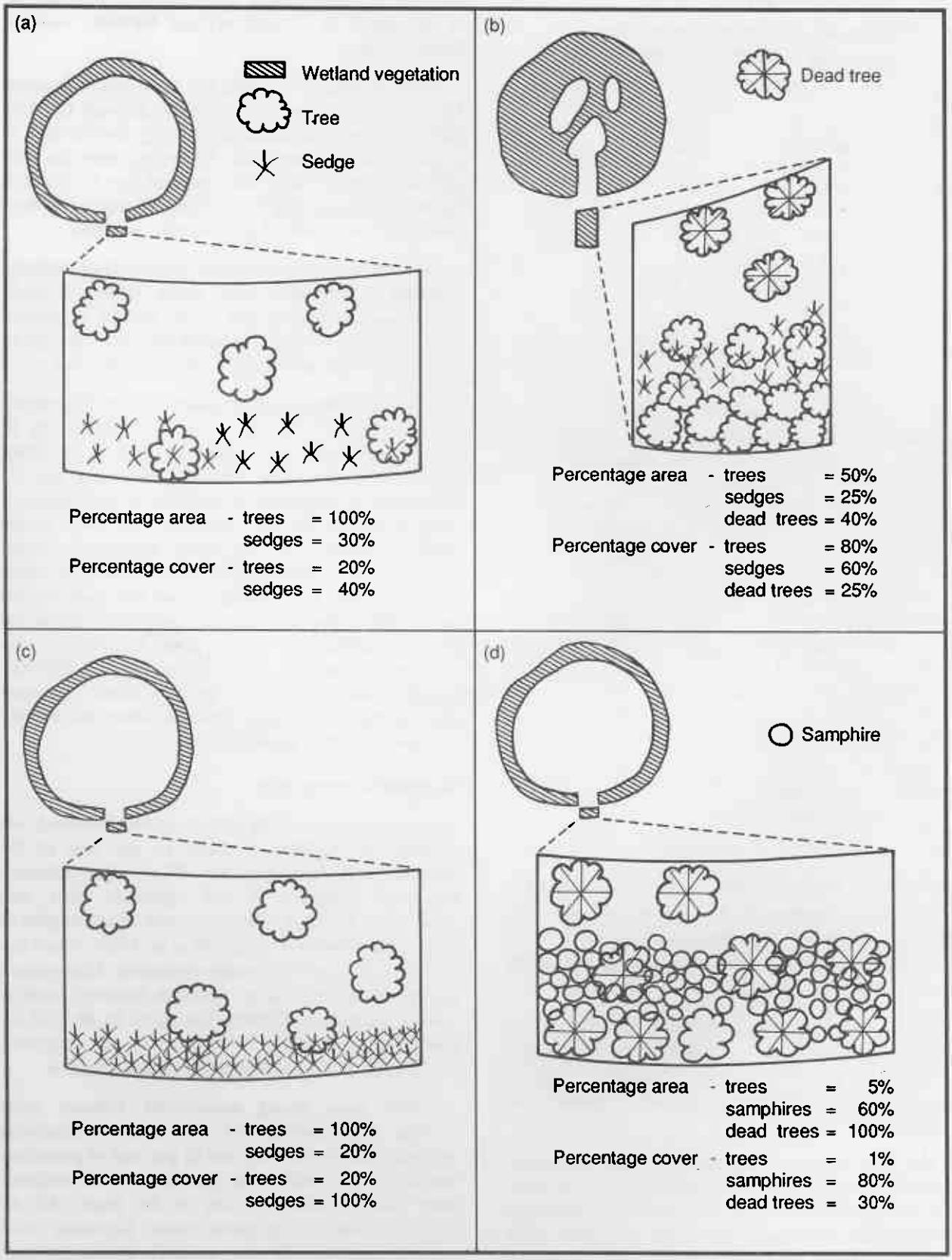

Figure 2

Method calculating percentage area and percentage cover of vegetation life forms.

Table 2
Frequency of occurrence in surveyed wetlands of the 150 plant species recorded.

No. of wetlands	No. of species
1-2	106
3-5	25
6-9	7
10-15	5
16-25	4
>25	3

Table 3
The 10 most commonly recorded plant species from the wetlands surveyed in south-west Western Australia.

Species	No. of wetlands
Halosarcia pergranulata	38
Casuarina obesa	31
Sarcocornia quinqueflora	27
Baumea articulata	25
Melaleuca rhaphiophylla	23
Halosarcia lepidosperma	23
Eucalyptus rudis	22
Melaleuca cuticularis	20
Halosarcia syncarpa	13
Schoenus brevifolius	12

dominated by live trees. Only Lake Bryde and Kent 29020 were dominated by shrubs (≤1m high *Muehlenbeckia* sp. growing throughout the wetland, see Appendix 1); this is an unusual vegetation type in south-west Western Australia.

The most common species in sedge or rush-dominated wetlands was *Baumea articulata*. Other species of *Baumea, Gahnia, Isolepis, Juncus, Lepidosperma, Leptocarpus, Restio* and *Schoenus* also occurred.

The most common tree species in tree-dominated wetlands was *Melaleuca rhaphiophylla*, which often occurred in association with the large shrub/small tree *M. teretifolia*. *Melaleuca cuticularis* frequently grew around naturally saline wetlands. Other common species of *Melaleuca*, which is the predominant tree genus in south-west Western Australian wetlands, included *M. lanceolata* and *M. preissiana*. The growth form, bark and overall appearance of *M. lanceolata* recorded in wetlands was vastly different from that of *M. lanceolata* in coastal dryland habitats, such as Rottnest Island.

Most wetlands containing the tree *Casuarina obesa* belonged to the 'dead tree' category, although *C. obesa* still grew above highwater mark. Lake Toolibin and, to a much lesser extent, Lake Walbrying were the only wetlands surveyed that still contained live *C. obesa* in the inundated area (see Halse 1988). Various species of *Melaleuca* also occurred in 'dead tree' wetlands.

Eucalyptus rudis was widely distributed in wetlands, although usually alive only above highwater mark. *Eucalyptus occidentalis* had a very limited occurrence in the surveyed wetlands, although the 'yate' swamps in which they occur are common on the South Coast.

The dominant genera of samphire were *Halosarcia* and *Sarcocornia*. They were widely distributed in all but fresh wetlands and comprised most of the living vegetation in 'dead tree' wetlands. They were also the major type of vegetation in wetlands of the 'samphire' category (Table 4). The distribution of these genera within wetlands was very much affected by recent flooding history. Plants often extended into the centre of brackish and saline wetlands that had been dry for one or two years whereas they were restricted to the edge of wetlands that had flooded in 1987 even if they were dry at the time of survey (summer of 1987/88). Samphire was restricted to the area above highwater mark in most hypersaline wetlands where soil salinity appeared to control its distribution.

Wetland characteristics

Some characteristics of the wetlands surveyed are summarized in Table 4. Only 31 per cent of the wetlands were fresh and only 47 per cent contained significant quantities of live vegetation other than salt-tolerant samphire. This is a result of salinization of most of the wheatbelt (Schofield *et al.* 1988), which has caused death of tree and sedge vegetation. There were a number of naturally saline wetlands, however, such as Lake Jerdacuttup and Station Lake (Fig. 1). Most of the ephemeral hypersaline wetlands, such as Esperance 32776 (Fig. 1), also represented a natural situation.

There were strong associations between some wetland characteristics: 75 per cent of ephemeral wetlands were hypersaline and 62 per cent of permanent wetlands were fresh. The permanent fresh wetlands were usually within 50 km of the coast. All the wetlands without vegetation below highwater mark were hypersaline. Of the wetlands containing dead trees, 65 per cent were saline, 20 per cent were brackish, 9 per cent were fresh and 6 per cent were hypersaline. In the fresh, and some of the brackish wetlands, only a small proportion of trees were dead.

Table 4
Percentage of the 106 wetlands surveyed in each class of salinity, inundation regime, size, vegetation type and extent of vegetation.

Salinity	Inundation	Size	Vegetation type	Vegetation extent[(a)]
fresh	permanent	≤30 ha	sedge	throughout
31	15	17	21	25
			tree	
			24	
brackish	semi-permanent	31-120 ha	shrub	broad fringe
17	22	30	2	30
			dead tree	
			29	
saline	seasonal	121-400 ha	samphire	narrow fringe
34	52	25	8	29
hypersaline	ephemeral	400 ha	open	open
18	11	28	16	16

[(a)] distribution of vegetation below highwater mark

Occurrence of species in relation to salinity

There was no significant relationship between salinity and species richness in undisturbed wetlands (Fig. 3, Table 5). Disturbance, in the forms of grazing and salinization, however, was inversely related to species richness (Fig. 3, Table 5).

Of the 44 taxa recorded in three or more wetlands, 11 were restricted to fresh and brackish sites and eight were restricted to saline and hypersaline sites (Fig. 4). The occurrence of the individual species in relation to salinity is illustrated in Appendix 2.

DISCUSSION

Undoubtedly, more than 150 species of vascular plant occurred in the 106 wetlands surveyed and the mean number of species per wetland would have been higher than our data indicated. This is largely owing to the fact that we collected only the more common species. In addition, taxonomic difficulties reduced the number of species recognized. For example, there were 26 occurrences of unidentified *Melaleuca*, seven of unidentified *Restio* and some Cyperaceae could not be identified even to genus level.

Our surveys provided additional evidence to that of Halse (1987) that salinization has had a detrimental effect on inland wetlands in south-west Western Australia. As well as causing a decline in species richness (Fig. 3), salinization has caused a marked change in the species composition of wetland vegetation (see also Sanders 1991) because many species occur only within a restricted salinity range (Fig. 4; Appendix 2). The principal factors responsible for reduced species richness in salinized wetlands are increased salinity levels and waterlogging, which together cause the death of many plants (Froend *et al.* 1987; van der Moezel *et al.* 1988). Water-logging also causes death of plants in some fresh wetlands on the Swan Coastal Plain as a result of increased run-off after land clearing and urbanization (Halse 1989).

Sixty-two per cent of all species were recorded from fresh sites compared with only 31 per cent and 24 per cent, respectively, from saline and hypersaline sites. Even allowing for the reduced species richness associated with salinized wetlands, the above figures suggest that the flora of fresh wetlands was more diverse (although each wetland contained the same number of species) than the saline flora. This result is in accordance with the general observation that biological diversity declines as salinity increases (Bayly and Williams 1973). The number of species of aquatic invertebrate in south-west Western Australian wetlands decreases with increasing salinity (Halse 1981; Edward 1983) and the number of waterbird species drops at high salinity levels (Halse *et al* 1993).

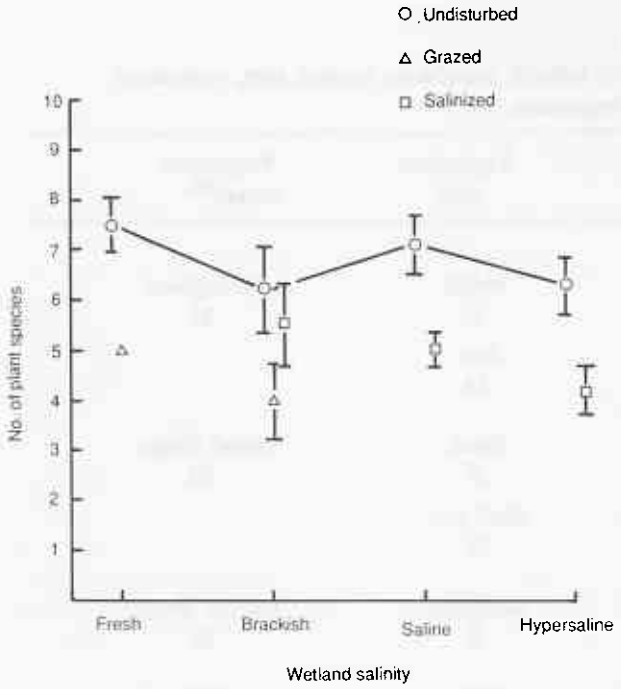

Figure 3

Effect of salinity and disturbance on plant species richness in surveyed wetlands.

Table 5

Two-way ANOVA of effect of salinity and disturbance on plant species richness in surveyed wetlands.

Treatment	df	MS	F	Significance
Salinity (A)	3	2.3	0.41	NS
Disturbance (B)	1	34.8	6.27	**
A x B	3	1.0	0.17	NS
Error	97	5.5		
Implied contrasts				
Salinized *vs* undisturbed	1	35.0	9.16	**
Grazed *vs* undisturbed	1	42.9	5.41	*

Grazing by sheep and cattle had a detrimental effect on number of emergent and fringing plant species (Fig. 3). Domestic stock have the same effect on submerged macrophytes, which causes associated reduction in the number of invertebrate species that occur in a wetland.[6] This is rarely a problem on nature reserves in south-west Western Australia but it may limit the conservation potential of wetlands on private land unless stock are fenced out.

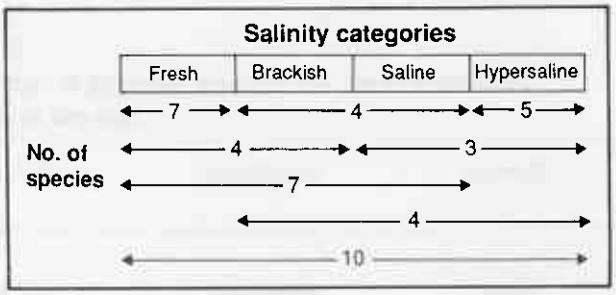

Figure 4

Number of commonly occurring plant species recorded in various categories of wetland salinity (see Appendix 2).

It is apparent from the wetland accounts in Appendix 1 that there are very few yate swamps in nature reserves in south-west Western Australia although they are a moderately common type of wetland.[7] A few occur in Fitzgerald River National Park and other areas under control of the Department of Conservation and Land Management but they are not good examples of the type and it would be desirable to have more reserves created around yate swamps. A substantial proportion of the trees in many yate swamps on private land have died from water-logging in recent years as adjacent land has been cleared and run-off into wetlands has increased.

The data presented herein are intended to be the basis for a long-term monitoring program. We suggest the surveys should be repeated at intervals of 10 years to document the substantial changes that are expected to occur in the vegetation of many depth-gauged wetlands over the next few decades as salinity levels continue to increase (Schofield *et al.* 1988) and, perhaps, rainfall patterns change as a result of the Greenhouse Effect.

Both Yarnup Swamp (Fig. 1) and an unnamed wetland on the eastern boundary of Watheroo National Park provide evidence that the situation in south-west Western Australian wetlands is not stable yet. In 1979 *Casuarina obesa* and *Melaleuca* spp. grew on the margins of the Watheroo National Park wetland (Halse 1981). By 1987 these species had died and a belt of samphire had become established. Salinity did not appear to have increased (10.7 ppt TDS in September 1979 *vs* 3.3 ppt in December 1987) but water depth was

6 D.G. Frey, University of Indiana, USA, personal communication.

7 S.A. Halse and D.R. Munro, unpublished data collected during annual aerial surveys counting ducks.

greater in 1987[8], making it difficult to compare salinities. Death of the trees may have been largely due to increased water-logging rather than salinity; water levels had increased as a result of drainage of adjacent farmland into the wetland (Halse 1981).

Yarnup Swamp is at an earlier stage of change. The upper part of the catchment is farmland, some of which is salt-affected. In 1983 or 1984 salt scalds appeared in the nature reserve about 200 m south of the wetland[9] although to date there are no definite signs of an increase in salinity in the swamp itself.

Tree-planting schemes and other agricultural strategies to reduce salinization (Halse 1988; Schofield *et al.* 1989) are urgently required in catchments such as that of Yarnup Swamp to prevent these wetlands becoming saline. Long-term monitoring of vegetation, as well as water depth and salinity (Lane and Munro 1983), will enable assessment of the effectiveness of salinity-reduction schemes in protecting the conservation values of wetlands.

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REFERENCES

Arnold, J.M. (1990). Perth wetlands resource book. Bulletin 266, Environmental Protection Authority, Perth.

Arnold, J.M. and Sanders, C.S. (1981). Wetlands of the Swan Coastal Plain. In: Carbon, B.A. (ed.), *Groundwater Resources of the Swan Coastal Plain*. CSIRO Division of Resources Management, Perth, pp. 81-98.

Atkins, R.P., Congdon, R.A., Finlayson, C.M. and Gordon, D.M. (1977). Lake Leschenaultia - an oligotrophic artificial lake in Western Australia. *Journal of the Royal Society of Western Australia* **59**, 65-70.

8 S.A. Halse and G.B. Pearson, unpublished data.

9 S.A. Halse and G.B. Pearson, personal observation and discussion with local farmers.

Backshall, D.J. and Bridgewater, P.B. (1981). Peripheral vegetation of Peel Inlet and Harvey Estuary, Western Australia. *Journal of the Royal Society of Western Australia* **63**, 5-11.

Bartle, J., Graham, G., Lane, J. and Moore, S. (1987). Forrestdale Lake Nature Reserve. Management Plan No. 3. Department of Conservation and Land Management, Perth.

Bayly, I.A.E. and Williams, W.D. (1973). *Inland Waters and their Ecology*. Longman, Melbourne.

Beard, J.S. (1972). *Vegetation Survey of Western Australia: The Vegetation of the Hyden Area*. Vegmap Publications, Sydney.

Bell, D.T., Loneragan, W.A. and Dodd, J. (1978). Preliminary vegetation survey of Star Swamp and vicinity, Western Australia. *Western Australian Herbarium Research Notes* **2**, 1-21.

Brock, M.A. and Lane, J.A.K. (1983). The aquatic macrophyte flora of saline wetlands in Western Australia in relation to salinity and permanence. *Hydrobiologia* **105**, 63-76.

Burgman, M.A. (1985). The flora and vegetation of the Lake Hurlstone reserve system, Western Australia. Unpublished report to Department of Conservation and Land Management.

Clark, R.L. (1990). Ecological history for environmental management. *Proceedings of the Ecological Society of Australia* **16**, 1-21.

Congdon, R.A. and McComb, A.J. (1976). The nutrients and plants of Lake Joondalup, a mildly eutrophic lake experiencing large changes in volume. *Journal of the Royal Society of Western Australia* **59**, 14-23.

Crook, I.G. and Evans, T. (1981). *Thomsons Lake Nature Reserve*. Department of Fisheries and Wildlife, Perth.

Edward, D.H.D. (1983). Inland waters of Rottnest Island. *Journal of the Royal Society of Western Australia* **66**, 41-47.

Froend, R.H., Heddle, E.M., Bell, D.T. and McComb, A.J. (1987). Effects of salinity and water-logging on the vegetation of Lake Toolibin, Western Australia. *Australian Journal of Ecology* **12**, 281-298.

Froend, R.H. and McComb, A.J. (1991). An account of the decline of Lake Towerrinning, a wheatbelt wetland. *Journal of the Royal Society of Western Australia* **73**, 123-128.

Froend, R.H. and van der Moezel, P.G. (1991). Wetlands of the Coobidge Creek catchment, their classification and response to prolonged flooding. Unpublished report to Department of Conservation and Land Management.

Green, J.W. (1985). *Census of the Vascular Plants of Western Australia*, 2nd edn. Department of Agriculture, Perth.

Green, J.W. (1988). *Census of the Vascular Plants of Western Australia*, Cumulative supplement no. 7. Department of Agriculture, Perth.

Halse, S.A. (1981). Faunal assemblages of some saline lakes near Marchagee, Western Australia. *Australian Journal of Marine and Freshwater Research* **32**, 133-142.

Halse, S.A. (1987). Probable effect of increased salinity on the waterbirds of Lake Toolibin. Technical Report 15. Department of Conservation and Land Management, Perth.

Halse, S. (1988). The last lake. *Landscope* **3**, 17-22.

Halse, S.A. (1989). Wetlands of the Swan Coastal Plain - past and present. In: Lowe, G. (ed), *Proceedings of the Swan Coastal Plain Groundwater Management Conference*. Western Australian Water Resources Council, Perth, pp. 105-112.

Halse, S.A., Williams, M.R., Jaensch, R.P. and Lane, J.A.K. (1993). Wetland characteristics and waterbird use of wetlands in south-western Australia. *Wildlife Research* **20**, 103-126.

Heddle, E., Lonergan, O.W. and Havel, J.J. (1980). Vegetation complexes of the Darling System, Western Australia. In: *Atlas of Natural Resources, Darling System, Western Australia*. Department of Conservation and Environment, Perth, pp. 37-72.

Hopkins, A.J.M., Brown, J.M. and Goodsell, J.T. (1987). A monitoring system for use in the management of natural areas in Western Australia. In: Saunders, D.A., Arnold, G.W., Burbidge, A.A. and Hopkins, A.J.M. (eds), *Nature Conservation: The Role of Remnants of Native Vegetation*. Surrey Beatty, Sydney, pp. 337-339.

Keighery, G.J. and Alford, J.L. (1990). Flora of Benger Swamp, south-west Western Australia. *Western Australian Naturalist* **18**, 65-70.

Keating, C. and Trudgen, M. (1986). A flora and vegetation survey of the Lake Dumbleyung - Coblinine River area. Unpublished report to Department of Conservation and Land Management.

Lane, J.A.K. and Munro, D.R. (1983). 1982 review of rainfall and wetlands in the south-west of Western Australia. Report 58. Department of Fisheries and Wildlife, Perth.

Lantzke, I.R. (1983). Notes on bladderworts (*Utricularia* species) in Lake Jandabup (Wanneroo, Western Australia) with a description of *Utricularia dichotoma*. *Western Australian Naturalist* **15**, 161-163.

Lyons, M.N. (1988). Vegetation and flora of Lake Coyrecup Nature Reserve Nos 26020, 28552 and adjoining unvested land (Loc. Nos 6904, 92). Unpublished report to Department of Conservation and Land Management.

McComb, J.A. and McComb, A.J. (1967). A preliminary account of the vegetation of Loch McNess, a swamp and fen formation in Western Australia. *Journal of the Royal Society of Western Australia* **50**, 105-112.

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987). *Flora of the Perth Region*, 2 vols. Department of Agriculture, Perth.

Mattiske, E.M. (1978). Vegetation studies of Lake Toolibin and surroundings. In: Northern Arthur River Wetlands Rehabilitation Committee - a progress report. Appendix D. Unpublished report to Minister of Fisheries and Wildlife.

Mulcahy, M.J. (1978). Salinization in the south-west of Western Australia. *Search* **9**, 269-272.

Muir, B.G. (1983). Drainage, swamp structure and vegetation succession at Melaleuca Park, northern Swan Coastal Plain. *Western Australian Herbarium Research Notes* **9**, 27-39.

Newbey, K.R. (1985). Preliminary vegetation and flora survey of Lake Ace Nature Reserve, near Lake King, Western Australia. Unpublished report to Department of Conservation and Land Management.

Pen, L.J. (1983). Peripheral vegetation of the Swan and Canning estuaries 1981. Bulletin 113. Department of Conservation and Environment, Perth.

Riggert, T.L. (1966). *A Study of the Wetlands of the Swan Coastal Plain*. Department of Fisheries and Fauna, Perth.

Sanders, A. (1991). Oral histories documenting changes in wheatbelt wetlands. Occasional Paper 2/91. Department of Conservation and Land Management, Perth.

Schofield, N.J., Ruprecht, J.K. and Loh, I.C. (1988). The impact of agricultural development on the salinity of surface water resources of south-west Western Australia. Report WS 27. Water Authority of Western Australia, Perth.

Schofield, N.J., Loh, I.C., Scott, P.R., Bartle, J.R, Ritson, P., Bell, R.W., Borg, H., Anson, B. and Moore, R. (1989). Vegetation strategies to reduce stream salinities of water resource catchments in south-west Western Australia. Report WS 33. Water Authority of Western Australia, Perth.

Seddon, G. (1976). *A Sense of Place*. University of Western Australia Press, Perth.

Semeniuk, C.A., Semeniuk, V., Cresswell, I.D. and Marchant, N.G. (1990). Wetlands of the Darling system, south-western Australia : a descriptive classification using vegetation pattern and form. *Journal of the Royal Society of Western Australia* **72**, 109-121.

Smith, F.G. (1972). *Vegetation Map of Pemberton and Irwin Inlet*. Department of Agriculture, Perth.

Speck, N.H. and Baird, A.M. (1984). Vegetation of the Yule Brook Reserve near Perth, Western Australia. *Journal of the Royal Society of Western Australia* **66**, 147-162.

van der Moezel, P.G., Watson, L.E., Pearce-Pinto, G.U.N. and Bell, D.T. (1988). The response of six *Eucalyptus* species and *Casuarina obesa* to the combined effect of salinity and water-logging. *Australian Journal of Plant Physiology* **15**, 465-474.

Ventriss, H.B. (1989). Groundwater management - the players and the process. In: Lowe, G. (ed.), *Proceedings of the Swan Coastal Plain Groundwater Management Conference*. Western Australian Water Resources Council, Perth, pp. 31-39.

Wadsworth, H.M. (1990). *Handbook of Statistical Methods for Engineers and Scientists*. McGraw-Hill, New York.

Watkins, D. and McNee, S. (1987). A survey of wetlands in and adjacent to Dunn Rock and Lake Bryde Nature Reserves. Unpublished report to Department of Conservation and Land Management.

Watson, A.N. (1978). The clearing history of the Toolibin area and some of its effects. In: Northern Arthur River Wetlands Rehabilitation Committee - a progress report. Appendix B. Unpublished report to Minister of Fisheries and Wildlife.

Appendix 1

Wetland accounts

Exotic species are marked with an asterisk, taxa that may be exotic are marked with a hatch, open water is shaded black, vegetation is stippled. Description of categories of lake permanence and salinity and the zones where plants occur are given in Table 1 (p. 3). Reserve boundary is shown only when it impinges on wetland vegetation. Abbreviations are: Cons. = Conservation of; NPNCA = National Parks and Nature Conservation Authority; NR = Nature Reserve.

Lake Ace

Nature Reserve :	Lake Ace NR	Reserve Number :	34522
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	150.3 ha	Vegetation Area :	59.0 ha
Open Water :	91.3 ha (60.75%)		
Lake Permanence :	Seasonal	Lake Salinity :	Hypersaline
Coordinates :	33.00 S, 119.46 E		

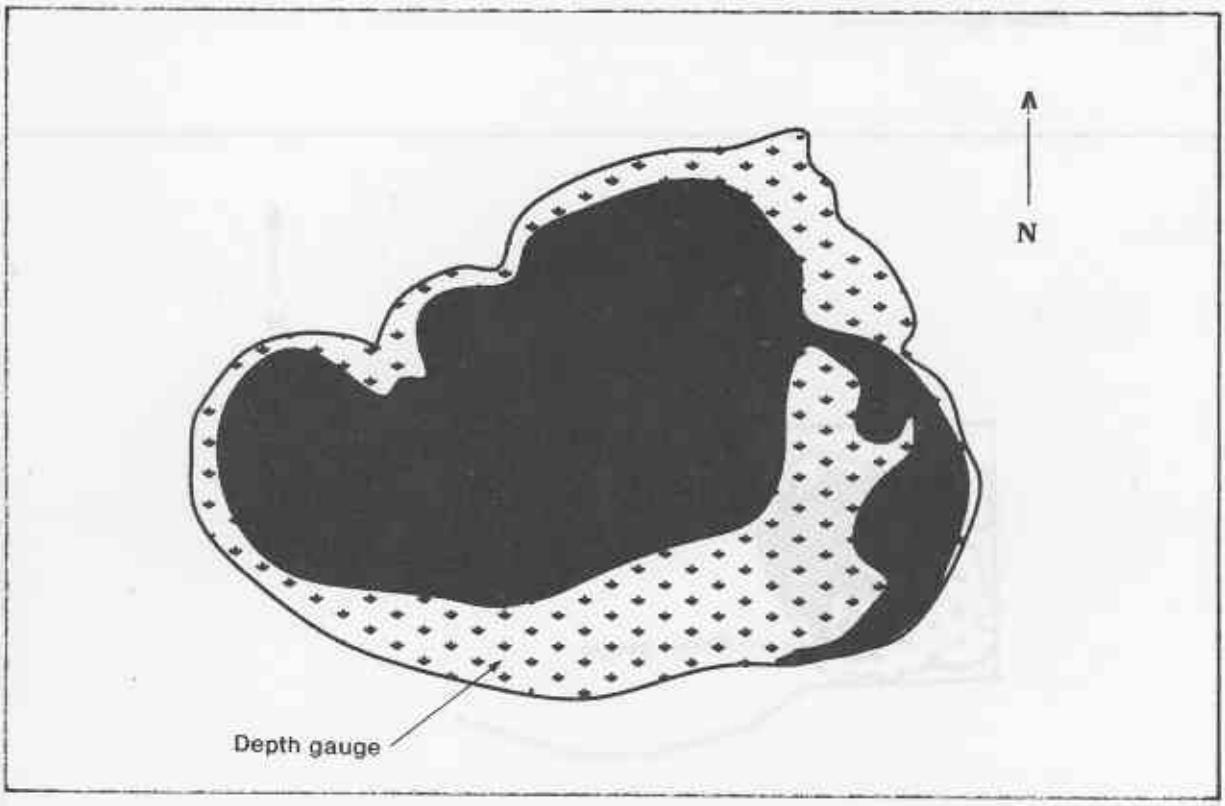
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A large open hypersaline lake, around which is a low open shrubland of samphire consisting of *Halosarcia pergranulata, Sarcocornia quinqueflora* and *H. halocnemoides.* As the ground around the lake rises *Carpobrotus* sp., *Lawrencia squamata* and *Atriplex* sp. also occur, as well as larger *Melaleuca* sp. shrubs and, in some areas, a few *Eucalyptus* sp. Beyond this is an open eucalypt woodland. More detailed information is given by Newbey (1985).

Plant species list (zones indicated by a single numeral)

4 *Atriplex* sp.
4 *#Carpobrotus* sp.
4 *Eucalyptus* sp.
4 *Halosarcia halocnemoides*
4 *Halosarcia pergranulata*
4 *Lawrencia squamata*
4 *Melaleuca* sp.
4 *Sarcocornia quinqueflora*



Albany 26385

Nature Reserve :	North Sister NR	Reserve Number :	26385
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	126.0 ha	Vegetation Area :	80.0 ha
Open Water :	46.0 ha (36.51%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Fresh
Coordinates :	34.48 S, 118.10 E		

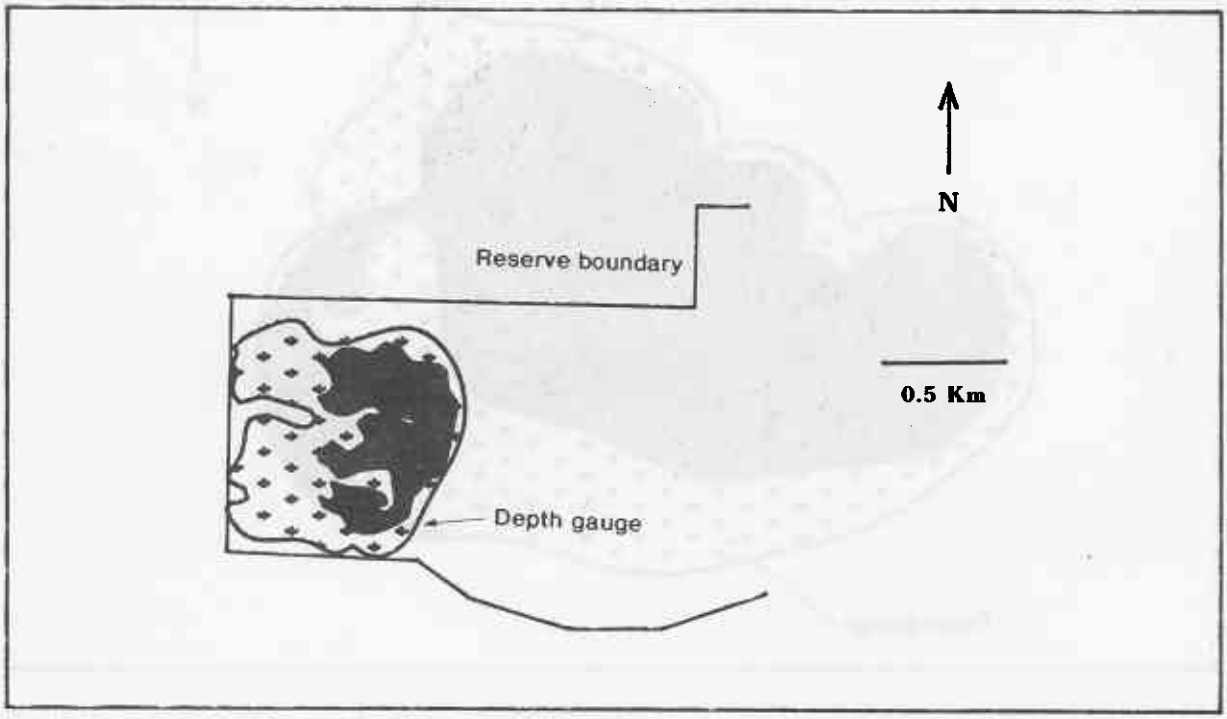
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	0.50	80	80
sedges	2.00	20	80

A moderate-sized lake mostly covered with sedges. There is a small area of open water in the centre containing clumps of *Baumea articulata*. This is surrounded by a fairly extensive area of sparse *Gahnia* sp. and then a broad band of *B. articulata* and *Lepidosperma* aff. *leptostachyum* that contains isolated clumps of *Juncus pauciflorum, Villarsia parnassifolia* and *Tetrariopsis octandra*. *Lepidosperma* aff. *leptostachyum* then extends out to the water mark. A few clumps of *Thysanotus* sp. occur around the water mark, beyond which is a band of *Restio leptocarpoides* and then isolated clumps of the shrubs *Daviesia incrassata, Banksia littoralis* and *Melaleuca cuticularis*. The ground rises to a closed jarrah/marri woodland.

Plant species list (zones indicated by a single numeral)

1 *Baumea articulata*
2 *Gahnia* sp.
2 *Lepidosperma* aff. *leptostachyum*
2 *Tetraria octandra*
3 *Thysanotus* sp.
3 *Villarsia parnassifolia*
4 *Banksia littoralis*
4 *Daviesia incrassata*
4 *Melaleuca cuticularis*
4 *Restio leptocarpoides*



Albany 27157

Nature Reserve :	Cheyne Road NR	Reserve Number :	27157
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	72.0 ha	Vegetation Area :	64.0 ha
Open Water :	8.0 ha (11.11%)		
Lake Permanence :	Permanent	Lake Salinity :	Fresh
Coordinates :	34.48 S, 118.17 E		

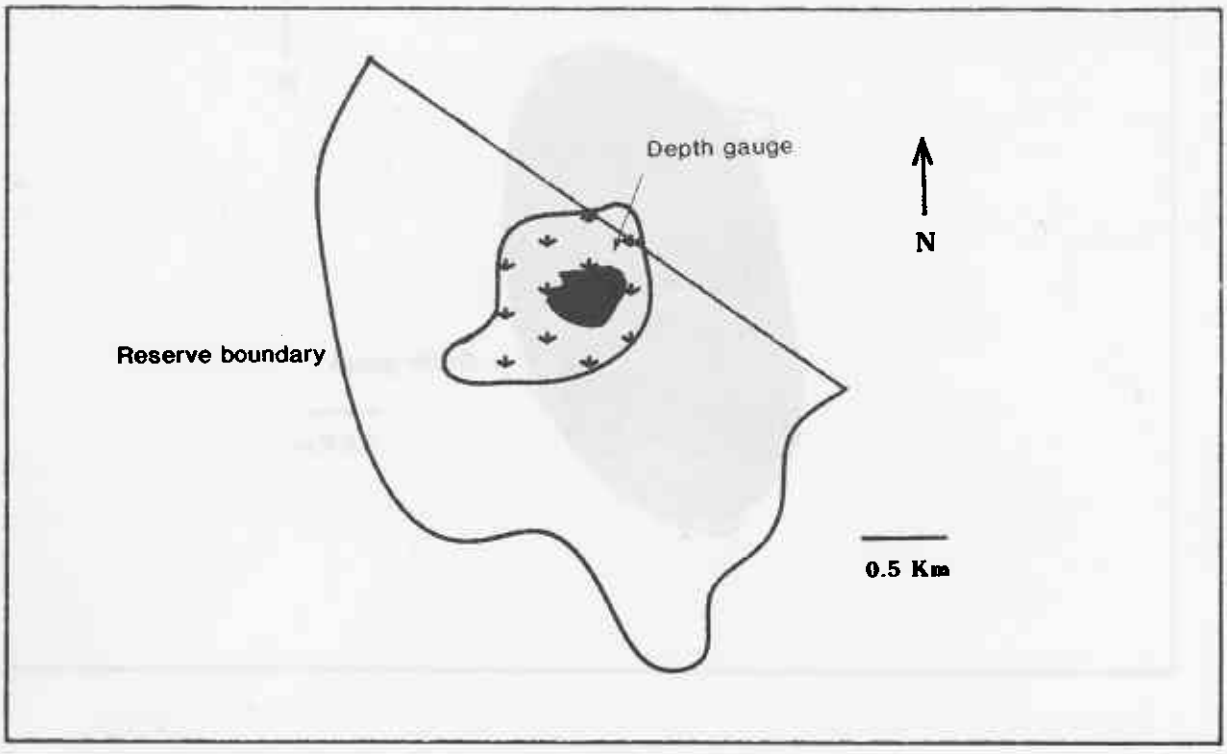
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	0.60	85	100
sedges	1.50	15	100
shrubs	2.00	2	20
trees	6.00	5	10

A moderate-sized sedge lake with a few *Melaleuca cuticularis* trees and shrubs in patches around the edge and a small area of open water in the middle. There are some extensive areas of *Baumea articulata* but most of the area is covered by *Gahnia* sp. with an understorey of *Lepidosperma tenue*, outside which is a band of *Restio* spp and another species of *Gahnia*. *Juncus pauciflorus* occurs in clumps at the water mark and extends onto higher ground amongst *M. cuticularis* and *Boronia denticulata*.

Plant species list (zones indicated by a single numeral)

1	*Baumea articulata*
2	*Gahnia* sp.
2	*Lepidosperma tenue*
3	*Gahnia* sp.
3	*Juncus pauciflorus*
3	*Melaleuca cuticularis*
3	*Restio* sp.
3	*Restio* sp.
4	*Boronia denticulata*



Lake Altham

Nature Reserve :	Chinocup NR	Reserve Number :	28395
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	243.0 ha	Vegetation Area :	5.0 ha
Open Water :	238.0 ha (97.94%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.24 S, 118.27 E		

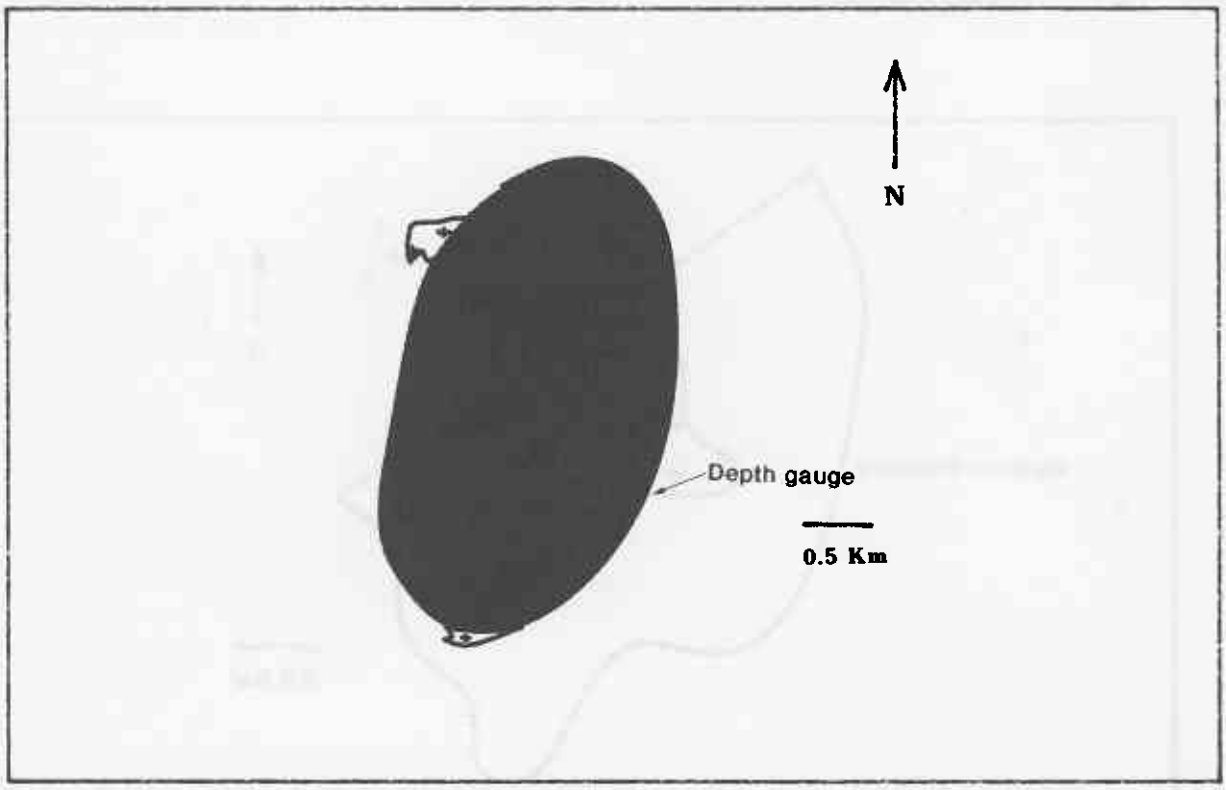
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A large completely open hypersaline lake. Above the water mark there is a sparse samphire marsh containing *Halosarcia pergranulata, Sarcocornia quinqueflora* and *Melaleuca* sp. at the rear of marsh. Occasional low shrubs of *Atriplex paludosa* ssp. *baudinii* also occur in the marsh. On the landward side of this riparian strip there is a low bank, behind which is a second marsh. The dominant species in the second marsh is *A. paludosa* ssp. *baudinii*. Other species present include *Maireana brevifolia, Lycium australe* and *Acacia nyssophylla.*

Plant species list (zones indicated by a single numeral)

4 *Acacia nyssophylla*
4 *Atriplex paludosa* ssp. *baudinii*
4 *Halosarcia pergranulata*
4 *Lycium australe*
4 *Maireana brevifolia*
4 *Melaleuca* sp.
4 *Sarcocornia quinqueflora*



Lake Anderson

Nature Reserve :	Anderson Lake NR	Reserve Number :	25194
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	186.0 ha	Vegetation Area :	44.0 ha
Open Water :	142.0 ha (76.34%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	34.10 S, 117.58 E		

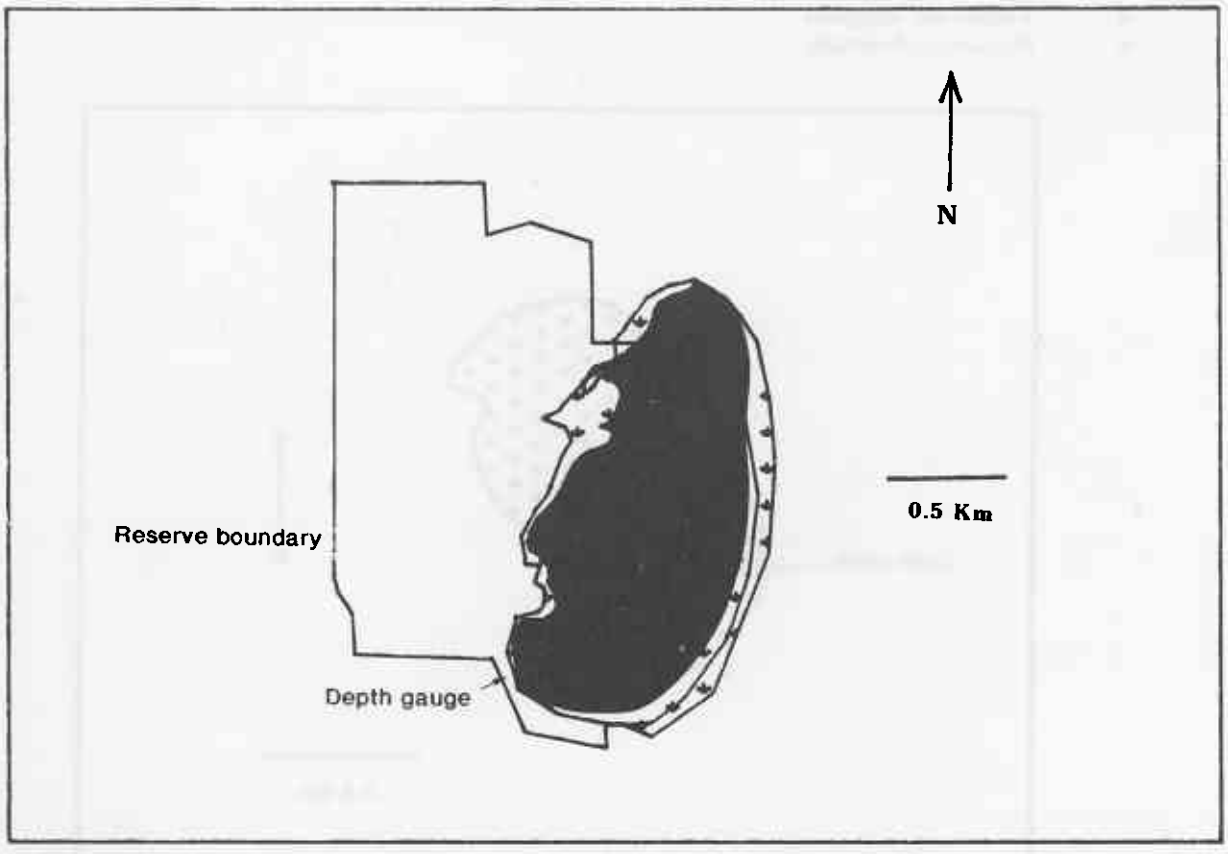
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.10	100	60
seedlings	0.50	30	30
dead trees	4.00	80	50

A large saline lake with a fringe of dead trees forming an open woodland. *Sarcocornia quinqueflora*, *Halosarcia pergranulata* and *Disphyma crassifolium* occur beneath the dead trees, behind which is a thicket of *Melaleuca cuticularis* that is 3-4 m high. In the vicinity of the depth gauge, seedling *M. cuticularis* extend down to the water line. Occasional clumps of *Gahnia trifida* and an unidentified sedge occur above the water line. Behind the fringing wetland vegetation there is a low woodland of *Eucalyptus astringens*.

Plant species list (zones indicated by a single numeral)

3	*Disphyma crassifolium*
3	*Halosarcia pergranulata*
3	*Melaleuca cuticularis*
3	*Sarcocornia quinqueflora*
4	Cyperaceae sp.
4	*Gahnia trifida*



Lake Angove

Nature Reserve :	Two Peoples Bay NR	Reserve Number :	27956
Vesting :	NPNCA	Purpose :	Cons. Fauna
Lake Area :	70.6 ha	Vegetation Area :	54.7 ha
Open Water :	15.8 ha (22.38%)		
Lake Permanence :	Permanent	Lake Salinity :	Fresh
Coordinates :	34.47 S, 118.10 E		

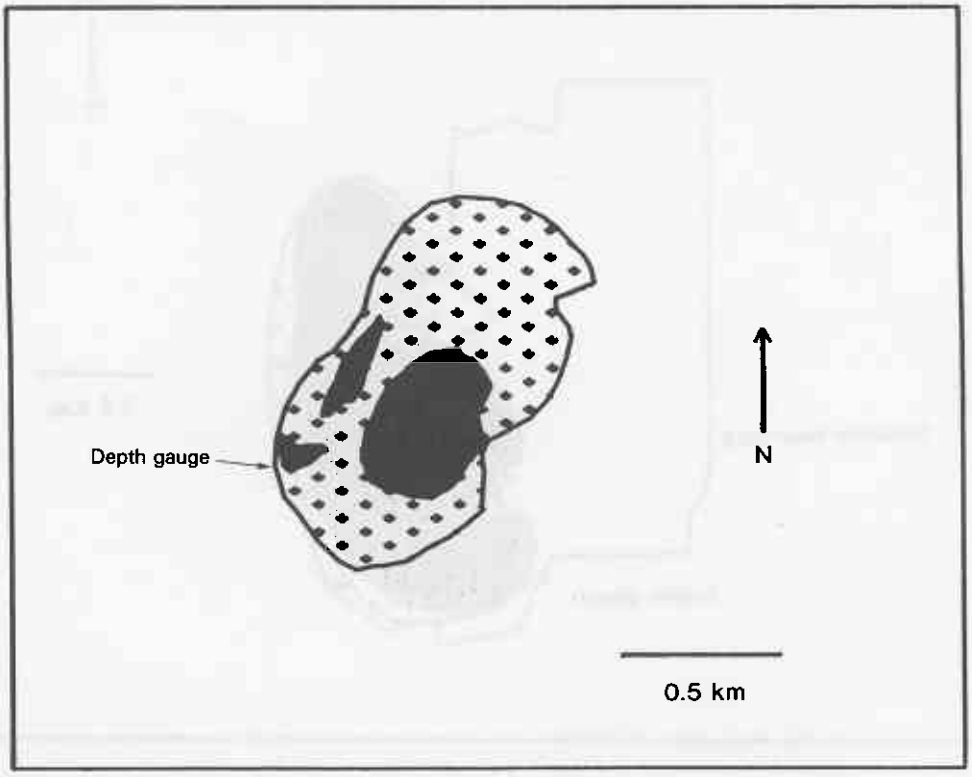
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	1.00	30	70
sedges	2.00	70	70

A moderate-sized fresh sedge lake with small areas of open water. *Baumea articulata* is the dominant sedge in deeper water but *B. ?preissii* occurs in shallow areas. On the shore in less disturbed parts of the lake are *Juncus pallidus, B. juncea, Isolepis prolifera, Triglochin procera* and *Cotula coronopifolia*. Behind the sedgeland are the shrubs *Agonis juniperina* and *Kunzea* aff. *ericifolia* and a dense thicket of *Melaleuca thymoides. Oxylobium lanceolatum* grows farther from the lake. The western part of the lake has been cleared for cattle grazing; the cattle probably have access to all the lake and this may have caused changes to the vegetation even in the more remote parts of it.

Plant species list (zones indicated by a single numeral)

1	*Baumea articulata*
2	*Baumea ? preissii*
2	*Triglochin procera*
3	*Baumea juncea*
3	*Cotula coronopifolia*
3	**Isolepis prolifera*
3	*Juncus pallidus*
4	*Agonis juniperina*
4	*Kunzea* aff. *ericifolia*
4	*Melaleuca thymoides*



Lake Bambun

Nature Reserve :	Bampanup NR	Reserve Number :	26756
Vesting :	NPNCA	Purpose :	Cons. Fauna
Lake Area :	42.5 ha	Vegetation Area :	8.3 ha
Open Water :	34.2 ha (80.47%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Fresh
Coordinates :	31.26 S, 115.53 E		

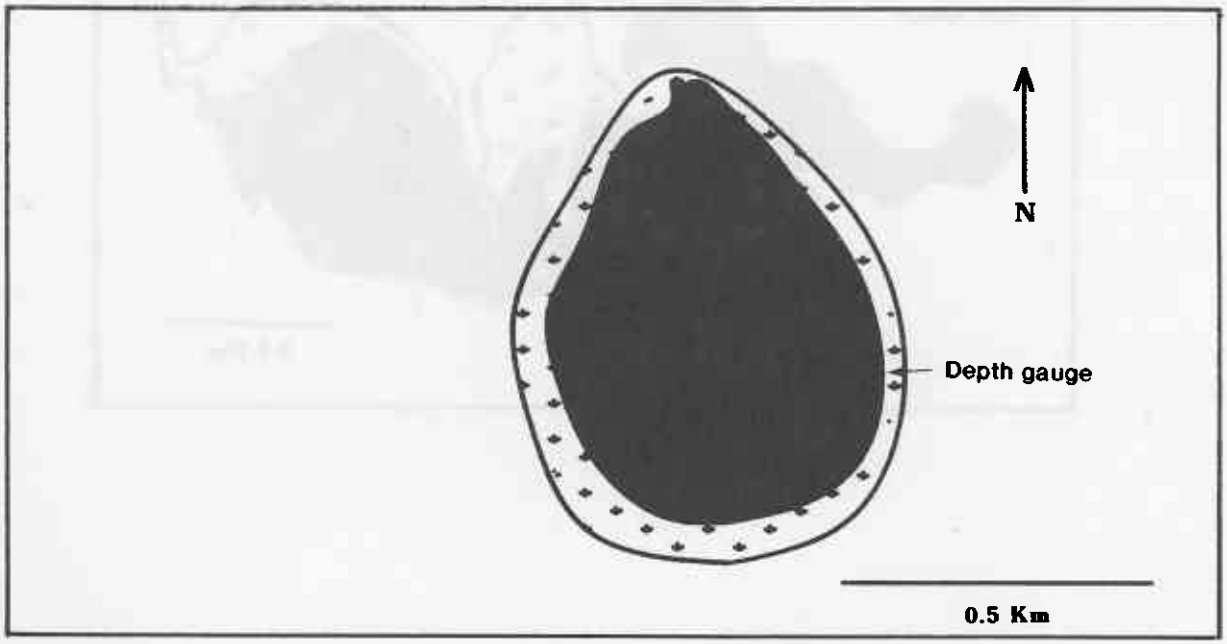
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	1.50	1	100
shrubs	3.00	10	90
trees	10.00	90	50

A moderate-sized lake fringed by a belt of *Melaleuca rhaphiophylla* trees along the water mark. At the northern end of the lake *M. teretifolia* shrubs occur on the lake side of the *M. rhaphiophylla* and near the depth gauge there is a small patch of *Baumea articulata* growing in the water. Above the water mark, and behind the *M. rhaphiophylla, Eucalyptus rudis* trees occur with occasional clumps of *Cyperus ?tenuiflorus* beneath. *Paspalum distichum* grows prolifically along the shore.

Plant species list (zones indicated by a single numeral)

1	*Baumea articulata*
1	*Melaleuca teretifolia*
2	*Melaleuca rhaphiophylla*
3	**Paspalum distichum*
4	**Cyperus ?tenuiflorus*
4	*Eucalyptus rudis*



Beverley Lakes

Nature Reserve :	Yenyenning Lakes NR	Reserve Number :	31837
Vesting :	NPNCA	Purpose :	Recreation and Cons. Flora and Fauna
Lake Area :	3115.0 ha	Vegetation Area :	716.0 ha
Open Water :	2399.0 ha (77.01%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Saline
Coordinates :	32.14 S, 117.09 E		

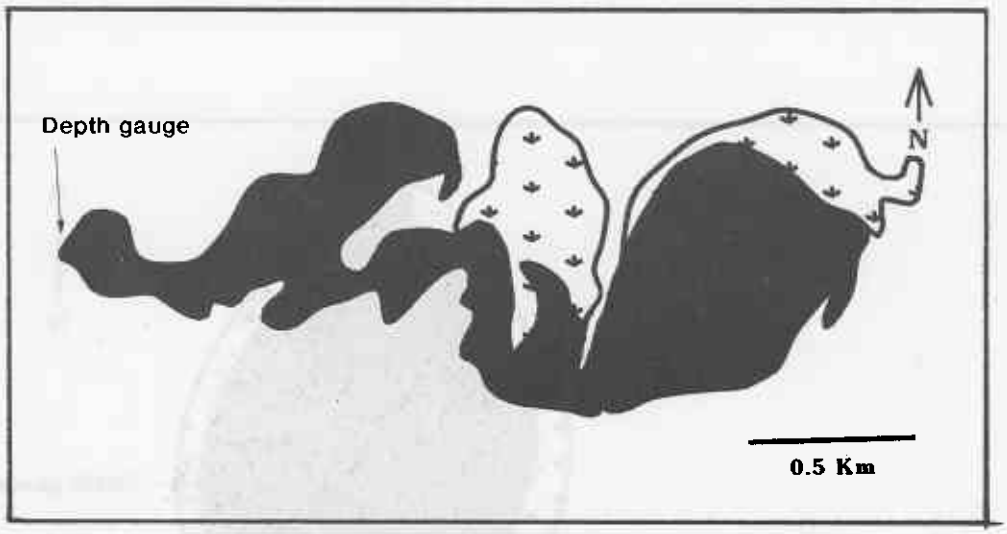
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	50	10
dead shrubs	2.00	30	30
dead trees	6.00	40	30

An extensive system of saline lakes fringed by samphire and trees that have been dead for so long that usually only their trunks remain. *Halosarcia pergranulata* and *Sarcocornia quinqueflora* occur in the samphire belt. Above the water mark *Casuarina obesa* occurs. Farther from the lake the land is mostly cleared for farming although there are small areas of salmon gum woodland.

Plant species list (zones indicated by a single numeral)

3	*Halosarcia pergranulata*
3	*Sarcocornia quinqueflora*
4	*Casuarina obesa*



Lake Biddy

Nature Reserve :	Lake Biddy NR	Reserve Number :	17617
Vesting :	NPNCA	Purpose :	Cons. Fauna
Lake Area :	13.4 ha	Vegetation Area :	6.0 ha
Open Water :	7.4 ha (55.22%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.01 S, 118.57 E		

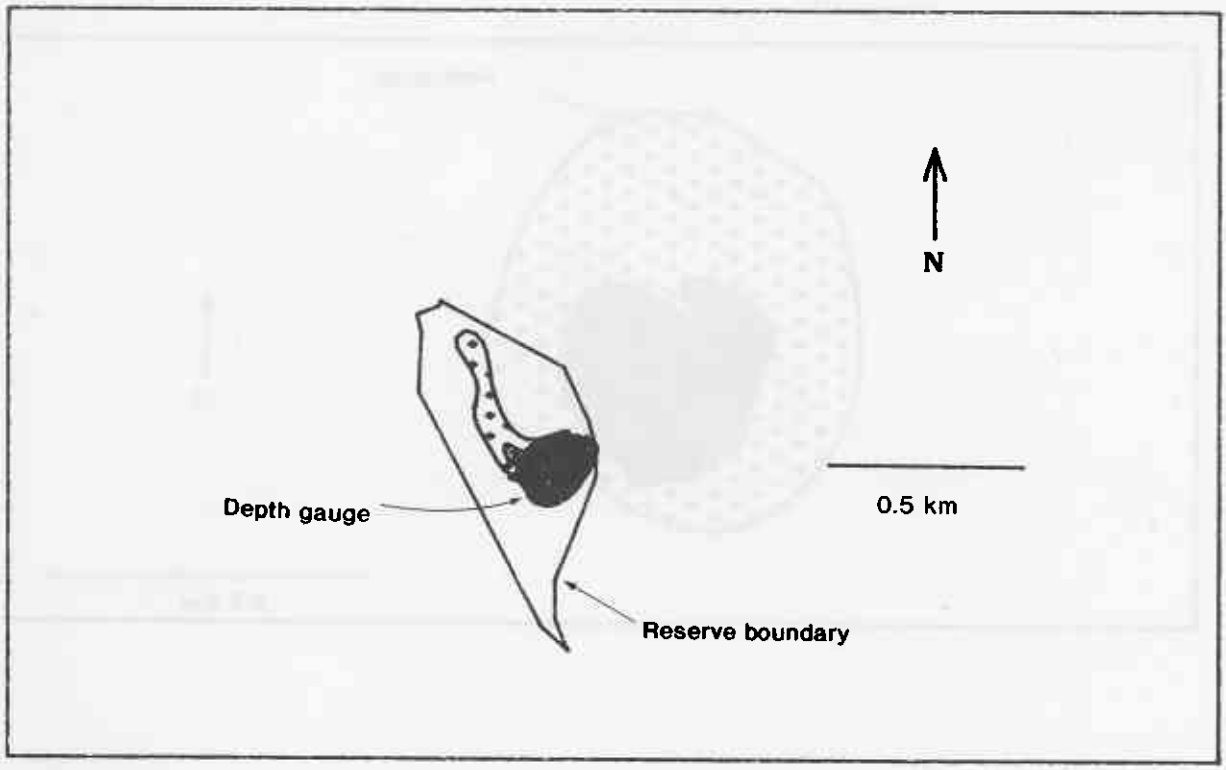
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.30	100	70
dead trees	4.00	10	10
dead trees	3.00	30	50

A small saline lake surrounded by samphire marsh consisting of *Halosarcia pergranulata, H. doleiformis* and *Enchylaena tomentosa.* Other species, including *Atriplex paludosa* ssp. *baudinii*, occur at low frequency. There are isolated dead trees around the margin of the lake and in the water and two areas of dense dead saplings. On higher ground there is a belt of *Melaleuca lanceolata.*

Plant species list (zones indicated by a single numeral)

3	*Enchylaena tomentosa*
3	*Halosarcia doleiformis*
3	*Halosarcia pergranulata*
4	*Atriplex paludosa* ssp. *baudinii*
4	*Melaleuca lanceolata*



Lake Bokan

Nature Reserve :	Bokan NR	Reserve Number :	9628
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	41.2 ha	Vegetation Area :	2.9 ha
Open Water :	38.3 ha (92.99%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	32.59 S, 117.32 E		

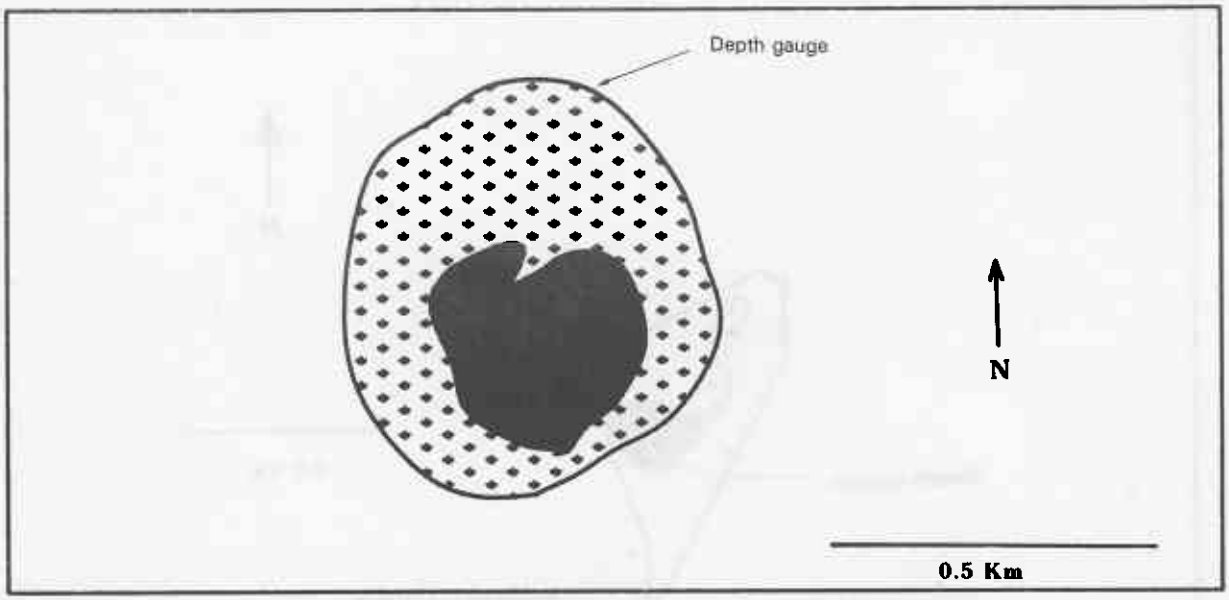
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	10	70
dead trees	6.00	5	3
dead trees	4.00	1	10

A moderate-sized saline lake with isolated dead *Casuarina obesa* trees around the lake margin and a thicket of small dead *Melaleuca* sp. at one end. Live *C. obesa* occur above the water mark with *Halosarcia lepidosperma, Disphyma crassifolium, Sarcocornia quinqueflora* and *H. pergranulata* as an understorey above and below the water mark.

Plant species list (zones indicated by a single numeral)

3	*Disphyma crassifolium*
3	*Halosarcia lepidosperma*
3	*Halosarcia pergranulata*
3	*Sarcocornia quinqueflora*
4	*Casuarina obesa*



Boyup 18239

Nature Reserve :	Kulikup NR	Reserve Number :	18239
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	24.5 ha	Vegetation Area :	24.5 ha
Open Water :	0.0 ha (0.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	33.50 S, 116.40 E		

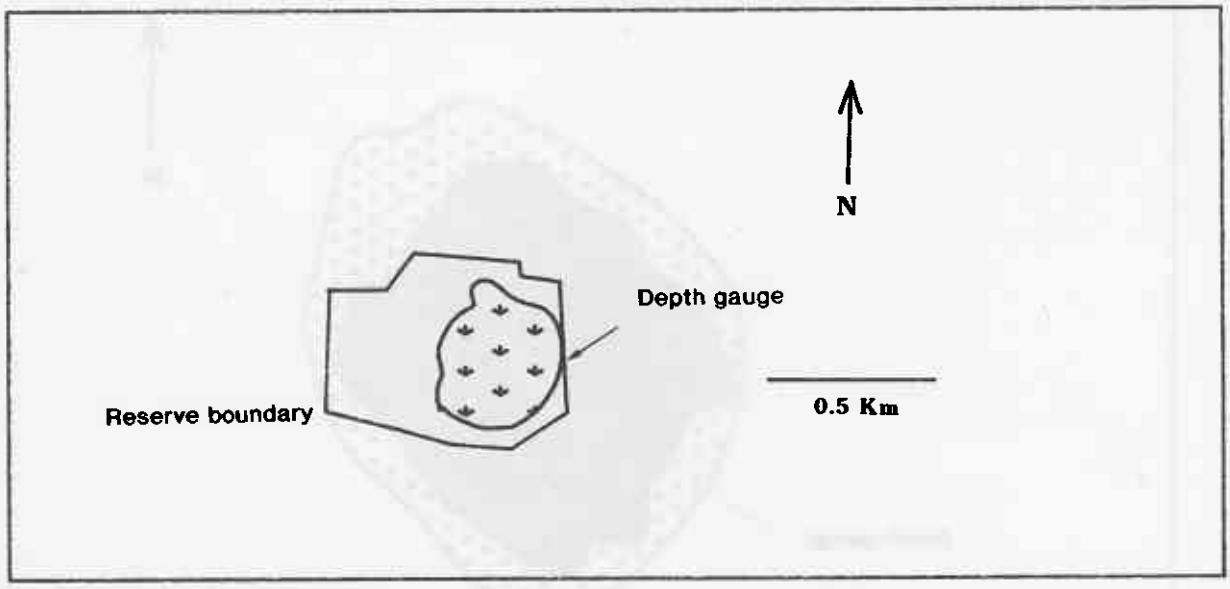
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	1.00	100	100
shrubs	1.50	5	20
trees	6.00	5	50

A small fresh sedge swamp. The centre of the lake is covered by *Baumea articulata* and there is no open water. The pattern at the edge of the lake is quite complex but several 'zones' are distinguishable. Outside the *B. articulata* zone there is a belt of *Melaleuca cuticularis* shrubs and trees. *Baumea articulata* continues as an understorey species into the middle of this zone where it is replaced by *Restio* sp. This transition approximates high water mark. Outside the *M. cuticularis* zone, *Restio* sp. continues as a low sedgeland until it is replaced by a second species of *Restio* just before the ground rises into a narrow zone of jarrah/marri woodland. This woodland is replaced by a narrow band of *Melaleuca cuticularis*, which probably represents an old flood line, before the ground rises higher and fully developed jarrah/marri woodland vegetation occurs.

Plant species list (zones indicated by a single numeral)

2 *Baumea articulata*
3 *Melaleuca cuticularis*
4 *Restio* sp.
4 *Restio* sp.



Lake Brown

Nature Reserve :	Nonalling NR	Reserve Number :	24428
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	127.0 ha	Vegetation Area :	50.0 ha
Open Water :	77.0 ha (60.63%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	32.33 S, 117.39 E		

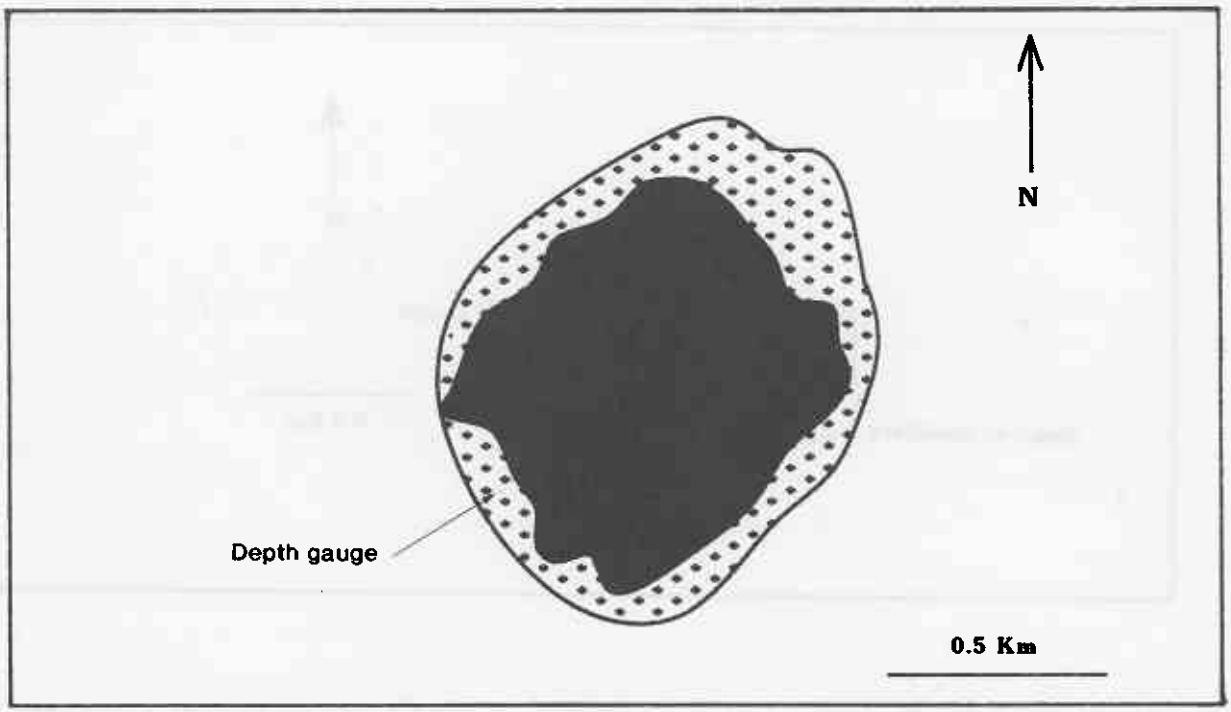
Vegetation Structure :

	Height (m)	% Area	% Cover
grasses	0.20	2	2
herbs	0.02	30	50
samphires	0.20	50	70
trees	4.00	5	5
dead trees	4.00	50	50

A moderate-sized saline lake with a fringe of dead *Melaleuca* sp. shrubs and *Casuarina obesa* trees. A few live *Melaleuca* sp. occur within the inundated area, which is extensively covered by *Sarcocornia quinqueflora*. Above the water mark live *C. obesa* occur.

Plant species list (zones indicated by a single numeral)

3 *Melaleuca* sp.
3 *Sarcocornia quinqueflora*
4 *Casuarina obesa*



Lake Bryde

Nature Reserve :	Lake Bryde NR	Reserve Number :	29021
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	97.0 ha	Vegetation Area :	97.0 ha
Open Water :	0.0 ha (0.0%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	33.21 S, 118.50 E		

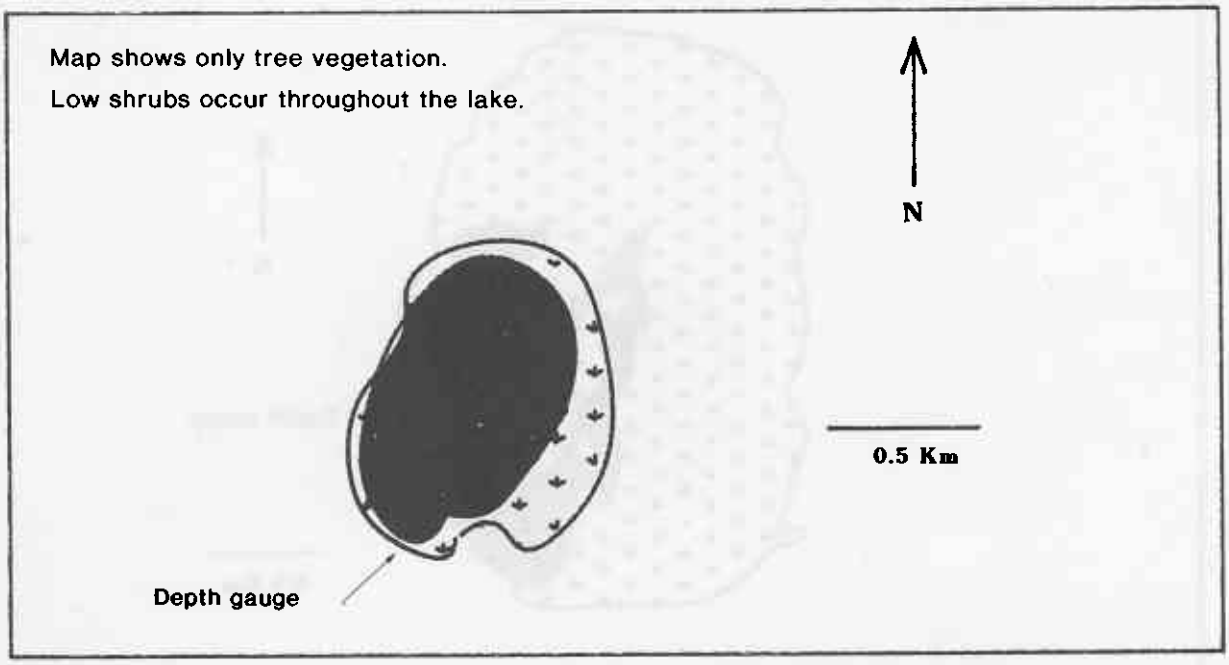
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.70	20	20
shrubs	1.00	80	30
trees	4.00	3	30
trees	10.00	2	30

A moderate-sized fresh lake with the low shrub *Muehlenbeckia* sp. growing across the lake bed. The samphire *Tecticornia verrucosa* also grows in parts of the lake bed. Around the margin of the lake but below the water mark *Melaleuca* sp. and *Eucalyptus occidentalis* occur with a very sparse understorey of *Halosarcia pergranulata* and *Carpobrotus* sp. *Eucalyptus occidentalis* continues above the water mark as eucalypt woodland with the shrubs *Melaleuca ?preissiana* and *M. lateriflora* forming an understorey around high water mark.

Plant species list (zones indicated by a single numeral)

2	*Muehlenbeckia* sp.
2	*Tecticornia verrucosa*
3	*Eucalyptus occidentalis*
3	*Halosarcia pergranulata*
3	*Melaleuca* sp.
4	*#Carpobrotus* sp.
4	*Melaleuca lateriflora*
4	*Melaleuca ?preissiana*



Byenup Lagoon

Nature Reserve :	Lake Muir NR	Reserve Number :	31880
Vesting :	NPNCA	Purpose :	Water and Cons. Flora and Fauna
Lake Area :	572.0 ha	Vegetation Area :	372.0 ha
Open Water :	200.0 ha (34.97%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Brackish
Coordinates :	34.28 S, 116.44 E		

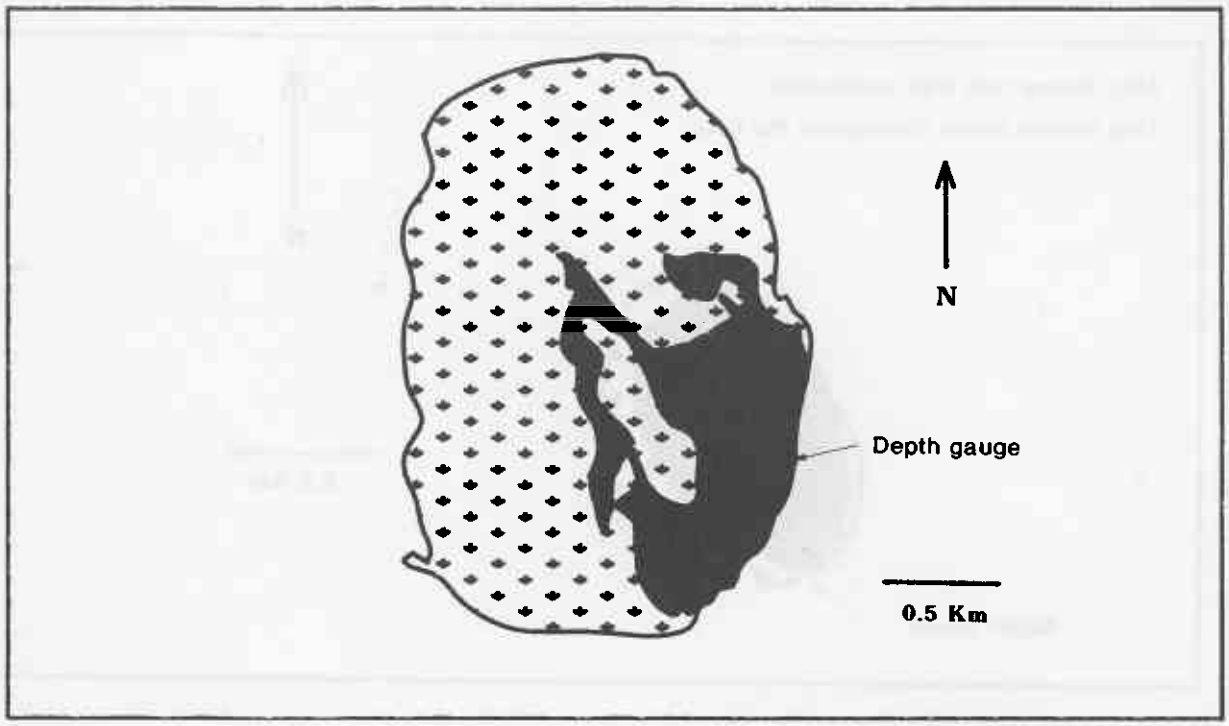
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	2.00	95	100
sedges	1.00	5	100
trees	5.00	5	50

A large brackish sedge lake with a large area of open water and extensive stands of the sedge *Baumea articulata*. On the eastern side there is a narrow belt of *Schoenus brevifolius* between the *B. articulata* and open water. *Melaleuca rhaphiophylla* (up to 10 m high) grows with an understorey of *B. articulata* at the edge of the water and *Gahnia trifida* occurs on higher ground. *Eucalyptus rudis* woodland occurs on the landward side of the *M. rhaphiophylla* belt. Very extensive stands of *B. articulata* occur in the western and northern sectors of the lake. Islands of *B. articulata* occur in the northern part of the lake.

Plant species list (zones indicated by a single numeral)

1 *Baumea articulata*
1 *Schoenus brevifolius*
3 *Gahnia trifida*
3 *Melaleuca rhaphiophylla*
4 *Eucalyptus rudis*



Cairlocup Lake

Nature Reserve :	Cairlocup NR	Reserve Number :	28324
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	284.0 ha	Vegetation Area :	196.0 ha
Open Water :	88.0 ha (30.99%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Hypersaline
Coordinates :	33.44 S, 118.45 E		

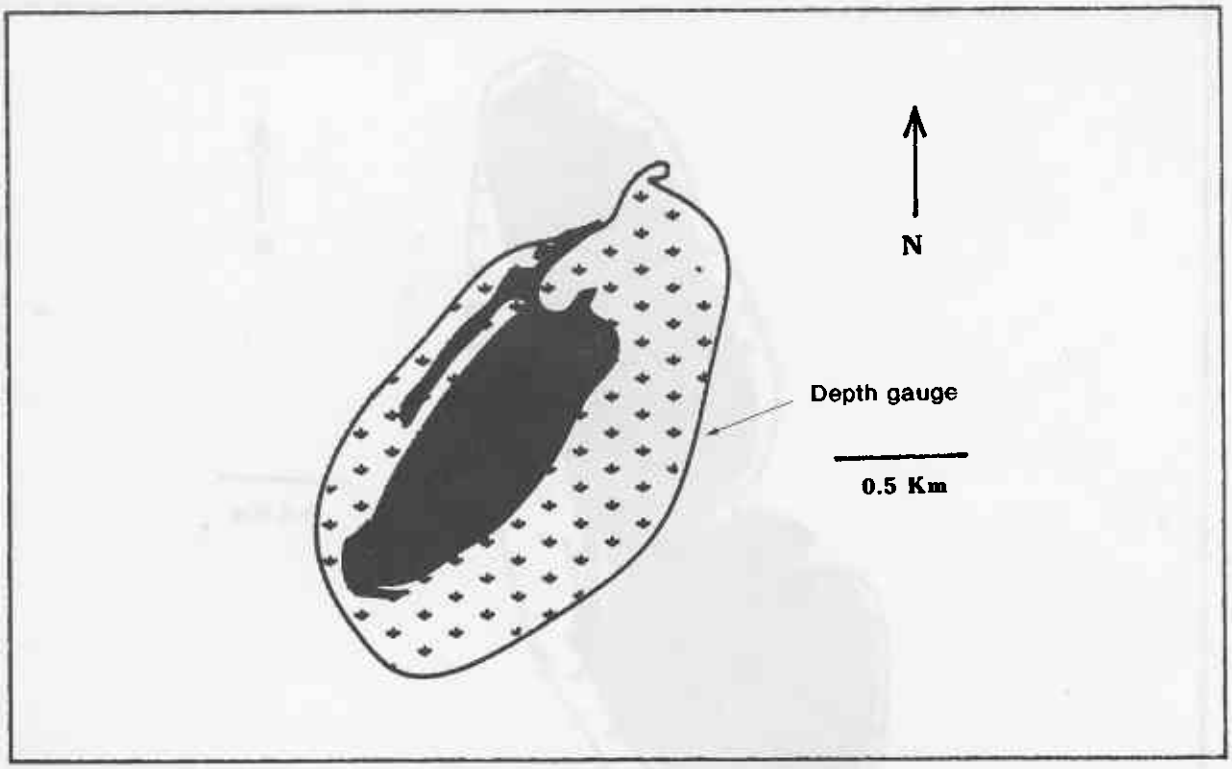
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A large open hypersaline lake with a raised bank around the edge which supports a low shrubland of *Halosarcia halocnemoides* and *H. pergranulata* close to the water's edge and *Lawrencia squamata, H. syncarpa, Schoenus* sp. and *Carpobrotus* sp. higher up the bank. Beyond this the ground level drops and there is more samphire marsh containing *H. halocnemoides, H. pergranulata* and other species before the ground rises to a eucalypt woodland.

Plant species list (zones indicated by a single numeral)

4 *#Carpobrotus* sp.
4 *Halosarcia halocnemoides*
4 *Halosarcia pergranulata*
4 *Halosarcia syncarpa*
4 *Lawrencia squamata*
4 *Schoenus* sp.



Lake Camel

Nature Reserve :	Camel Lake NR	Reserve Number :	26161
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	402.0 ha	Vegetation Area :	114.0 ha
Open Water :	288.0 ha (71.64%)		
Lake Permanence :	Seasonal	Lake Salinity :	Hypersaline
Coordinates :	34.17 S, 118.00 E		

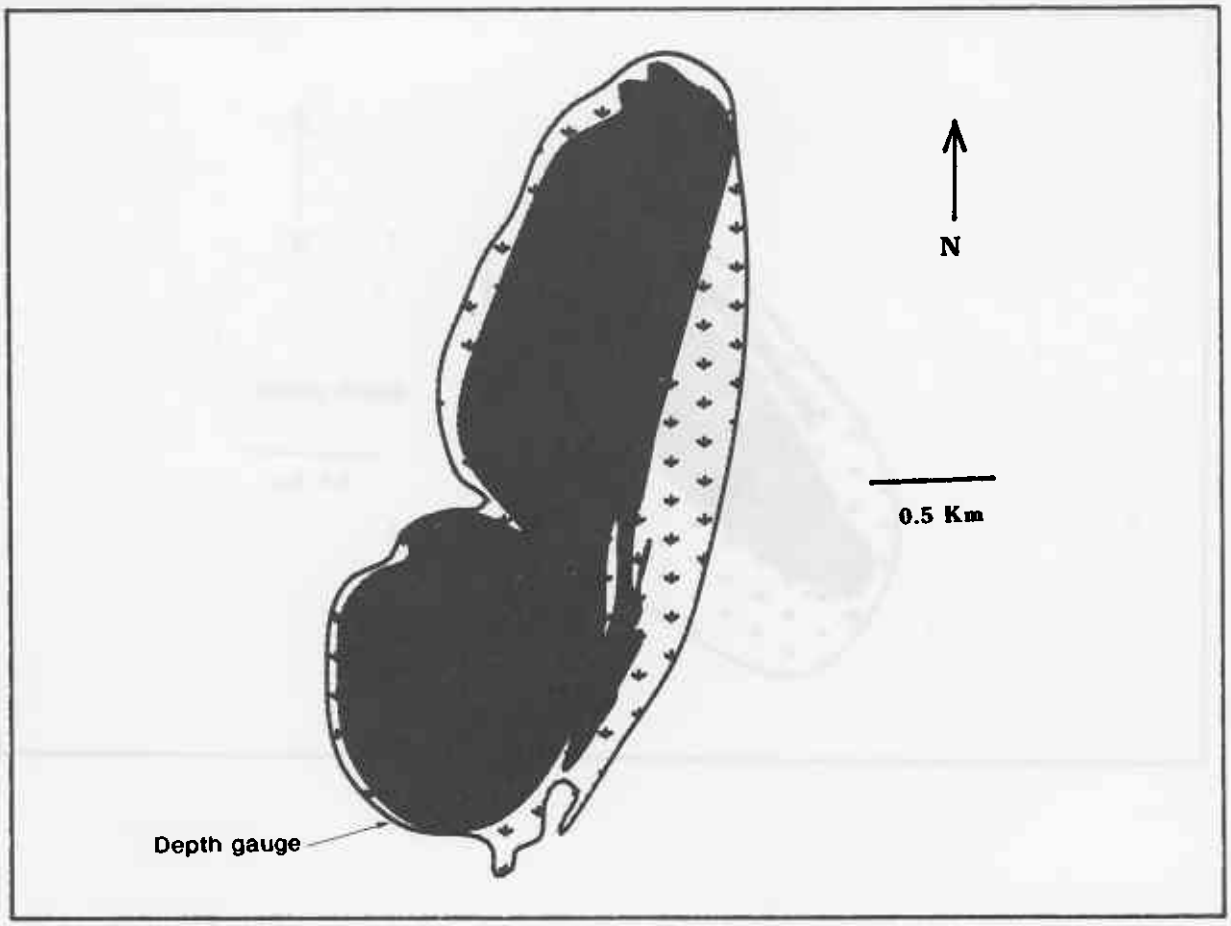
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	100	30

A large open hypersaline lake with a narrow belt of samphire above the water mark containing *Halosarcia pergranulata* and *H. syncarpa*, behind which a belt of *Melaleuca cuticularis* grows on a raised bank around the lake. *Halosarcia halocnemoides* and *Sarcocornia quinqueflora* grow under the *M. cuticularis* together with *Lawrencia squamata* and *Stipa* sp. On the landward side of the *M. cuticularis* belt, the ground drops down to an open marsh that contains the understorey species from the *Melaleuca* zone. On the landward side of the marsh *M. cuticularis* occurs again.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia pergranulata*
3 *Halosarcia syncarpa*
4 *Halosarcia halocnemoides*
4 *Lawrencia squamata*
4 *Melaleuca cuticularis*
4 *Sarcocornia quinqueflora*
4 *Stipa* sp.



Lake Campion

Nature Reserve :	Campion NR	Reserve Number :	24789
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	611.2 ha	Vegetation Area :	0.0 ha
Open Water :	611.2 ha (100.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Hypersaline
Coordinates :	31.09 S, 118.21 E		

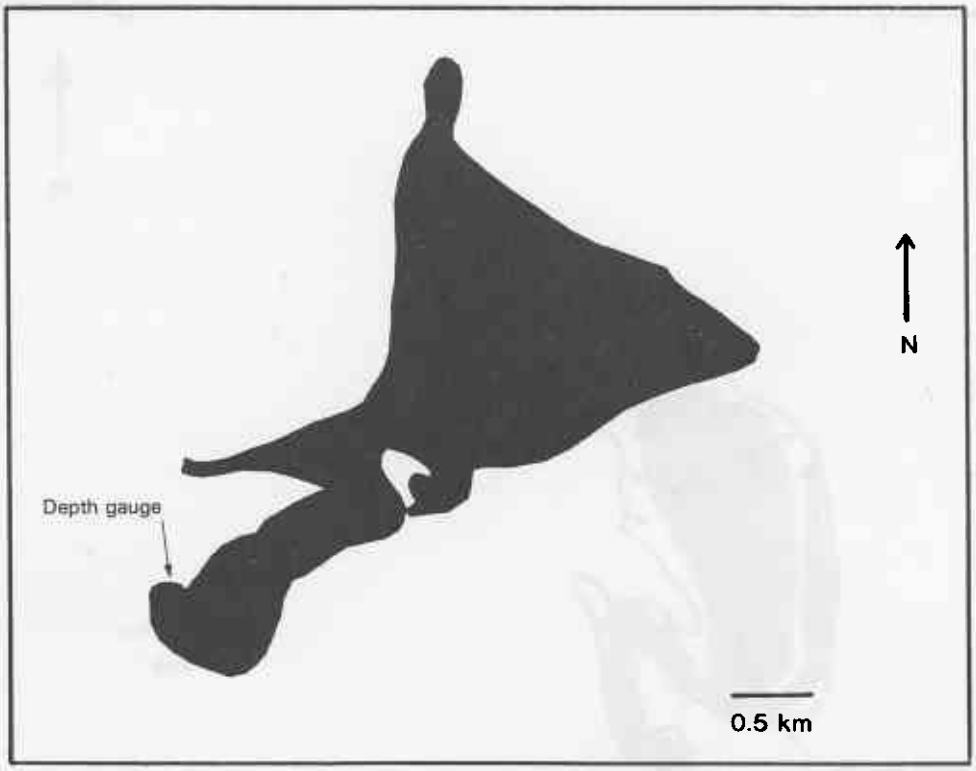
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A very large open hypersaline lake. Above the water mark there is a low shrubland of *Halosarcia pergranulata*, *H. lepidosperma*, *Frankenia* sp. and *Disphyma crassifolium* with larger *Melaleuca* aff. *halmaturorum* interspersed. Salmon gum woodland occurs on higher ground.

Plant species list (zones indicated by a single numeral)

4 *Disphyma crassifolium*
4 *Eucalyptus salmonophloia*
4 *Frankenia* sp.
4 *Halosarcia lepidosperma*
4 *Halosarcia pergranulata*
4 *Melaleuca* aff. *halmaturorum*



Capamouro Lake

Nature Reserve :	Capamouro NR	Reserve Number :	24618
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	145.5 ha	Vegetation Area :	50.0 ha
Open Water :	74.5 ha (64.98%)		
Lake Permanence :	Seasonal	Lake Salinity :	Hypersaline
Coordinates :	29.54 S, 115.56 E		

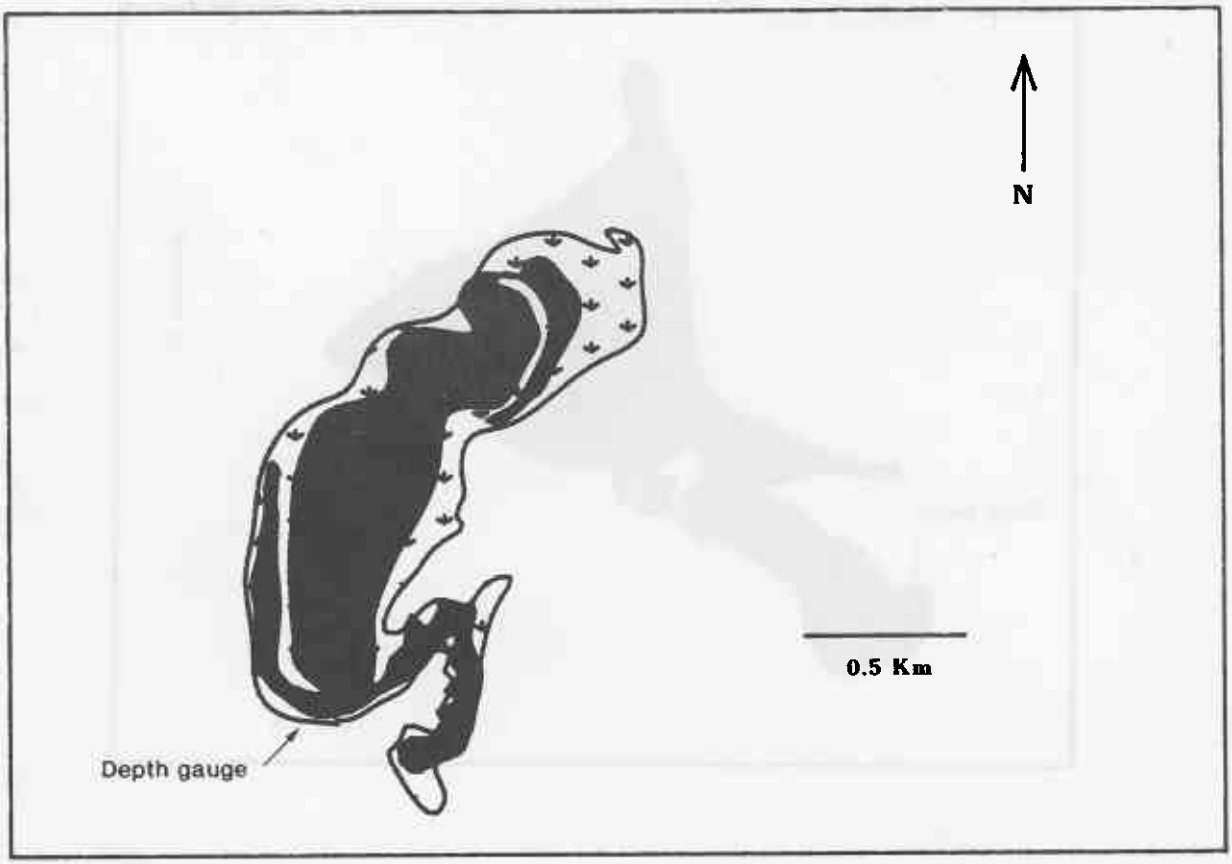
Vegetation Structure :

	Height (m)	% Area	% Cover
grasses	0.05	5	25
herbs	0.05	5	25
samphires	0.50	30	30

A moderate-sized hypersaline lake with a belt of dead *Casuarina obesa* above the high water mark, interspersed with occasional live *C. obesa* and *Melaleuca* sp. *Halosarcia halocnemoides* grows beneath the trees. Below the water mark there is a broad belt of samphire consisting of *Halosarcia fimbriata* and *H. indica* ssp. *bidens*.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia fimbriata*
3 *Halosarcia indica* ssp. *bidens*
4 *Casuarina obesa*
4 *Halosarcia halocnemoides*
4 *Melaleuca* sp.



Casuarina Lake

Nature Reserve :	Coblinine NR	Reserve Number :	25136
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	57.7 ha	Vegetation Area :	41.0 ha
Open Water :	16.7 ha (28.94%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.39 S, 117.45 E		

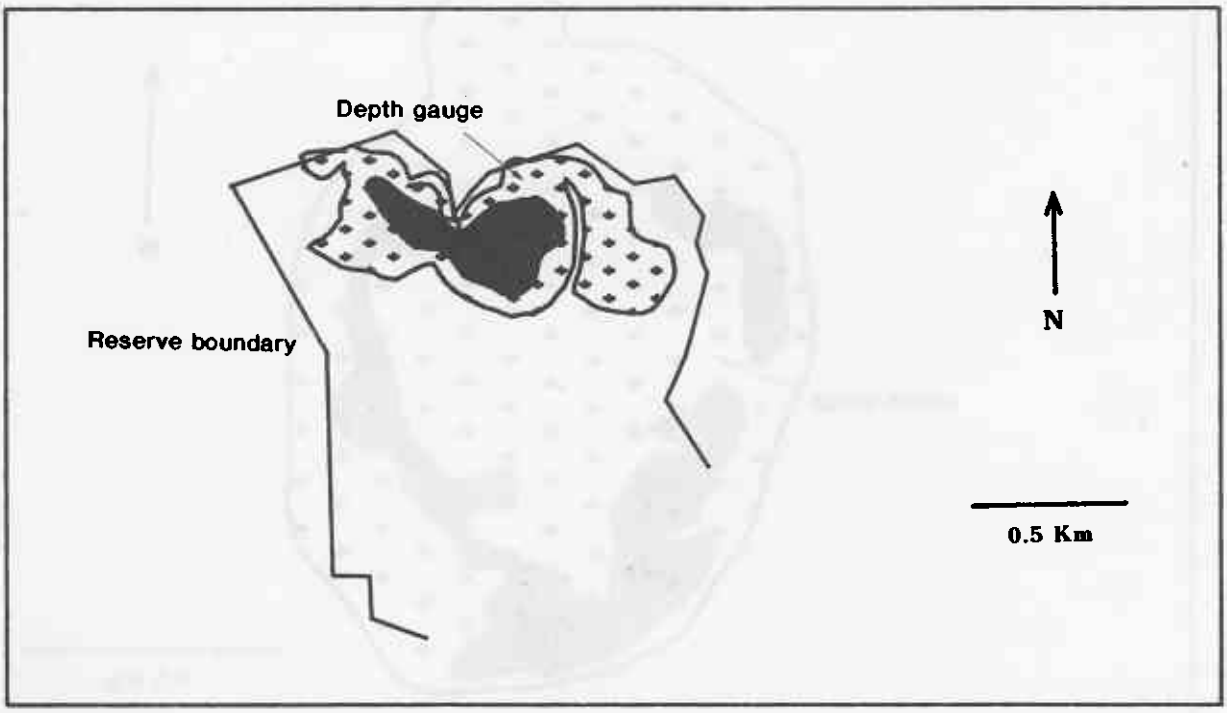
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	5	70
dead shrubs	2.00	100	30
dead trees	5.00	100	10

A moderate-sized saline lake containing an extensive area of dense thickets and more scattered dead trees. At the edge of the lake below the water mark there is a narrow belt of the samphire *Sarcocornia quinqueflora* with occasional shrubs of *Melaleuca uncinata*. Above the water mark *Halosarcia indica* ssp. *bidens* and *H. lepidosperma* grow under a 2-3 m high thicket of *Melaleuca* sp. and under a woodland of *Melaleuca uncinata* and *Casuarina obesa* growing behind the thicket. A few *Hakea* sp. and unhealthy *Eucalyptus* sp. grow in the woodland.

Plant species list (zones indicated by a single numeral)

3 *Melaleuca uncinata*
3 *Sarcocornia quinqueflora*
4 *Casuarina obesa*
4 *Eucalyptus* sp.
4 *Hakea* sp.
4 *Halosarcia indica* ssp. *bidens*
4 *Halosarcia lepidosperma*
4 *Melaleuca* sp.



Lake Chandala

Nature Reserve :	Chandala NR	Reserve Number :	37060
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	97.2 ha	Vegetation Area :	72.0 ha
Open Water :	25.2 ha (25.90%)		
Lake Permanence :	Permanent	Lake Salinity :	Fresh
Coordinates :	31.30 S, 115.58 E		

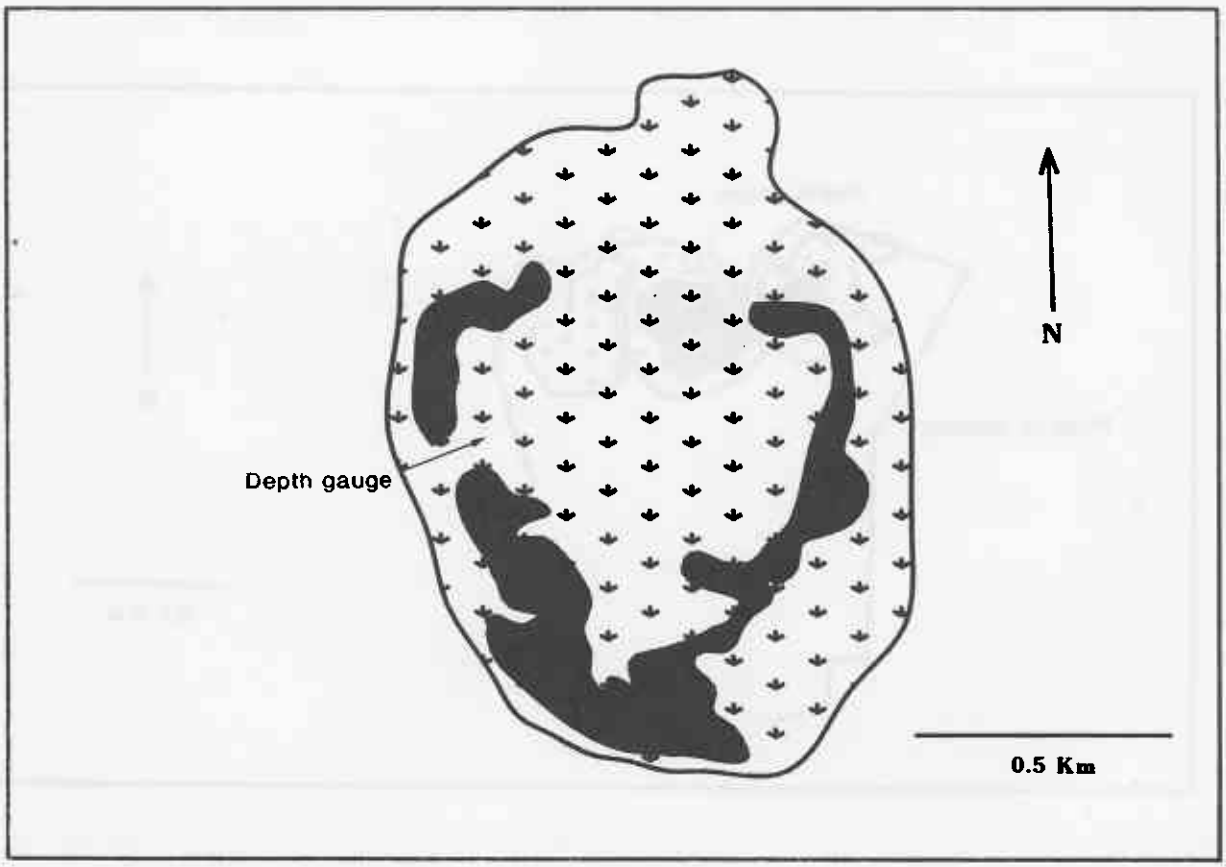
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.10	30	50
trees	5.00	15	100
trees	7.00	40	100
trees	10.00	15	100

A moderate-sized fresh closed *Melaleuca* swamp. The area of open water around the depth gauge is surrounded by large *Melaleuca rhaphiophylla*, behind which is a very dense thicket of *M. rhaphiophylla* saplings. A dense belt of *Eucalyptus rudis* occurs at the rear of the *M. rhaphiophylla* and this is replaced by further thickets of *M. rhaphiophylla*. Towards the edge of the lake, within the flooded zone, there are occasional *Melaleuca uncinata* interspersed amongst the samphire *Sarcocornia blackiana*. At the lake edge and above the waterline there is a low open grassland of *Sporobolus virginicus*. There is no tree vegetation around the wetland because the area was cleared for farmland before becoming a reserve.

Plant species list (zones indicated by a single numeral)

1	*Melaleuca rhaphiophylla*
2	*Eucalyptus rudis*
2	*Melaleuca uncinata*
2	*Sarcocornia blackiana*
3	*Sporobolus virginicus*



Lake Chittering

Nature Reserve :	Chittering Lakes NR	Reserve Number :	29538
Vesting :	NPNCA	Purpose :	Cons. Fauna
Lake Area :	148.0 ha	Vegetation Area :	79.0 ha
Open Water :	69.0 ha (46.62%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Brackish
Coordinates :	31.30 S, 115.58 E		

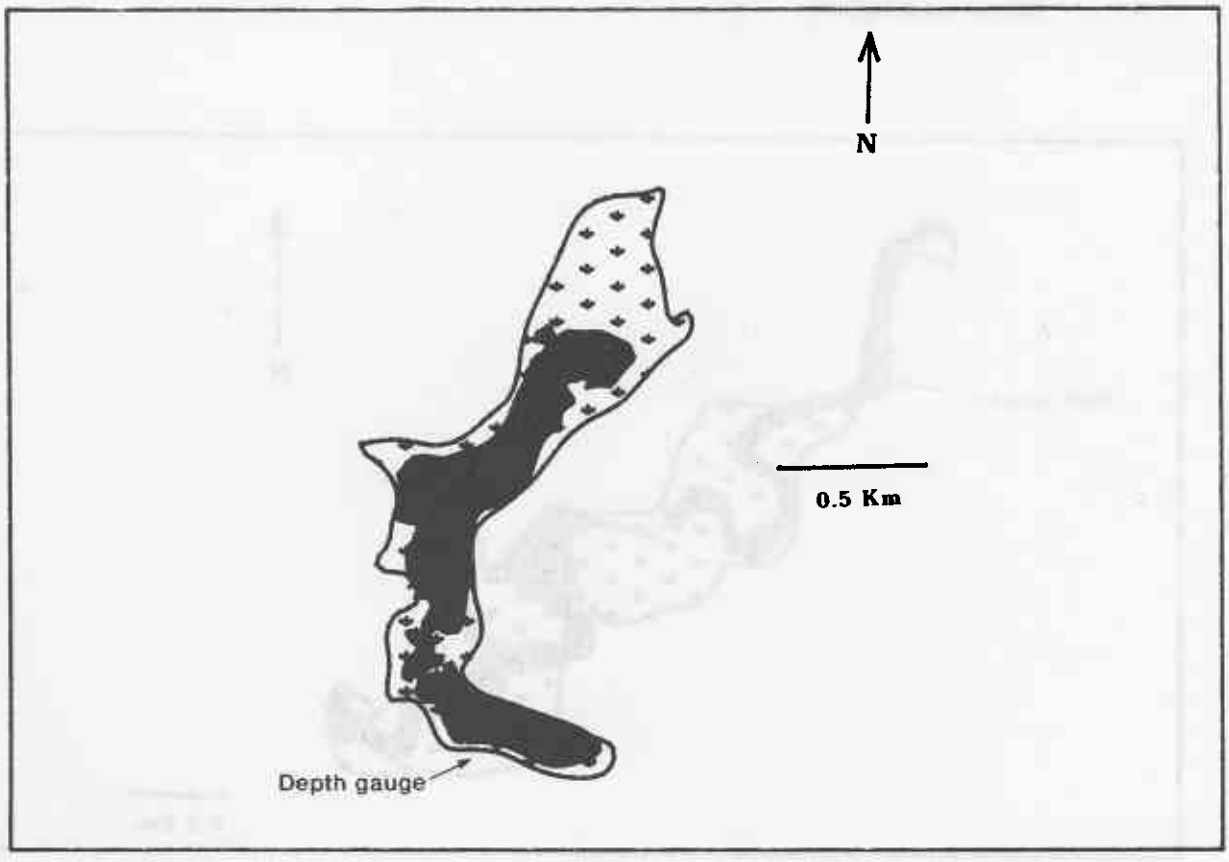
Vegetation Structure :

	Height (m)	% Area	% Cover
shrubs	1.00	1	50
shrubs	3.00	20	60
trees	6.00	100	70

A moderate-sized lake with a controlled water level. It becomes brackish as water levels decline in summer. Occasional *Melaleuca teretifolia* and *M. rhaphiophylla* shrubs occur throughout the wetland and *M. rhaphiophylla* grows profusely on some islands at the north-western end of the lake, although some of these trees have died from water-logging. Around the edge of the lake, within the flooded zone, there is a dense 20 m wide belt of large *Melaleuca rhaphiophylla*. Above high water there are occasional *M. rhaphiophylla* and *Eucalyptus rudis* in cleared farmland.

Plant species list (zones indicated by a single numeral)

1 *Melaleuca rhaphiophylla*
1 *Melaleuca teretifolia*
4 *Eucalyptus rudis*



Coblinine River

Nature Reserve :	Coblinine NR	Reserve Number :	25134
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	191.8 ha	Vegetation Area :	142.0 ha
Open Water :	49.8 ha (25.96%)		
Lake Permanence :	Permanent	Lake Salinity :	Saline
Coordinates :	33.23 S, 117.42 E		

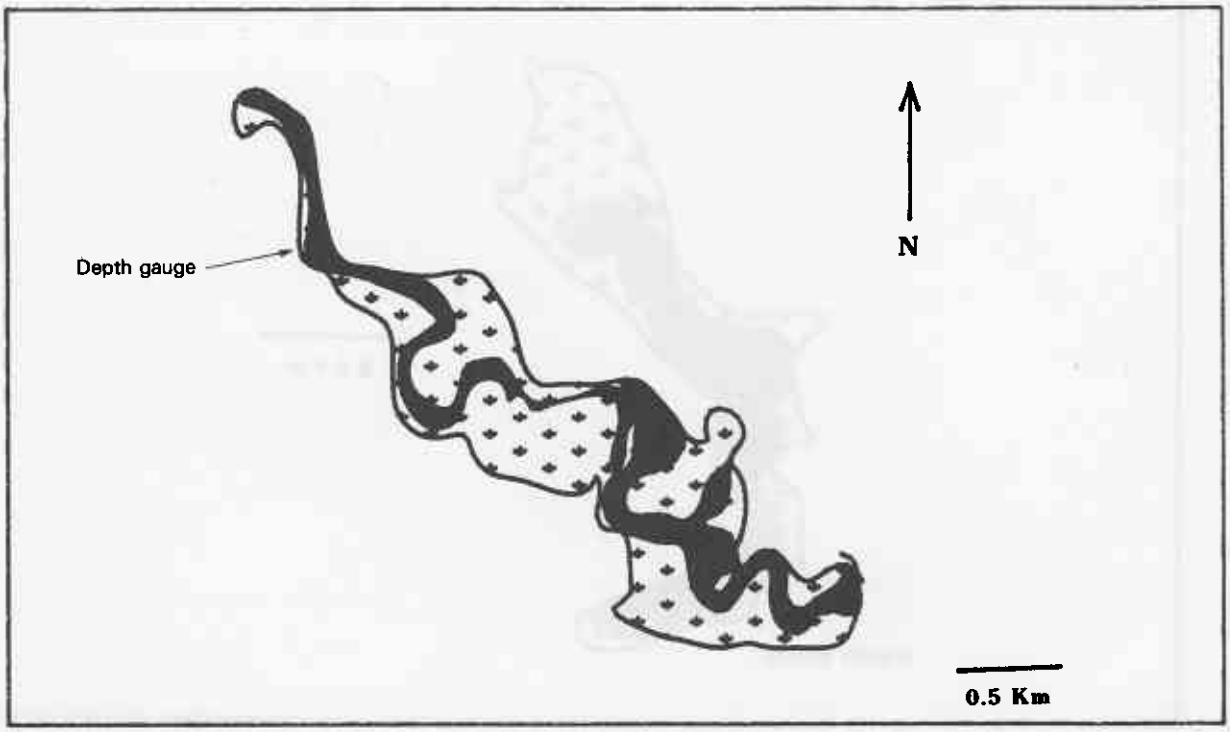
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.30	1	5
seedlings	0.50	10	20
shrubs	3.00	1	90
dead shrubs	3.00	1	50
dead trees	5.00	100	10

A moderate-sized lagoon in the river with steep sides and a fringing belt of *Eucalyptus* sp. high on the banks. The water level in the river is very variable but below the flood mark all trees are dead. These dead trees are not numerous. In some areas thickets of *Melaleuca* sp. regrowth (to 3 m high) have become established in the flood zone, in other areas there are similar dead thickets. Occasional *Casuarina obesa* and *Eucalyptus* sp. seedlings occur in the thickets. There is a sparse covering of samphire on the banks of the river with *Halosarcia lepidosperma* and *H. pergranulata* growing below the flood line and *H. doleiformis* occurring higher up the bank. Above the water mark there is a narrow band of *Melaleuca* sp. shrubs and some *C. obesa* before eucalypt woodland becomes dominant. Additional information is given by Keating and Trudgen (1986).

Plant species list (zones indicated by a single numeral)

3 *Halosarcia lepidosperma*
3 *Halosarcia pergranulata*
3 *Melaleuca* sp.
4 *Casuarina obesa*
4 *Eucalyptus* sp.
4 *Halosarcia doleiformis*



Lake Coomelberrup

Nature Reserve :	Coomelberrup NR	Reserve Number :	10472
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	90.6 ha	Vegetation Area :	48.5 ha
Open Water :	42.1 ha (46.47%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Saline
Coordinates :	33.24 S, 117.47 E		

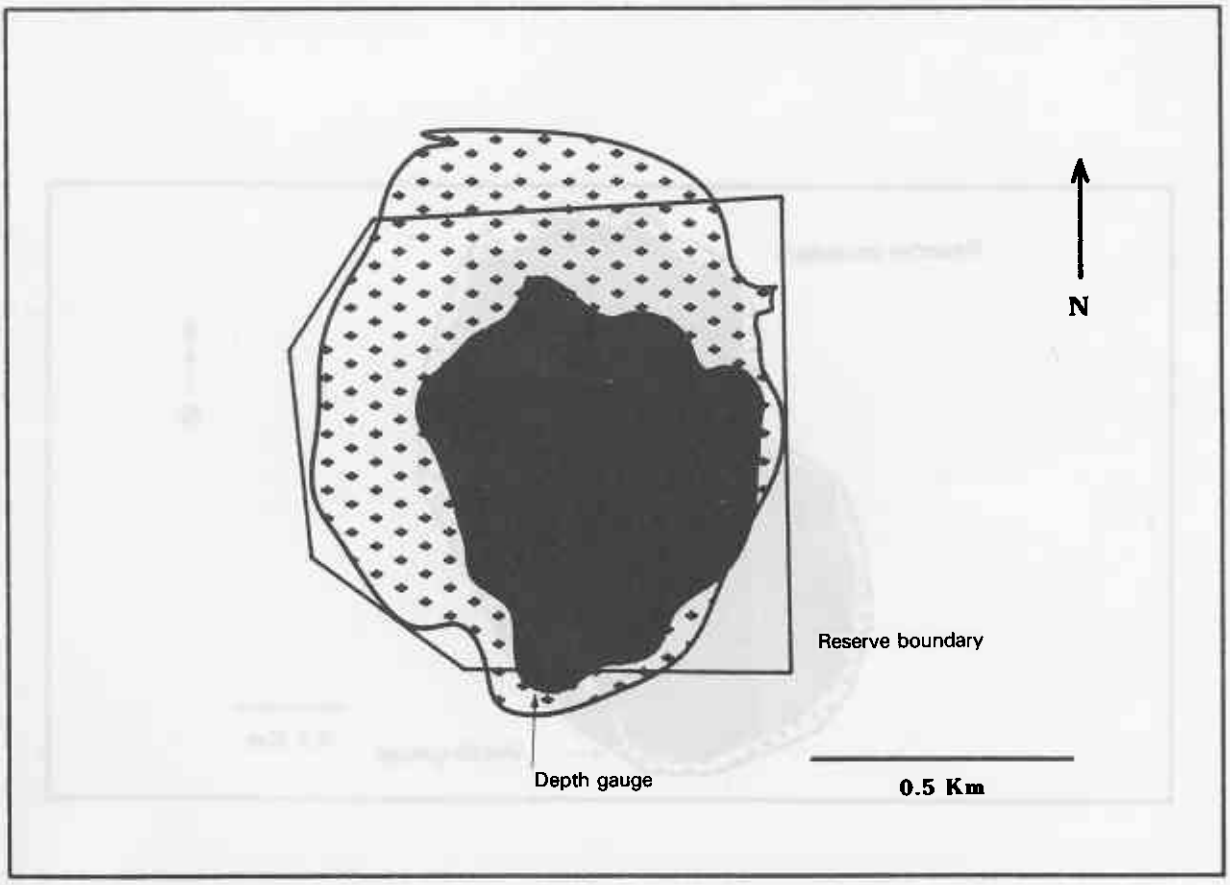
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	40	20
shrubs	2.00	40	5
trees	4.00	10	30
dead shrubs	2.00	40	5
dead trees	4.00	70	50

A moderate-sized lake with extensive areas of recently-dead trees on the western side. There is a dense belt of dead trees (50 - 100 m wide) around most of the lake below the water mark with scattered live *Melaleuca* sp. trees close to the shore. A sparse understorey of *Halosarcia lepidosperma* and *H. pergranulata* occurs beneath the dead and live trees. Above the water mark there are occasional *Casuarina obesa*, which are replaced by eucalypt woodland farther up the slope.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia lepidosperma*
3 *Halosarcia pergranulata*
3 *Melaleuca* sp.
4 *Casuarina obesa*



Lake Coyrecup

Nature Reserve :	Coyrecup NR	Reserve Number :	28552
Vesting :	NPNCA	Purpose :	Flora, Fauna and Recreation
Lake Area :	448.0 ha	Vegetation Area :	89.0 ha
Open Water :	359.0 ha (80.13%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Saline
Coordinates :	33.43 S, 117.51 E		

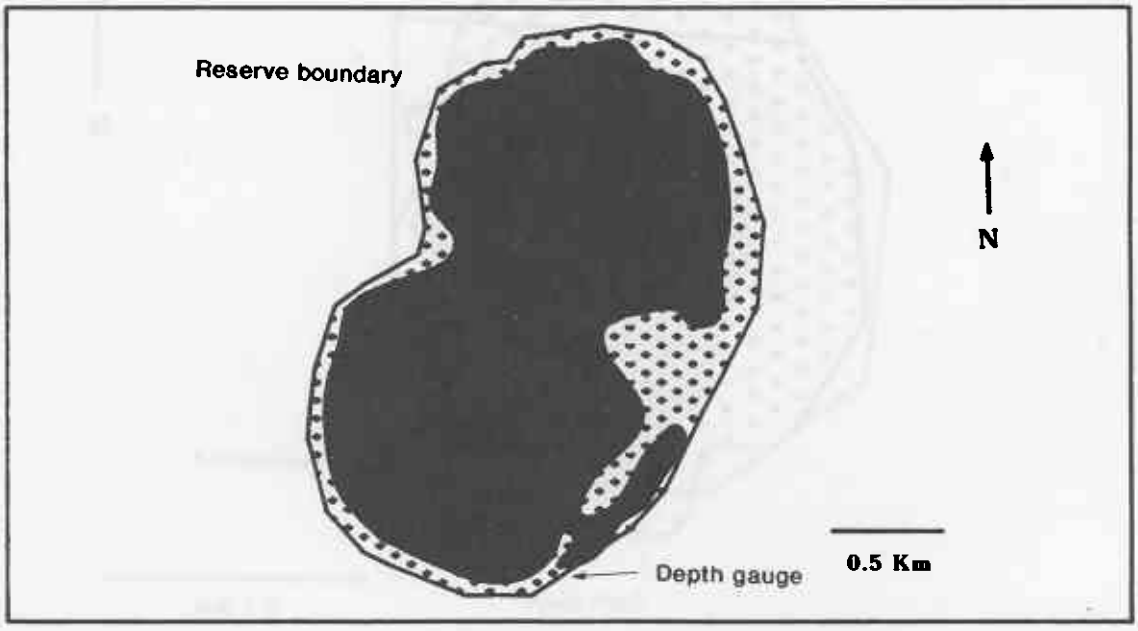
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.30	90	50
dead trees	8.00	100	5
dead trees	3.00	50	70

A large saline lake with extensive areas of dead trees. Around the open water the dead trees consist of very old stags, towards the shore some of the trees have died more recently and along the shoreline there are areas of recently-dead, 3 m high *Melaleuca* sp. shrubs. Throughout the dead tree zone and extending above the water mark there is an understorey of samphire consisting of *Halosarcia pergranulata, Sarcocornia quinqueflora* and *H. lepidosperma* (above water mark). Around the edge of the lake are a few unhealthy *Melaleuca cuticularis,* behind which is a belt of *Casuarina obesa* and dead *Eucalyptus* sp. Additional information is given by Lyons (1988).

Plant species list (zones indicated by a single numeral)

3	*Halosarcia pergranulata*
3	*Melaleuca cuticularis*
3	*Sarcocornia quinqueflora*
4	*Casuarina obesa*
4	*Halosarcia lepidosperma*



Crackers Swamp - Main Lake

Nature Reserve :	Namming NR	Reserve Number :	28558
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	74.8 ha	Vegetation Area :	64.0 ha
Open Water :	10.7 ha (14.34%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	30.54 S, 115.35 E		

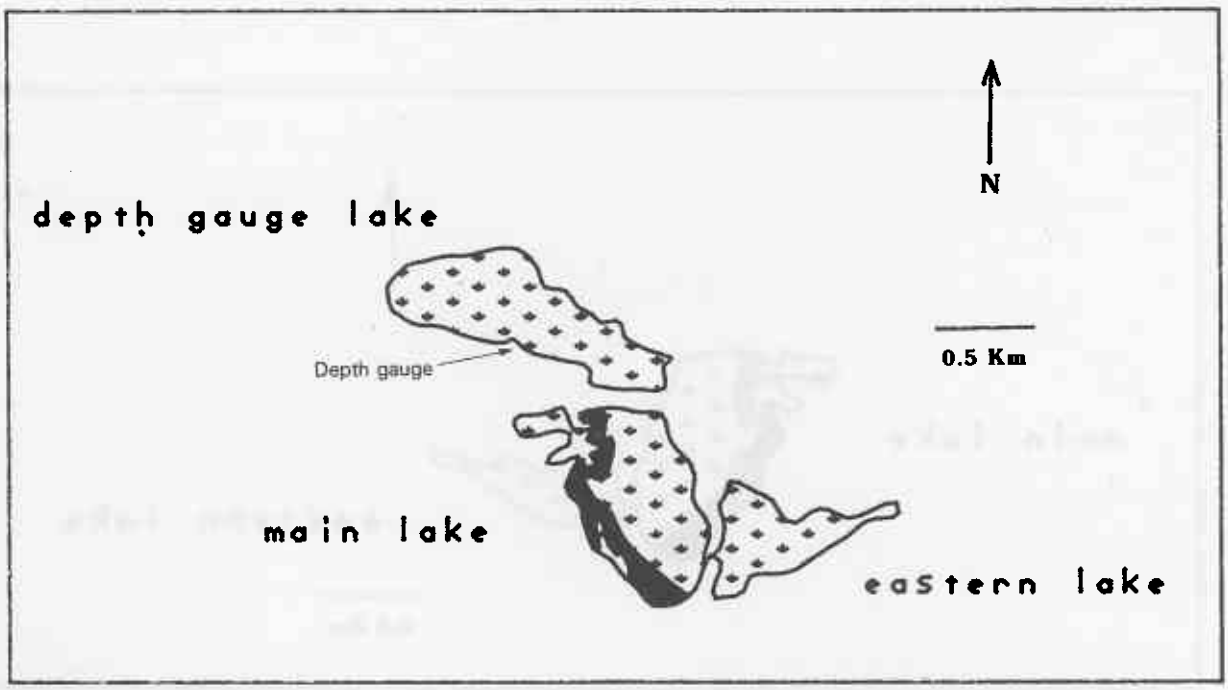
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	0.60	10	20
shrubs	2.00	50	50
trees	7.00	30	30
dead trees	9.00	10	5

A moderate-sized fresh lake with extensive open stands of shrubs or low trees of *Melaleuca rhaphiophylla* and *M. teretifolia* through most of the lakes interspersed with small areas of open water. There are a few dead *M. rhaphiophylla* trees in the lake and numerous live trees closer to the shore. Just inside the water mark there is a dense belt of *M. rhaphiophylla* and *M. preissiana* with an understorey of *Anarthria* sp. and an unidentified sedge, as well as the shrubs *Astartea fascicularis* and *Regelia ciliata* in the landward half of the *Melaleuca* zone where *M. preissiana* grows.

Plant species list (zones indicated by a single numeral)

2	*Melaleuca rhaphiophylla*
2	*Melaleuca teretifolia*
3	*Anarthria* sp.
3	*Astartea fascicularis*
3	Cyperaceae sp.
3	*Melaleuca preissiana*
3	*Regelia ciliata*



Crackers Swamp - Eastern Lake

Nature Reserve :	Namming NR	Reserve Number :	28558
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	34.7 ha	Vegetation Area :	34.7 ha
Open Water :	0.0 ha (0.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	30.54 S, 115.35 E		

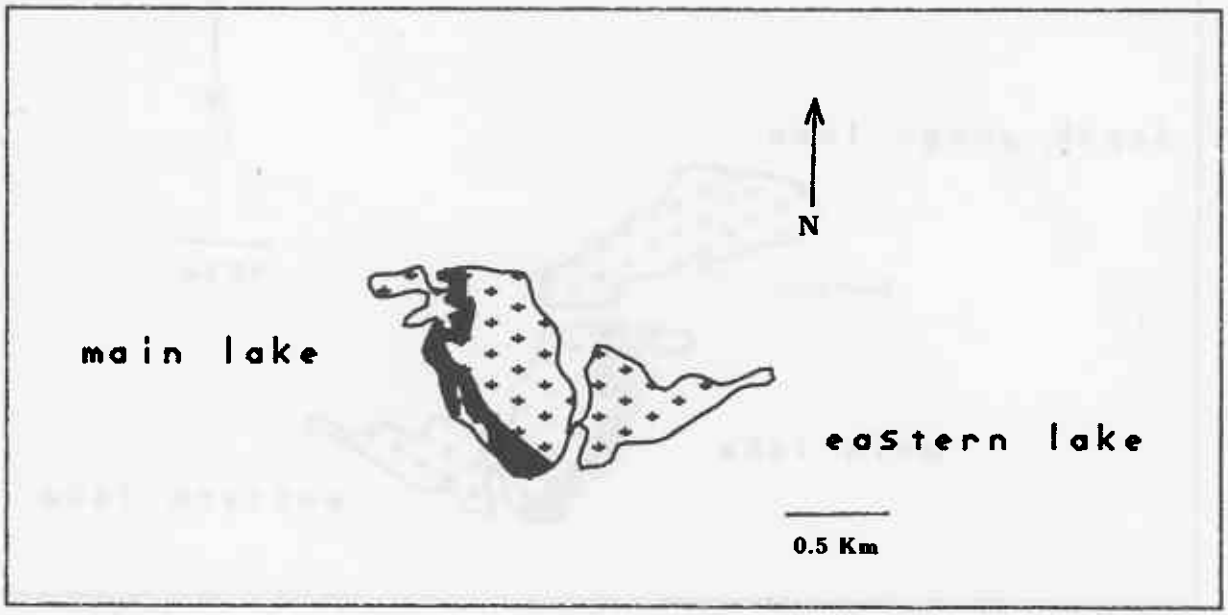
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	0.60	30	50
shrubs	2.00	50	70
trees	8.00	40	30

A slightly smaller wetland than the main lake with virtually no open water and more complex vegetation. In the lake bed there are dense stands of *Melaleuca teretifolia* shrubs and *M. rhaphiophylla* saplings and trees. Along the shore there are a few patches of *Baumea articulata* and scattered areas of *Anarthria* sp. Behind these, below the water mark, *M. rhaphiophylla* and *M. preissiana* trees occur with an understorey of the sedges *Leptocarpus coangustatus*, *L. aristatus* and *Lepidosperma* sp. and shrubs *Regelia ciliata*, *Astartea fascicularis*, *Hakea varia* and *H. sulcata*.

Plant species list (zones indicated by a single numeral)

2	*Melaleuca rhaphiophylla*
2	*Melaleuca teretifolia*
3	*Anarthria* sp.
3	*Astartea fascicularis*
3	*Hakea sulcata*
3	*Hakea varia*
3	*Leptocarpus aristatus*
3	*Leptocarpus coangustatus*
3	*Lepidosperma* sp.
3	*Melaleuca preissiana*
3	*Regelia ciliata*



Crackers Swamp - Depth Gauged Lake

Nature Reserve :	Namming NR	Reserve Number :	28558
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	65.8 ha	Vegetation Area :	64.4 ha
Open Water :	1.4 ha (2.13%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	30.54 S, 115.35 E		

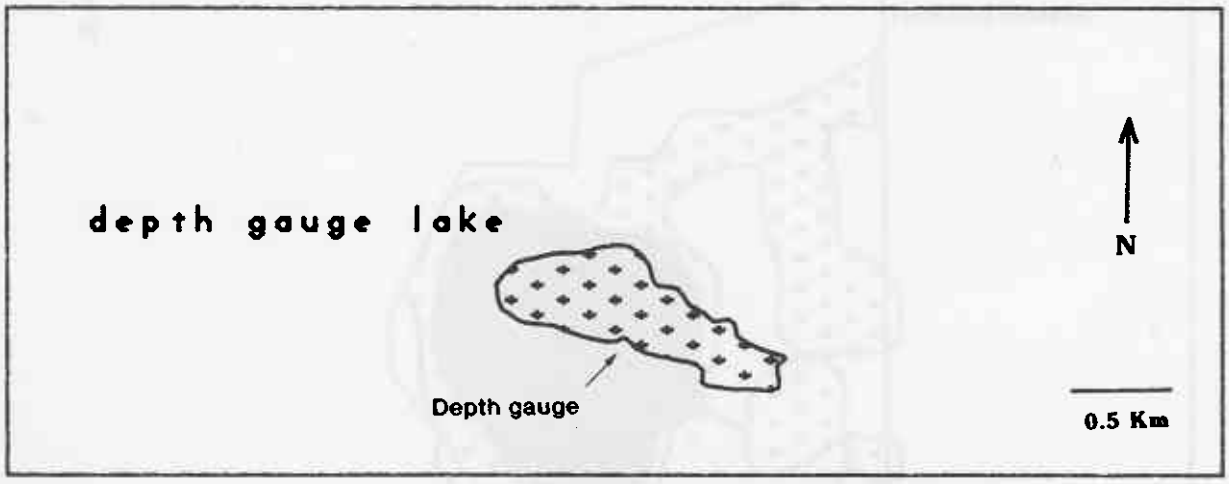
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	0.60	20	80
sedges	2.00	5	20
shrubs	2.00	5	60
trees	6.00	20	20

A similar-sized wetland to the main lake but more densely vegetated. *Melaleuca teretifolia* occurs throughout the inundated area as 3 m high shrubs together with *M. rhaphiophylla* saplings and trees. *Lepidosperma* aff. *tenue* often grows around the bases of shrubs and trees. Around the shore, on and below the water mark, there is an extensive band of sedges. The main species is *Anarthria* sp. but *Lepidosperma effusum, Juncus pallidus, Cyperus* sp., *Schoenus brevifolius* and an unidentified sedge also occur. *Melaleuca rhaphiophylla* trees and *M. teretifolia* shrubs grow in this band as well as in the lake bed. At the western end of the lake there is a large area of *Baumea articulata* growing below the water mark under *M. rhaphiophylla* trees.

Plant species list (zones indicated by a single numeral)

2	*Baumea articulata*
2	Cyperaceae sp.
2	*Lepidosperma* aff. *tenue*
2	*Melaleuca rhaphiophylla*
2	*Melaleuca teretifolia*
2	*Schoenus brevifolius*
3	*Anarthria* sp.
3	*Juncus pallidus*
3	*Lepidosperma effusum*
3	*Schoenus* sp.



Cranbrook 25812

Nature Reserve :	Salt Lake NR	Reserve Number :	25812
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	82.4 ha	Vegetation Area :	49.1 ha
Open Water :	33.3 ha (40.41%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	34.18 S, 117.48 E		

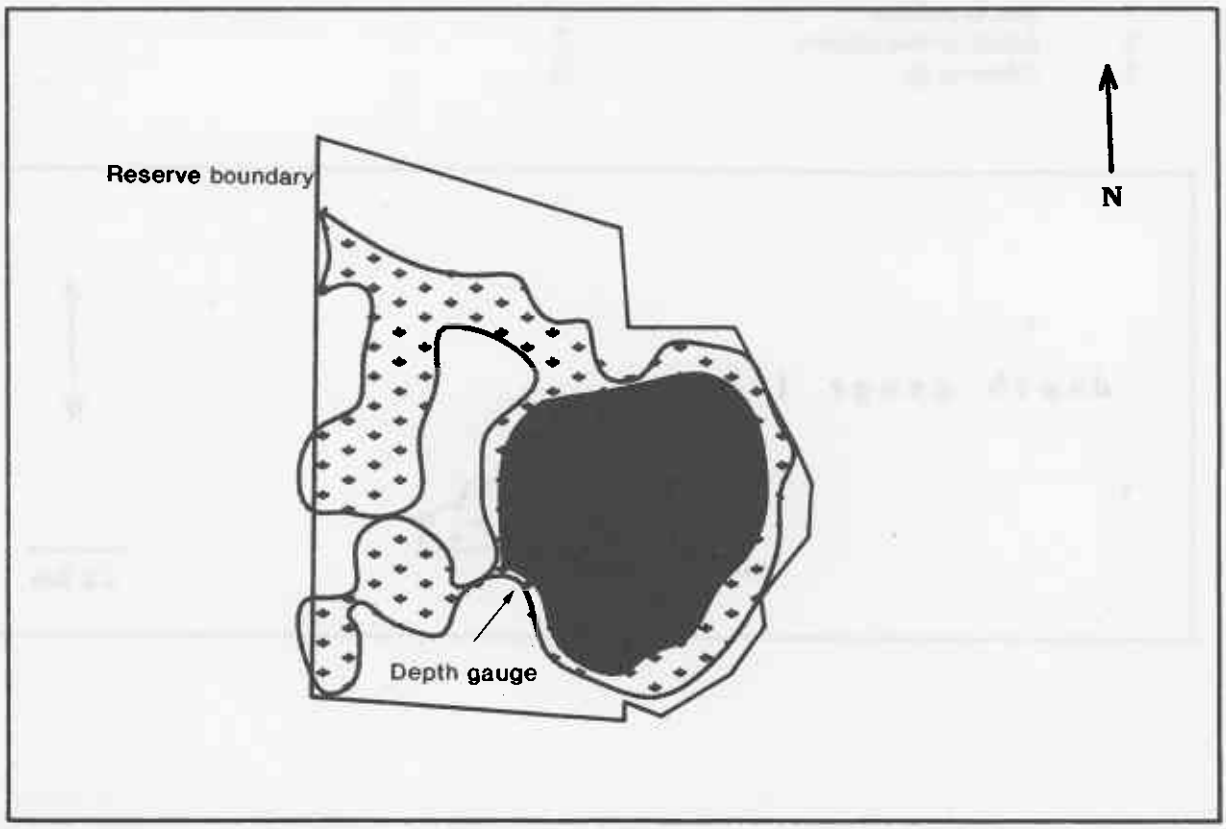
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A moderate-sized completely open lake with a raised bank outside the water mark that supports *Halosarcia pergranulata* and *Sarcocornia quinqueflora*. Behind the bank is a lower area of samphire marsh dominated by *H. lepidosperma* and *H. syncarpa*. *Crassula* sp. occurs commonly in the marsh. At the rear of the marsh there is an open woodland of *Melaleuca cuticularis* with an understorey consisting of *Gahnia ?trifida*. The *M. cuticularis* is gradually replaced by a eucalypt woodland.

Plant species list (zones indicated by a single numeral)

4	*#Crassula* sp.
4	*Gahnia ? trifida*
4	*Halosarcia lepidosperma*
4	*Halosarcia pergranulata*
4	*Halosarcia syncarpa*
4	*Melaleuca cuticularis*
4	*Sarcocornia quinqueflora*



Lake Cronin

Nature Reserve :	Lake Cronin NR	Reserve Number :	36256
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	13.1 ha	Vegetation Area :	9.1 ha
Open Water :	4.0 ha (30.53%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Fresh
Coordinates :	32.23 S, 119.48 E		

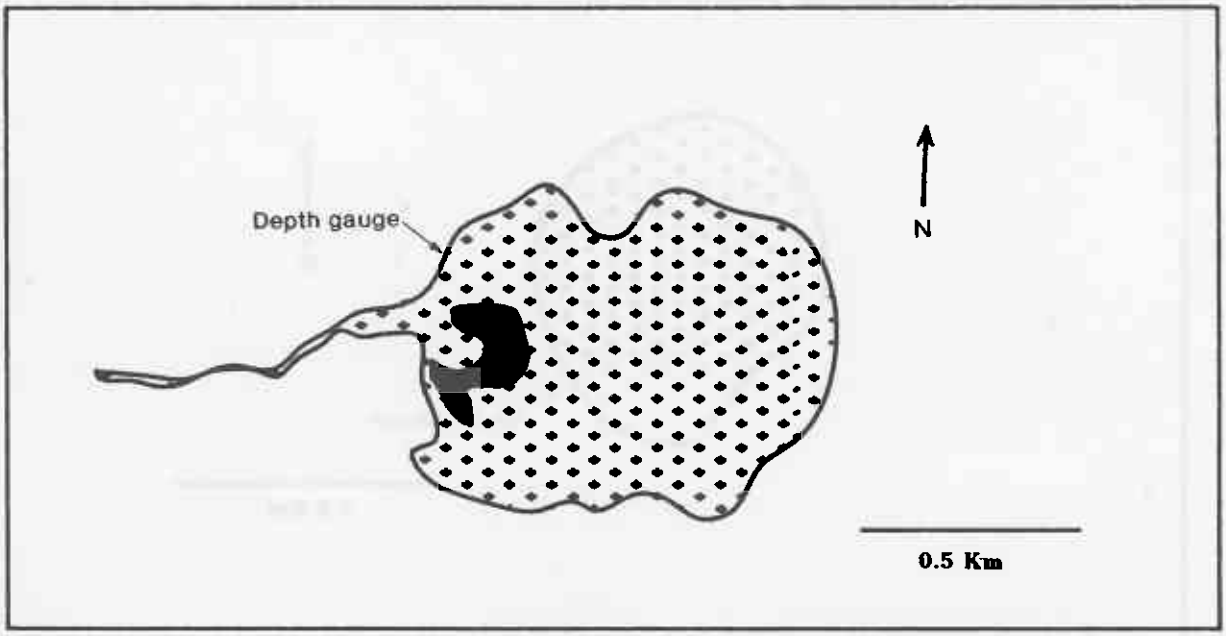
Vegetation Structure :

	Height (m)	% Area	% Cover
herbs	0.30	70	40
trees	8.00	30	70
trees	3.00	2	20

A small fresh lake fringed with an extensive dense thicket of *Melaleuca lanceolata* interspersed with occasional trees of the same species. In January 1988 the centre of the lake was dry and covered with a dense herbland of *Goodenia viscida* and *Glycyrrhiza acanthocarpa*. In October 1986 when the lake contained about 0.2 m of water *Morgania floribunda*, the grass *Amphibromus neesii* and the sedge *Eleocharis acuta* were also present.

Plant species list (zones indicated by a single numeral)

2 *Amphibromus neesii*
2 *Eleocharis acuta*
2 *Glycyrrhiza acanthocarpa*
2 *Goodenia viscida*
2 *Morgania floribunda*
3 *Melaleuca lanceolata*



Dobaderry Swamp

Nature Reserve :	Dobaderry NR	Reserve Number :	34442
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	63.0 ha	Vegetation Area :	63.0 ha
Open Water :	0.0 ha (0.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	32.13 S, 116.38 E		

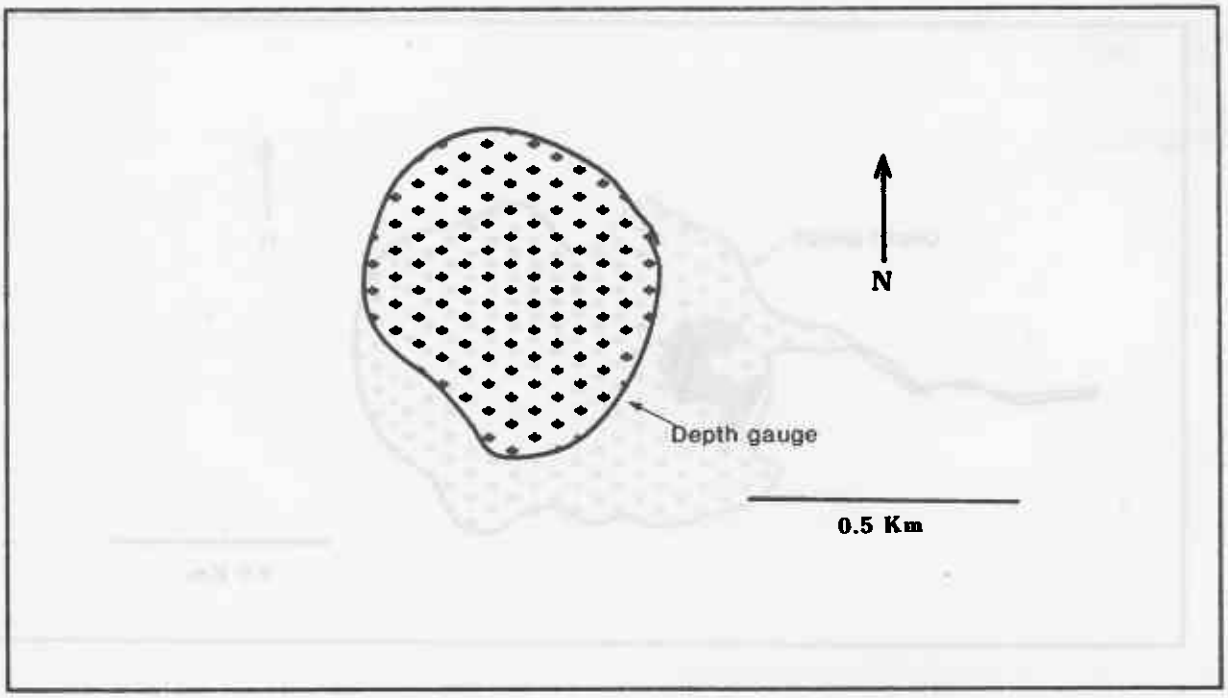
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	0.60	60	100
shrubs	1.50	90	10

A small fresh swamp covered by a dense 1.5 m high shrubland of *Melaleuca lateritia*. The sedge *Leptocarpus coangustatus* grows extensively among the *M. lateritia* and the small herb *Chorizandra enodis* covers the ground when the swamp is dry. Occasional 2 m high shrubs of *Melaleuca* aff. *hamulosa* also occur within the wetland. Above the water mark there is a shrubland of *M.* aff. *hamulosa*.

Plant species list (zones indicated by a single numeral)

2	*Chorizandra enodis*
2	*Leptocarpus coangustatus*
2	*Melaleuca lateritia*
3	*Melaleuca* aff. *hamulosa*



Lake Dulbining

Nature Reserve :	Unnamed	Reserve Number :	9617
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	72.0 ha	Vegetation Area :	72.0 ha
Open Water :	0.0 ha (0.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Brackish
Coordinates :	32.54 S, 117.37 E		

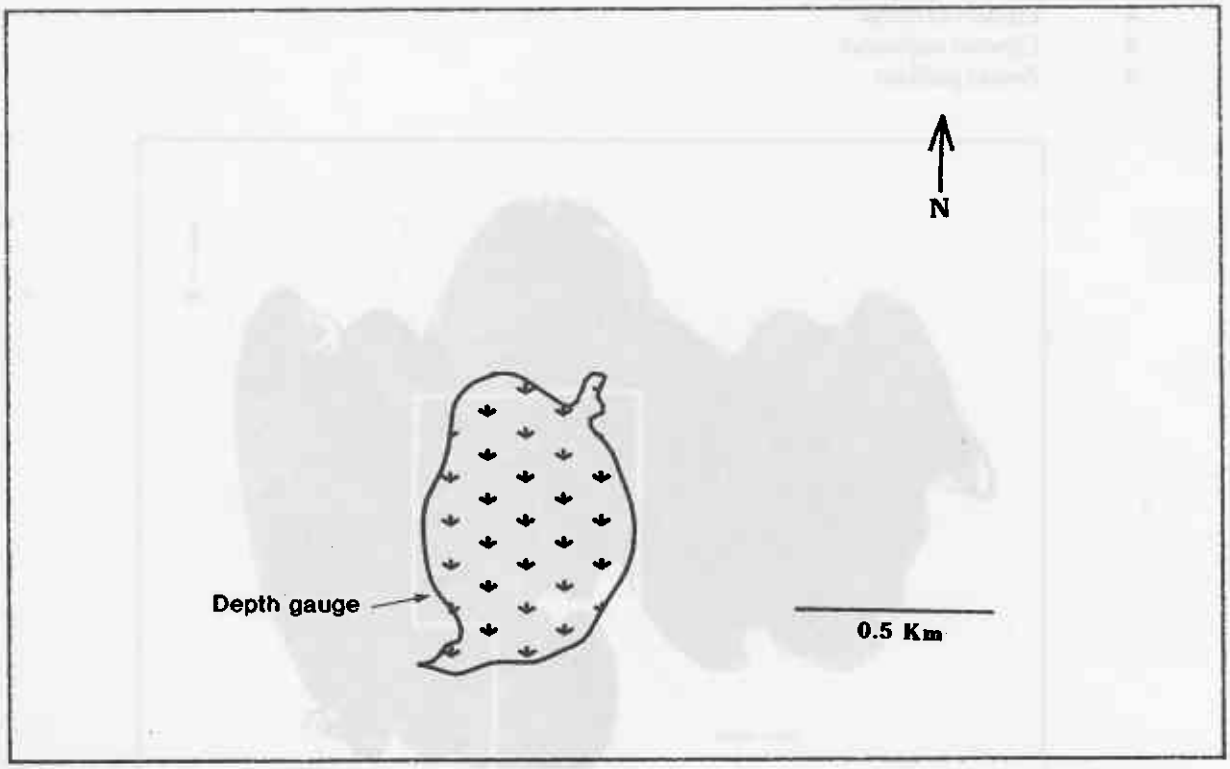
Vegetation Structure :

	Height (m)	% Area	% Cover
grasses	0.30	1	5
herbs	0.05	10	50
shrubs	0.40	20	70
dead trees	8.00	70	70

A moderate-sized brackish lake with few open water areas. Extensive stands of *Casuarina obesa* are present as a woodland over most of the lake and occasionally as thickets. *Melaleuca* sp. trees occur intermittently amongst the thickets and throughout the woodland when the lake is dry. *Halosarcia pergranulata, H. lepidosperma* and *Crassula* sp. grow on the lake bed. *Casuarina obesa* also grows above the water mark at the edge of the lake; on higher ground it is replaced by eucalypt woodland.

Plant species list (zones indicated by a single numeral)

2	*Casuarina obesa*
2	*Melaleuca* sp.
3	*Halosarcia lepidosperma*
3	*Halosarcia pergranulata*
4	*#Crassula* sp.



Lake Dumbleyung

Nature Reserve :	Lake Dumbleyung NR	Reserve Number :	5999
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	5560.7 ha	Vegetation Area :	1025.3 ha
Open Water :	4535.4 ha (81.57%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Saline
Coordinates :	33.22 S, 117.38 E		

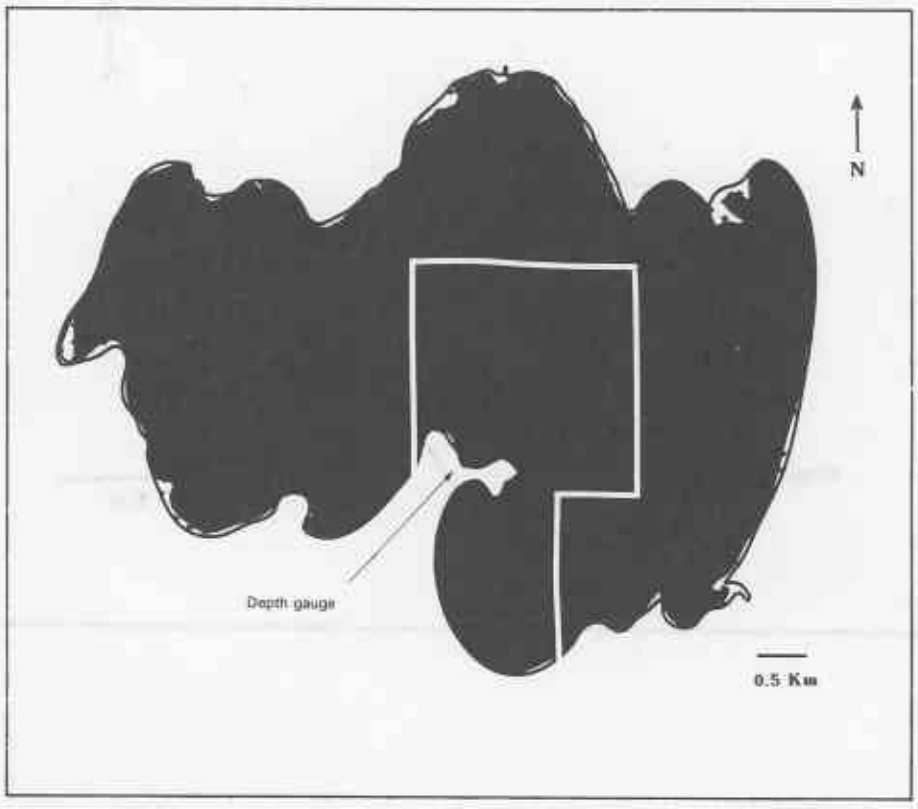
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	40	40
saplings	1.00	5	1
trees	4.00	5	10
dead trees	5.00	95	40

A very large saline lake with a fringing belt of trees that have been dead a long time. When the dead tree zone is dry it contains an open shrubland of *Halosarcia pergranulata* and *Sarcocornia quinqueflora*. *Chenopodium* sp. occurs on slightly higher ground with *Enchylaena tomentosa* and *Atriplex semibaccata*. Still below the maximum flood mark but in an area that is rarely inundated live *Casuarina obesa* and *Eucalyptus* sp. seedlings occur. *Cyperus vaginatus*, *Epilobium* sp. and *Juncus pallidus* also grow prolifically in this area. Above the high water mark yate and salmon gum woodland occurs. Additional information is given by Keating and Trudgen (1986).

Plant species list (zones indicated by a single numeral)

3 *Atriplex semibaccata*
3 *Chenopodium* sp.
3 *Enchylaena tomentosa*
3 *#Epilobium* sp.
3 *Eucalyptus* sp.
3 *Halosarcia pergranulata*
3 *Sarcocornia quinqueflora*
4 *Casuarina obesa*
4 *Cyperus vaginatus*
4 *Juncus pallidus*



Dundas 33113

Nature Reserve :	Unnamed	Reserve Number :	33113
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	834.0 ha	Vegetation Area :	73.0 ha
Open Water :	761.0 ha (91.25%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Hypersaline
Coordinates :	32.57 S, 121.51 E		

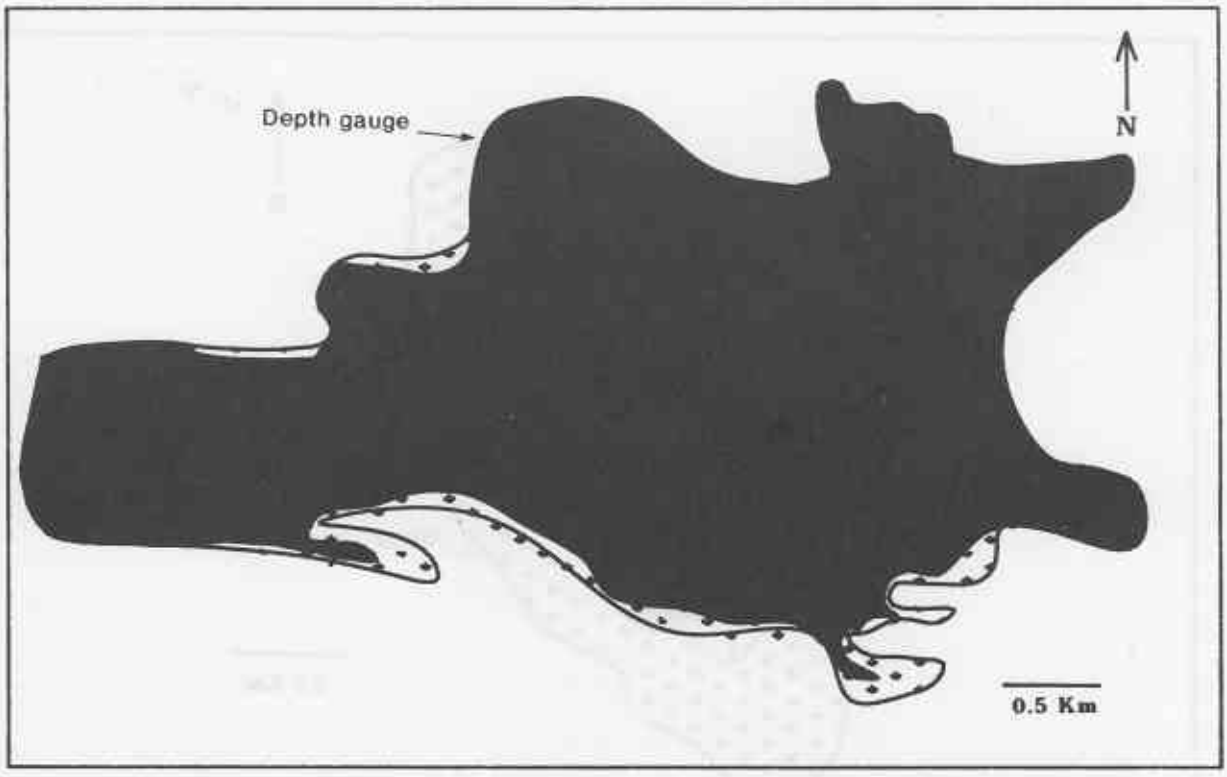
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A very large open hypersaline lake, around which there is a steep low bank. A sparse band of samphire occurs on the bank around most of the lake. *Halosarcia lyleii* is the dominant species in this band but *Frankenia* aff. *pauciflora* also occurs. On top of the bank 2 m high *Melaleuca* sp. shrubs occur as well as samphire. These are replaced by mallee woodland as the ground rises.

Plant species list (zones indicated by a single numeral)

4 *Frankenia* aff. *pauciflora*
4 *Halosarcia lylei*
4 *Melaleuca* sp.



Lake Eganu

Nature Reserve :	Pinjarrega NR	Reserve Number :	25210
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	82.2 ha	Vegetation Area :	62.5 ha
Open Water :	19.7 ha (23.96%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Saline
Coordinates :	30.00 S, 115.53 E		

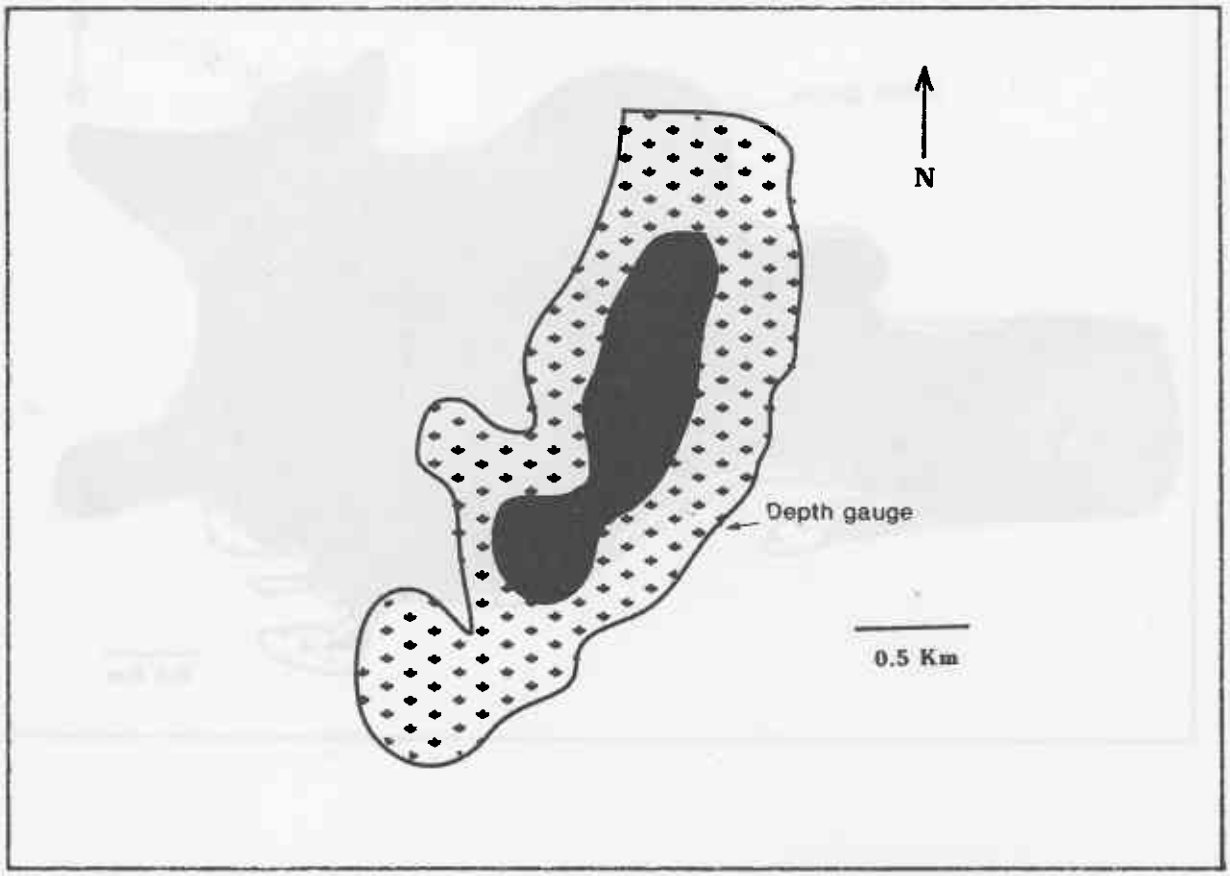
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.30	30	20
trees	7.00	2	1
dead trees	6.00	80	50

A large saline lake with an extensive belt of dead *Melaleuca* sp. and *Casuarina obesa* trees around the lake edge. The samphire *Halosarcia pergranulata* grows under the dead trees and extends into a belt of live *C. obesa*, *Melaleuca* sp. and *Eucalyptus rudis* above the water mark, some of which are also dead.

Plant species list (zones indicated by a single numeral)

3	*Halosarcia pergranulata*
4	*Casuarina obesa*
4	*Eucalyptus rudis*
4	*Melaleuca* sp.



Eneminga Swamps

Nature Reserve :	Eneminga NR	Reserve Number :	27394
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	62.0 ha	Vegetation Area :	41.5 ha
Open Water :	20.5 ha (33.06%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Fresh
Coordinates :	30.47 S, 115.31 E		

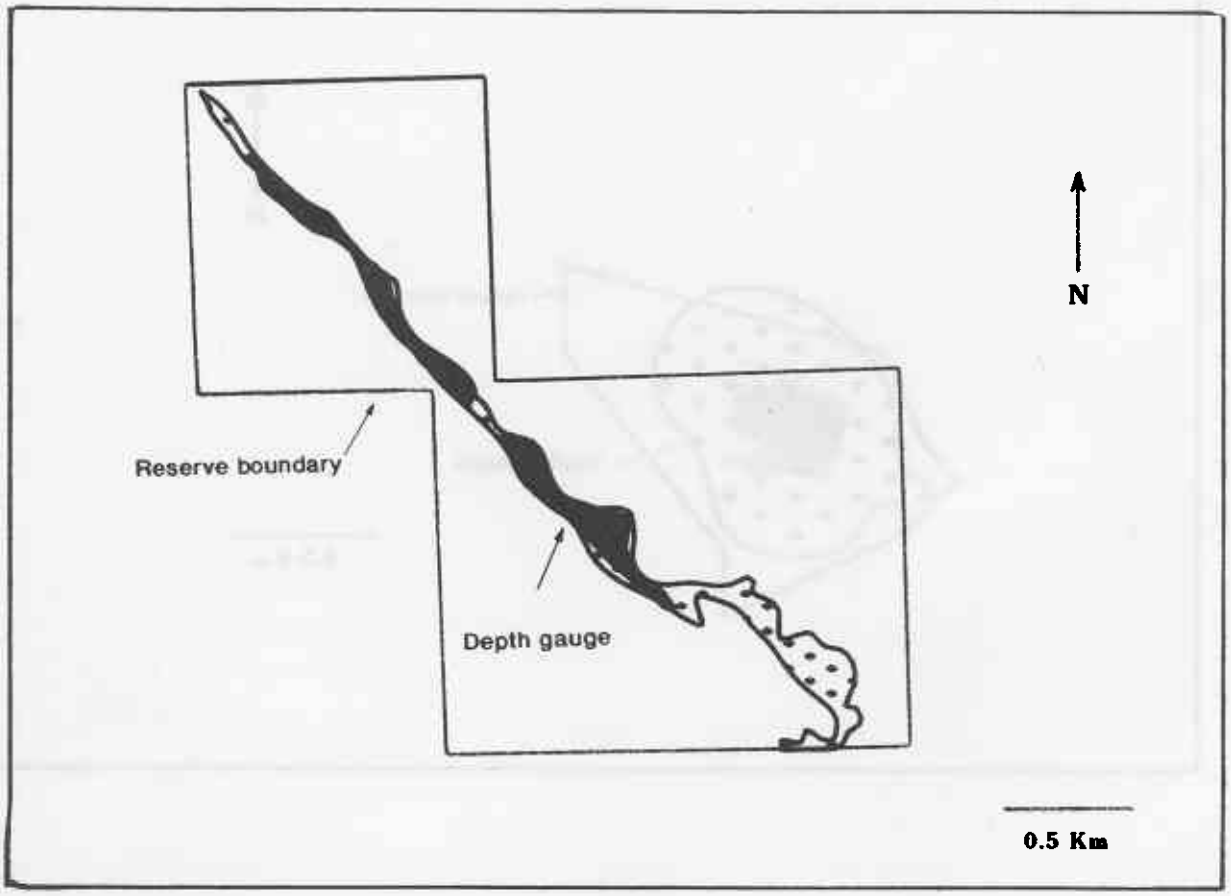
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	0.60	5	15
sedges	2.00	1	1
shrubs	2.00	40	30
trees	5.00	30	50

A moderate-sized system of swamps and lakes containing fresh water, some of which are seasonal and others are semi-permanent. The surrounding ground drops sharply into the depth-gauged lake, which has a narrow fringe of *Eucalyptus rudis* above the water mark, with the sedges *Schoenus* sp. and *Lepidosperma* sp. growing as an understorey. *Melaleuca rhaphiophylla* trees and shrubs and *M. teretifolia* shrubs grow below the water mark with a few clumps of *Baumea articulata.*

Plant species list (zones indicated by a single numeral)

2 *Baumea articulata*
2 *Melaleuca rhaphiophylla*
2 *Melaleuca teretifolia*
3 *Eucalyptus rudis*
3 *Lepidosperma* sp.
3 *Schoenus* sp.



Esperance 26410

Nature Reserve :	Unnamed	Reserve Number :	26410
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	105.2 ha	Vegetation Area :	90.0 ha
Open Water :	15.2 ha (14.45%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Fresh
Coordinates :	33.44 S, 120.53 E		

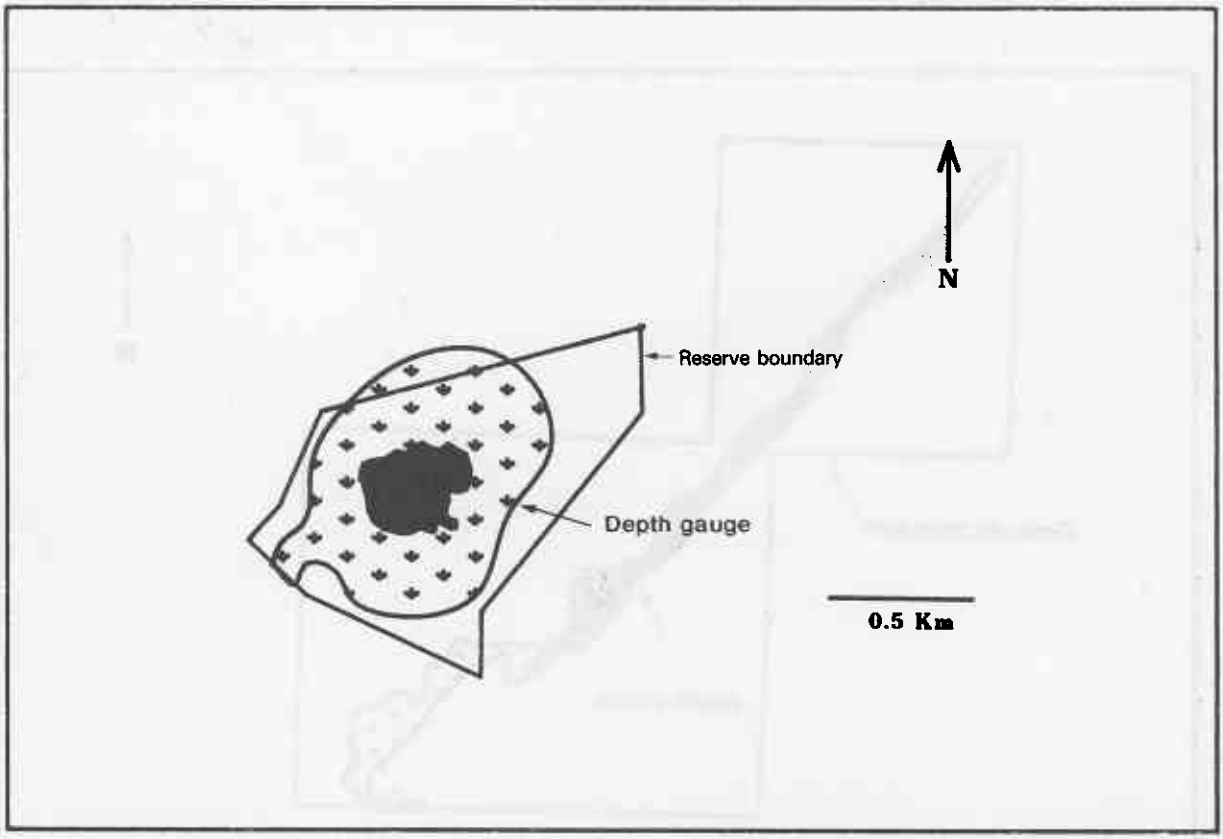
Vegetation Structure :

	Height (m)	% Area	% Cover
trees	12.00	95	60
dead shrubs	1.00	80	40

A moderate-sized yate swamp with a small area of open water, around which occasional *Melaleuca cuticularis* occur. On the landward side of the *M. cuticularis* there is an extensive belt of occasionally-flooded *Eucalyptus occidentalis* with a shrub understorey that consisted of *Acacia glaucoptera* and *M. glaberrima* in 1986. In January 1988 water levels were still very high after flooding in 1986 with the result that the shrub understorey had died. A few *M. cuticularis* occur in the *E.* aff. *astringens* belt.

Plant species list (zones indicated by a single numeral)

2	*Melaleuca cuticularis*
4	*Acacia glaucoptera*
4	*Eucalyptus occidentalis*
4	*Melaleuca glaberrima*



Esperance 27768

Nature Reserve :	Unnamed	Reserve Number :	27768
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	131.0 ha	Vegetation Area :	6.0 ha
Open Water :	125.0 ha (95.42%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Hypersaline
Coordinates :	33.18 S, 121.49 E		

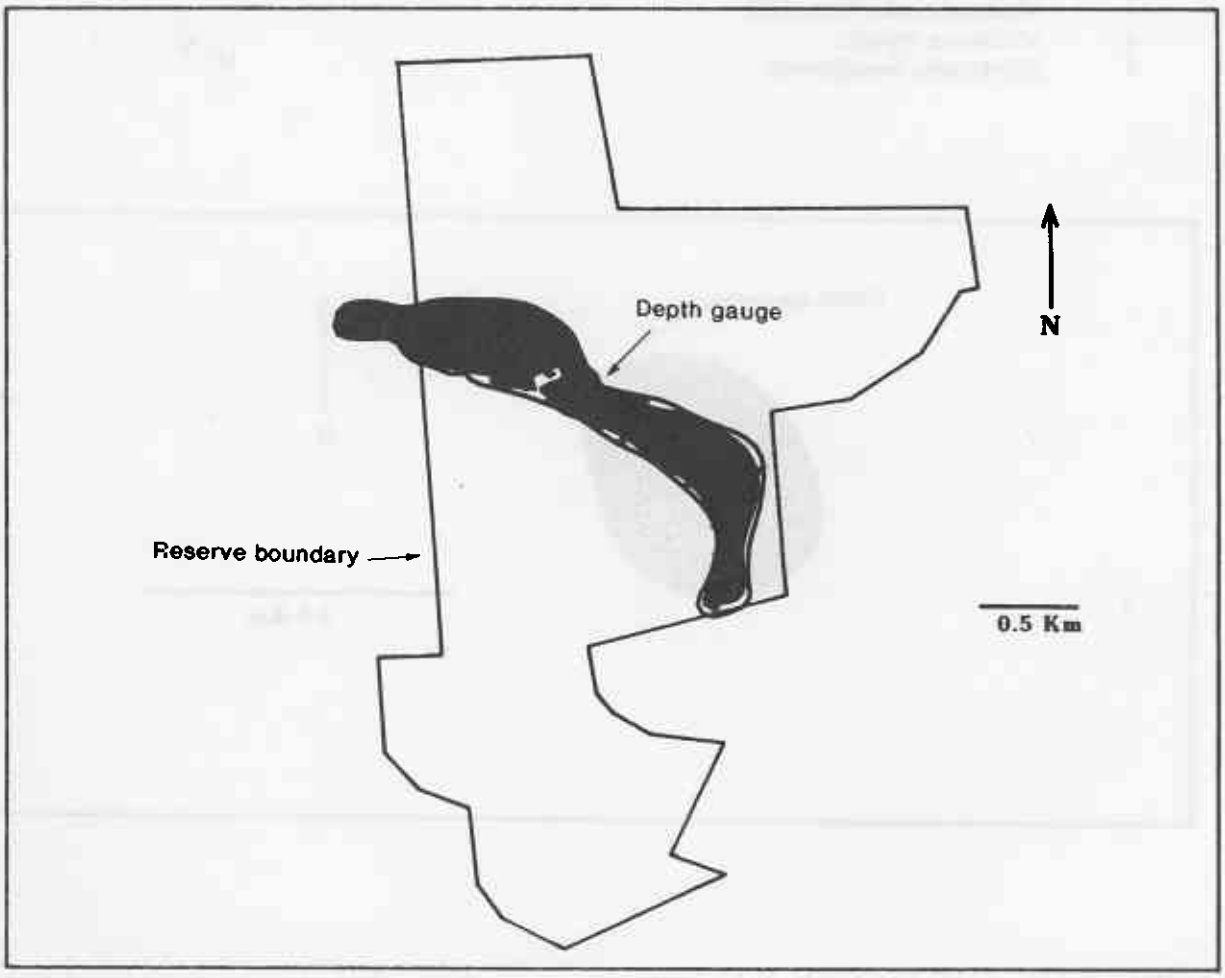
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A moderate-sized hypersaline lake containing some low islands covered with *Halosarcia halocnemoides* and *Maireana oppositifolia*. There is a low, steep bank around the lake, on which occur isolated clumps of *Halosarcia* sp. and *Frankenia pauciflora*. Higher on the bank *Melaleuca* aff. *acuminata* and *M. thyoides* shrubs grow. Beyond the shrubs there is eucalypt woodland.

Plant species list (zones indicated by a single numeral)

4 *Frankenia pauciflora*
4 *Halosarcia halocnemoides*
4 *Halosarcia* sp.
4 *Maireana oppositifolia*
4 *Melaleuca* aff. *acuminata*
4 *Melaleuca thyoides*



Esperance 27985

Nature Reserve :	Unnamed	Reserve Number :	27985
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	11.5 ha	Vegetation Area :	0.5 ha
Open Water :	11.0 ha (95.65%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Hypersaline
Coordinates :	33.23 S, 121.46 E		

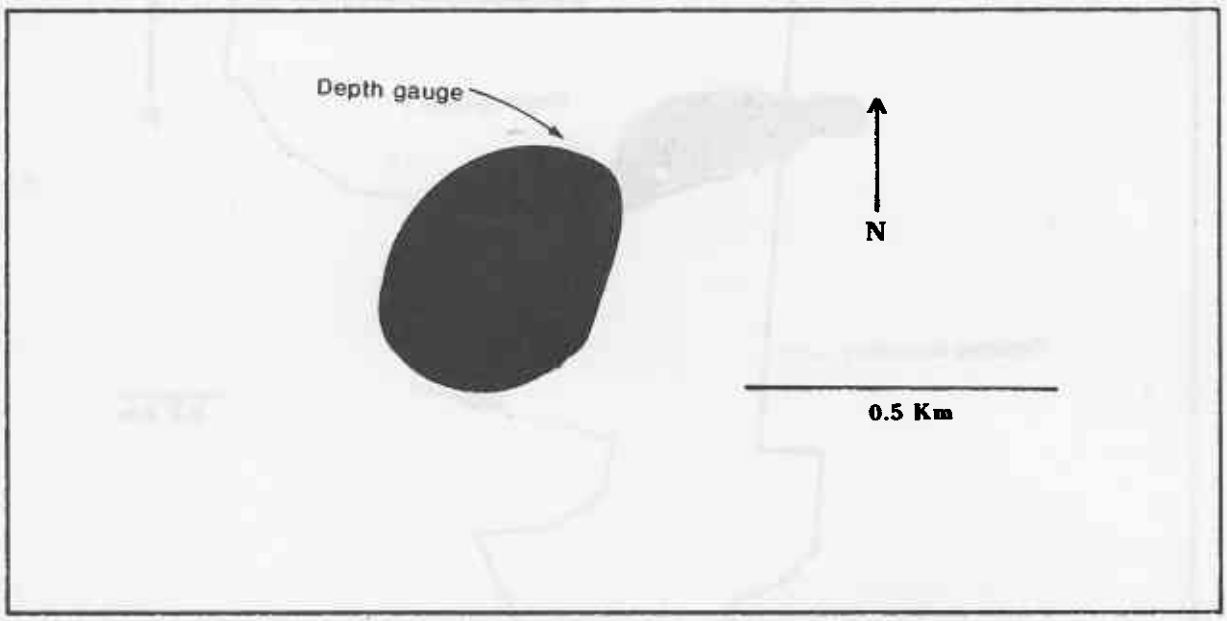
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A small hypersaline lake, which is completely open with the exception of a small samphire-covered island at one end. *Sclerostegia moniliformis, Halosarcia halocnemoides, Disphyma crassifolium* and *Maireana oppositifolia* grow on the island. Around the edge of the lake *S. moniliformis, Halosarcia* sp. and *Frankenia pauciflora* grow as scattered clumps near the water to be replaced by the shrub *Melaleuca thyoides* with an understorey of *H. lepidosperma* as the ground rises. Farther from the lake *M. conothamnoides* occurs, then eucalypt woodland.

Plant species list (zones indicated by a single numeral)

4 *Disphyma crassifolium*
4 *Frankenia pauciflora*
4 *Halosarcia halocnemoides*
4 *Halosarcia lepidosperma*
4 *Halosarcia* sp.
4 *Maireana oppositifolia*
4 *Melaleuca conothamnoides*
4 *Melaleuca thyoides*
4 *Sclerostegia moniliformis*



Esperance 32776

Nature Reserve :	Unnamed	Reserve Number :	32776
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	4.0 ha	Vegetation Area :	0.0 ha
Open Water :	4.0 ha (100.00%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Hypersaline
Coordinates :	33.32 S, 122.21 E		

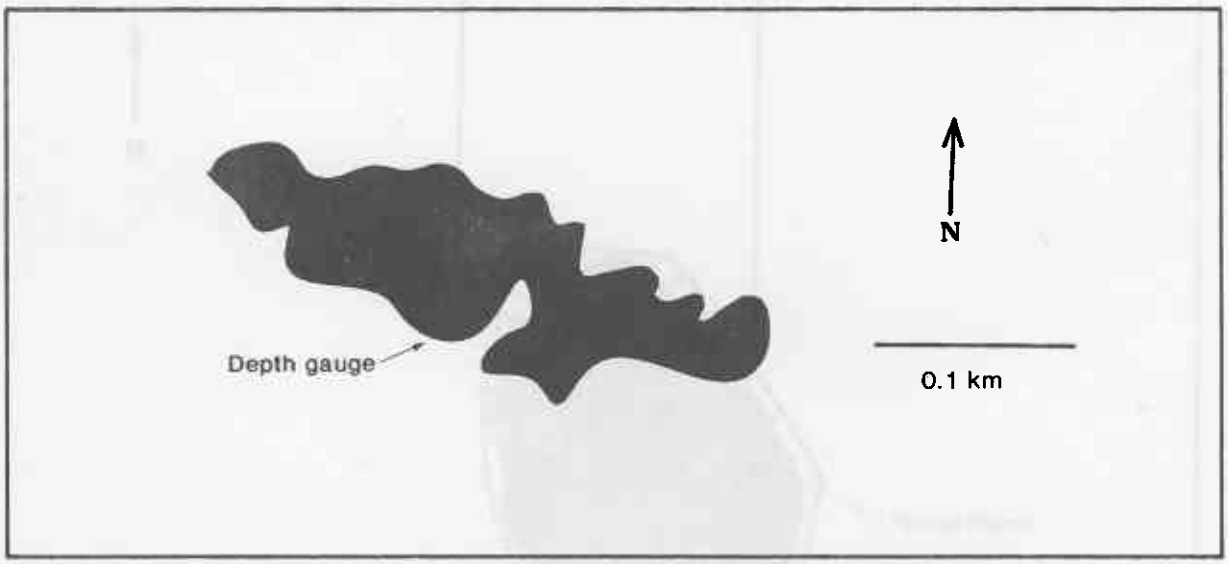
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A small open hypersaline lake surrounded by fairly flat samphire marsh with *Halosarcia halocnemoides* and *Sclerostegia moniliformis* near the water and *Frankenia* sp., *Halosarcia syncarpa*, *Maireana oppositifolia* and *Calandrinia* sp. farther away. The marsh is replaced by a shrubland of *Melaleuca* aff. *acuminata* and *Melaleuca* sp. as the ground rises.

Plant species list (zones indicated by a single numeral)

4 *Calandrinia* sp.
4 *Frankenia* sp.
4 *Halosarcia halocnemoides*
4 *Halosarcia syncarpa*
4 *Maireana oppositifolia*
4 *Melaleuca* aff. *acuminata*
4 *Melaleuca* sp.
4 *Sclerostegia moniliformis*



Flagstaff Lake

Nature Reserve :	Flagstaff NR	Reserve Number :	27609
Vesting :	NPNCA	Purpose :	Protection of Flora and Fauna
Lake Area :	223.0 ha	Vegetation Area :	31.0 ha
Open Water :	192.0 ha (86.10%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.30 S, 117.16 E		

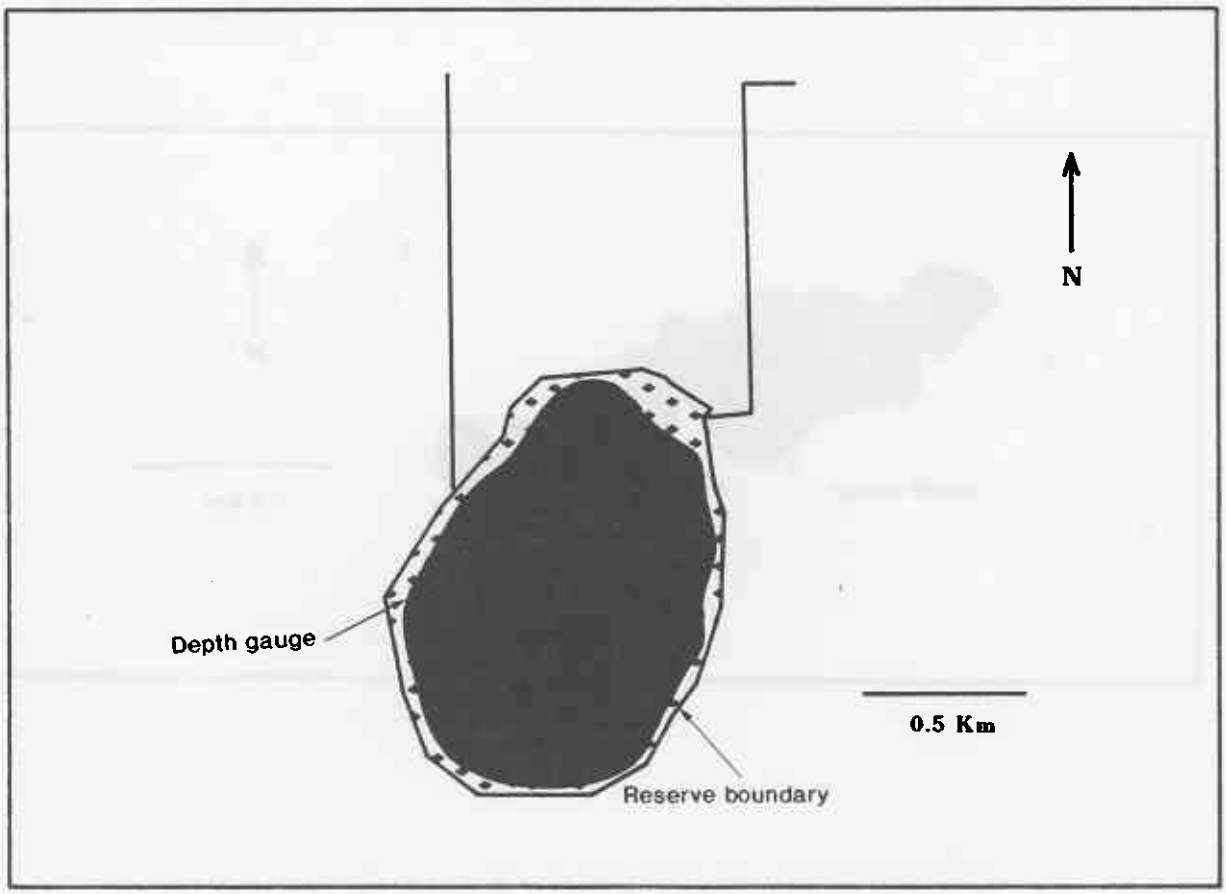
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.40	100	10
saplings	4.00	10	1
dead saplings	3.00	90	20

A moderate-sized saline lake with a narrow fringe (up to 30 m wide) of dead saplings. Live *Melaleuca* sp. saplings occur occasionally through the sapling belt and just inside the water mark. There is an extensive though fairly sparse zone of samphire under the sapling belt; it extends into a narrow dense thicket of live *Melaleuca* sp. occurring above the water mark. The main samphire species are *Halosarcia pergranulata* and *H. syncarpa*; *Sarcocornia blackiana* grows closest to the centre of the lake and *Wilsonia humilis* grows around the water mark. *Casuarina obesa* and then eucalypt woodland occur behind the live *Melaleuca* sp.

Plant species list (zones indicated by a single numeral)

3	*Halosarcia pergranulata*
3	*Halosarcia syncarpa*
3	*Sarcocornia blackiana*
3	*Wilsonia humilis*
4	*Casuarina obesa*
4	*Melaleuca* sp.



Lake Forrestdale

Nature Reserve :	Forrestdale Lake NR	Reserve Number :	24781
Vesting :	NPNCA	Purpose :	Protection of Flora and Fauna and Rec'n
Lake Area :	199.6 ha	Vegetation Area :	41.0 ha
Open Water :	158.6 ha (79.46%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Brackish
Coordinates :	32.10 S, 115.56 E		

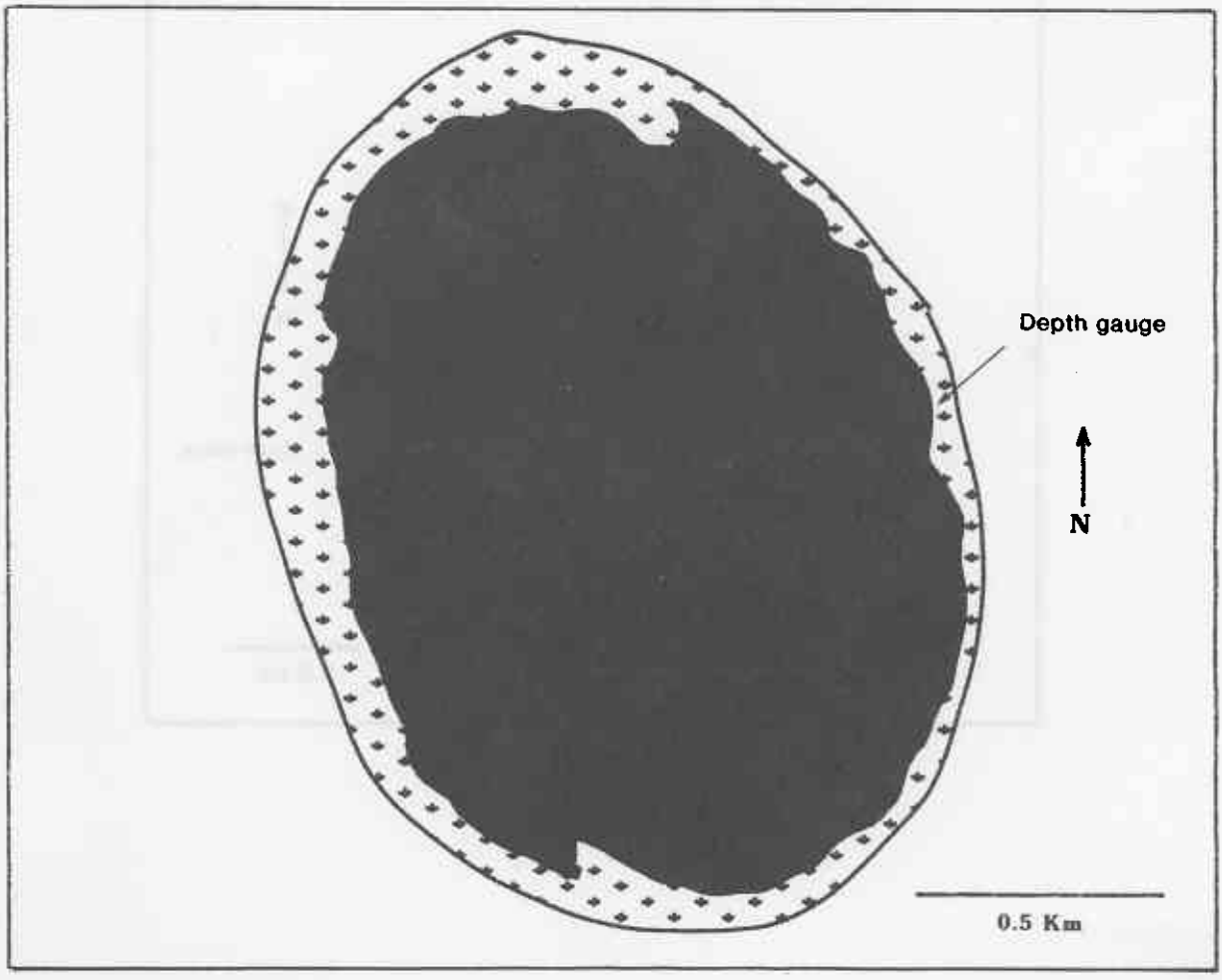
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	2.00	90	100
sedges	1.00	10	100
shrubs	2.00	10	15
trees	4.00	10	70

A moderate-sized brackish lake fringed by rushes, sedges and trees. Below the water mark there is an almost continuous belt of *Typha orientalis*, behind which *Baumea articulata, B. juncea* and *Juncus pallidus* grow. On the water mark there is a belt of trees, principally *Melaleuca rhaphiophylla* but *Acacia saligna* and *Eucalyptus rudis* occur on the landward side of this zone. *Cyperus congestus* grows under *M. rhaphiophylla*. More detailed information is given by Bartle *et al.* (1987).

Plant species list (zones indicated by a single numeral)

2 *Baumea articulata*
2 **Typha orientalis*
3 *Baumea juncea*
3 **Cyperus congestus*
3 *Juncus pallidus*
3 *Melaleuca rhaphiophylla*
4 *Acacia saligna*
4 *Eucalyptus rudis*



Lake Gardner

Nature Reserve :	Two Peoples Bay NR	Reserve Number :	27956
Vesting :	NPNCA	Purpose :	Cons. Fauna
Lake Area :	170.2 ha	Vegetation Area :	21.3 ha
Open Water :	148.9 ha (87.49%)		
Lake Permanence :	Permanent	Lake Salinity :	Brackish
Coordinates :	34.58 S, 118.09 E		

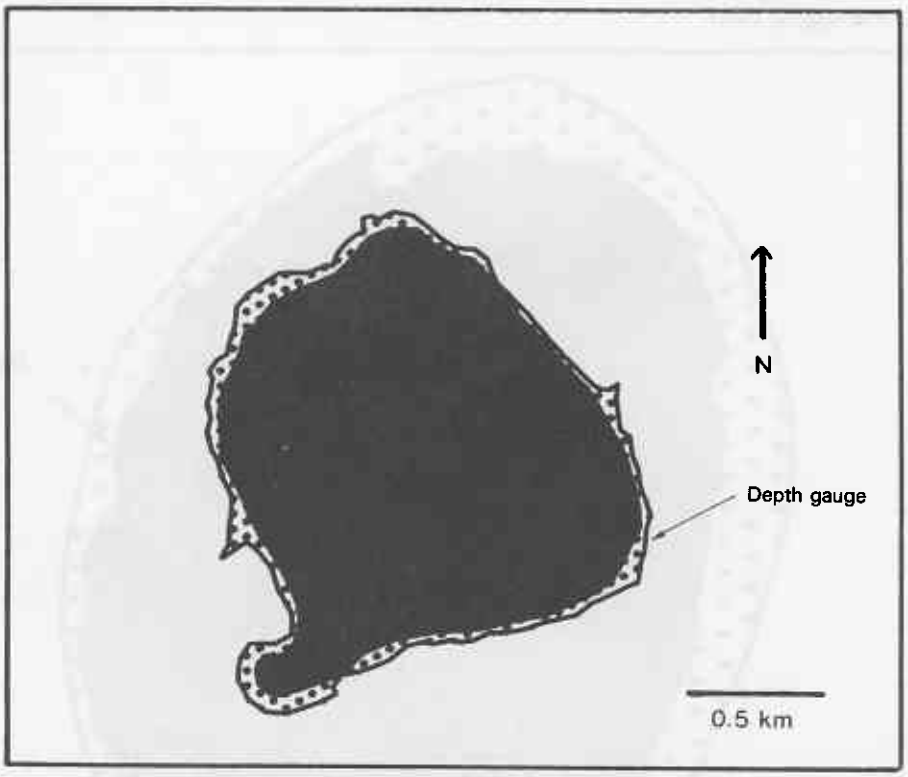
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	1.00	100	60

A moderate-sized brackish lake fringed by a belt of sedges up to 100 m wide but often only 20 m wide and sparse. The dominant species of sedge in the water is unidentified but *Schoenus brevifolius* is dominant along the shoreline, interspersed with *Restio* sp. Away from the open water but below the maximum flood level *Gahnia trifida* and shrubs, including *Agonis juniperina* and *Hakea* sp., form a 2-3 m high thicket. The thicket is only flooded extensively when the bar across Gardner Creek (the overflow from Lake Gardner) is closed. *Banksia* woodland occurs on higher ground.

Plant species list (zones indicated by a single numeral)

2	*Restio* sp.
2	*Schoenus brevifolius*
3	*Agonis juniperina*
3	*Gahnia trifida*
3	*Hakea* sp.



Gingin 31241

Nature Reserve :	Yeal NR	Reserve Number :	31241
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	92.0 ha	Vegetation Area :	67.0 ha
Open Water :	25.0 ha (27.17%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Fresh
Coordinates :	31.25 S, 115.49 E		

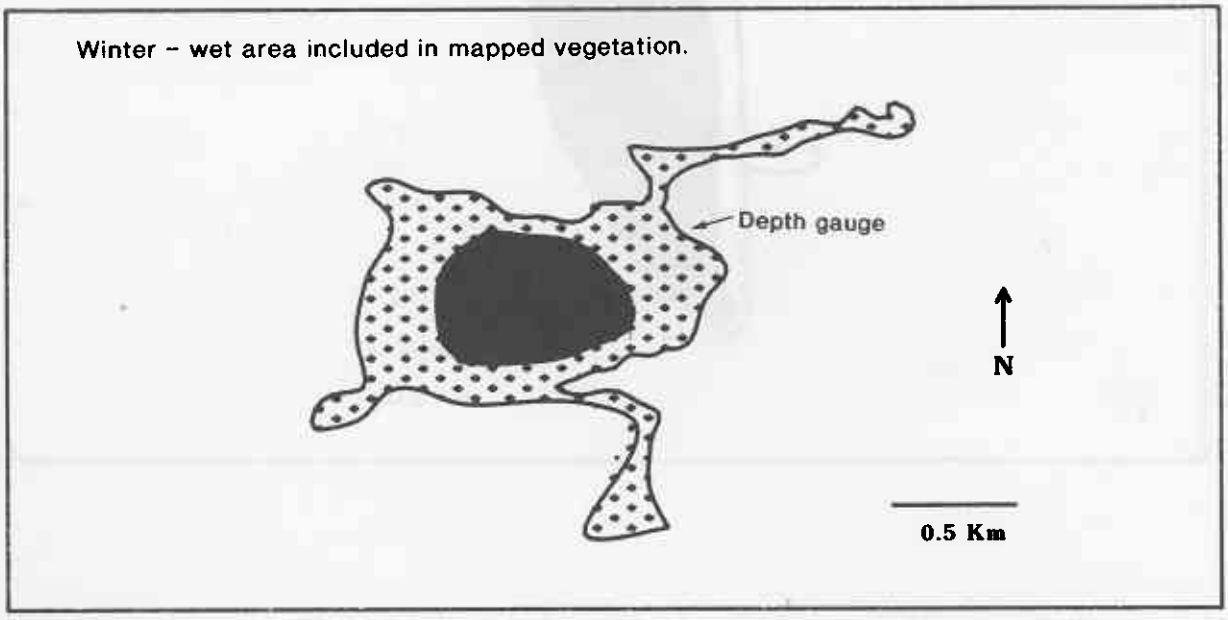
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	1.50	20	80
shrubs	3.00	20	100
trees	6.00	80	100

A moderate-sized fresh lake fringed by large *Melaleuca rhaphiophylla* trees, without an understorey, that extend to the boundary of the lake. On the lake side of the *Melaleuca* belt there are occasional clumps of *Baumea articulata* along the shore and, in some sections, *M. teretifolia* occurs as dense 3 m-high shrubs. Beyond the lake boundary there is a dense belt of *M. teretifolia* with occasional clumps of *B. articulata* under isolated *M. rhaphiophylla* and *Eucalyptus rudis* trees. *Melaleuca lateritia, Lepidosperma longitudinale* and *Schoenus* sp. also occur in this zone which is low-lying and becomes 'winter-wet'.

Plant species list (zones indicated by a single numeral)

1	*Baumea articulata*
1	*Melaleuca teretifolia*
2	*Melaleuca rhaphiophylla*
3	*Eucalyptus rudis*
3	*Lepidosperma longitudinale*
3	*Melaleuca lateritia*
3	*Schoenus* sp.



Gnowangerup 26264

Nature Reserve :	Unnamed	Reserve Number :	26264
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	174.0 ha	Vegetation Area :	87.0 ha
Open Water :	87.0 ha (50.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	34.22 S, 118.29 E		

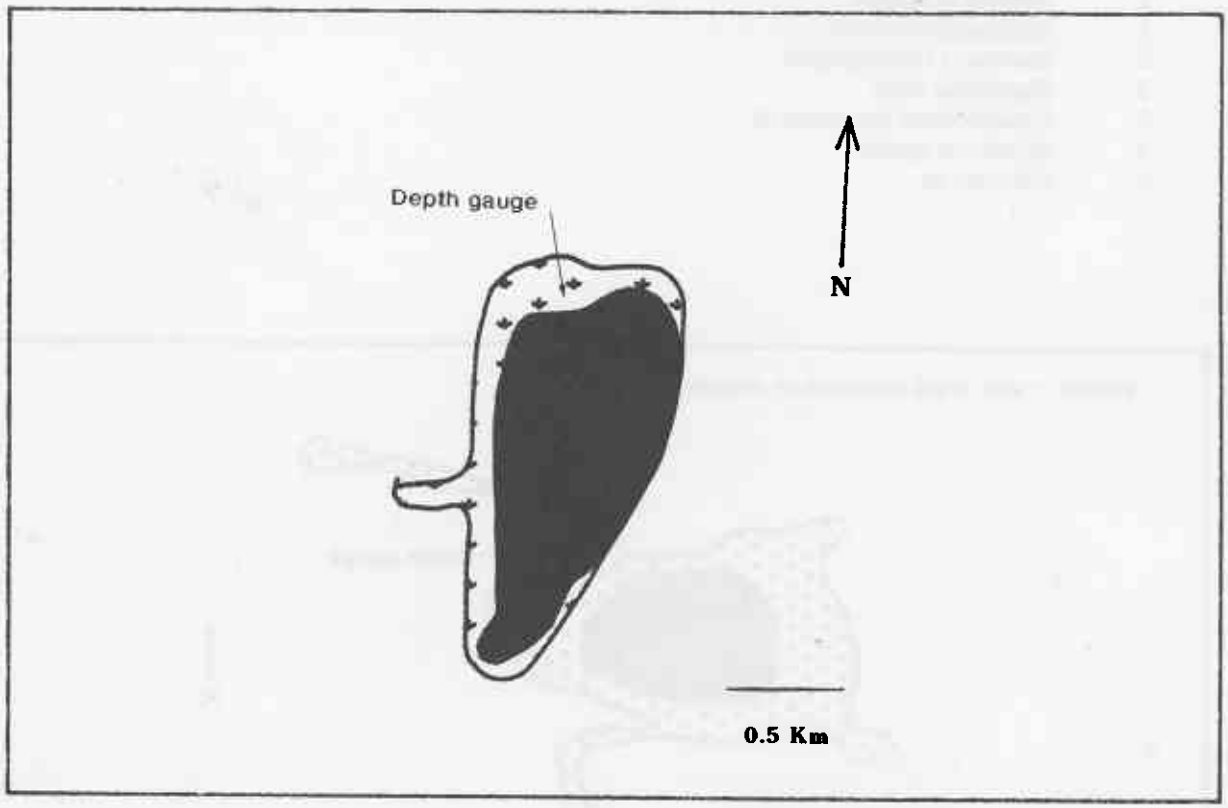
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A moderate-sized completely open saline lake with a surrounding bank above the water mark, on which samphire grows.

Plant species list (zones indicated by a single numeral)

No collection made



Gnowangerup 26569

Nature Reserve :	Unnamed	Reserve Number :	26569
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	7.6 ha	Vegetation Area :	2.0 ha
Open Water :	5.6 ha (73.68%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Brackish
Coordinates :	33.49 S, 118.29 E		

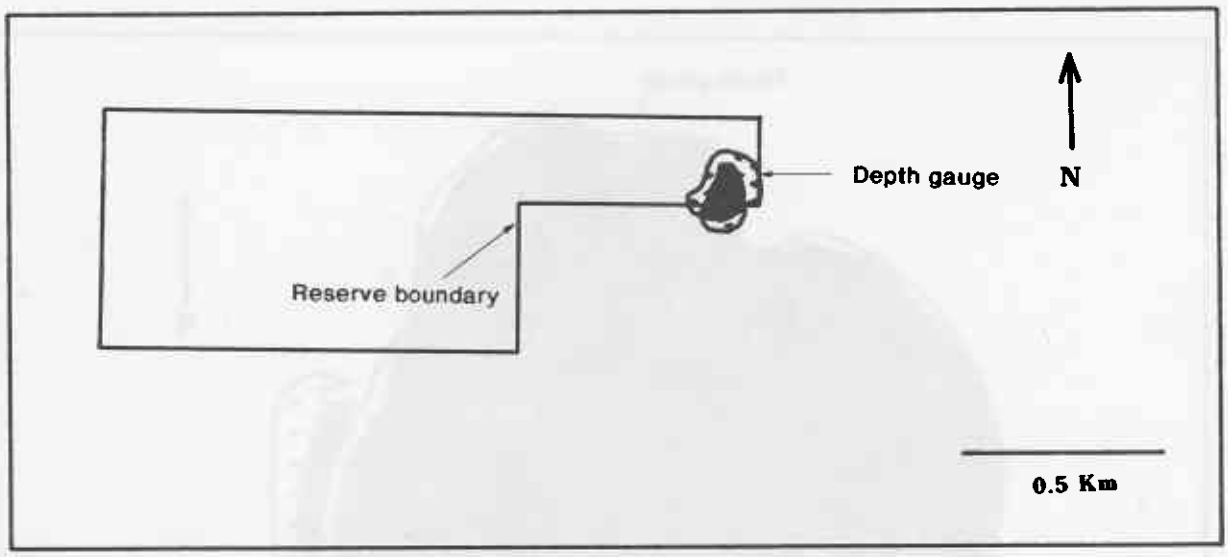
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.30	100	60
dead trees	3.00	100	20

A small brackish lake with an open woodland of long-dead small trees. When the lake is dry there is an understorey of *Halosarcia pergranulata, H. lepidosperma, Atriplex exilifolia* and *Carpobrotus* sp. throughout the wetland area. Above the high water mark there is a fringe of *Melaleuca lanceolata* and *Melaleuca* sp. with a samphire understorey similar to that in the lake. Behind the *Melaleuca* belt is a mallee woodland - many of the trees in it are affected by salinity or high groundwater levels.

Plant species list (zones indicated by a single numeral)

3	*Atriplex exilifolia*
3	*#Carpobrotus* sp.
3	*Halosarcia lepidosperma*
3	*Halosarcia pergranulata*
4	*Melaleuca lanceolata*
4	*Melaleuca* sp.



Lake Gore

Nature Reserve :	Unnamed	Reserve Number :	32419
Vesting :	NPNCA	Purpose :	Water and Cons. Flora and Fauna
Lake Area :	738.0 ha	Vegetation Area :	39.0 ha
Open Water :	699.0 ha (94.72%)		
Lake Permanence :	Permanent	Lake Salinity :	Saline
Coordinates :	33.46 S, 121.32 E		

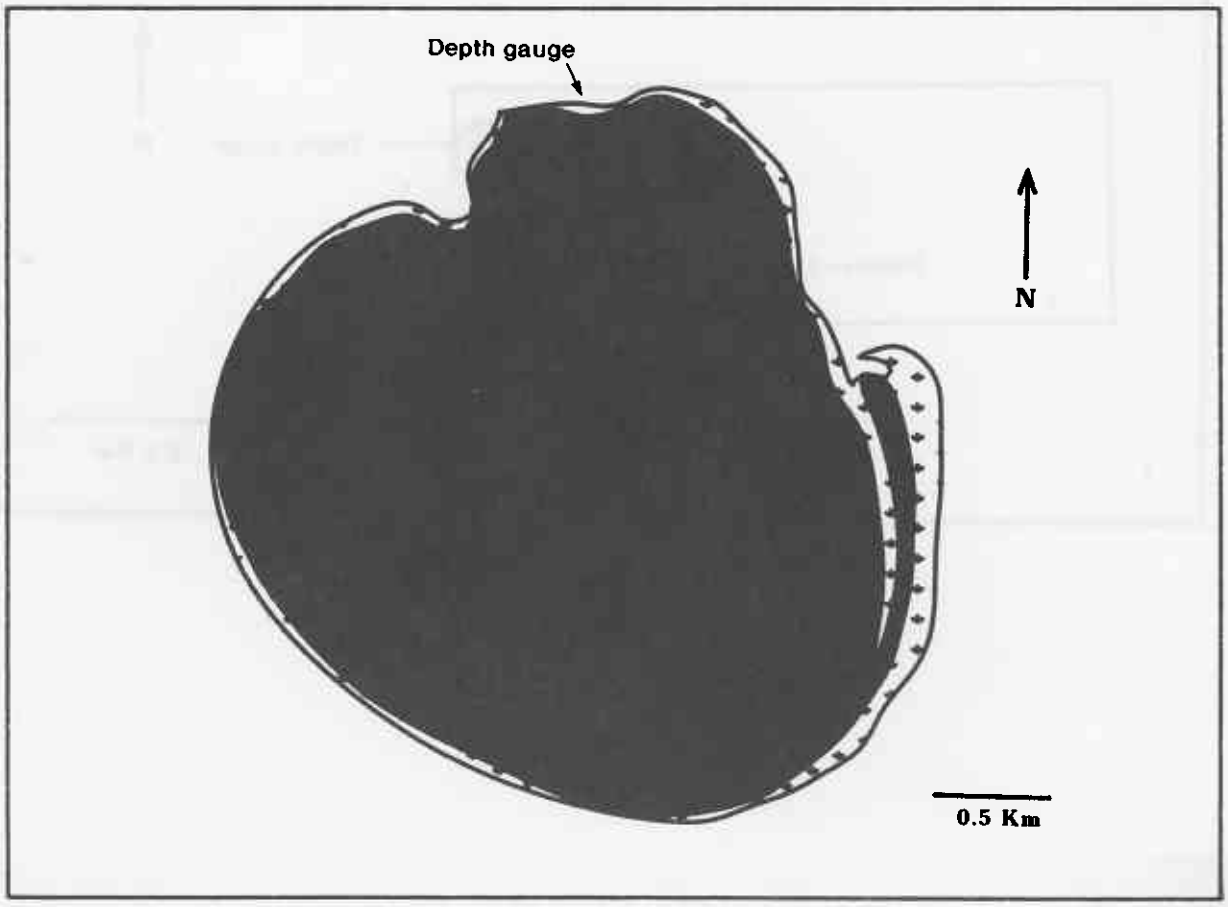
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	1	20
sedges	0.80	5	10
trees	5.00	60	60
dead trees	4.00	20	40

A large open saline lake with a fringing belt of *Melaleuca cuticularis* of variable width growing on the shoreline and in the water. Many of the outermost trees are dead or moribund. Around high water mark the sedges *Schoenus brevifolius, Gahnia trifida*, samphires *Suaeda australis, Sarcocornia quinqueflora*, grass *Sporobolus virginicus* and herb *Samolus repens* occur. On the north side of the lake there is a steep bank that rises sharply above high water mark. *Melaleuca cuticularis* and associated species are replaced by *Acacia* sp. as the ground rises up the bank.

Plant species list (zones indicated by a single numeral)

2	*Melaleuca cuticularis*
3	*Gahnia trifida*
3	*Samolus repens*
3	*Sarcocornia quinqueflora*
3	*Schoenus brevifolius*
3	*Sporobolus virginicus*
3	*Suaeda australis*



Lake Gounter

Nature Reserve :	Lake Gounter NR	Reserve Number :	21253
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna Act
Lake Area :	118.0 ha	Vegetation Area :	33.0 ha
Open Water :	85.0 ha (72.03%)		
Lake Permanence :	Seasonal	Lake Salinity :	Hypersaline
Coordinates :	32.25 S, 118 49 E		

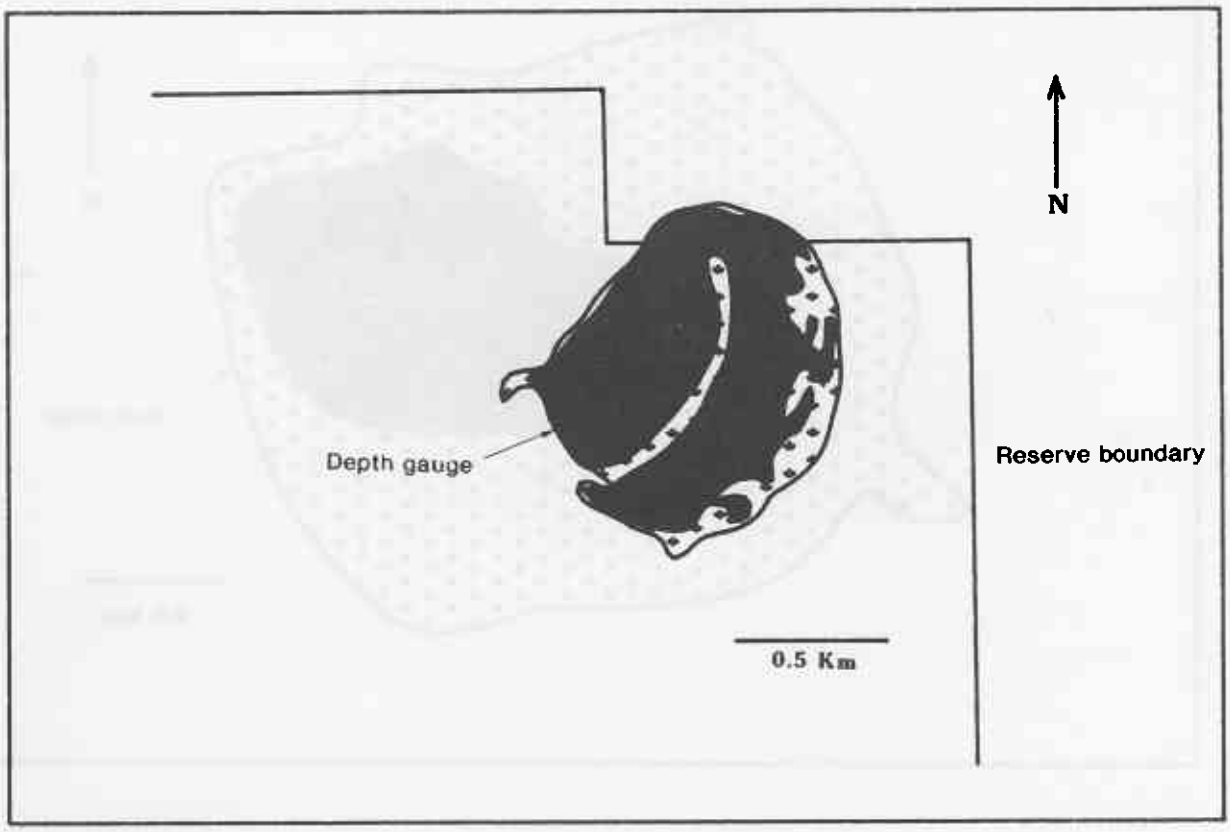
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.30	1	30

A moderate-sized hypersaline lake with a few scattered bushes of *Halosarcia lepidosperma* below the water mark. *Melaleuca* aff. *acuminata* and *M. thyoides* shrubs occur above the water mark with a little *Carpobrotus* sp.

Plant species list (zones indicated by a single numeral)

3	*Halosarcia lepidosperma*
4	*#Carpobrotus* sp.
4	*Melaleuca* aff. *acuminata*
4	*Melaleuca thyoides*



Lake Gundaring

Nature Reserve :	Gundaring Lake NR	Reserve Number :	24373
Vesting :	NPNCA	Purpose :	Protection of Fauna
Lake Area :	308.0 ha	Vegetation Area :	221.0 ha
Open Water :	87.0 ha (28.25%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Saline
Coordinates :	33.18 S, 117.30 E		

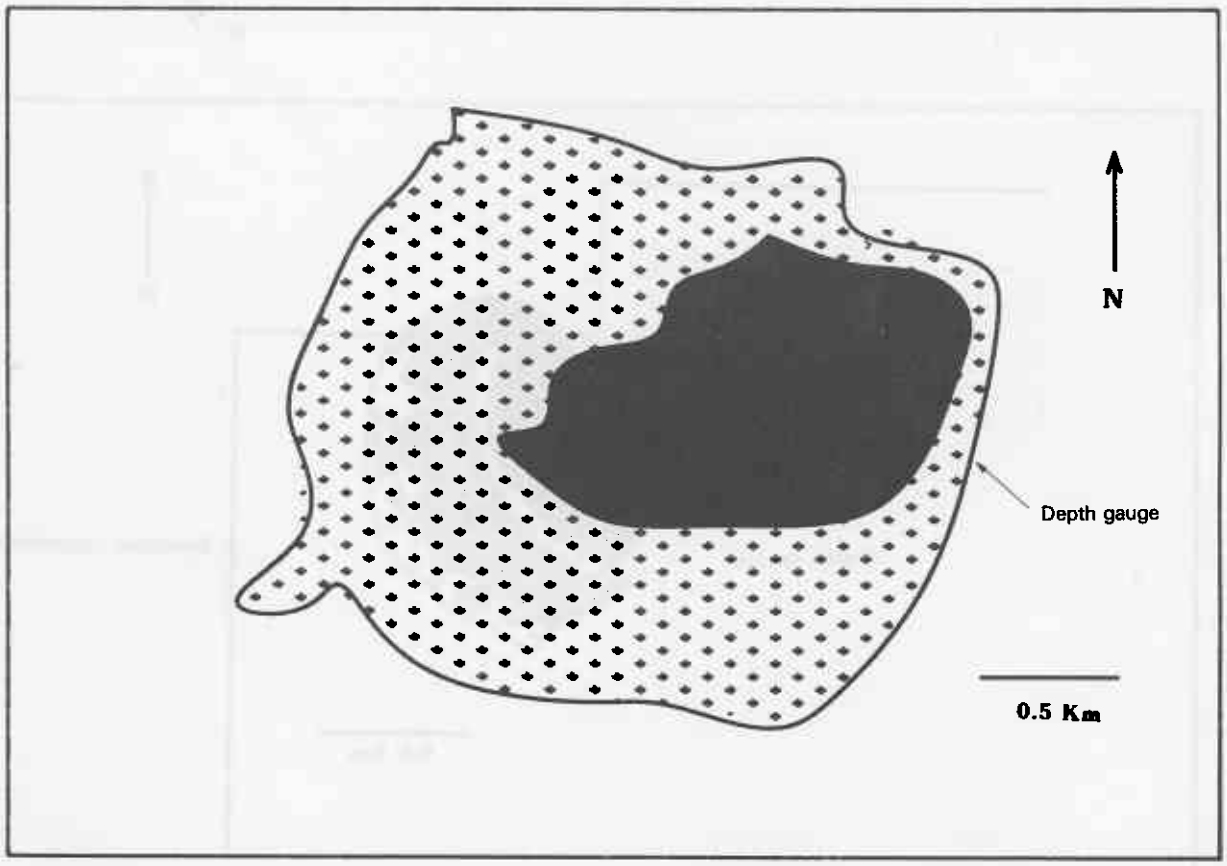
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.40	20	60
trees	5.00	15	60
dead trees	4.00	85	50

A moderate-sized saline lake with an extensive fringe of dead trees. The samphires *Sarcocornia quinqueflora* and *Halosarcia pergranulata* occur under the landward-most dead trees and under a thin belt of live *Melaleuca* aff. *acuminata* above the water mark, behind which *Casuarina obesa* and occasional *Eucalyptus rudis* occur.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia pergranulata*
3 *Sarcocornia quinqueflora*
4 *Casuarina obesa*
4 *Eucalyptus rudis*
4 *Melaleuca* aff. *acuminata*



Lake Guraga

Nature Reserve :	Unnamed	Reserve Number :	31223
Vesting :	Dandaragan Shire	Purpose :	Recreation
Lake Area :	695.0 ha	Vegetation Area :	154.0 ha
Open Water :	541.0 ha (77.84%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Brackish
Coordinates :	30.52 S, 115.33 E		

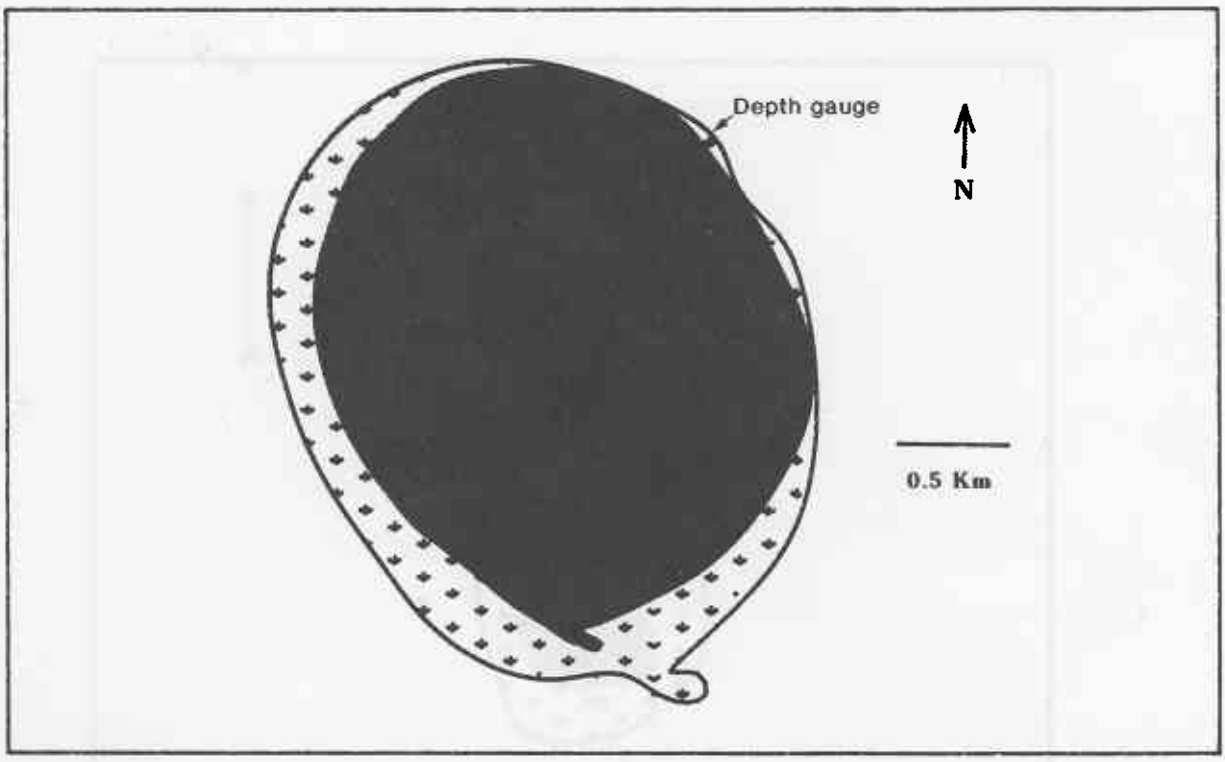
Vegetation Structure :

	Height (m)	% Area	% Cover
grasses	0.20	20	48
herbs	0.10	20	48
shrubs	2.00	1	2

A large brackish open lake. There is a low bank around the lake rising to an extensive grassy plateau that contains *Agrostis avenacea, Sporobolus virginicus* and the herb *Wilsonia backhousei*.

Plant species list (zones indicated by a single numeral)

4 *Agrostis avenacea*
4 *Sporobolus virginicus*
4 *Wilsonia backhousei*



Harvey 12632

Nature Reserve :	Riverdale NR	Reserve Number :	12632
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	1.7 ha	Vegetation Area :	1.0 ha
Open Water :	0.7 ha (43.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	35.59 S, 115.48 E		

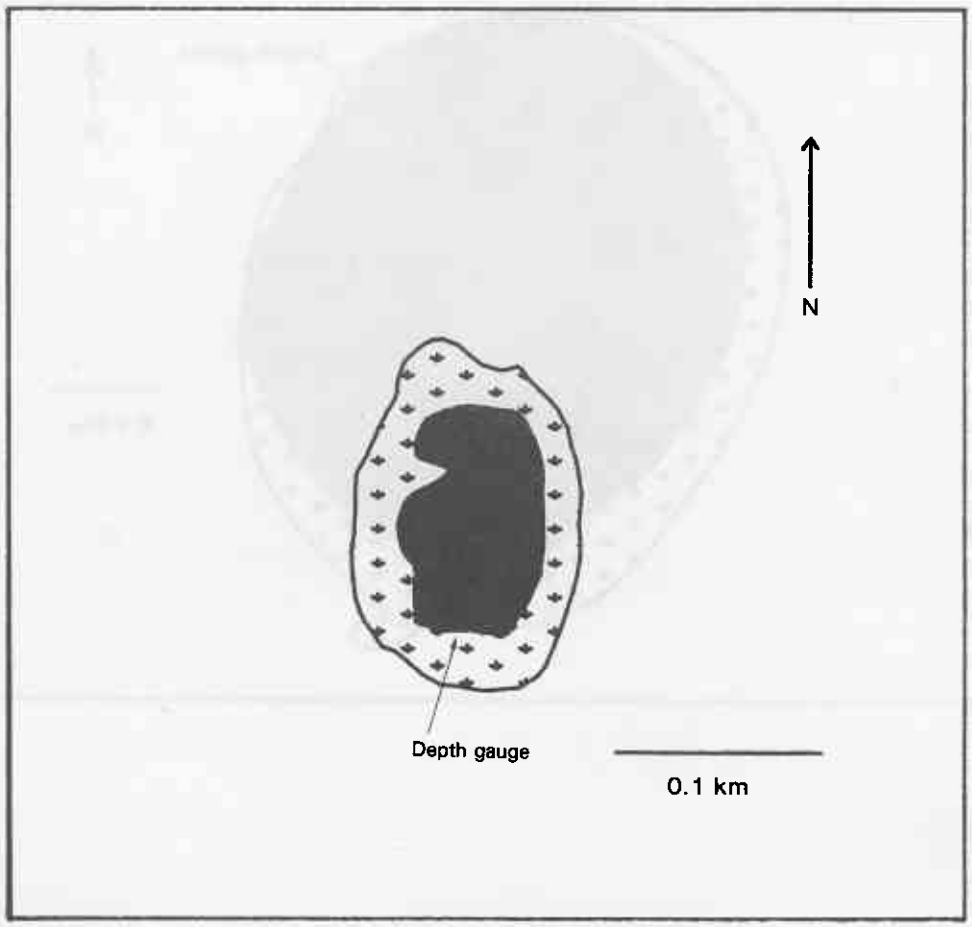
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	1.00	70	80
shrubs	2.00	90	90
trees	5.00	60	90

A small fresh lake with an extensive belt of *Melaleuca* aff. *rhaphiophylla* and tall *M. lateritia* shrubs extending from high water mark into the lake. The sedges *Leptocarpus scariosus* and *Lepidosperma* sp. grow under the trees below the water mark; *Astartea fascicularis* shrubs extend from just below the water mark onto dry land where they are replaced by jarrah/marri woodland.

Plant species list (zones indicated by a single numeral)

2 *Leptocarpus scariosus*
2 *Lepidosperma* sp.
2 *Melaleuca lateritia*
2 *Melaleuca* aff. *rhaphiophylla*
3 *Astartea fascicularis*



Lake Hinds

Nature Reserve :	Unnamed	Reserve Number :	16305
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	1592.9 ha	Vegetation Area :	306.9 ha
Open Water :	1286.0 ha (80.73%)		
Lake Permanence :	Seasonal	Lake Salinity :	Hypersaline
Coordinates :	30.46 S, 116.34 E		

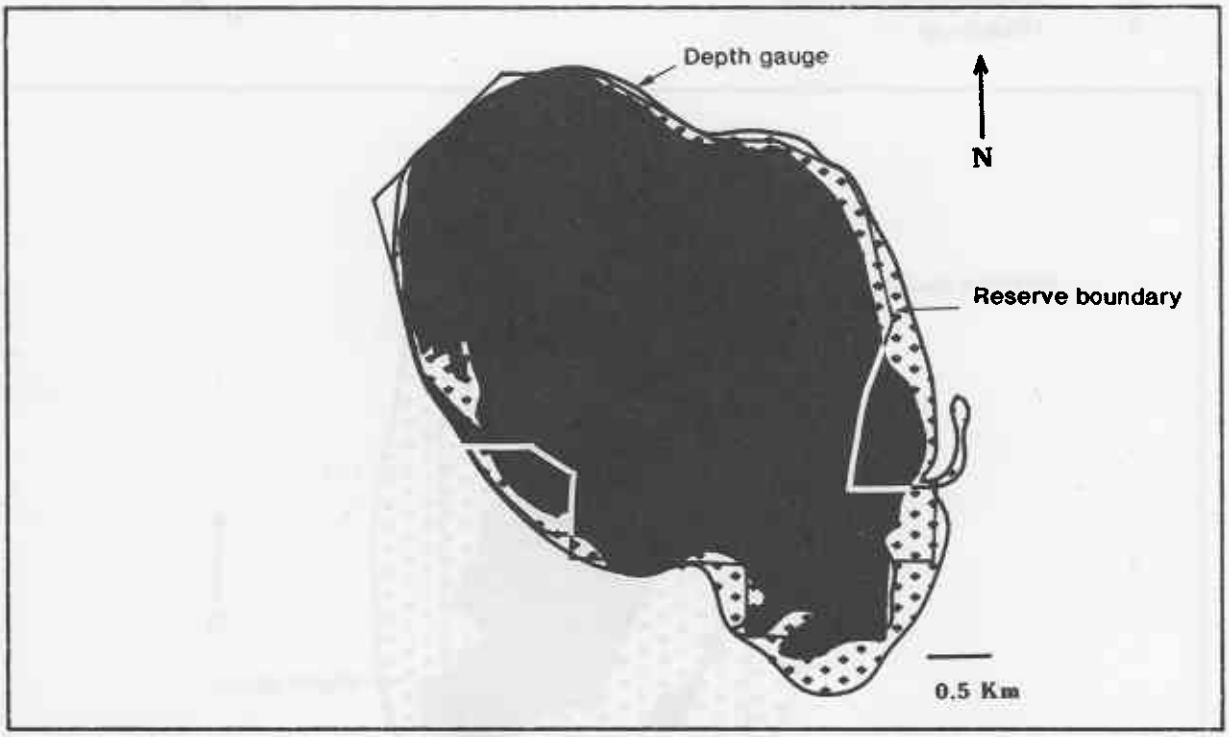
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.50	15	20
dead trees	5.00	2	10

A large hypersaline lake with a sparse belt of samphire and long-dead trees around the water mark. *Halosarcia pergranulata, H. lepidosperma* and *Sarcocornia quinqueflora* occur in the samphire.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia lepidosperma*
3 *Halosarcia pergranulata*
3 *Sarcocornia quinqueflora*



Lake Jandabup

Nature Reserve :	Jandabup NR	Reserve Number :	7349
Vesting :	NPNCA	Purpose :	Cons. Fauna
Lake Area :	451.0 ha	Vegetation Area :	280.0 ha
Open Water :	171.0 ha (37.92%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Fresh
Coordinates :	31.45 S, 115.50 E		

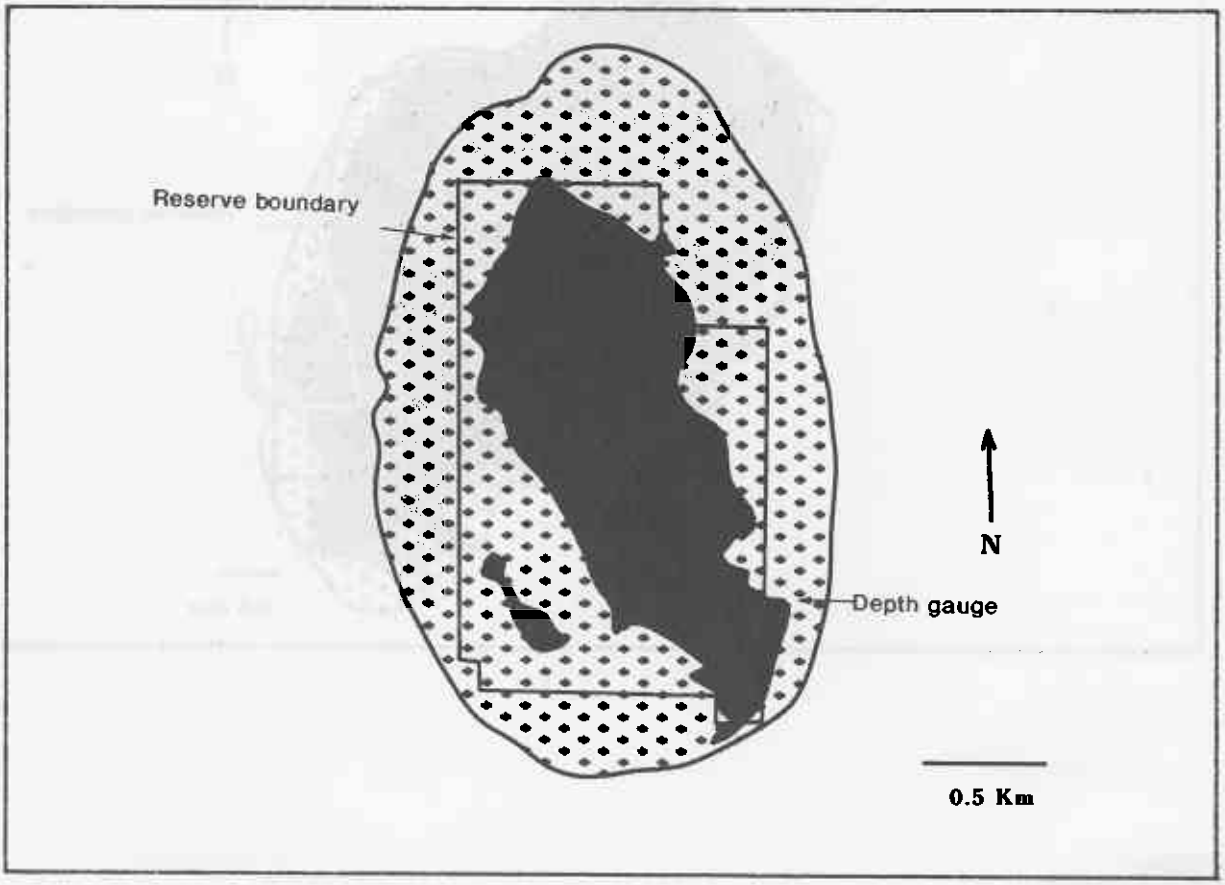
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	2.00	70	100
sedges	1.00	30	50
shrubs	2.00	1	1

A large fresh lake with open water in the centre surrounded by extensive sedge beds. The wetland area extends beyond the reserve boundary. The main sedge species is *Baumea articulata* but towards the shore there are areas containing two unidentified sedges. Yet closer to high water mark *Leptocarpus scariosus*, *Lepidosperma* sp. and another unidentified sedge occur. The herbs *Villarsia* sp. and *Myriophyllum tillaeoides* occur amongst them. Low shrubs of *Astartea fascicularis* also occur occasionally on the higher ground within the flooded zone. This sedge-dominated vegetation continues above the water mark until it is replaced with *Banksia* woodland as the ground rises. Some additional information is given by Lantzke (1983).

Plant species list (zones indicated by a single numeral)

1 *Baumea articulata*
2 Cyperaceae sp.
3 *Astartea fascicularis*
3 *Leptocarpus scariosus*
3 *Lepidosperma* sp.
3 *Myriophyllum tillaeoides*
3 *Villarsia* sp.



Lake Jerdacuttup

Nature Reserve :	Oldfield NR	Reserve Number :	40156
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	1203.0 ha	Vegetation Area :	597.0 ha
Open Water :	606.0 ha (50.37%)		
Lake Permanence :	Permanent	Lake Salinity :	Saline
Coordinates :	33.56 S, 120.14 E		

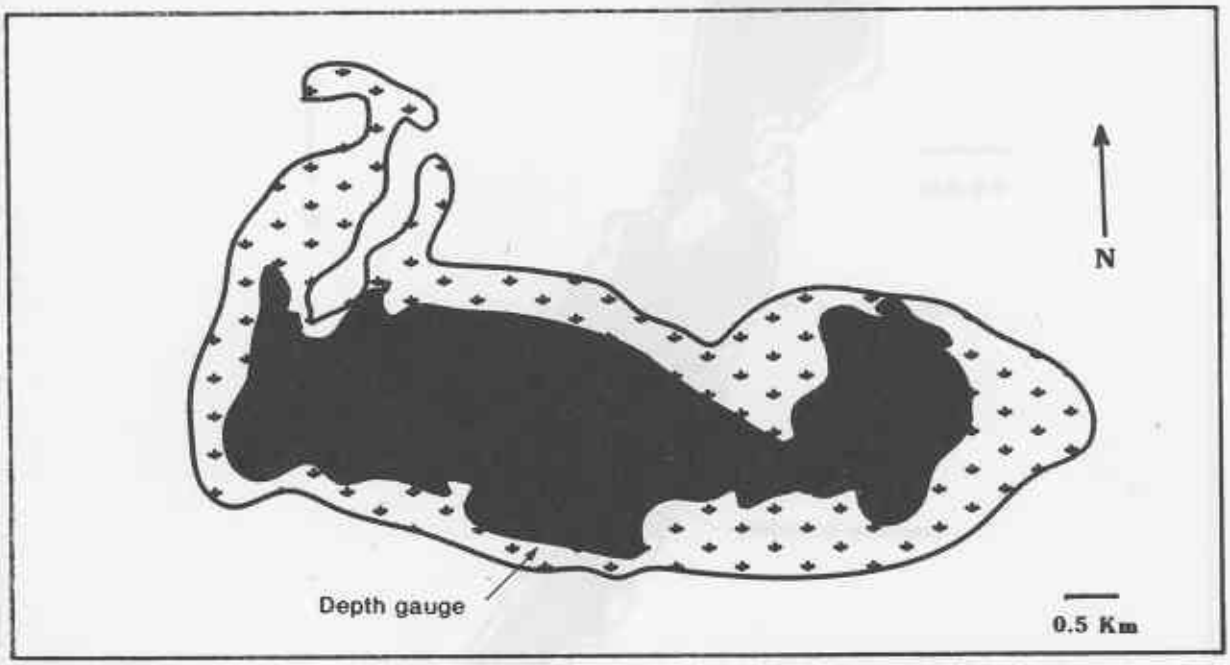
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	1.00	10	20
sedges	0.60	1	1
trees	5.00	90	80

A very large saline lake. Near the depth gauge *Melaleuca cuticularis* forms a riparian belt (up to 100 m in width) of 5 m high dense woodland. In other parts of the lake the woodland belt is far more extensive. On the landward side of the woodland *Halosarcia indica* ssp. *bidens*, *Carpobrotus* sp. and *Isolepis stelbata* occur as a sparse low shrubland with occasional *M. cuticularis* trees. As the ground rises the shrubland is replaced by more terrestrial vegetation, consisting of a low eucalypt woodland. In very wet years the lake floods beyond the *Melaleuca cuticularis* belt into the low shrubland but more commonly only *Melaleuca cuticularis* is inundated.

Plant species list (zones indicated by a single numeral)

1 *Melaleuca cuticularis*
3 *Halosarcia indica* ssp. *bidens*
4 *#Carpobrotus* sp.
4 *Isolepis stellata*



Lake Joondalup

Nature Reserve :	Joondalup NR	Reserve Number :	31048
Vesting :	NPNCA	Purpose :	Recreation and Cons. Flora and Fauna
Lake Area :	458.5 ha	Vegetation Area :	48.5 ha
Open Water :	410.0 ha (89.42%)		
Lake Permanence :	Permanent	Lake Salinity :	Fresh
Coordinates :	31.45 S, 115.47 E		

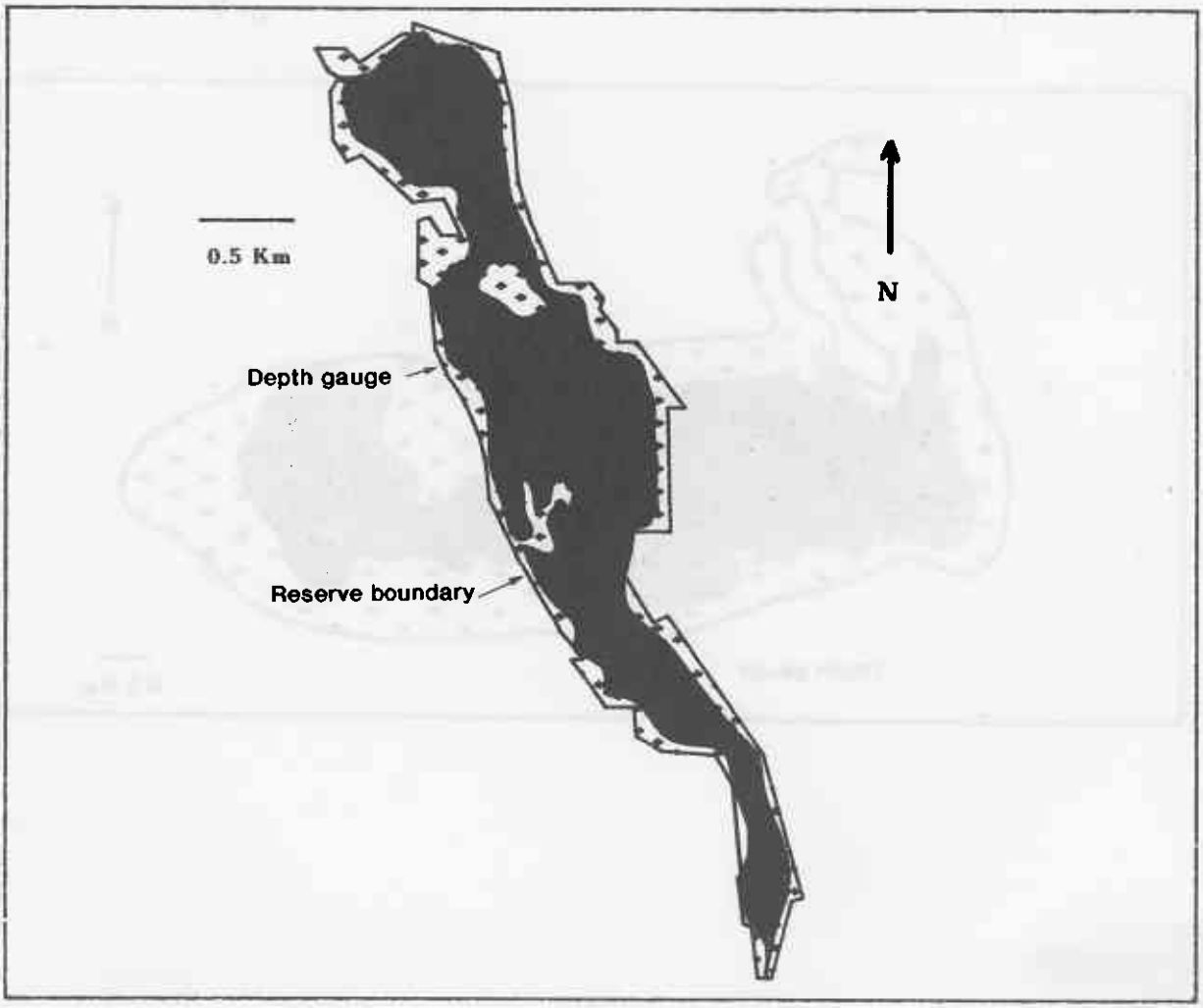
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	2.00	20	100
trees	5.00	5	90
dead trees	4.00	1	50

A large fresh lake with islands of *Baumea articulata* occurring throughout and a fringe of the same species around the edge. In places the *B. articulata* has been replaced by expanding pockets of *Typha* sp. Outside the sedge there is a dense belt of *Melaleuca rhaphiophylla*, which straddles the water mark. *Schoenus subfascicularis* grows beneath the *M. rhaphiophylla* canopy and intrudes into the *B. articulata*. The herb *Centella asiatica* and clumps of the rush *Isolepis nodosa* are also present beneath the *M. rhaphiophylla* belt canopy but only above the water mark. More detailed information is given by Congdon and McComb (1976).

Plant species list (zones indicated by a single numeral)

1	*Baumea articulata*
1	*#Typha* sp.
2	*Schoenus subfascicularis*
3	*Melaleuca rhaphiophylla*
4	*Centella asiatica*
4	*Isolepis nodosa*



Kent 29020

Nature Reserve :	Unnamed	Reserve Number :	29020
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	42.6 ha	Vegetation Area :	42.6 ha
Open Water :	0.0 ha (0.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	33.22 S, 118.54 E		

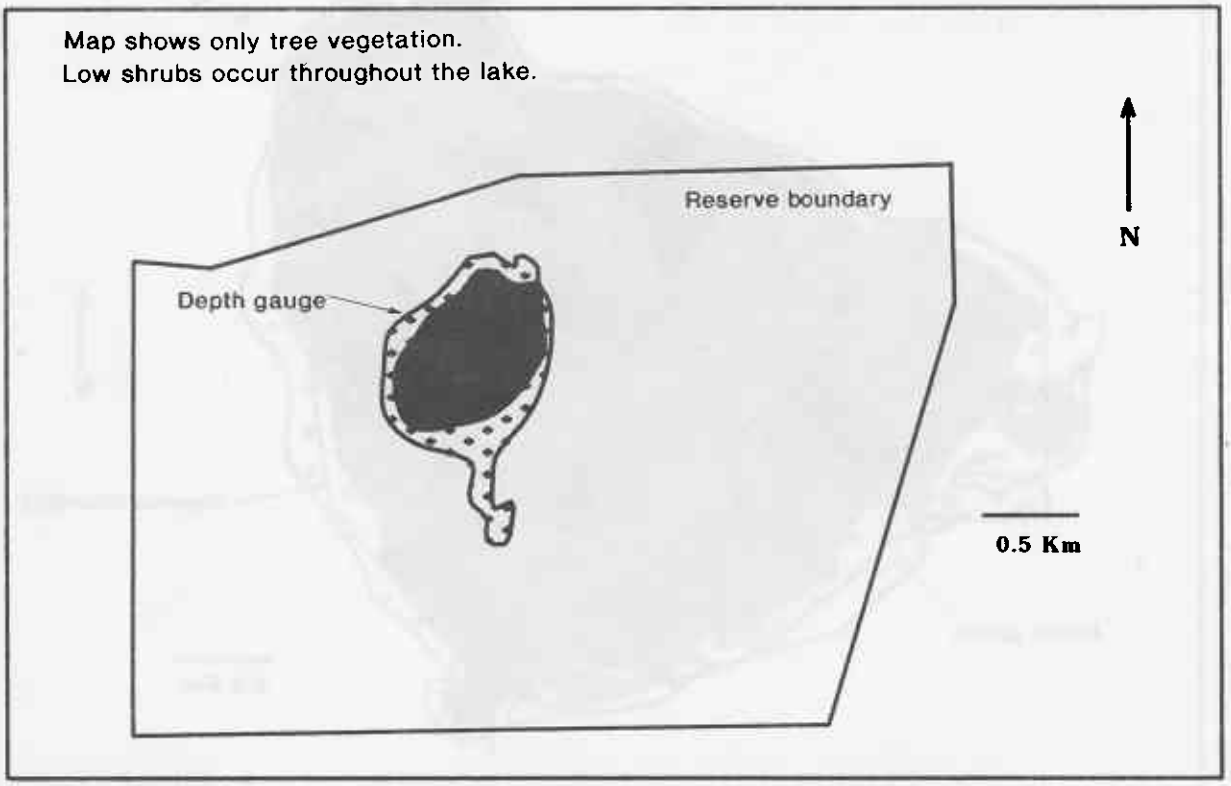
Vegetation Structure :

	Height (m)	% Area	% Cover
shrubs	0.60	95	20
shrubs	3.00	2	30
trees	10.00	1	1

A small fresh lake containing low shrubs of *Muehlenbeckia* sp. throughout the wetland area with occasional *Halosarcia pergranulata*, *Lawrencia squamata* and *Carpobrotus* sp. Inside the edge of the wetland there is a thin belt of *Melaleuca* sp. with occasional *Eucalyptus occidentalis* occurring mostly as shrubby saplings. *Melaleuca priessiana* occurs at the water mark, behind which is a *Eucalyptus occidentalis* woodland.

Plant species list (zones indicated by a single numeral)

2 *#Carpobrotus* sp.
2 *Halosarcia pergranulata*
2 *Lawrencia squamata*
2 *Muehlenbeckia* sp.
3 *Eucalyptus occidentalis*
3 *Melaleuca preissiana*
3 *Melaleuca* sp.



Lake Kondinin

Nature Reserve :	Kondinin Lake NR	Reserve Number :	22519
Vesting :	Kondinin Shire	Purpose :	Recreation and Cons. Flora and Fauna
Lake Area :	1517.0 ha	Vegetation Area :	226.0 ha
Open Water :	1291.0 ha (85.10%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Hypersaline
Coordinates :	32.30 S, 118.12 E		

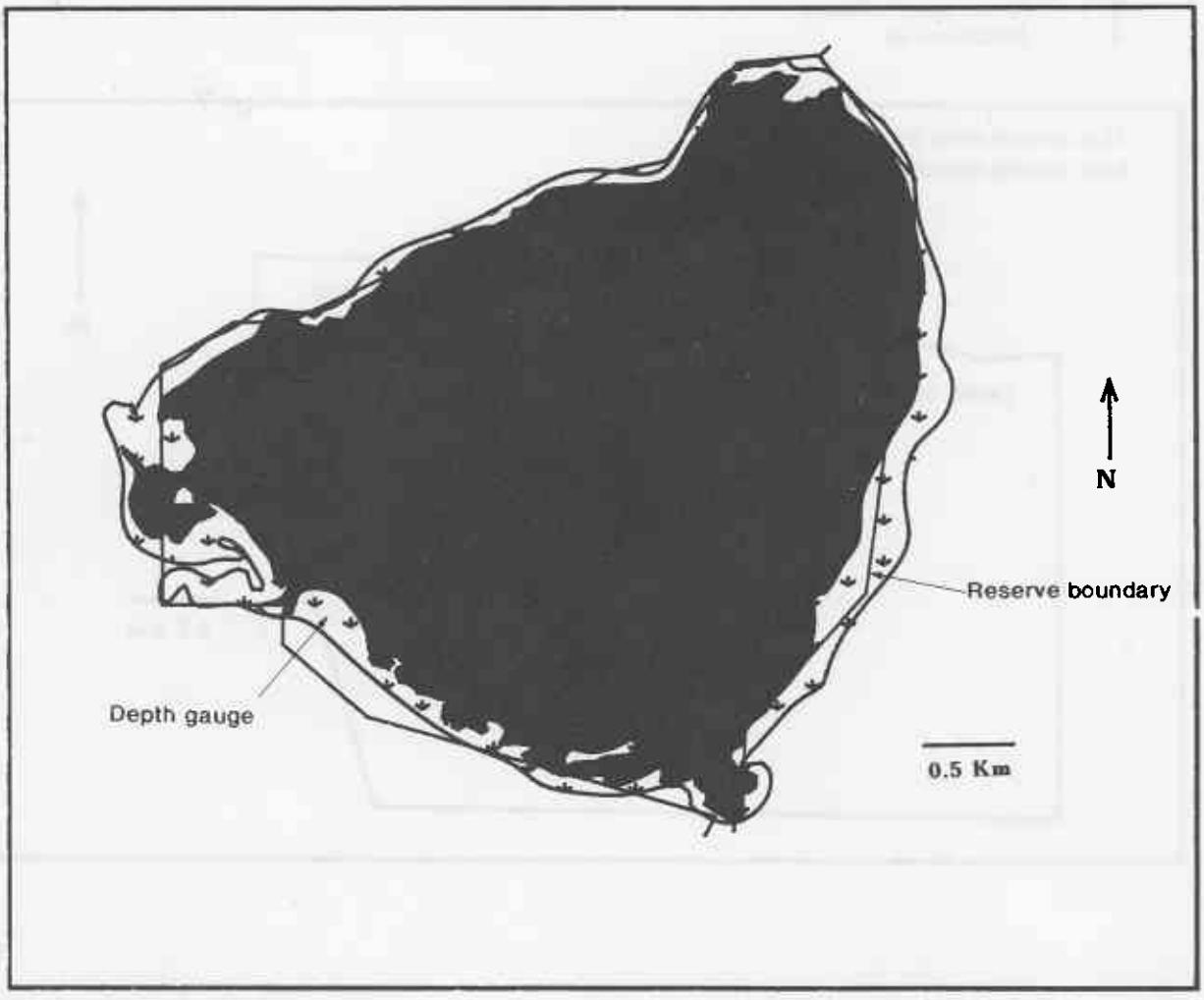
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.30	30	20
dead trees	3.00	1	1

A very large hypersaline lake with a few dead trees and shrubs and a sparse samphire shrubland of *Halosarcia syncarpa* and *H. pergranulata* around the edge. Above the water mark there is a thicket of dead trees and shrubs, under which the same samphire species grow as well as *Sarcocornia blackiana* and *Carpobrotus* sp. A few live *Melaleuca uncinata* shrubs also occur among the dead trees and shrubs.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia pergranulata*
3 *Halosarcia syncarpa*
4 *#Carpobrotus* sp.
4 *Melaleuca uncinata*
4 *Sarcocornia blackiana*



Kwobrup Swamp

Nature Reserve :		Reserve Number :	Not reserved
Vesting :		Purpose :	
Lake Area :	42.8 ha	Vegetation Area :	36.6 ha
Open Water :	6.2 ha (14.49%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.44 S, 118.01 E		

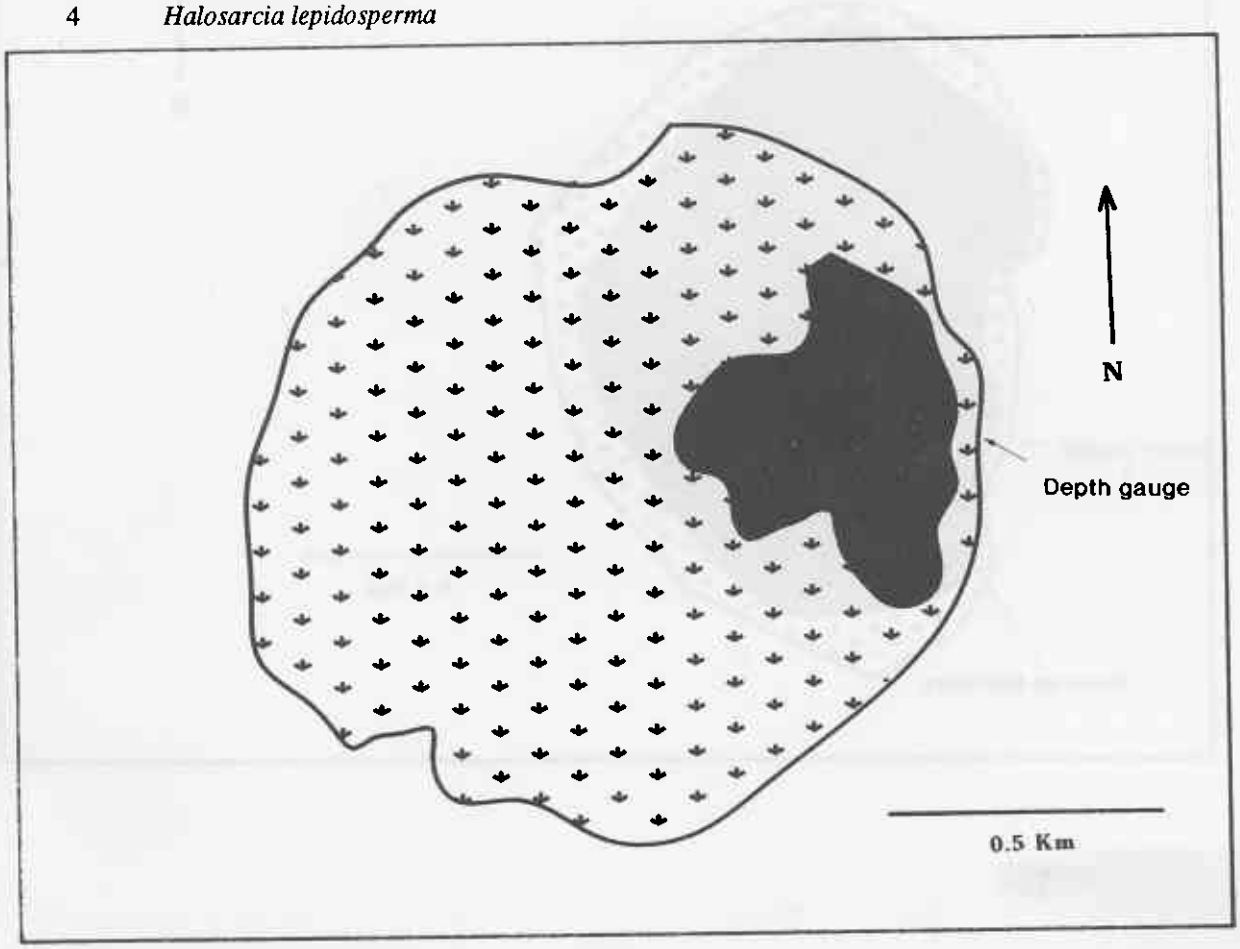
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.30	70	30
trees	5.00	60	50
dead trees	5.00	50	10
dead trees	3.00	10	50

A small lake that is relatively heavily vegetated with much of the vegetation badly salt-affected. *Melaleuca lanceolata* occurs in poor condition over most of the lake as an open woodland and forms a narrow thicket (in some places dead) along the high water mark. Long-dead trees, probably *Eucalyptus* sp., also occur through most of the lake. At the northern and eastern sides there is a low dense shrubland of dead *Melaleuca* sp. *Halosarcia pergranulata, H. lepidosperma, Sarcocornia quinqueflora* ssp. *quinqueflora, Wilsonia rotundifolia, Dysphyma crassifolium, Atriplex exilifolia* and *A. semibaccata* occur throughout the lake when it is dry. *Halosarcia lepidosperma* occurs above the water mark and extends into the eucalypt woodland that surrounds the lake.

Plant species list (zones indicated by a single numeral)

2	*Melaleuca lanceolata*
3	*Atriplex exilifolia*
3	*Atriplex semibaccata*
3	*Disphyma crassifolium*
3	*Halosarcia pergranulata*
3	*Sarcocornia quinqueflora* ssp. *quinqueflora*
3	*Wilsonia rotundifolia*
4	*Halosarcia lepidosperma*



Lake Kwornicup

Nature Reserve :	Kwornicup Lake NR	Reserve Number :	32284
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	218.0 ha	Vegetation Area :	44.0 ha
Open Water :	174.0 ha (79.82%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	34.33 S, 117.26 E		

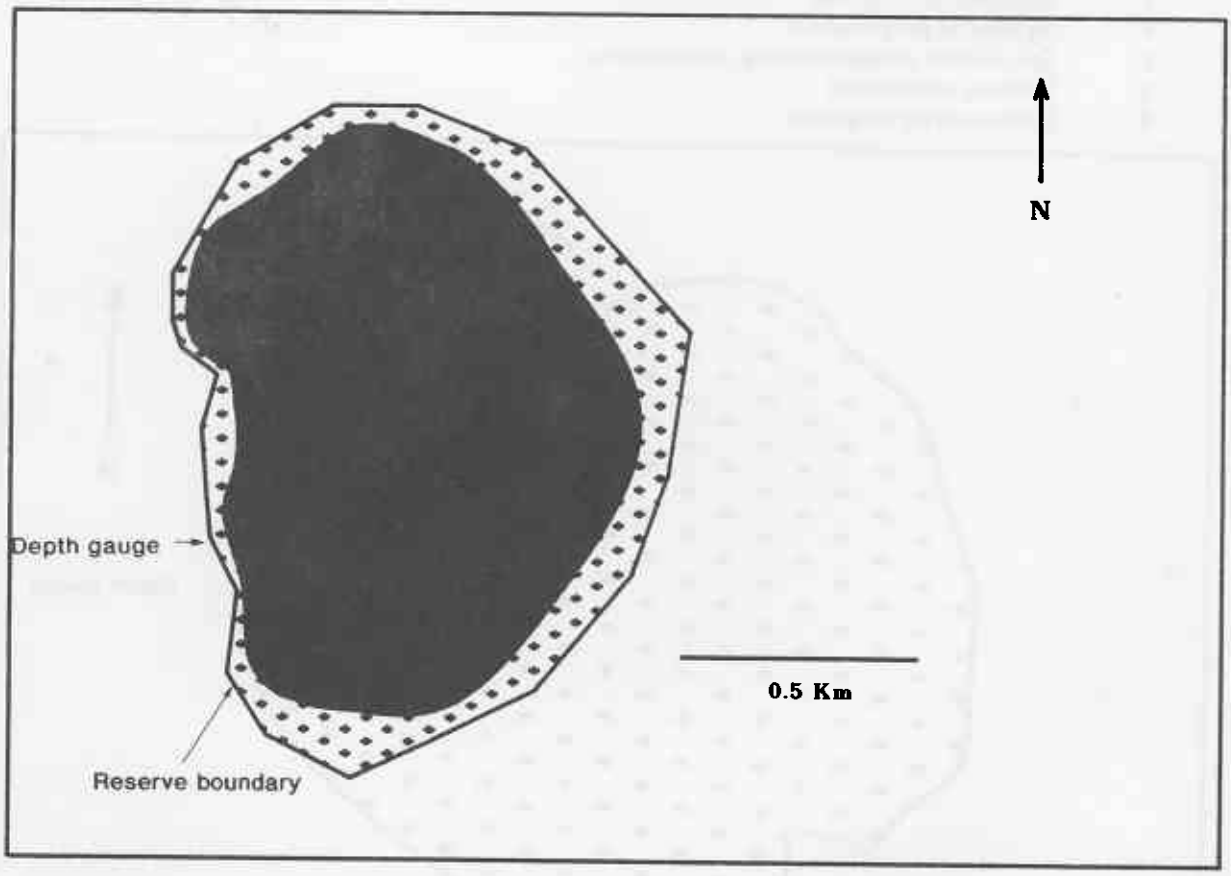
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.10	100	60
shrubs	3.00	2	80
dead shrubs	3.00	5	1

A moderate-sized open saline lake surrounded by a fringe of *Melaleuca cuticularis*. Scattered clumps of *Sarcocornia quinqueflora* and some sparse *Schoenus brevifolius* occur as a narrow band below the water mark. The small succulent *Wilsonia backhousei* is present between the samphire and the edge of sapling *M. cuticularis* about 3 m high that form a narrow band inside the main belt of *M. cuticularis* in some places and presumably established on a receding water level after flooding. At the water mark clumps of *Gahnia trifida* occur among the band of *Melaleuca cuticularis*; these clumps extend into a tall woodland of jarrah/marri as the ground rises.

Plant species list (zones indicated by a single numeral)

3 *Gahnia trifida*
3 *Melaleuca cuticularis*
3 *Sarcocornia quinqueflora*
3 *Schoenus brevifolius*
3 *Wilsonia backhousei*



Little White Lake

Nature Reserve :	Carmody NR	Reserve Number :	26786
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	43.3 ha	Vegetation Area :	30.8 ha
Open Water :	12.5 ha (28.87%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.01 S, 117.26 E		

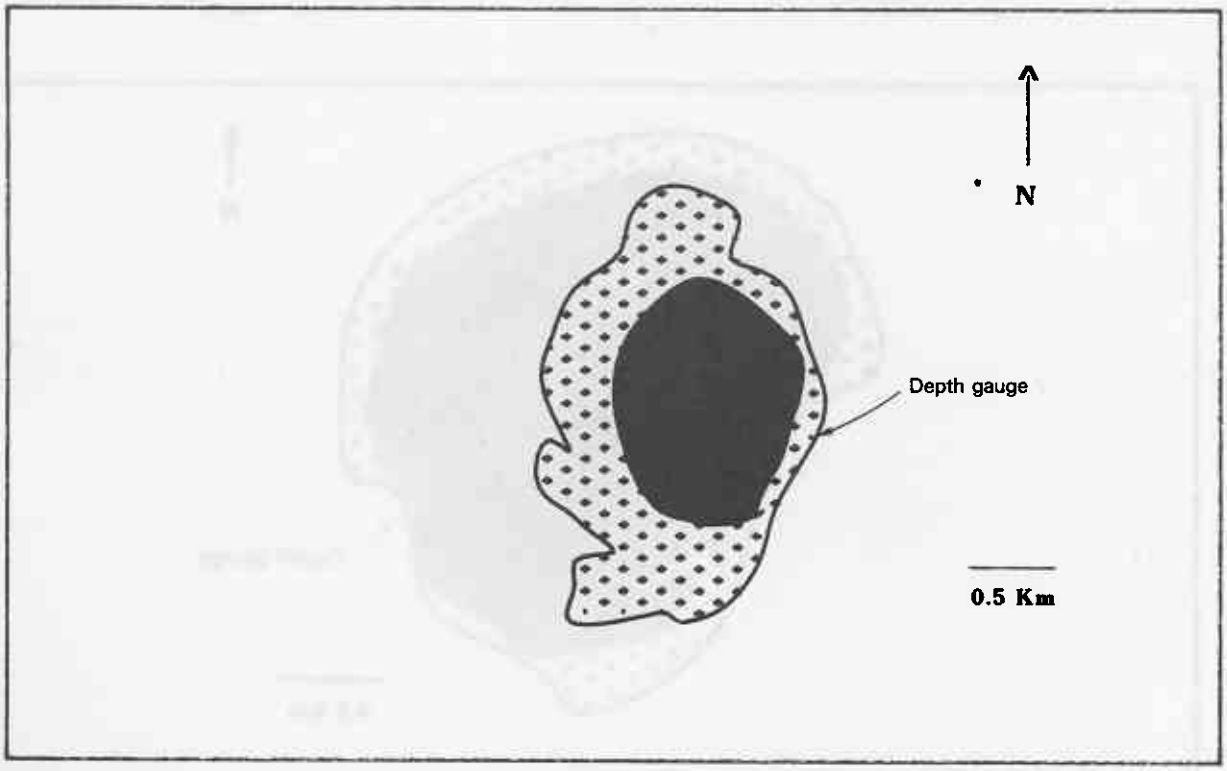
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	40	70
dead trees	4.00	60	70

A moderate-sized saline lake in which several islands have been created. Extending into the lake from the water mark there is an extensive band of dead *Melaleuca* aff. *halmaturorum* with *Halosarcia pergranulata* and *Sarcocornia quinqueflora* growing underneath. Above the water mark there is a thicket of live *M.* aff. *halmaturorum* and a few *Eucalyptus* sp. *Casuarina obesa* also occurs above the water mark, especially on the western side of the lake.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia pergranulata*
3 *Sarcocornia quinqueflora*
4 *Casuarina obesa*
4 *Eucalyptus* sp.
4 *Melaleuca* aff. *halmaturorum*



Lake Logue

Nature Reserve :	Lake Logue NR	Reserve Number :	29073
Vesting :	Unvested	Purpose :	Cons. Flora and Fauna
Lake Area :	424.8 ha	Vegetation Area :	106.0 ha
Open Water :	318.0 ha (74.86%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	29.51 S, 115.08 E		

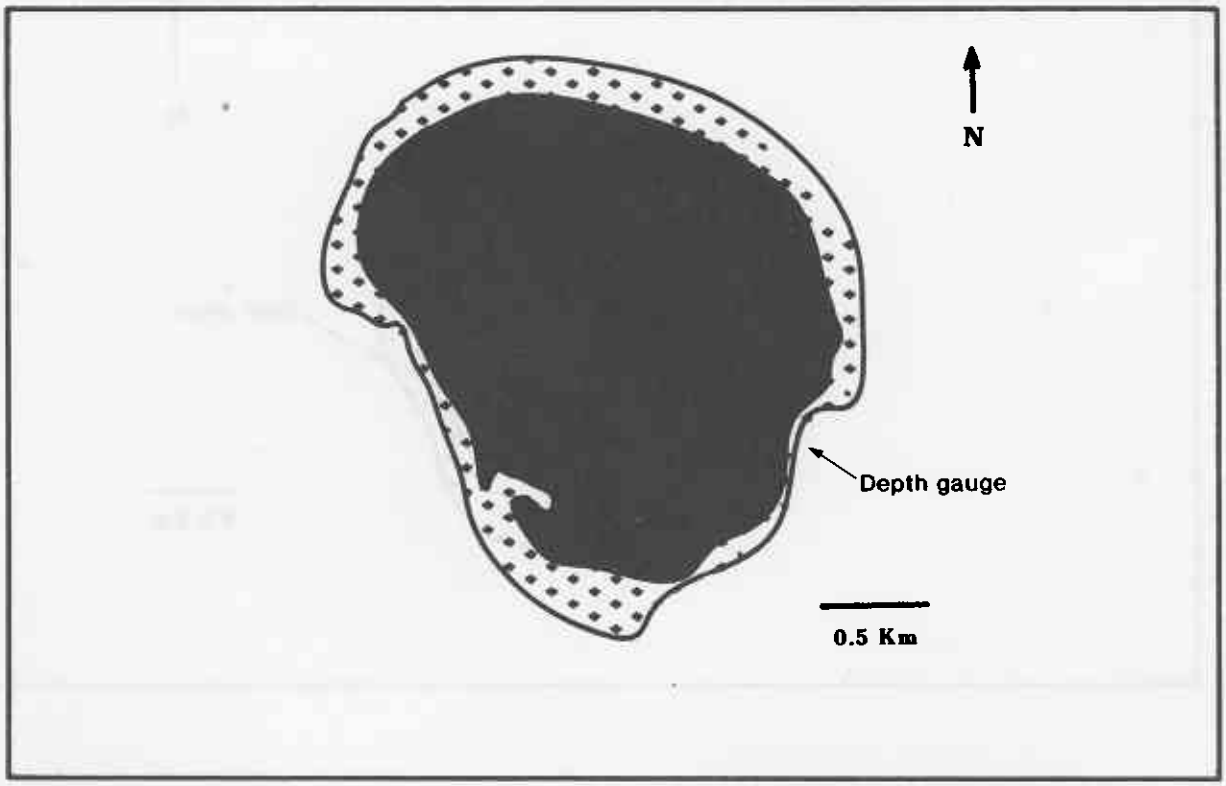
Vegetation Structure :

	Height (m)	% Area	% Cover
grasses	0.50	40	15
herbs	0.50	30	15
sedges	1.00	15	5
shrubs	2.00	5	2
trees	6.00	5	25
dead trees	6.00	10	10
dead trees	6.00	5	25

A large fresh lake with a fringe of live *Casuarina obesa* interspersed with mostly dead *Eucalyptus rudis*. An unidentified sedge grows under the *C. obesa*. Isolated *C. obesa* occur farther into the lake on raised mounds. When the lake is dry *Eragrostis curvula* occurs on lake bed. Outside the *C. obesa* zone *Melaleuca rhaphiophylla* occurs as a sapling or tree with an understorey of *Alyogyne hakeifolia*.

Plant species list (zones indicated by a single numeral)

3	*Casuarina obesa*
3	*Eucalyptus rudis*
4	*Alyogyne hakeifolia*
4	Cyperaceae sp.
4	**Eragrostis curvula*
4	*Melaleuca rhaphiophylla*



Lake Martinup

Nature Reserve :	Martinup NR	Reserve Number :	17055
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	84.0 ha	Vegetation Area :	12.0 ha
Open Water :	72.0 ha (85.71%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.32 S, 117.10 E		

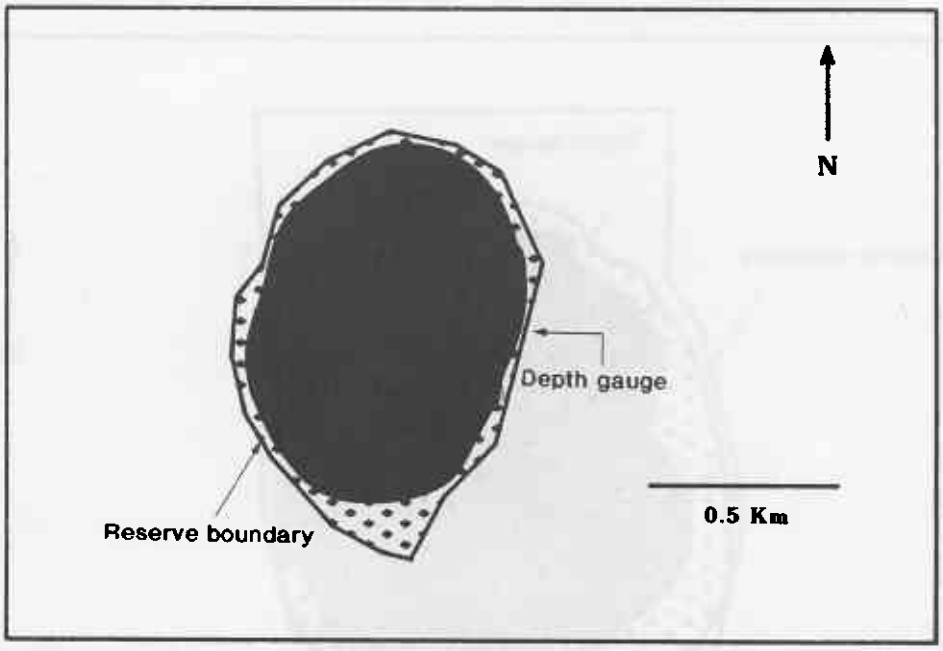
Vegetation Structure :

	Height (m)	% Area	% Cover
trees	4.00	20	5
dead trees	4.00	90	40

A moderate-sized saline lake with a narrow (about 20 m) band of dead trees well below water mark. Live *Melaleuca* aff. *acuminata* trees occur occasionally below the water mark and *Casuarina obesa* occurs above it. *Halosarcia lepidosperma* and *Sarcocornia quinqueflora* grow under all the tree zones.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia lepidosperma*
3 *Melaleuca* aff. *acuminata*
3 *Sarcocornia quinqueflora*
4 *Casuarina obesa*



Lake Mears

Nature Reserve :	Wandjagill NR	Reserve Number :	25884
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	199.0 ha	Vegetation Area :	52.0 ha
Open Water :	147.0 ha (73.87%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Saline
Coordinates :	32.14 S, 117.21 E		

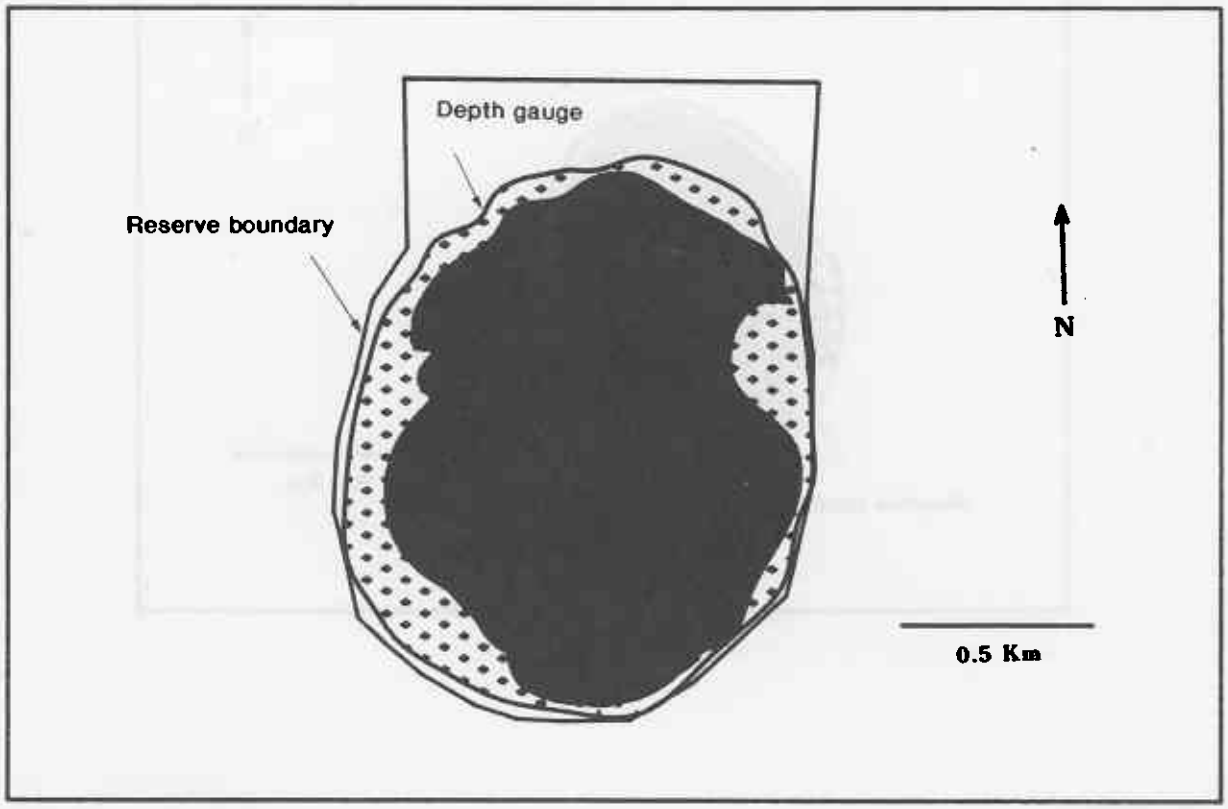
Vegetation Structure :

	Height (m)	% Area	% Cover
herbs	0.20	1	10
samphires	0.10	40	80
trees	8.00	2	20
dead trees	6.00	50	50

A moderate-sized saline lake with a broad fringe of dead *Casuarina obesa* and *Melaleuca halmaturorum*, under which *Halosarcia pergranulata* and *H. lepidosperma* grow. Between the band of dead trees and high water mark there are a few live *C. obesa* trees, numerous *C. obesa* seedlings and a few *Rhagodia* sp. Above the water mark *Melaleuca halmaturorum* and *Eucalyptus rudis* occur and are replaced by salmon gum woodland as the ground rises.

Plant species list (zones indicated by a single numeral)

3 *Casuarina obesa*
3 *Halosarcia lepidosperma*
3 *Halosarcia pergranulata*
3 *Rhagodia* sp.
4 *Eucalyptus rudis*
4 *Melaleuca halmaturorum*



Mettler Lake

Nature Reserve :	Mettler Lake NR	Reserve Number :	26894
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	24.0 ha	Vegetation Area :	24.0 ha
Open Water :	0.0 ha (0.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	34.34 S, 118.37 E		

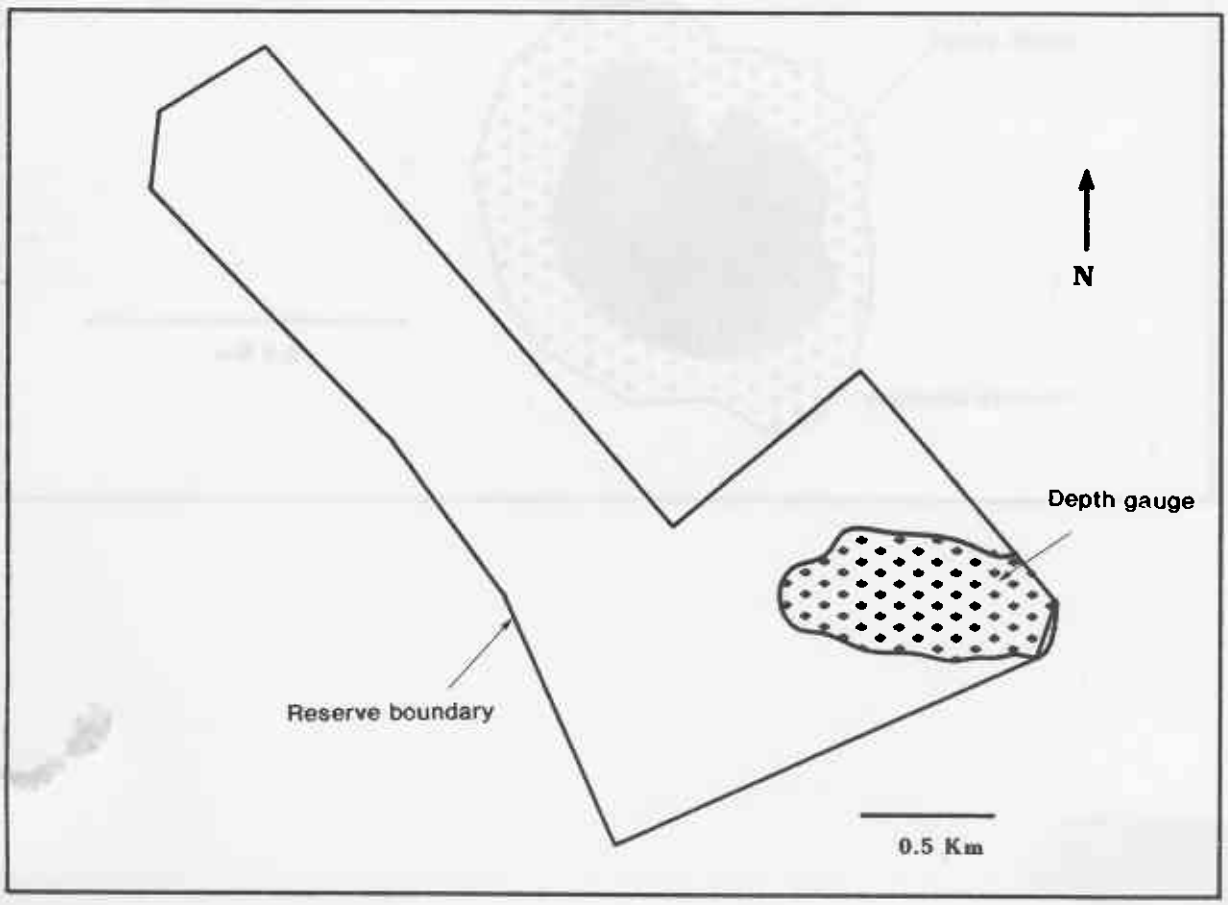
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	2.00	80	100
sedges	0.60	20	60
shrubs	3.00	10	20
trees	8.00	1	20
trees	5.00	40	20

A small densely vegetated swamp containing the sedge *Baumea articulata* in the centre and fringed with *Schoenus* sp.(restricted to the edge of the *B. articulata* zone) and *Lepidosperma leptostachyum*, which extends to the edge of the lake. Towards the outside of the swamp *B. juncea* and *L. tenue* occur with *L. leptostachyum*, forming a low sedge meadow. Just inside the *B. articulata* zone there is a belt of *Melaleuca cuticularis* shrubs, outside which scattered *M. cuticularis* trees extend to the lake edge, but the overall impression is that the lake vegetation consists of sedges. Beyond the swamp the vegetation consists of *Eucalyptus occidentalis* woodland; the bases of some of these trees are inundated when water levels are high.

Plant species list (zones indicated by a single numeral)

2 *Baumea articulata*
2 *Baumea juncea*
2 *Lepidosperma leptostachyum*
2 *Melaleuca cuticularis*
2 *Schoenus* sp.
3 *Eucalyptus occidentalis*
3 *Lepidosperma tenue*



Lake Miripin

Nature Reserve :	Miripin NR	Reserve Number :	24912
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	28.0 ha	Vegetation Area :	14.0 ha
Open Water :	14.0 ha (50.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Brackish
Coordinates :	33.32 S, 117.12 E		

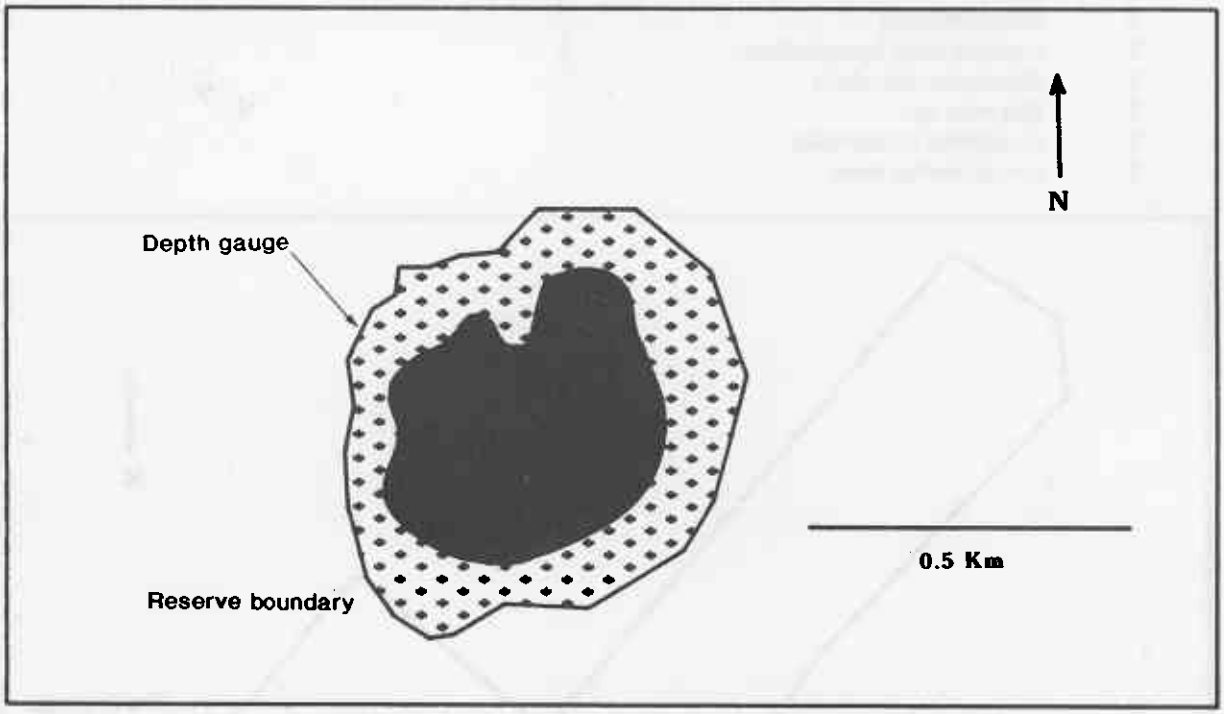
Vegetation Structure :

	Height (m)	% Area	% Cover
shrubs	4.00	100	5
dead trees	10.00	100	5

A small brackish lake fringed by a sparse band of dead *Eucalyptus loxophleba* and *Eucalyptus* sp. trees and live *Melaleuca* sp. shrubs growing inside the water mark. The herb *Spergularia rubra* grows among the shrubs and dead trees. Above the water mark *E. loxophleba* and *Eucalyptus* sp. occur.

Plant species list (zones indicated by a single numeral)

3	*Melaleuca* sp.
3	**Spergularia rubra*
4	*Eucalyptus loxophleba*
4	*Eucalyptus* sp.



Lake Moates

Nature Reserve :	Two Peoples Bay NR	Reserve Number :	27956
Vesting :	NPNCA	Purpose :	Cons. Fauna
Lake Area :	144.0 ha	Vegetation Area :	82.2 ha
Open Water :	61.8 ha (42.92%)		
Lake Permanence :	Permanent	Lake Salinity :	Fresh
Coordinates :	34.57 S, 118.06 E		

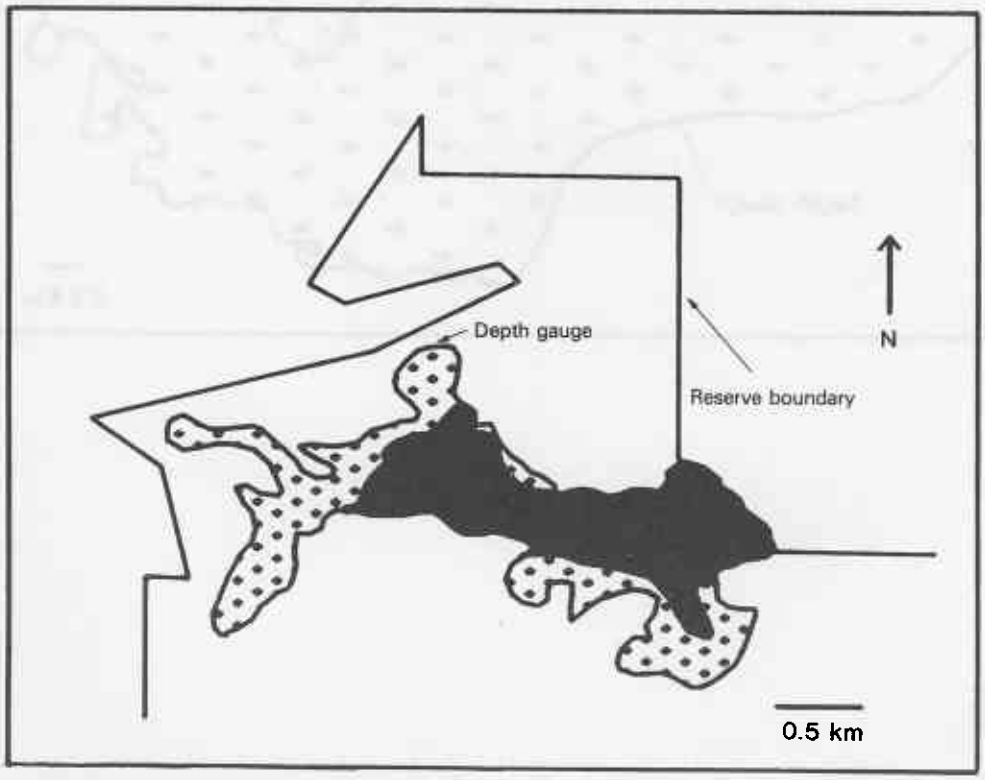
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	1.00	50	90
sedges	2.00	50	90
shrubs	1.00	5	5
trees	3.00	5	60

A moderate-sized fresh lake containing areas of sand dune that extend into the water on the southern side. There are belts of sedges in the water dominated by *Baumea articulata* and *B. juncea*. *Triglochin procera* occurs in sheltered areas. At the edge of the water there is a sedgeland that includes *Leptocarpus scariosus*, *L. coangustatus*, *Anarthria scabra*, an unidentified sedge, *Evandra aristata* and the herbs *Stylidium scandens*, *Dampiera* sp. and *Xanthosia rotundifolia*. At the rear of the sedgeland are a few low trees of *Agonis linearifolia* and *A. juniperina* with an understorey of *Melaleuca thymoides*, *Cosmelia rubra*, *Actinodium cunninghamii*, *Adenanthos obovatus*, *Aotus* sp., *Boronia denticulata*, *Pimelea imbricata*, *Dasypogon bromeliifolius* and the herbs *Stylidium scandens*, *Dampiera* sp. and *Xanthosia rotundifolia*. The ground rises to an open *Eucalyptus staerii/Allocasuarina decussata* woodland away from the lake.

Plant species list (zones indicated by a single numeral)

1	*Baumea articulata*	4	*Actinodium cunninghamii*
2	*Baumea juncea*	4	*Adenanthos obovatus*
2	*Triglochin procera*	4	*Agonis juniperina*
3	*Anarthria scabra*	4	*Agonis linearifolia*
3	*Dampiera* sp.	4	*Aotus* sp
3	*Evandra aristata*	4	*Boronia denticulata*
3	*Leptocarpus coangustatus*	4	*Cosmelia rubra*
3	*Leptocarpus scariosus*	4	*Dasypogon bromeliifolius*
3	*Stylidium scandens*	4	*Melaleuca thymoides*
3	*Xanthosia rotundifolia*	4	*Pimelea imbricata*



Lake Mollerin

Nature Reserve :	Unnamed	Reserve Number :	14429
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	4882.0 ha	Vegetation Area :	2200.0 ha
Open Water :	2682.0 ha (54.94%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Hypersaline
Coordinates :	30.30 S, 117.34 E		

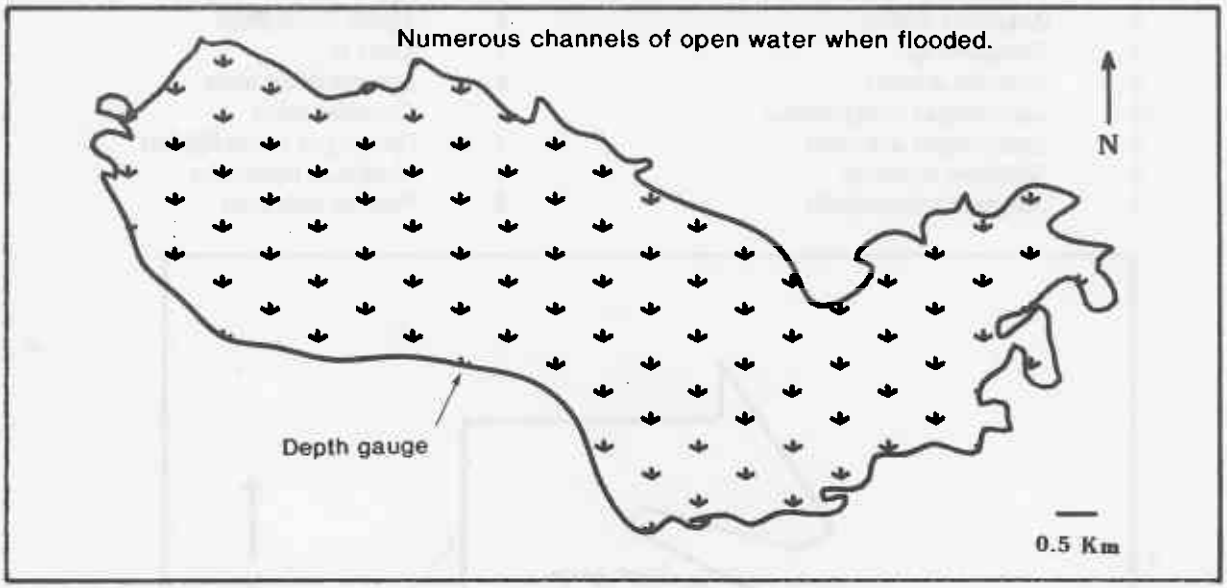
Vegetation Structure :

	Height (m)	% Area	% Cover
herbs	0.10	2	10
samphires	0.50	20	30

An extensive hypersaline lake containing a network of small islands with channels between. Around the edge of the lake a narrow band of samphire occurs below the water mark consisting of *Halosarcia leptoclada* ssp. *inclusa* and *Frankenia* sp. Above the water mark there is a band of *Sclerostegia moniliformis*. All three species occur on the islands. Behind the *S. moniliformis* zone at the edge of the lake there is an open shrub zone and then salmon gum woodland.

Plant species list (zones indicated by a single numeral)

3 *Frankenia* sp.
3 *Halosarcia leptoclada* ssp. *inclusa*
4 *Sclerostegia moniliformis*



Mt Marshall 26687

Nature Reserve :	North Wallambin NR	Reserve Number :	26687
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	106.0 ha	Vegetation Area :	0.0 ha
Open Water :	106.0 ha (100.00%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Hypersaline
Coordinates :	30.55 S, 117.38 E		

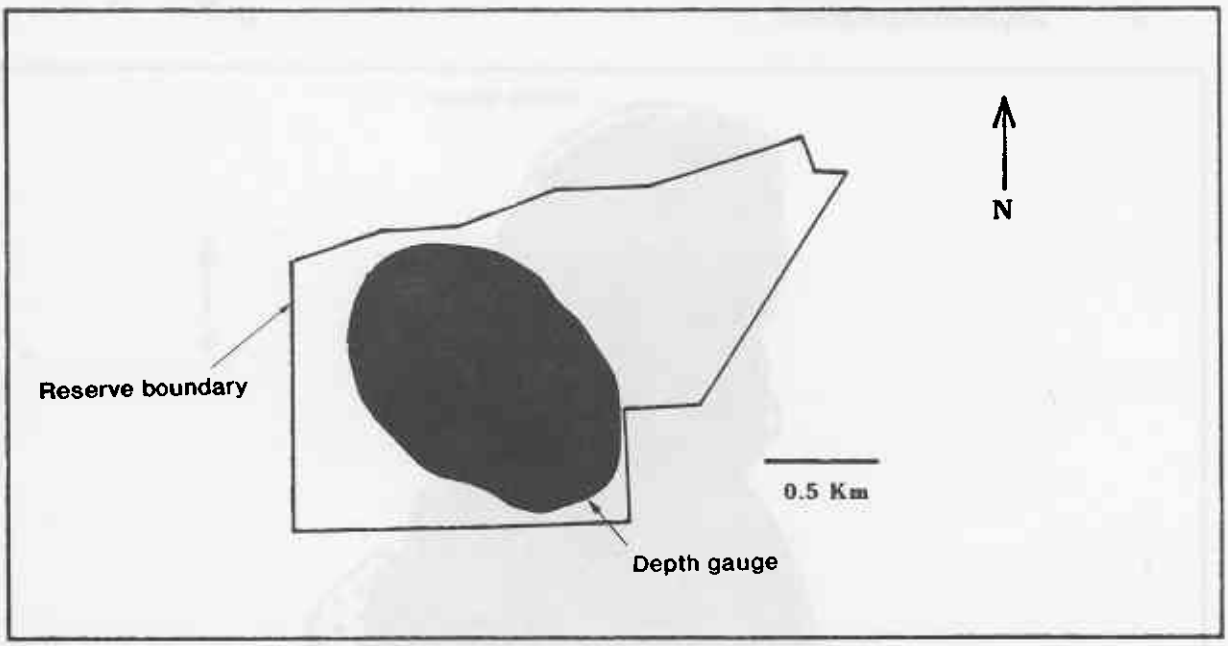
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A moderate-sized acidic hypersaline lake. Above the water mark there is an open shrubland of *Halosarcia lylei*, *Hakea preissii*, *Callitris verrucosa* and other species. Farther from the lake this is replaced by salmon gum woodland.

Plant species list (zones indicated by a single numeral)

4 *Callitris verrucosa*
4 *Hakea preissii*
4 *Halosarcia lylei*



Lake Muir

Nature Reserve :	Lake Muir NR	Reserve Number :	31880
Vesting :	NPNCA	Purpose :	Water and Cons. Flora and Fauna
Lake Area :	4600.0 ha	Vegetation Area :	516.0 ha
Open Water :	4084.0 ha (88.78%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	34.26 S, 116.40 E		

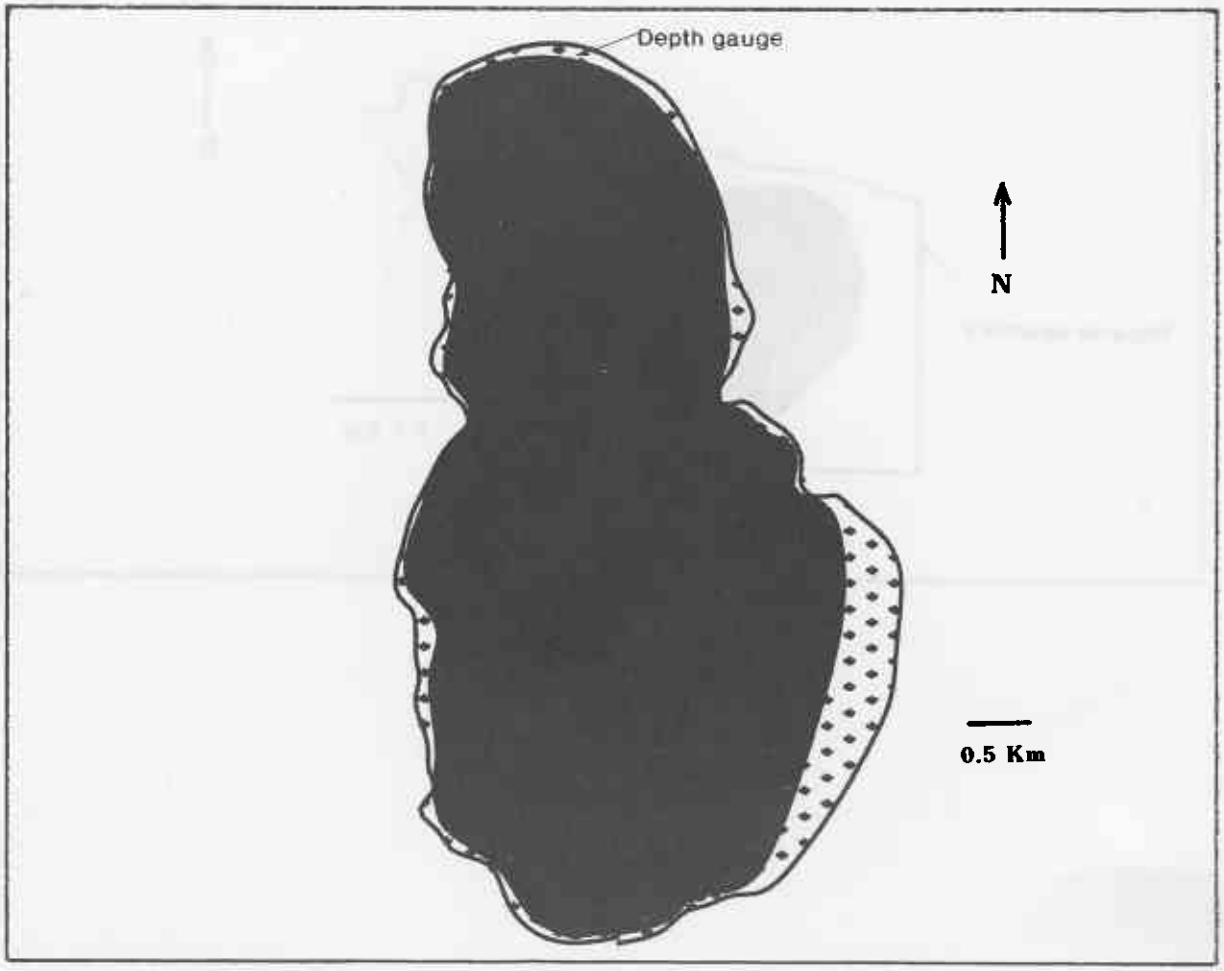
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	80	30
sedges	0.60	20	20
shrubs	0.60	20	2
trees	4.00	20	10

An extensive large saline lake with a belt of samphire around the edge, behind which are *Melaleuca* spp. *Sarcocornia quinqueflora* is the main samphire species but there is also some *Halosarcia lepidosperma* on the landward side of it. In some places *M. halmaturorum* grows between two samphire zones. On the landward side of the samphire there are sparse clumps of *Lepidosperma effusum* with occasional shrubs of *Melaleuca* sp. and *M. cuticularis* trees. At the high water mark and beyond *M.* aff. *viminea* shrubs occur with *Melaleuca* sp. as an understorey; they are replaced by jarrah/marri woodland farther from the lake. Near the depth gauge a drain enters the lake. It is fringed with *M. rhaphiophylla* and *Melaleuca* sp.; *L. effusum* and *Schoenus brevifolius* grow in it. *Wilsonia backhousei* grows around the drain.

Plant species list (zones indicated by a single numeral)

3	*Halosarcia lepidosperma*	3	*Sarcocornia quinqueflora*
3	*Lepidosperma effusum*	3	*Schoenus brevifolius*
3	*Melaleuca cuticularis*	3	*Wilsonia backhousei*
3	*Melaleuca halmaturorum*	4	*Melaleuca* aff. *viminea*
3	*Melaleuca rhaphiophylla*		



Lake Mungala

Nature Reserve :	Bampanup NR	Reserve Number :	26756
Vesting :	NPNCA	Purpose :	Cons. Fauna
Lake Area :	14.6 ha	Vegetation Area :	2.9 ha
Open Water :	11.7 ha (80.14%)		
Lake Permanence :	Seasonal	Lake Salinity :	Brackish
Coordinates :	31.27 S, 115.53 E		

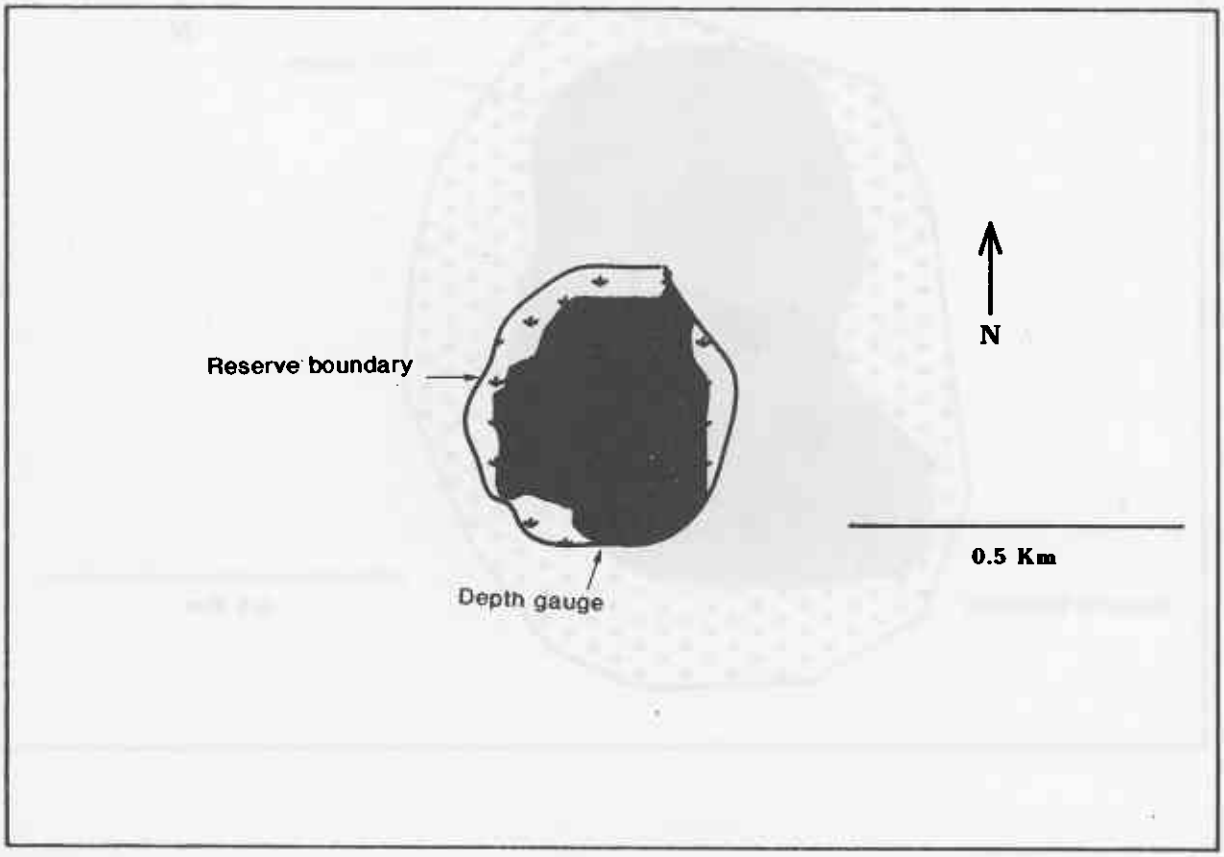
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	0.50	10	20
shrubs	2.00	40	90
trees	4.00	60	40

A small brackish lake that has been cleared to the water mark in several areas. Elsewhere there is a thin band of *Melaleuca rhaphiophylla* with an understorey of *M. teretifolia* and *Cyperus ?tenuiflorus*. In two areas on the western side dense low shrubs of *M. teretifolia* extend inside the *M. rhaphiophylla* band with an unidentified sedge growing amongst them. Most of the wetland vegetation shows signs of heavy grazing by sheep.

Plant species list (zones indicated by a single numeral)

2 Cyperaceae sp.
2 *Melaleuca teretifolia*
3 **Cyperus ?tenuiflorus*
3 *Melaleuca rhaphiophylla*



Lake Murapin

Nature Reserve :	Murapin NR	Reserve Number :	17257
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	64.4 ha	Vegetation Area :	41.6 ha
Open Water :	32.8 ha (50.93%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.32 S, 117.11 E		

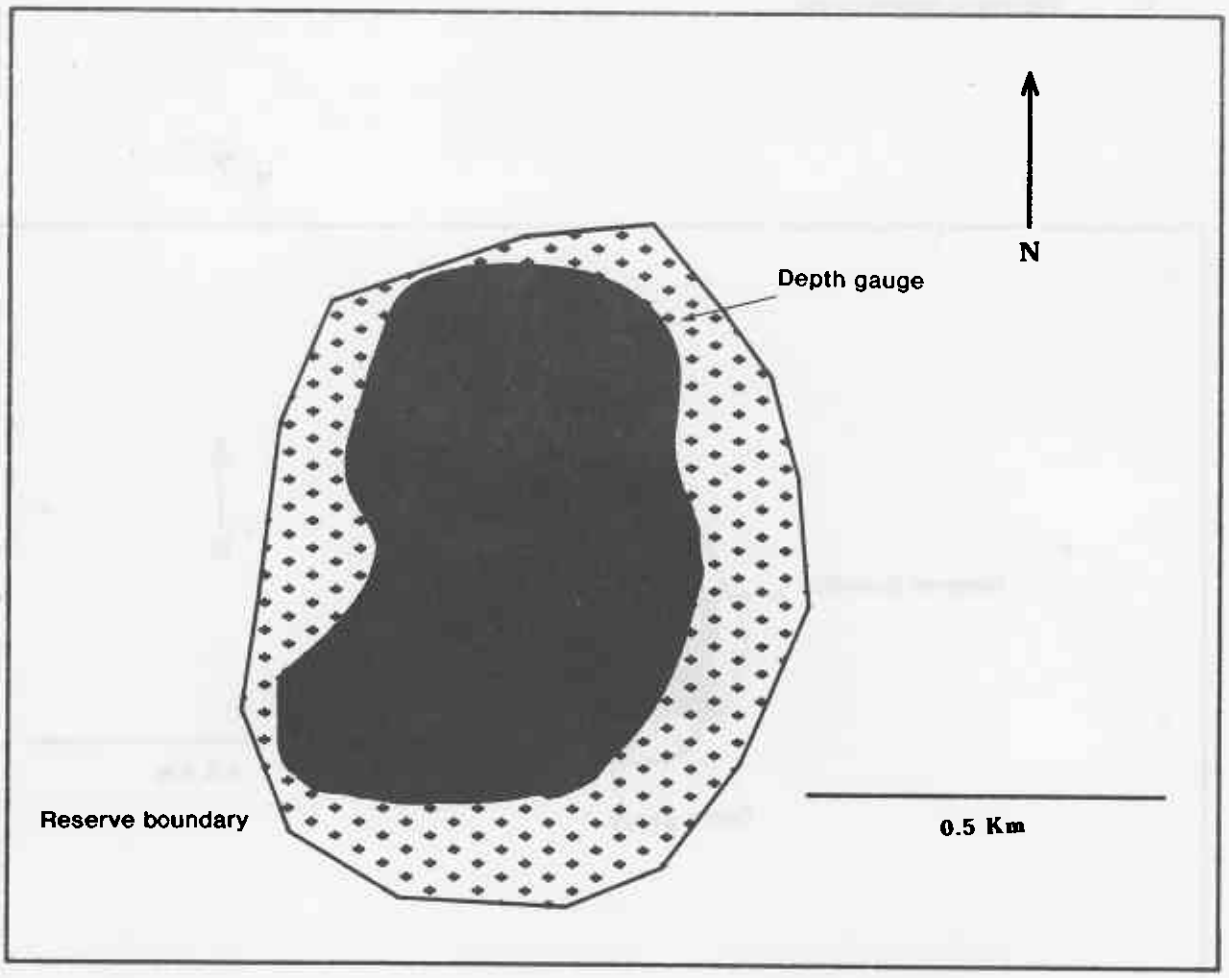
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.40	90	5
trees	5.00	70	2
dead trees	5.00	90	30

A moderate-sized lake with a wide (100 m or more) belt of long-dead *Casuarina obesa* below the water mark, in which there is scattered regeneration in higher parts of the lake bed. Small scattered bushes of *Sarcocornia quinqueflora* occur under the dead trees. Above the water mark there is a dense belt of live *C. obesa*.

Plant species list (zones indicated by a single numeral)

3 *Sarcocornia quinqueflora*
4 *Casuarina obesa*



Lake Nambung

Nature Reserve :	Bampanup NR	Reserve Number :	26756
Vesting :	NPNCA	Purpose :	Cons. Fauna
Lake Area :	28.8 ha	Vegetation Area :	9.2 ha
Open Water :	19.6 ha (68.06%)		
Lake Permanence :	Seasonal	Lake Salinity :	Brackish
Coordinates :	31.27 S, 115.53 E		

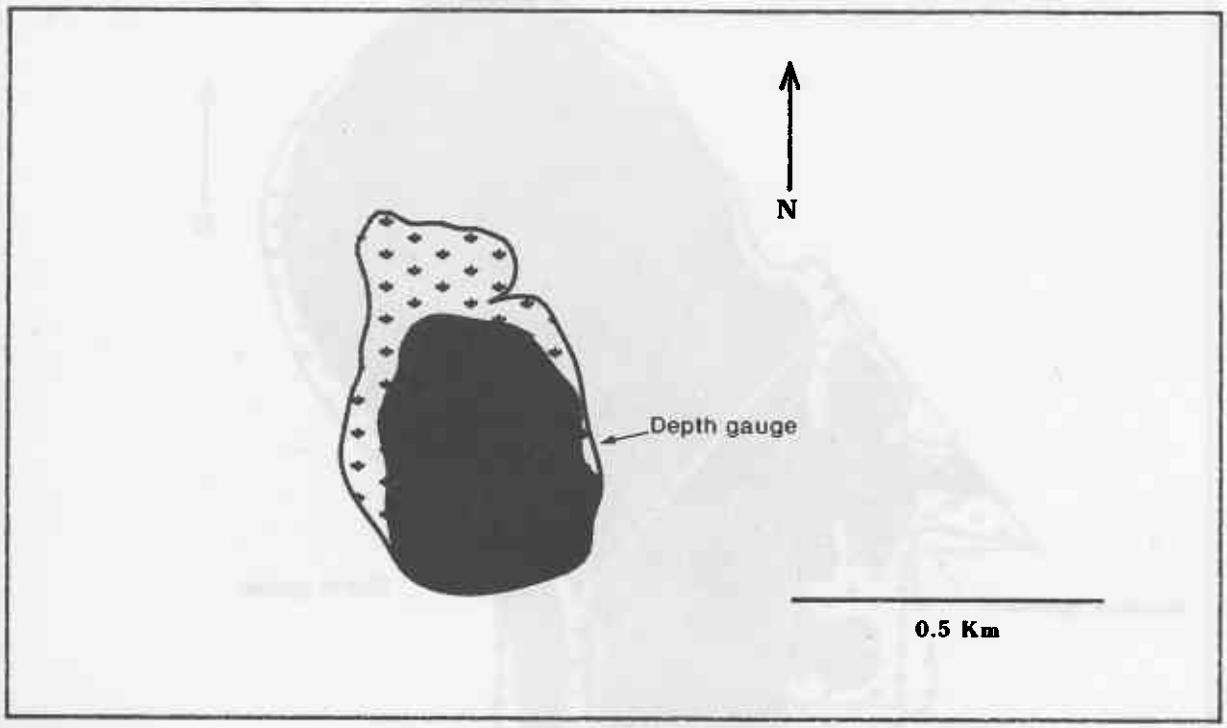
Vegetation Structure :

	Height (m)	% Area	% Cover
shrubs	2.50	10	90
trees	5.00	90	25
dead trees	5.00	2	40

A small brackish lake with a very narrow open fringe of *Melaleuca rhaphiophylla* trees below the water mark. In some places a few *Melaleuca teretifolia* shrubs occur and there are a few dead trees at the southern end. Above the water mark *Lepidosperma* sp. occurs amongst a few trees of *Kunzea ericifolia*, *Acacia cyclops* and *Eucalyptus rudis*. *Banksia prionotes* occurs on higher ground. The whole area has been heavily grazed by sheep.

Plant species list (zones indicated by a single numeral)

2	*Melaleuca rhaphiophylla*
2	*Melaleuca teretifolia*
4	*Acacia cyclops*
4	*Eucalyptus rudis*
4	*Kunzea ericifolia*
4	*Lepidosperma* sp.



Lake Ninan

Nature Reserve :	Unnamed	Reserve Number :	27026
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	722.0 ha	Vegetation Area :	171.0 ha
Open Water :	551.0 ha (76.32%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Saline
Coordinates :	30.57 S, 116.39 E		

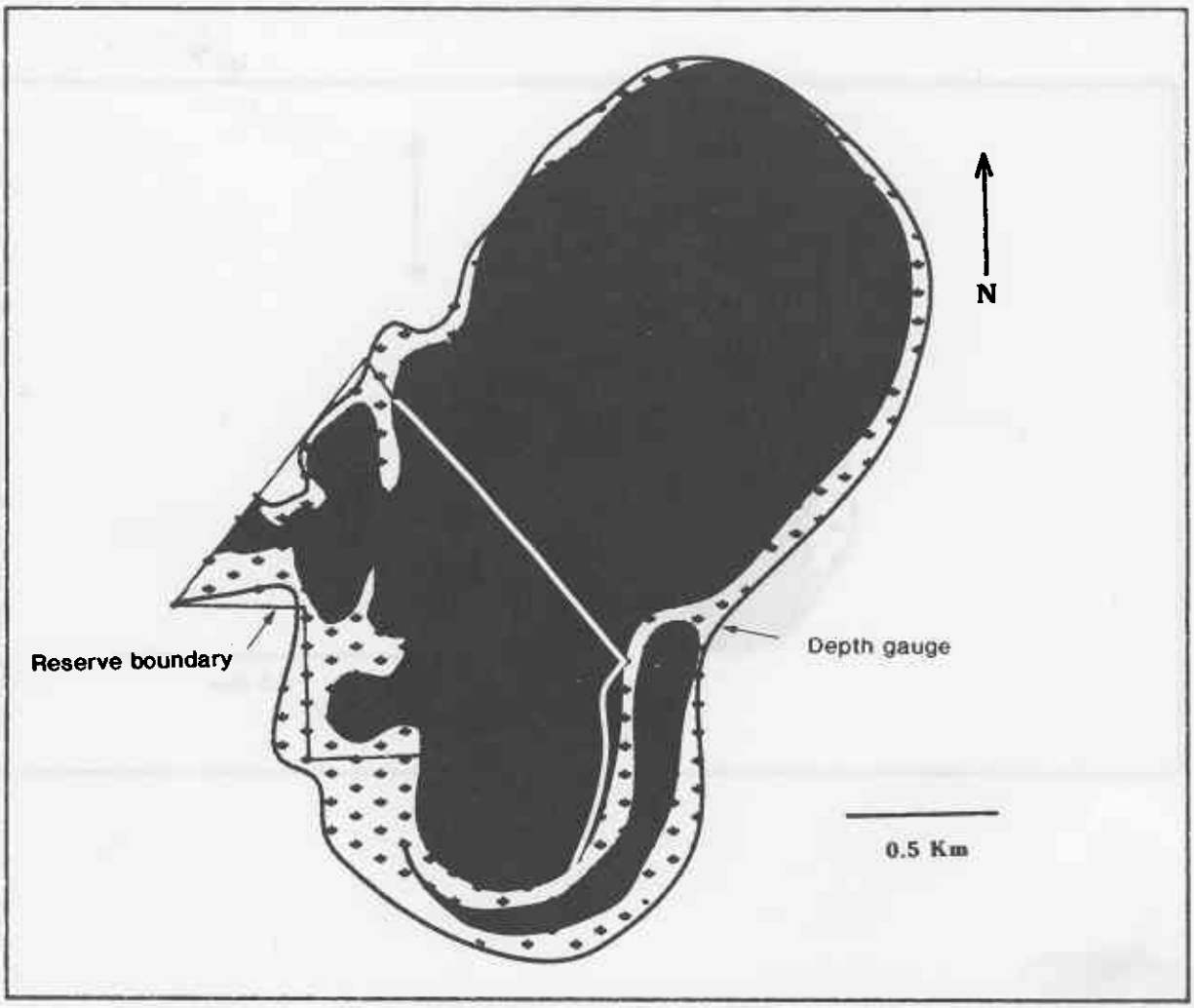
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	10	10
dead shrubs	2.00	10	20
dead trees	8.00	5	2

A large saline lake with a fringe of sparse dead *Casuarina obesa* trees and dead *Melaleuca* aff. *halmaturorum* shrubs below the water mark. *Sarcocornia quinqueflora*, *Halosarcia pergranulata* and *H. syncarpa* occur amongst the dead trees and shrubs near the water mark and extend above it into a band of sparse live *C. obesa* and *M.* aff. *halmaturorum*.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia pergranulata*
3 *Halosarcia syncarpa*
3 *Sarcocornia quinqueflora*
4 *Casuarina obesa*
4 *Melaleuca* aff. *halmaturorum*



Nine Mile Swamp

Nature Reserve :	Nine Mile Lake NR	Reserve Number :	16907
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	15.1 ha	Vegetation Area :	14.6 ha
Open Water :	0.5 ha (3.31%)		
Lake Permanence :	Permanent	Lake Salinity :	Fresh
Coordinates :	32.44 S, 115.45 E		

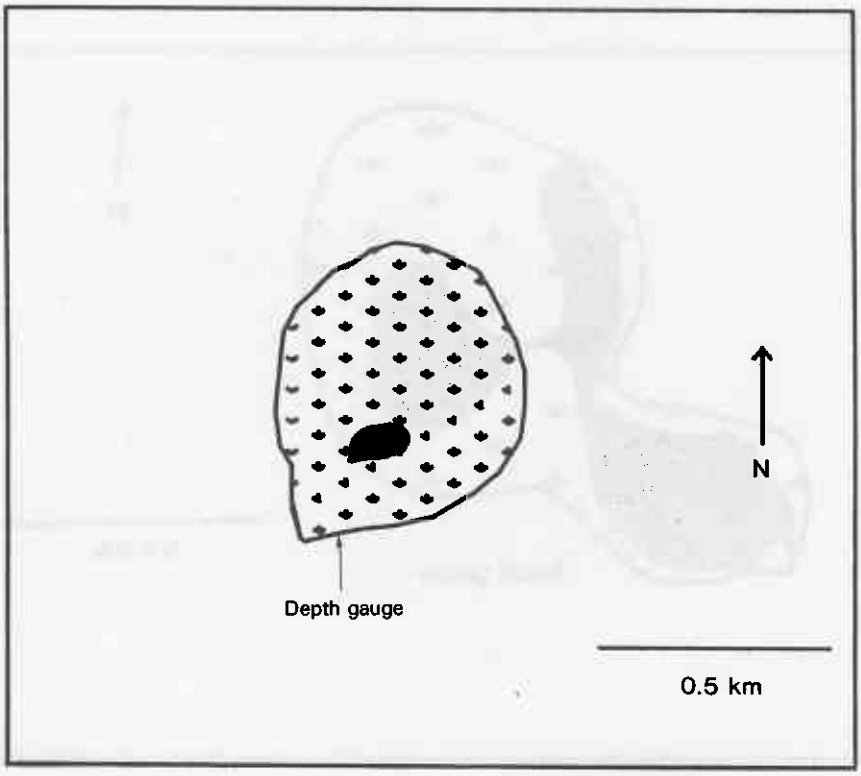
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	3.00	100	100
shrubs	3.00	2	1

A small fresh swamp with a very small area of open water in the centre. Most of the lake is covered in a mixture of *Baumea articulata* and *Typha* sp. with a belt of *B. articulata* close to the shoreline. *Lepidosperma* sp. and *Melaleuca rhaphiophylla* occur outside the *B. articulata* but below the water mark. *Melaleuca rhaphiophylla* also occurs above the water mark together with *M. preissiana*, *Leptocarpus scariosus* and *Astartea fascicularis*. A closed jarrah/marri woodland occurs around the lake as the ground rises.

Plant species list (zones indicated by a single numeral)

1	*Baumea articulata*
1	*#Typha* sp.
3	*Lepidosperma* sp.
3	*Melaleuca rhaphiophylla*
4	*Astartea fascicularis*
4	*Leptocarpus scariosus*
4	*Melaleuca preissiana*



Lake Nonalling

Nature Reserve :	Nonalling NR	Reserve Number :	24428
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	20.4 ha	Vegetation Area :	13.0 ha
Open Water :	7.4 ha (36.27%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	32.32 S, 117.37 E		

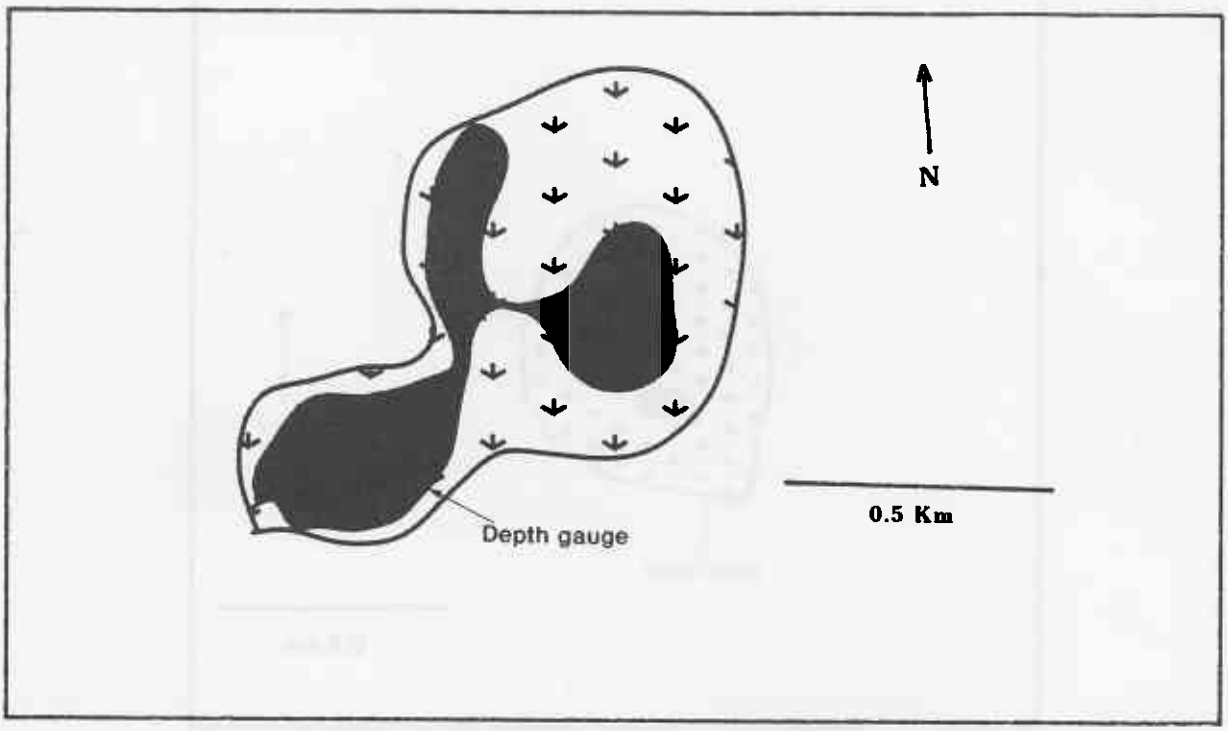
Vegetation Structure :

	Height (m)	% Area	% Cover
herbs	0.05	10	20
samphires	0.20	60	80
dead trees	6.00	40	60

A small saline lake with a dense fringing belt of dead *Casuarina obesa* below the water mark, under which samphire grows. The dominant samphire is *Sarcocornia quinqueflora*; *Halosarcia pergranulata, H. syncarpa* and the herb *Mesembryanthemum nodiflorum* (near water mark only) also occur. Above the water mark the samphire *H. indica* ssp. *bidens* grows amongst a few *C. obesa* trees. Eucalypt woodland grows farther from the lake.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia pergranulata*
3 *Halosarcia syncarpa*
3 **Mesembryanthemum nodiflorum*
3 *Sarcocornia quinqueflora*
4 *Casuarina obesa*
4 *Halosarcia indica* ssp. *bidens*



Lake Noonying

Nature Reserve :	Noonying NR	Reserve Number :	10313
Vesting :	NPNCA	Purpose :	Water and Cons. Fauna
Lake Area :	12.0 ha	Vegetation Area :	12.0 ha
Open Water :	0.0 ha (0.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	31.40 S, 117.27 E		

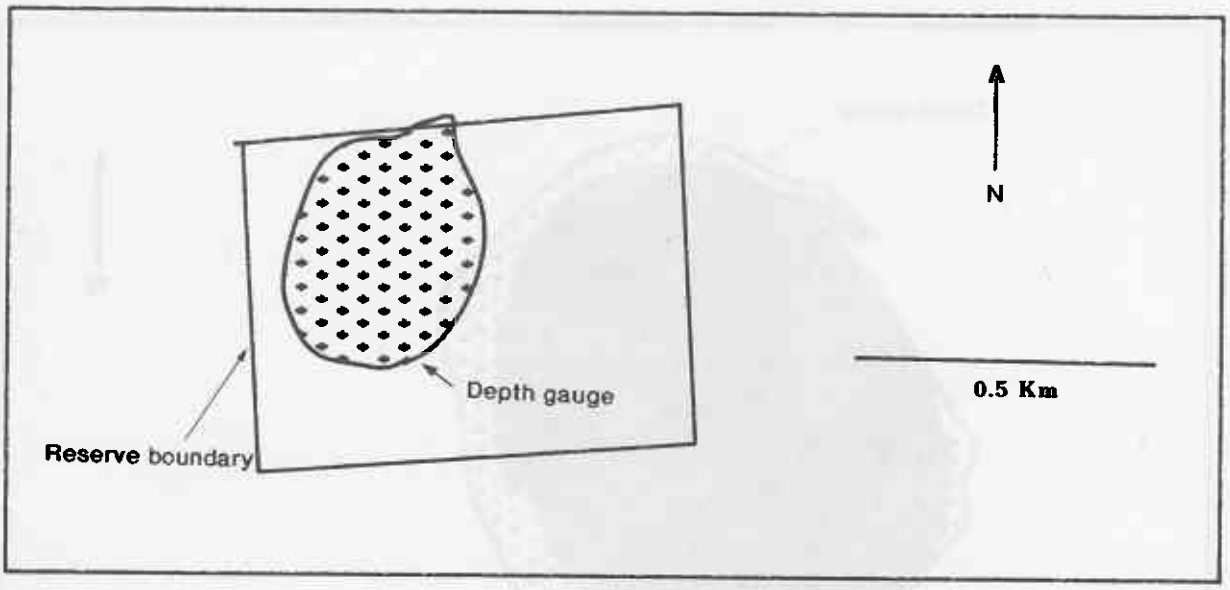
Vegetation Structure :

	Height (m)	% Area	% Cover
shrubs	3.00	20	5
dead trees	10.00	80	40

A small lake that has recently become saline. The lake bed is covered in a dense stand of recently-dead *Casuarina obesa*. Above the water mark and just below it live *C. obesa* saplings and *Melaleuca uncinata* shrubs occur in a 20-30 m wide band. Beyond this *Eucalyptus loxophleba* occurs.

Plant species list (zones indicated by a single numeral)

3 *Casuarina obesa*
3 *Melaleuca uncinata*



Lake Pallarup

Nature Reserve :	Pallarup NR	Reserve Number :	29860
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	1125.0 ha	Vegetation Area :	225.0 ha
Open Water :	900.0 ha (80.00%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Hypersaline
Coordinates :	33.14 S, 119.45 E		

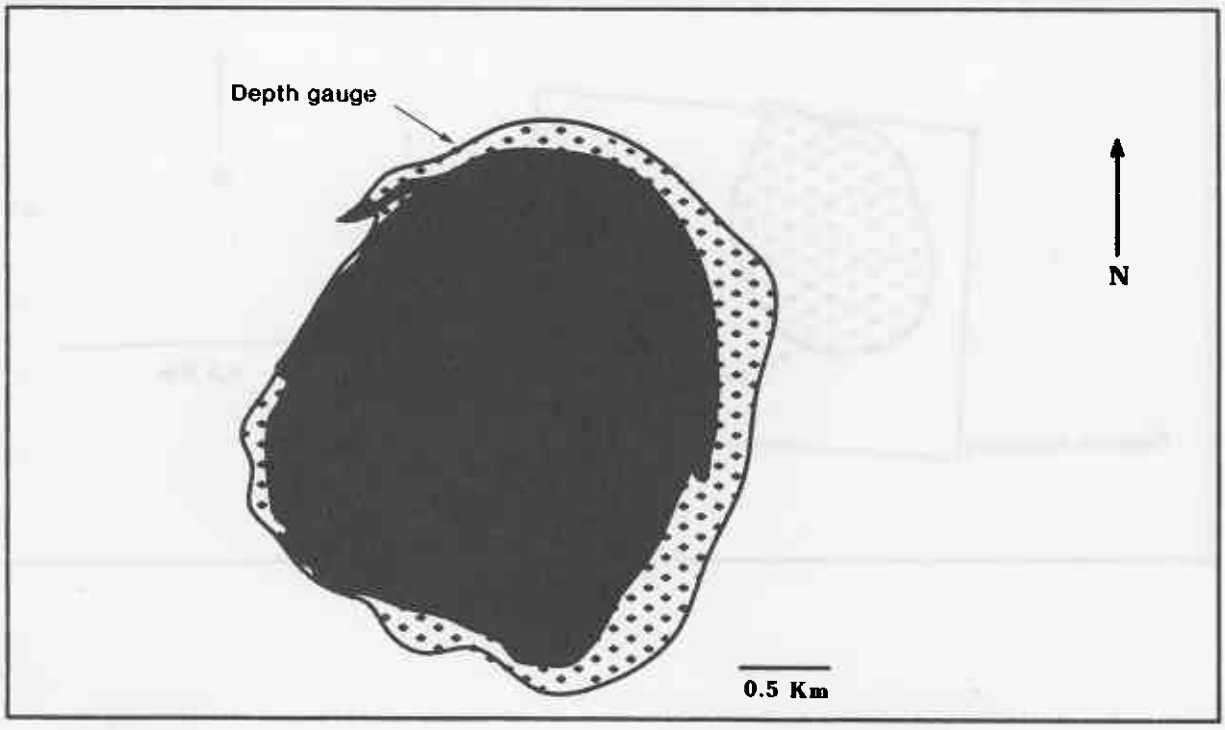
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A large open hypersaline lake. Above the water mark there is a low samphire marsh containing *Halosarcia halocnemoides* and *Maireana oppositifolia*, which is replaced on higher ground by an open shrubland of *Melaleuca* aff. *acuminata* and *M. thyoides* with an understorey of *Atriplex paludosa* ssp. *cordata*, *Schoenus* sp., *Halosarcia lepidosperma* and *Carpobrotus* sp. In drier parts of the samphire marsh and in the shrubland *H. lylei* occurs. Away from the lake the shrubland is replaced by salmon gum woodland.

Plant species list (zones indicated by a single numeral)

4 *Atriplex paludosa* ssp. *cordata*
4 *#Carpobrotus* sp.
4 *Halosarcia halocnemoides*
4 *Halosarcia lepidosperma*
4 *Halosarcia lylei*
4 *Maireana oppositifolia*
4 *Melaleuca* aff. *acuminata*
4 *Melaleuca thyoides*
4 *Schoenus* sp.



Lake Parkeyerring

Nature Reserve :	Parkeyerring NR	Reserve Number :	24792
Vesting :	NPNCA	Purpose :	Recreation and Cons. Flora and Fauna
Lake Area :	322.0 ha	Vegetation Area :	42.0 ha
Open Water :	280.0 ha (86.96%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Saline
Coordinates :	33.22 S, 117.20 E		

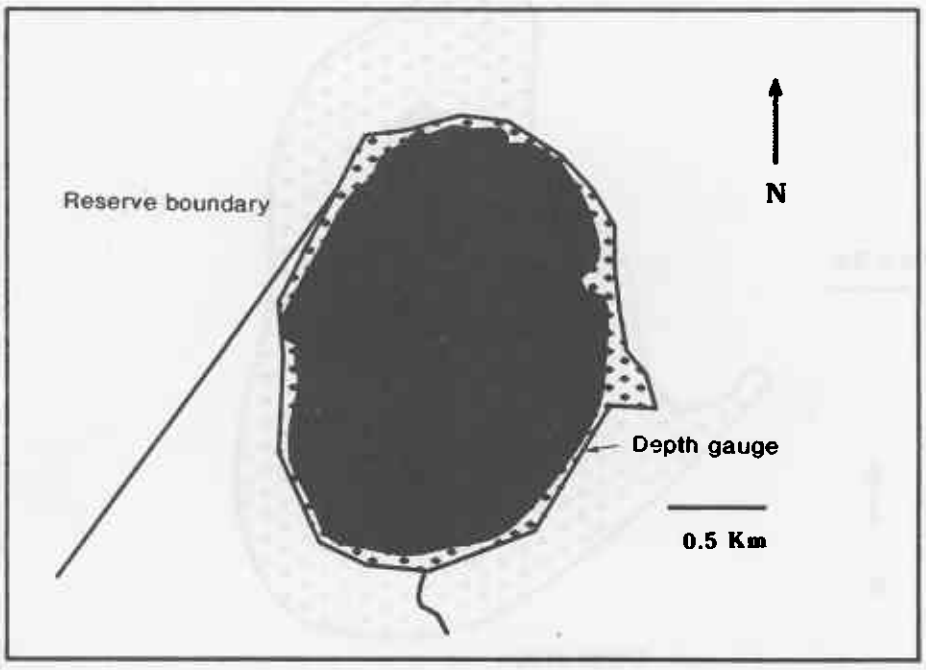
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.30	20	40
saplings	3.00	20	5
trees	10.00	10	60
dead saplings	3.00	40	30
dead trees	6.00	5	30

A moderate-sized saline lake with an extensive fringe of long-dead *Melaleuca* sp. shrub/saplings, on the landward side of which are occasional dead *Casuarina obesa*. There are some regenerating *Melaleuca* sp. saplings amongst the dead trees in places. Around the perimeter of the wetland is a narrow but dense belt of live *C. obesa* trees, which are below the maximum water mark (although the lake rarely fills to this level). There is a samphire zone containing *Halosarcia lepidosperma* on the lake side of the *C. obesa* but it does not extend far into the dead timber.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia lepidosperma*
3 *Melaleuca* sp.
4 *Casuarina obesa*



Lake Pinjarrega

Nature Reserve :	Pinjarrega NR	Reserve Number :	25210
Vesting :	NPNCA	Purpose :	Flora and Fauna Act
Lake Area :	696.7 ha	Vegetation Area :	503.0 ha
Open Water :	193.7 ha (27.80%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	30.05 S, 115.55 E		

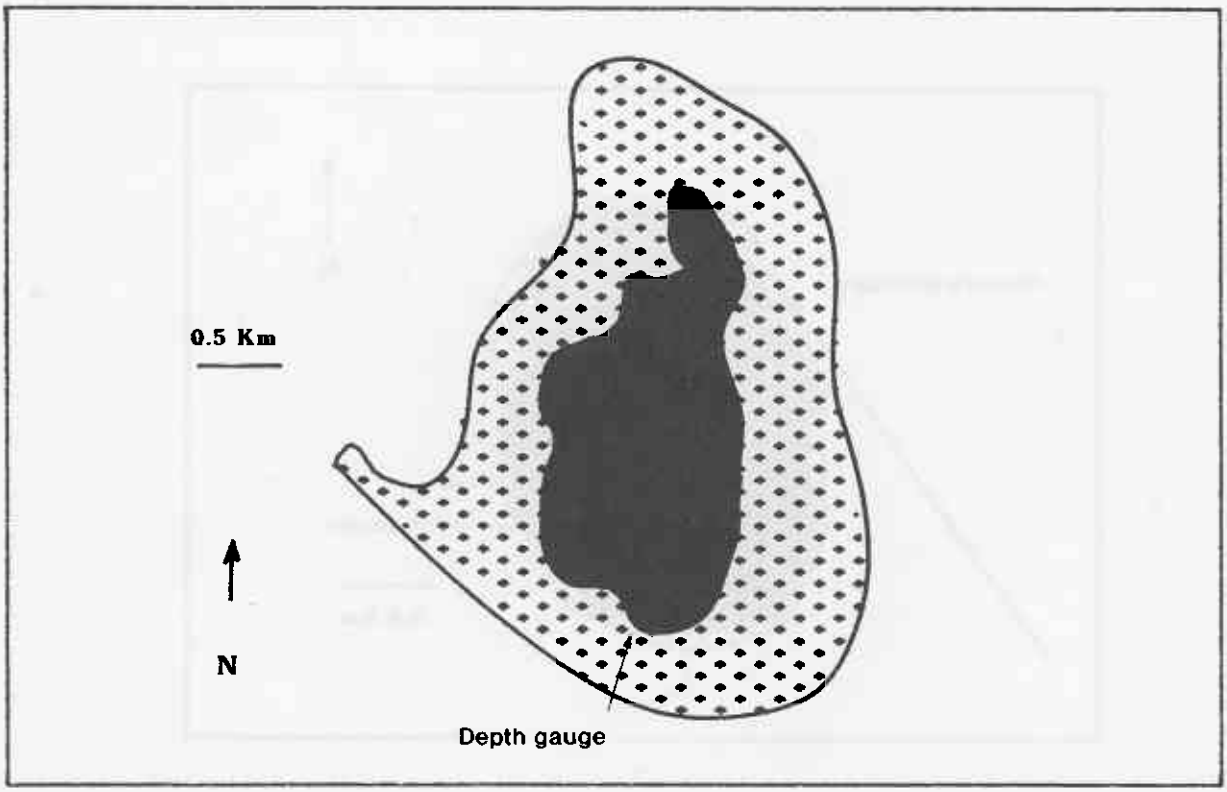
Vegetation Structure :

	Height (m)	% Area	% Cover
herbs	0.10	1	1
samphires	0.50	30	25
trees	5.00	2	10
dead trees	5.00	83	38

A large saline lake with very extensive thickets of *Melaleuca lanceolata* in the outer part of the lake and an open *Melaleuca* sp. woodland in the centre. Except at the periphery of the lake all the *Melaleuca* spp. are dead; around the water mark some *M. lanceolata* thickets still contain a small proportion of live saplings. Beneath the thickets there is an understorey of *Halosarcia lepidosperma, Threlkeldia diffusa, Carpobrotus* sp. and *Mesembryanthemum nodiflorum.*

Plant species list (zones indicated by a single numeral)

3	*#Carpobrotus* sp.
3	*Halosarcia lepidosperma*
3	*Melaleuca lanceolata*
3	**Mesembryanthemum nodiflorum*
3	*Threlkeldia diffusa*



Plantaganet 25386

Nature Reserve :	Chillinup NR	Reserve Number :	25386
Vesting :	NPNCA	Purpose :	Cons. of Indigenous Fauna
Lake Area :	200.5 ha	Vegetation Area :	84.5 ha
Open Water :	116.0 ha (57.86%)		
Lake Permanence :	Seasonal	Lake Salinity :	Hypersaline
Coordinates :	34.32 S, 118.04 E		

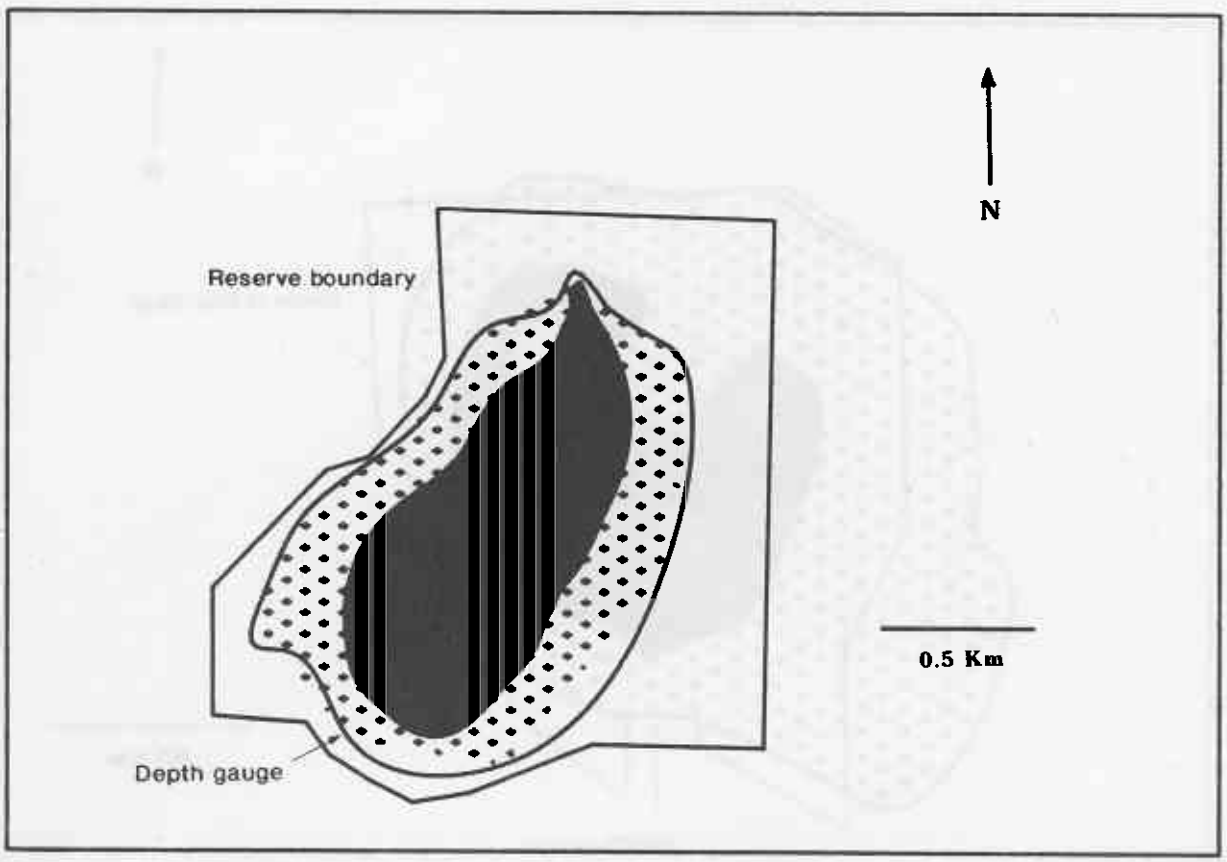
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A large open hypersaline lake with a low raised bank around the edge. On the front of the bank growing down to the water mark are *Halosarcia syncarpa* and *Tegicornia uniflora*. *Sarcocornia quinqueflora, Lawrencia squamata* and an unidentified sedge grow higher on the bank and extend into a winter-wet marsh behind the bank. On the ridge of the bank *Melaleuca halmaturorum* trees and shrubs grow; they also grow on the landward side of the winter-wet marsh, although many of the *M. halmaturorum* in this zone are dead. Eucalypt woodland occurs behind the *M. halmaturorum* zone.

Plant species list (zones indicated by a single numeral)

3	Cyperaceae sp.
3	*Lawrencia squamata*
3	*Sarcocornia quinqueflora*
4	*Halosarcia syncarpa*
4	*Melaleuca halmaturorum*
4	*Tegicornia uniflora*



Lake Pleasant View

Nature Reserve :	Lake Pleasant View NR	Reserve Number :	15107
Vesting :	NPNCA	Purpose :	Water and Cons. Flora and Fauna
Lake Area :	201.3 ha	Vegetation Area :	200.5 ha
Open Water :	0.8 ha (0.04%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	34.50 S, 118.11 E		

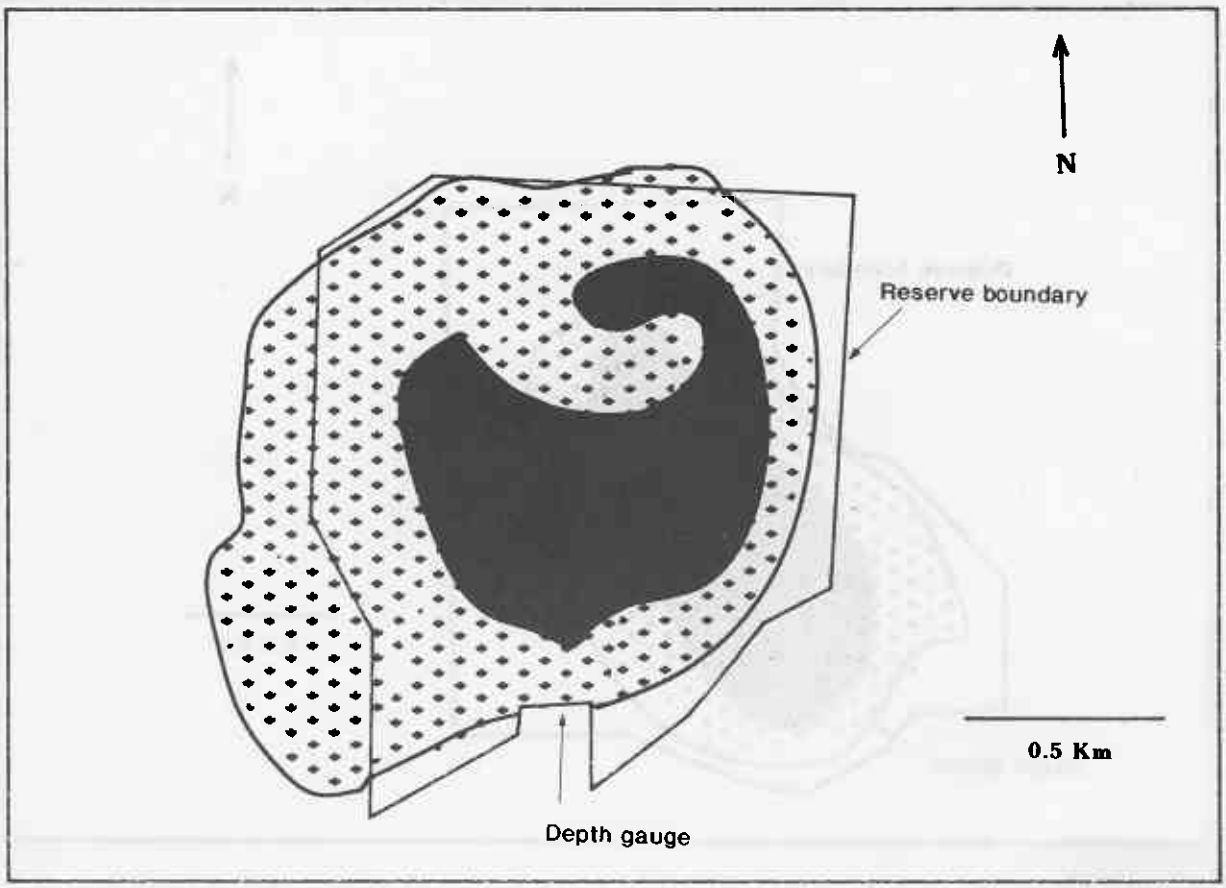
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	0.50	90	50
sedges	2.00	10	100
shrubs	2.50	1	10

A moderate-sized sedge lake containing a number of small open water areas and extensive areas of sparse sedge. There are clumps of *Baumea articulata* throughout the lake and a couple of quite extensive areas of the species. However, the main sedge in the lake is *Gahnia* sp. Around the edge of the lake it is replaced by *Restio* sp., *Juncus* sp., *Lepidosperma tenue* and *Schoenus* sp., all of which extend into *Melaleuca cuticularis* shrubland that occurs just above the water mark. In places *Viminaria juncea*, with *Villarsia parnassifolia* as an understorey, occurs inside the *M. cuticularis* shrubland. A jarrah/marri woodland occupies the higher ground around the lake.

Plant species list (zones indicated by a single numeral)

2	*Baumea articulata*
2	*Gahnia* sp.
3	*Juncus* sp.
3	*Lepidosperma tenue*
3	*Restio* sp.
3	*Schoenus* sp.
3	*Villarsia parnassifolia*
3	*Viminaria juncea*
4	*Melaleuca cuticularis*



Poorginup Swamp

Nature Reserve :	Lake Muir NR	Reserve Number :	31880
Vesting :	NPNCA	Purpose :	Water and Cons. Flora and Fauna
Lake Area :	143.4 ha	Vegetation Area :	143.4 ha
Open Water :	0.0 ha (0.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	34.32 S, 116.44 E		

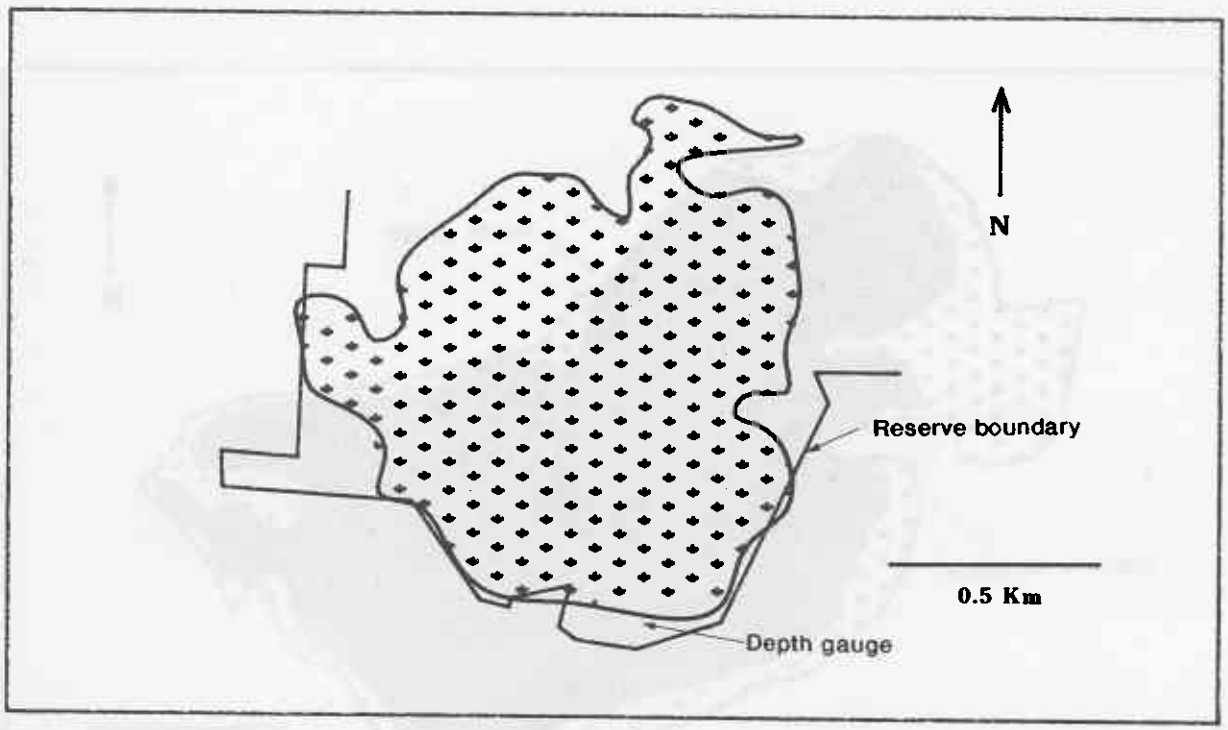
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	1.50	100	100
shrubs	2.50	20	30
trees	4.00	20	2
trees	8.00	10	60

A moderate-sized fresh sedge swamp. *Baumea articulata* and *Leptocarpus scariosus* are the major species of sedge in the centre of the swamp with occasional clumps of *B. vaginalis*. The twining herb *Cassytha glabella* often grows amongst the sedges. *Melaleuca lateritia* occurs occasionally as a shrub throughout the swamp, especially on the western side. Around the water mark there is a dense belt of *M. rhaphiophylla* trees with an understorey of *B. articulata, M. lateritia* and, in the higher part of the *M. rhaphiophylla* belt, *Astartea fascicularis* and *Sphenotoma* sp. Jarrah/marri woodland occurs on higher ground around the swamp.

Plant species list (zones indicated by a single numeral)

2	*Baumea articulata*
2	*Baumea vaginalis*
2	*Cassytha glabella*
2	*Leptocarpus scariosus*
2	*Melaleuca lateritia*
3	*Astartea fascicularis*
3	*Melaleuca rhaphiophylla*
3	*Sphenotoma* sp.



Lake Powell

Nature Reserve :	Lake Powell NR	Reserve Number :	25809
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	142.8 ha	Vegetation Area :	22.2 ha
Open Water :	12.6 ha (84.47%)		
Lake Permanence :	Permanent	Lake Salinity :	Fresh
Coordinates :	35.02 S, 117.44 E		

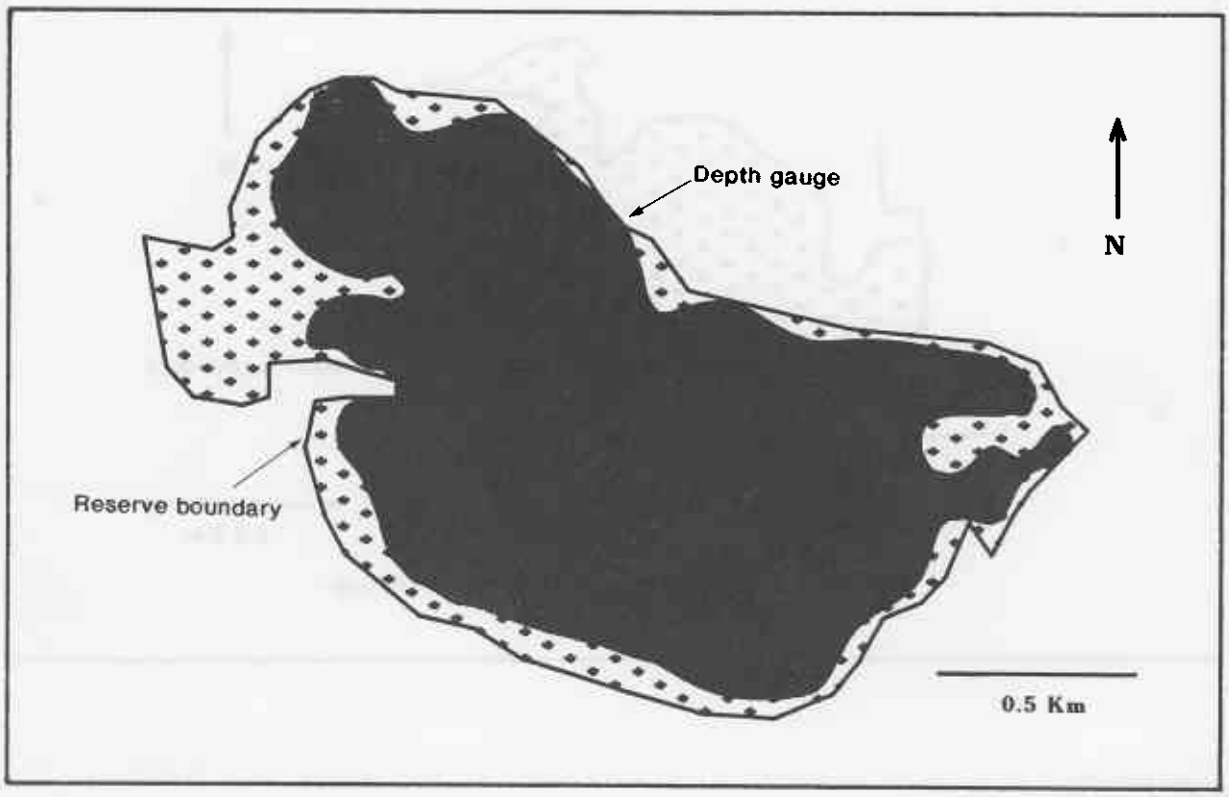
Vegetation Structure :

	Height (m)	% Area	% Cover
grasses	0.50	40	100
sedges	3.00	10	100
sedges	0.60	50	40
trees	4.00	10	70

A moderate-sized fresh swamp fringed by dense sedges and grassy banks. There are several islands supporting the sedge *Lepidosperma effusum*. Below the water mark around the lake there are beds of *Typha* sp., *L. effusum* and the grass *Paspalum distichum*. On the southern side of the lake *Melaleuca* sp. trees occasionally grow in this zone. Behind the fringing vegetation, but still below or on the water mark, *Agonis juniperina* and *Melaleuca* sp. trees grow with an understorey of sedges *Leptocarpus scariosus*, *Restio* sp. and *Juncus planifolius*. Water levels are artificially controlled.

Plant species list (zones indicated by a single numeral)

1 *#Typha* sp.
2 *Lepidosperma effusum*
2 **Paspalum distichum*
3 *Agonis juniperina*
3 *Juncus planifolius*
3 *Leptocarpus scariosus*
3 *Melaleuca* sp.
3 *Restio* sp.



Shark Lake

Nature Reserve :	Unnamed	Reserve Number :	31197
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	8.6 ha	Vegetation Area :	4.1 ha
Open Water :	4.5 ha (52.33%)		
Lake Permanence :	Permanent	Lake Salinity :	Fresh
Coordinates :	33.47 S, 121.52 E		

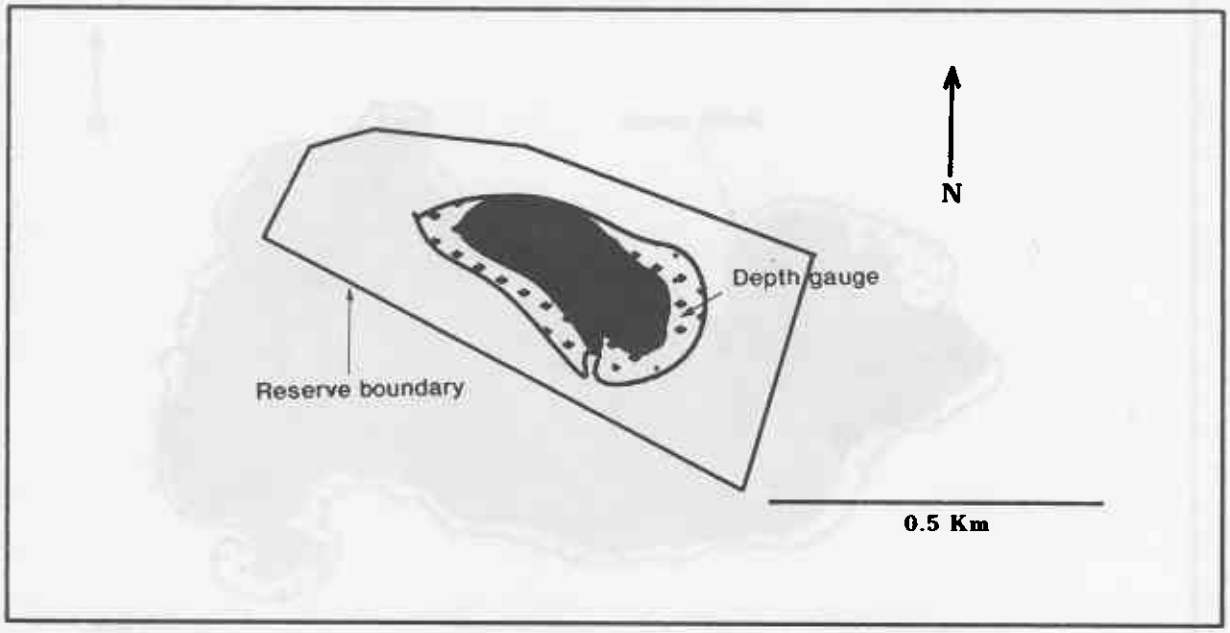
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	2.00	40	60
sedges	1.00	50	100
shrubs	2.00	5	70
trees	4.00	10	70

A small fresh lake with very dense sedge beds around the edge of the open water. In deeper water at the edge of the lake *Baumea articulata* occurs. *Isolepis nodosa*, *Juncus* sp., *Schoenus brevifolius*, the grasses *Hainardia cylindrica* and *Agrostis avenacea* and the herbs *Lobelia alata* and *Centella cordifolia* grow just below or on the water mark and are seasonally flooded. *Melaleuca* sp. shrubs and trees grow at the edge of the lake on the eastern side on and above the water mark. *Banksia* woodland occurs on higher ground around the lake that has not been cleared.

Plant species list (zones indicated by a single numeral)

1	*Baumea articulata*
2	*Melaleuca* sp.
3	*Agrostis avenacea*
3	*Centella cordifolia*
3	**Hainardia cylindrica*
3	*Isolepis nodosa*
3	*Juncus* sp.
3	*Lobelia alata*
3	*Schoenus brevifolius*



Lake Shaster

Nature Reserve :	Lake Shaster NR	Reserve Number :	32339
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	479.3 ha	Vegetation Area :	111.0 ha
Open Water :	368.3 ha (76.84%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.52 S, 120.42 E		

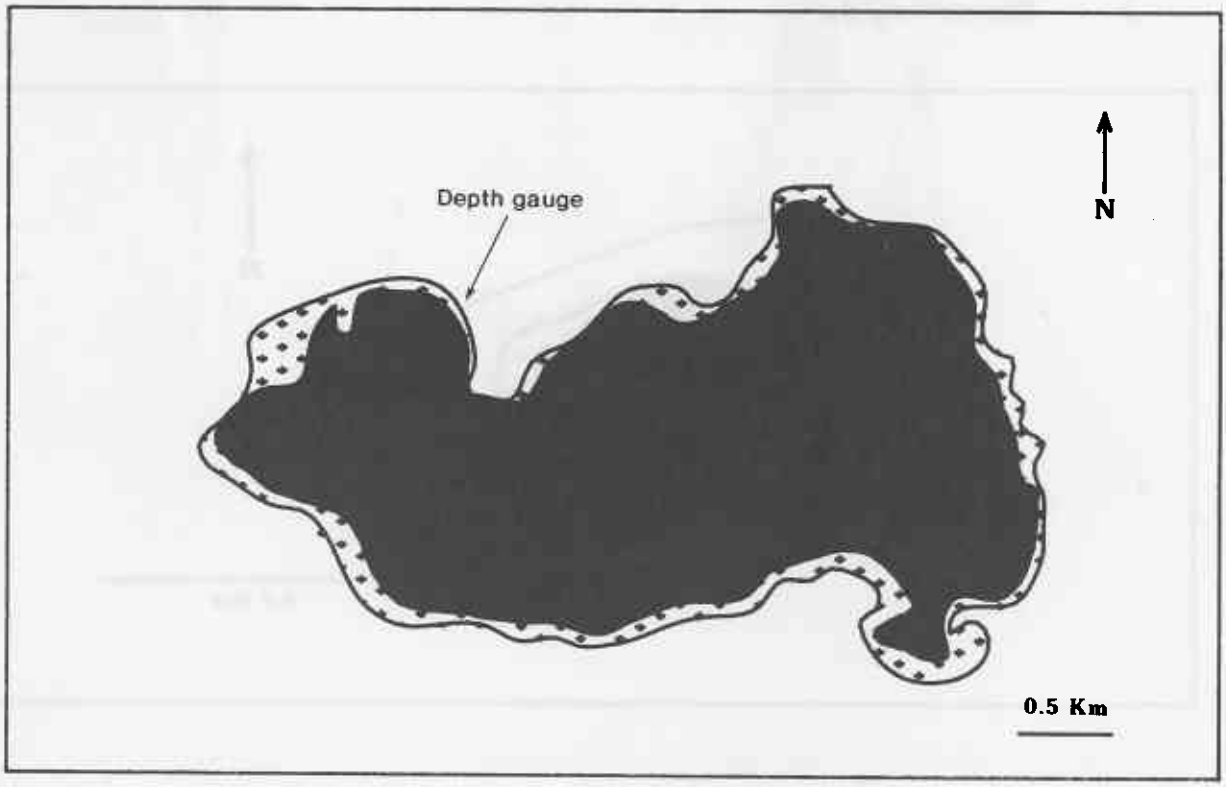
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	5	20

A large open saline lake with some small rock outcrops along the edge. Isolated clumps of *Halosarcia pergranulata, Halosarcia syncarpa, Wilsonia humilis* and *W. backhousei* occur at the water mark. Farther from the water the vegetation consists mostly of clumps of *Gahnia trifida* and *H. pergranulata* and the shrubs *Melaleuca* spp. and *Gastrolobium* sp. grow. *Melaleuca cuticularis* also occurs in this zone in some areas.

Plant species list (zones indicated by a single numeral)

3	*Halosarcia pergranulata*
3	*Halosarcia syncarpa*
3	*Wilsonia backhousei*
3	*Wilsonia humilis*
4	*Gahnia trifida*
4	*Gastrolobium* sp.
4	*Melaleuca cuticularis*
4	*Melaleuca* sp.



Station Lake

Nature Reserve :	Unnamed	Reserve Number :	23825
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	87.5 ha	Vegetation Area :	31.0 ha
Open Water :	56.5 ha (64.57%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.49 S, 121.57 E		

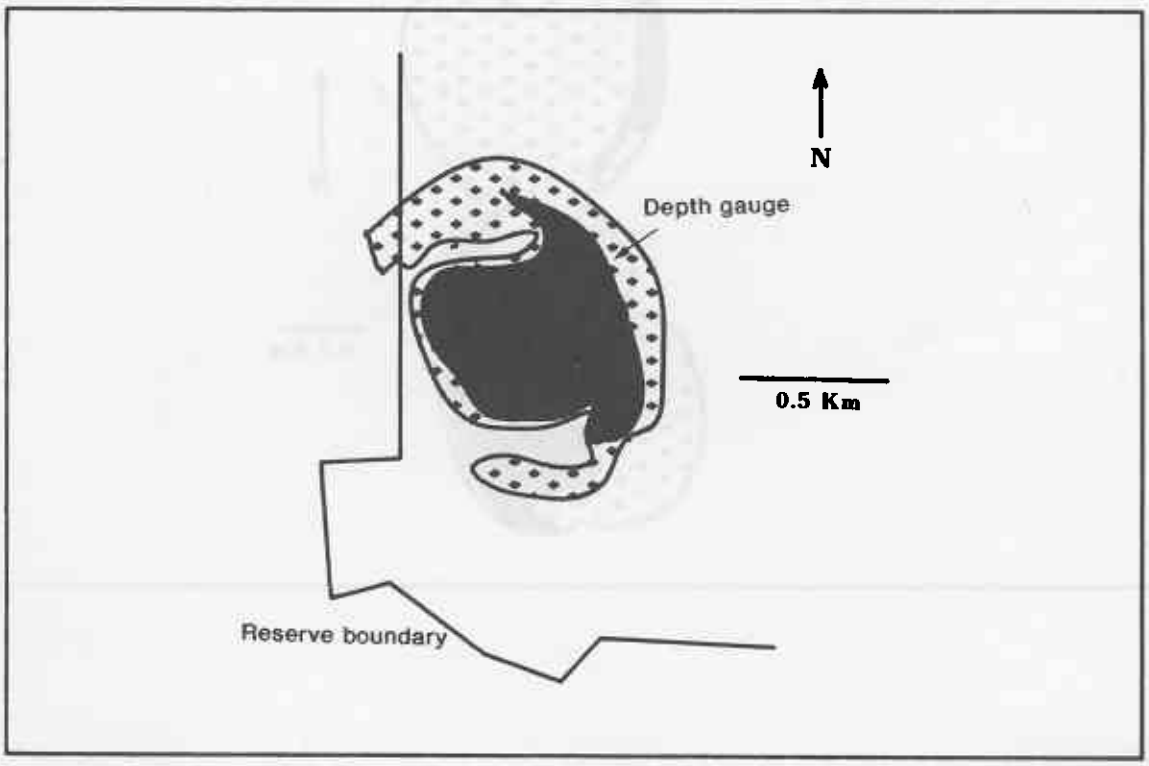
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	70	40
shrubs	1.50	1	60
dead shrubs	1.50	1	40
dead trees	3.00	2	1

A moderate-sized saline lake that is mostly open but contains a narrow fringe of dead trees at the northern end. There is a patch of dense live small shrubs, dead shrubs and trees on the western side. On the eastern side is a low ridge that separates the lake from an extensive marshland. There are distinct bands of vegetation associated with the ridge. As the ground rises from the lake there is a low shrubland of *Suaeda australis*, *Halosarcia syncarpa*, *Sarcocornia quinqueflora*, *Sclerostegia moniliformis*, *Schoenus* sp. and *Gahnia trifida*. On top of the ridge *Melaleuca cuticularis* and *Melaleuca* sp. trees and shrubs occur with *Schoenus* sp. and *Gahnia trifida* as understorey. The marsh at the rear of the ridge is inundated in wet winters and contains samphire. As the ground rises behind the marsh the vegetation changes to *Melaleuca/Acacia* woodland.

Plant species list (zones indicated by a single numeral)

3	*Halosarcia syncarpa*
3	*Sarcocornia quinqueflora*
3	*Sclerostegia moniliformis*
3	*Suaeda australis*
4	*Gahnia trifida*
4	*Melaleuca cuticularis*
4	*Melaleuca* sp.
4	*Schoenus* sp.



Lake Taarblin

Nature Reserve :	Taarblin Lake NR	Reserve Number :	20962
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	916.0 ha	Vegetation Area :	766.0 ha
Open Water :	150.0 ha (16.38%)		
Lake Permanence :	Seasonal	Lake Salinity :	Brackish
Coordinates :	32.59 S, 117.33 E		

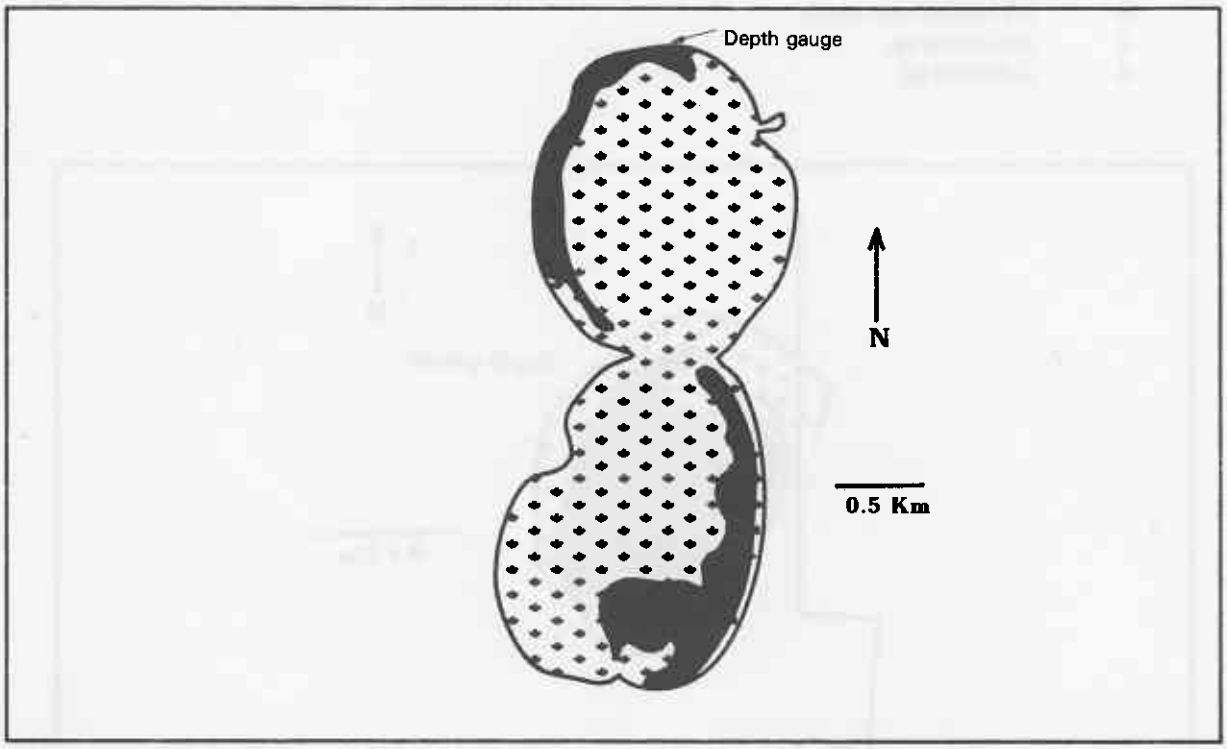
Vegetation Structure :

	Height (m)	% Area	% Cover
herbs	0.10	80	10
samphires	0.30	20	60
dead trees	5.00	85	50

A large brackish-to-saline lake with extensive areas of long-dead *Casuarina obesa* trees below the water mark. There are live *C. obesa* trees in some raised sections of the lake bed. *Halosarcia pergranulata* and *Wilsonia rotundifolia* grow under the dead trees. Above the water mark live *C. obesa* trees occur, with *Disphyma crassifolium* growing on the ground near the edge of the inundated area.

Plant species list (zones indicated by a single numeral)

3 *Disphyma crassifolium*
3 *Halosarcia pergranulata*
3 *Wilsonia rotundifolia*
4 *Casuarina obesa*



Thomsons Lake

Nature Reserve :	Thomsons Lake NR	Reserve Number :	15556
Vesting :	NPNCA	Purpose :	Fauna Conservation Research and Drainage
Lake Area :	213.3 ha	Vegetation Area :	94.0 ha
Open Water :	119.3 ha (55.93%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	32.09 S, 115.49 E		

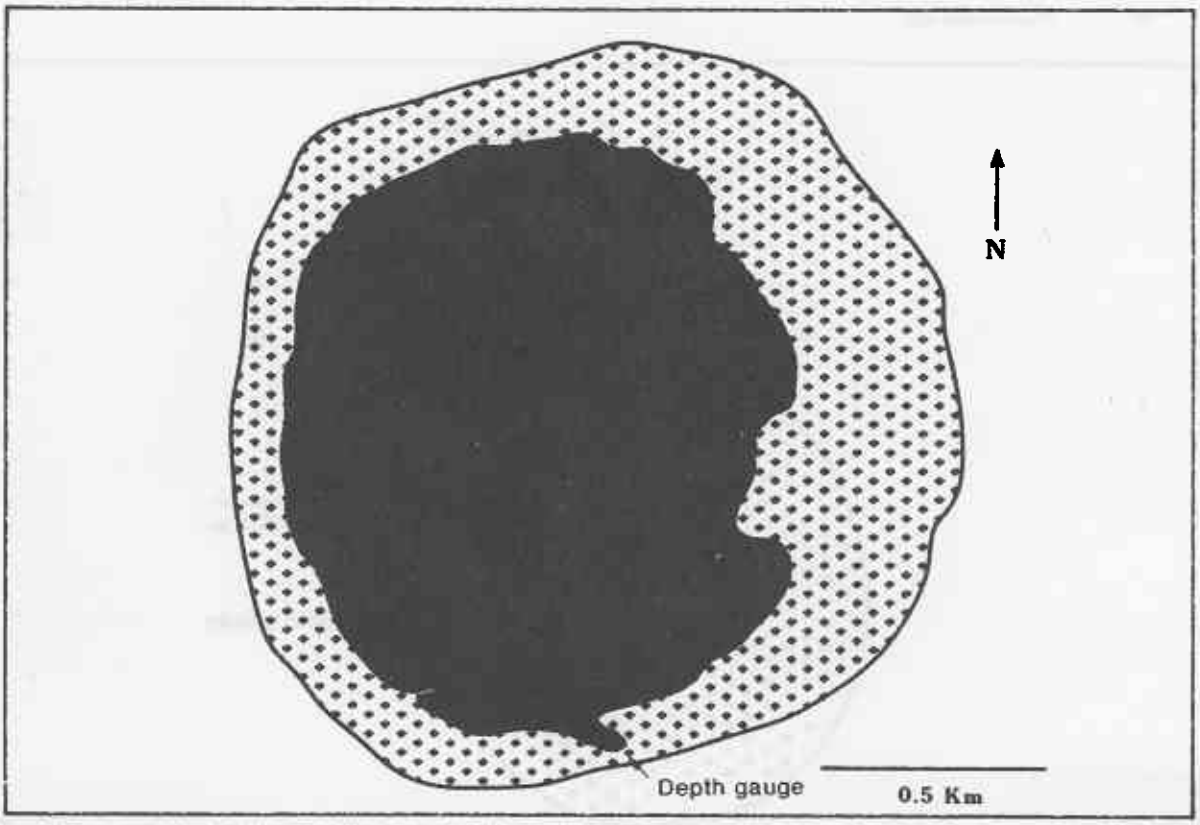
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	2.00	80	100
sedges	1.00	20	90
shrubs	3.00	15	10
trees	6.00	5	5

A moderate-sized brackish lake with an extensive band of sedges below the water mark. As the lake dries out *Bulboschoenus caldwellii* becomes established inside the main belt of sedges, which consist of *Baumea articulata* and *Typha* sp. Around the water mark *B. juncea* replaces *B. articulata* and *Typha* sp. This zone contains a few *Viminaria juncea* and *Acacia saligna* shrubs. Above the usual water mark (though within the maximum flood mark) *Eucalyptus rudis, Melaleuca preissiana* and *Jacksonia furcellata* grow. These are replaced by *Banksia*/jarrah woodland as the ground rises. Additional information is given by Crook and Evans (1981).

Plant species list (zones indicated by a single numeral)

2	*Baumea articulata*
2	*#Typha* sp.
3	*Acacia saligna*
3	*Baumea juncea*
3	*Bolboschoenus caldwellii*
3	*Viminaria juncea*
4	*Eucalyptus rudis*
4	*Jacksonia furcellata*
4	*Melaleuca preissiana*



Lake Toolibin

Nature Reserve :	Unnamed	Reserve Number :	24556
Vesting :	NPNCA	Purpose :	Protection of Flora and Fauna
Lake Area :	296.4 ha	Vegetation Area :	253.2 ha
Open Water :	43.2 ha (14.56%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Brackish
Coordinates :	32.55 S, 117.37 E		

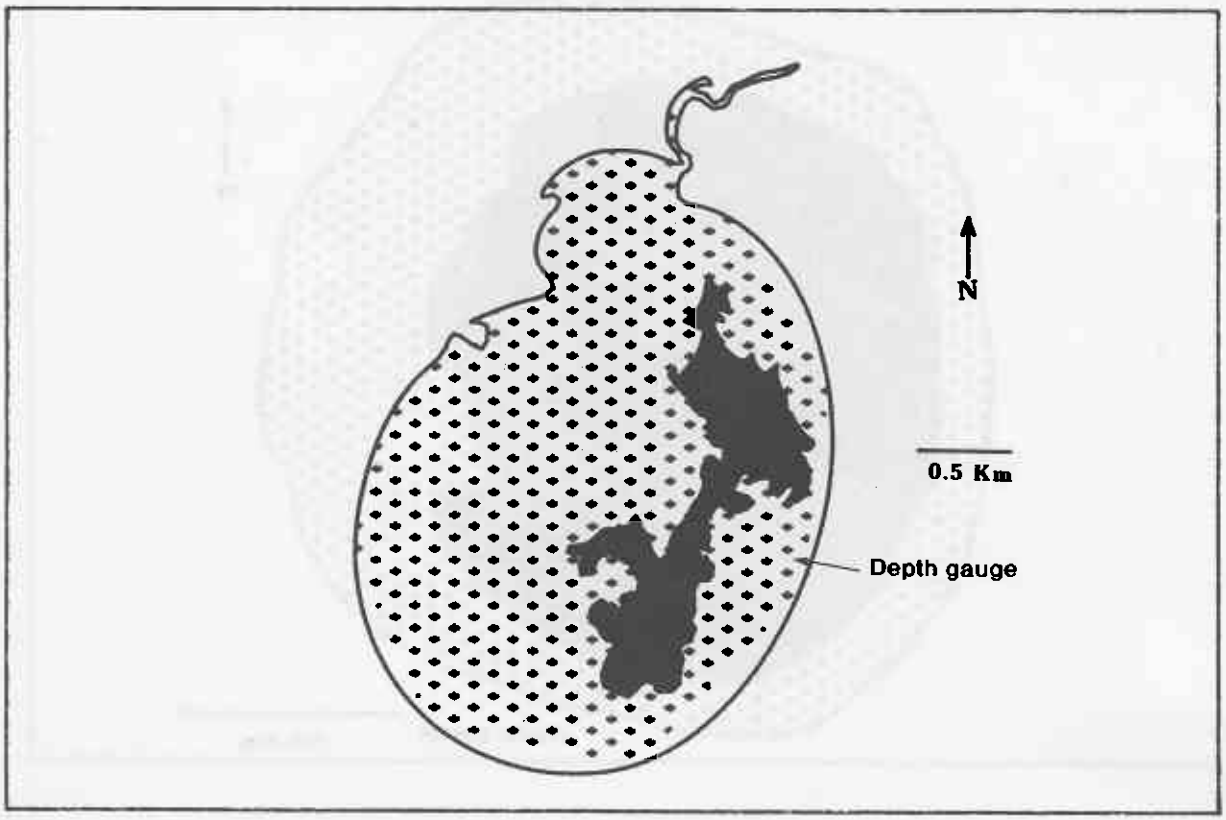
Vegetation Structure :

	Height (m)	% Area	% Cover
herbs	0.01	30	20
samphires	0.50	15	10
trees	12.00	40	10
trees	6.00	60	40

A large brackish lake containing very dense thickets of *Casuarina obesa*, *Melaleuca strobophylla* and occasional *Eucalyptus rudis* below the water mark. A few *C. obesa* reach 12 m in height. On the western side of the lake a lot of trees have died due to increasing salinity. There are also a few dead trees (mostly *E. rudis*) in the open lagoon on the eastern side of the lake. When the lake is dry samphire species *Halosarcia lepidosperma*, *H. pergranulata* and *H. indica* ssp. *bidens* occur on the lake bed as a low open shrubland. There are patches of *Atriplex exilifolia*, *Carpobrotus* sp., *Goodenia viscida* and *Wilsonia humilis* among the samphire. *Eucalyptus rudis* trees occur above the water mark. Additional information is given by Mattiske (1978).

Plant species list (zones indicated by a single numeral)

1 *Casuarina obesa*
1 *Melaleuca strobophylla*
3 *Atriplex exilifolia*
3 *#Carpobrotus* sp.
3 *Eucalyptus rudis*
3 *Goodenia viscida*
3 *Halosarcia indica* ssp. *bidens*
3 *Halosarcia lepidosperma*
3 *Halosarcia pergranulata*
3 *Wilsonia humilis*
4 *#Crassula* sp.



Tordit-Garrup Lagoon

Nature Reserve :	Lake Muir NR	Reserve Number :	31880
Vesting :	NPNCA	Purpose :	Water and Cons. Flora and Fauna
Lake Area :	686.6 ha	Vegetation Area :	529.6 ha
Open Water :	157.0 ha (22.87%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Fresh
Coordinates :	34.30 S, 116.45 E		

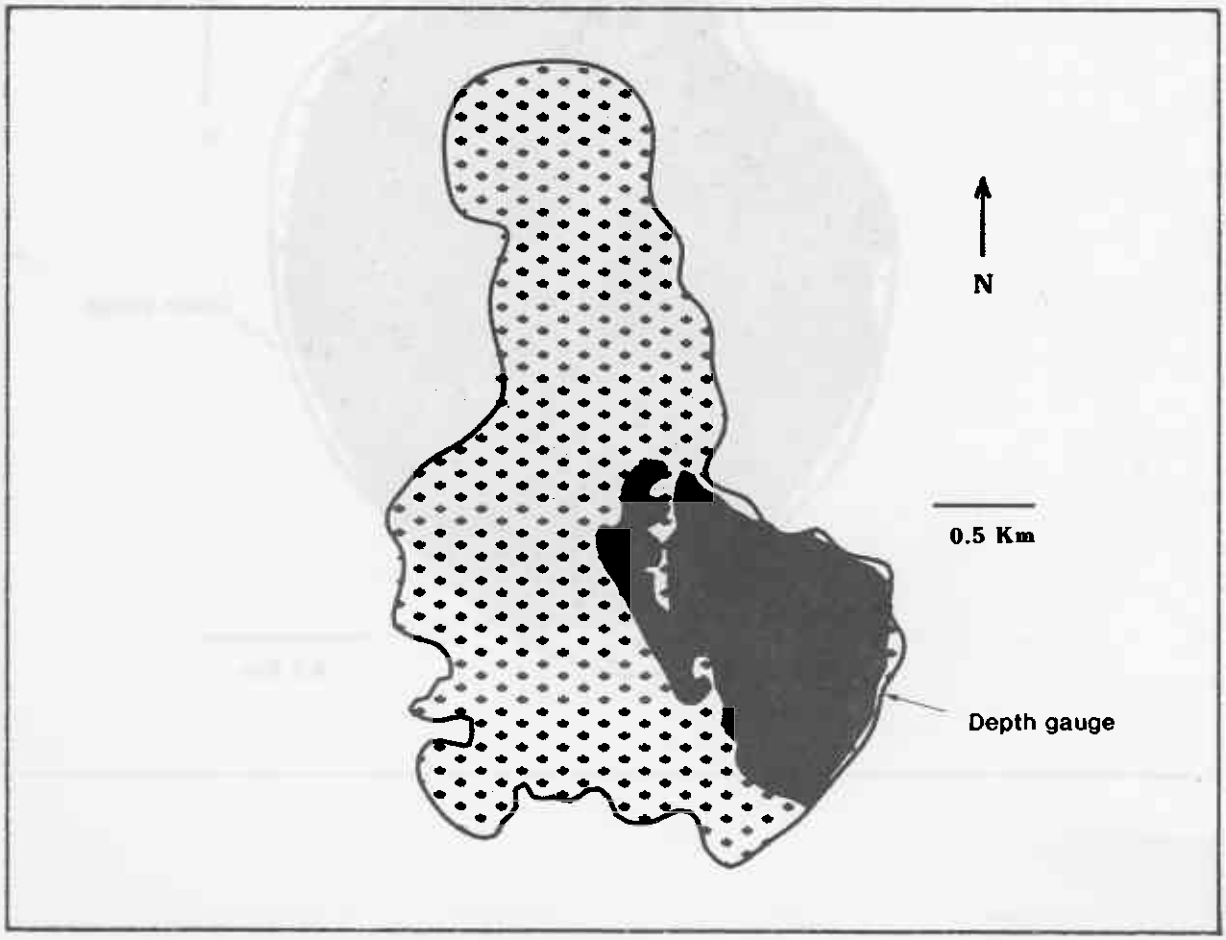
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	1.00	85	100
sedges	2.00	15	100
trees	4.00	5	5

A large fresh lake with extensive sedge beds below the water mark and a large area of open water. The large sedge bed on the western side consists mostly of *Baumea articulata* but near the shore it is dominated by *Schoenus brevifolius* interspersed with *Baumea articulata*, behind which a scattered belt of *Melaleuca rhaphiophylla* trees occur on the water mark. On the eastern side *S. brevifolius* and occasional clumps of two unidentified sedges grow sparsely on an open shore and there are a few *M. rhaphiophylla* trees. Behind the shore, which is an open beach in some areas, the ground rises steeply to a jarrah/marri woodland. At the southern end of the lake there is a small patch of *Typha* sp. beside the open water.

Plant species list (zones indicated by a single numeral)

1 *Baumea articulata*
1 *#Typha* sp.
2 *Schoenus brevifolius*
3 Cyperaceae sp.
3 *Melaleuca rhaphiophylla*



Lake Towerinning

Nature Reserve :	Towerinning NR	Reserve Number :	24917
Vesting :	NPNCA	Purpose :	Aquatic Sports and Preservation of Fauna
Lake Area :	179.5 ha	Vegetation Area :	21.5 ha
Open Water :	158.0 ha (88.02%)		
Lake Permanence :	Permanent	Lake Salinity :	Brackish
Coordinates :	33.35 S, 116.48 E		

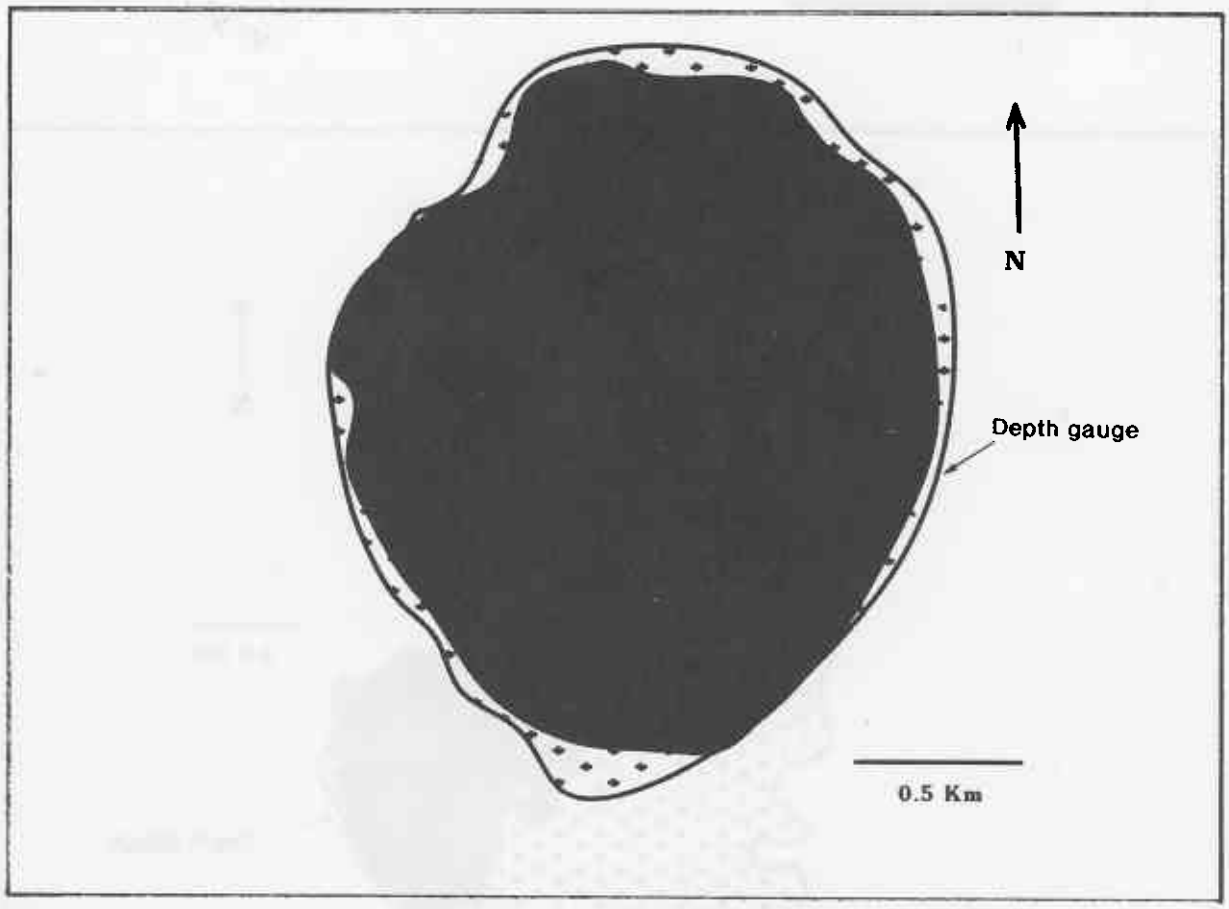
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	1.00	2	5
trees	6.00	50	5
dead trees	5.00	50	7

A moderate-sized brackish lake with several patches of *Baumea articulata* below the water mark and isolated dead and live *Melaleuca cuticularis* nearby, slightly higher on the shore. There is a narrow fringe of *Eucalyptus rudis* above the water mark. *Schoenus* sp. grows sparsely beneath the *E. rudis*. Froend and McComb (1991) give information about changes in vegetation and water quality since the 1960s.

Plant species list (zones indicated by a single numeral)

2	*Baumea articulata*
3	*Melaleuca cuticularis*
4	*Eucalyptus rudis*
4	*Schoenus* sp.



Lake Unicup

Nature Reserve :	Unicup NR	Reserve Number :	25798
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	280.8 ha	Vegetation Area :	38.5 ha
Open Water :	242.3 ha (86.29%)		
Lake Permanence :	Seasonal	Lake Salinity :	Brackish
Coordinates :	34.21 S, 116.43 E		

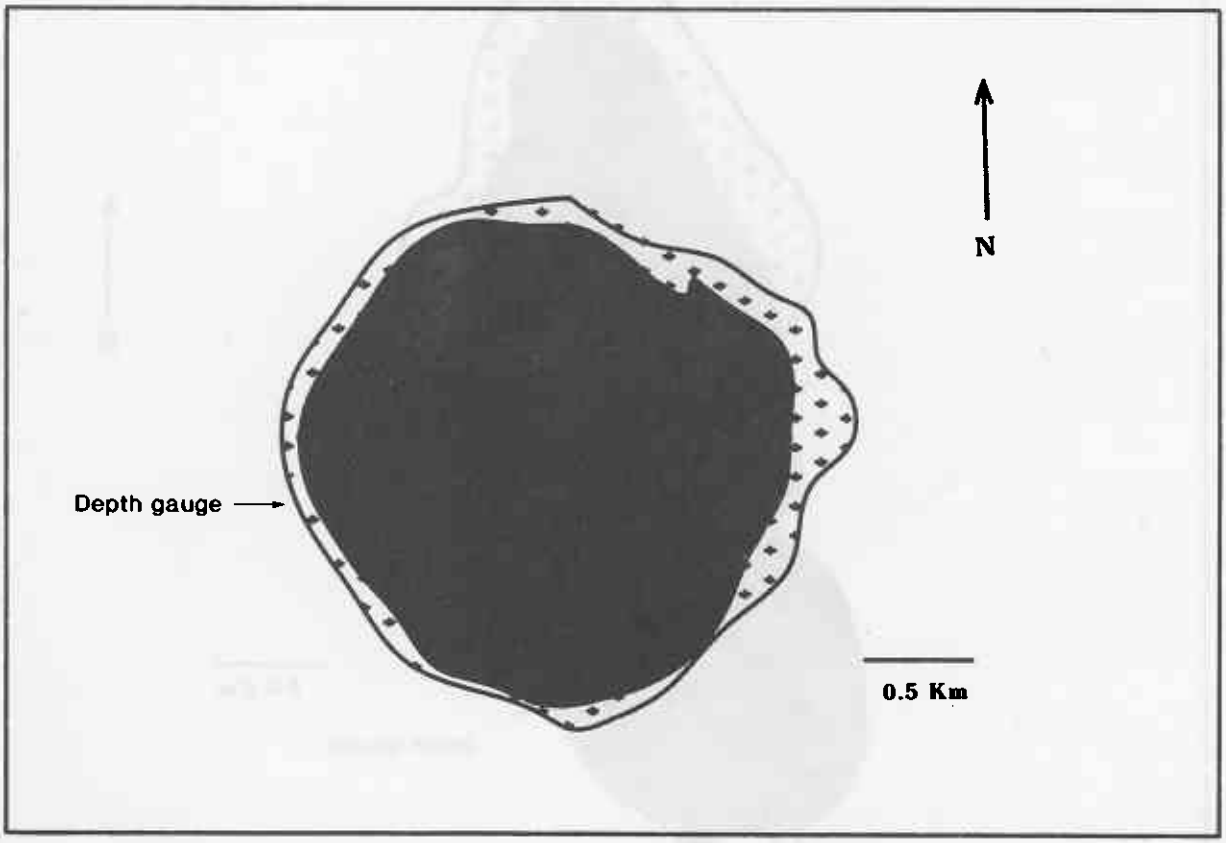
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	1.50	80	50
sedges	0.70	30	60
shrubs	1.50	2	5

A moderate-sized brackish acidic lake with a flat shore and extensive area of sedges comprising *Baumea articulata*, which is restricted to the area below the water mark, and *Schoenus brevifolius*, *Isolepis* sp. and *Juncus pallidus* which extend from below to above the water mark. *Melaleuca* sp. and *Kunzea ericifolia* occur at the water mark and above, together with *Eucalyptus rudis* on higher ground. There is a single *M. cuticularis* near the depth gauge. Farther from the lake jarrah/marri woodland occurs.

Plant species list (zones indicated by a single numeral)

2 *Baumea articulata*
3 *Isolepis* sp.
3 *Juncus pallidus*
3 *Melaleuca* sp.
3 *Schoenus brevifolius*
4 *Eucalyptus rudis*
4 *Kunzea ericifolia*
4 *Melaleuca cuticularis*



Lake Varley

Nature Reserve :	Lake Varley NR	Reserve Number :	27928
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	1051.0 ha	Vegetation Area :	84.0 ha
Open Water :	967.0 ha (92.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Hypersaline
Coordinates :	32.41 S, 119.22 E		

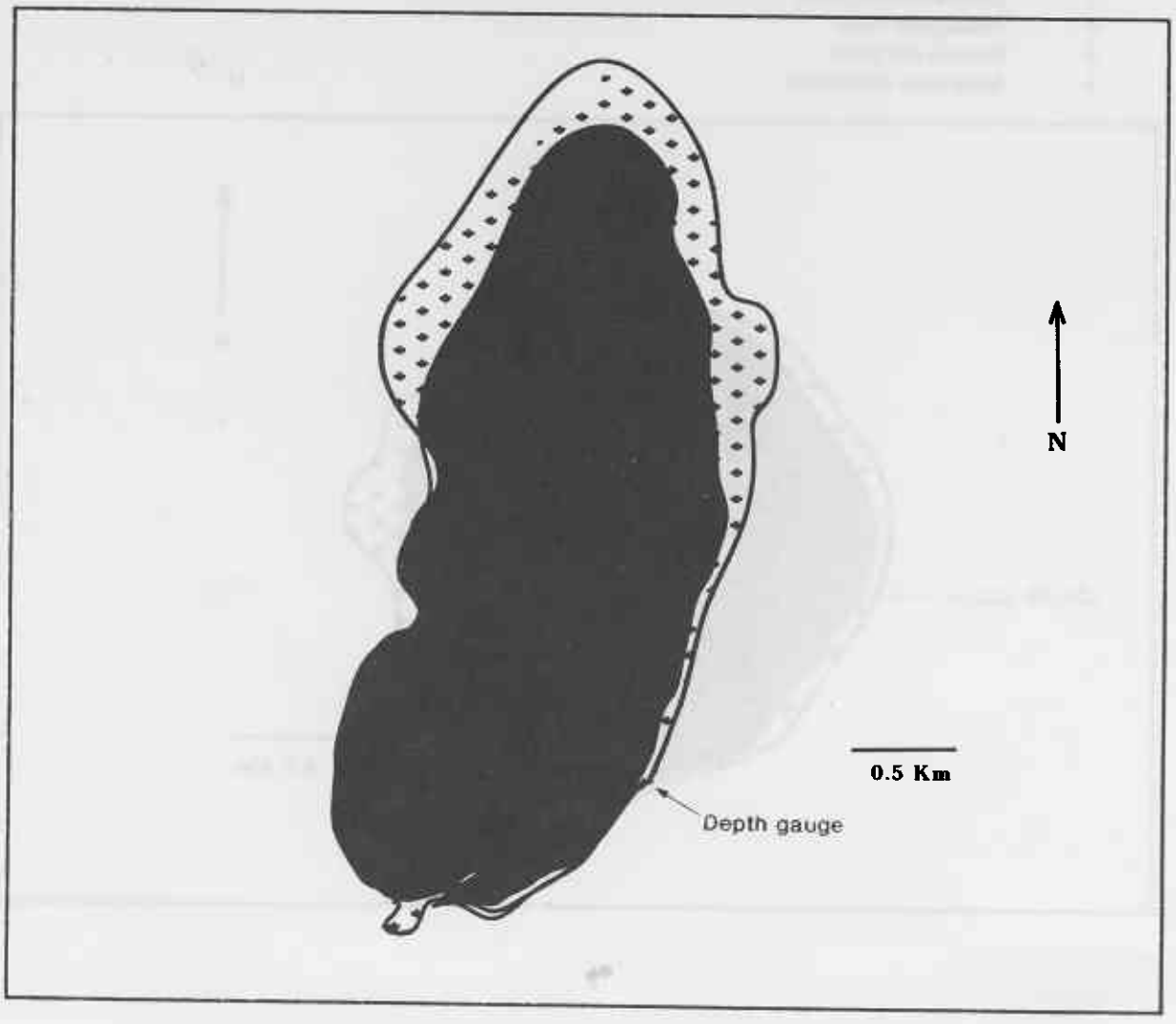
Vegetation Structure :

	Height (m)	% Area	% Cover
totally open	0.00	0	0

A large open hypersaline lake. Above the water mark there is an extensive area of samphire marsh that becomes damp in winter but has no surface water. The marsh contains *Halosarcia pergranulata, H. halocnemoides* ssp. *catenulata, Kippistia suaedifolia, Carpobrotus* sp. and *Stipa* sp. *Atriplex paludosa* ssp. *cordata* grows at the back of the marsh. As the ground rises the marsh is replaced by eucalypt woodland.

Plant species list (zones indicated by a single numeral)

4 *Atriplex paludosa* ssp. *cordata*
4 *#Carpobrotus* sp.
4 *Halosarcia halocnemoides* ssp. *catenulata*
4 *Halosarcia pergranulata*
4 *Kippistia suaedifolia*
4 *Maireana oppositifolia*
4 *Stipa* sp.



Wagin 2088

Nature Reserve :	Casuarina NR	Reserve Number :	2088
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	49.7 ha	Vegetation Area :	14.4 ha
Open Water :	35.3 ha (71.03%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.20 S, 117.23 E		

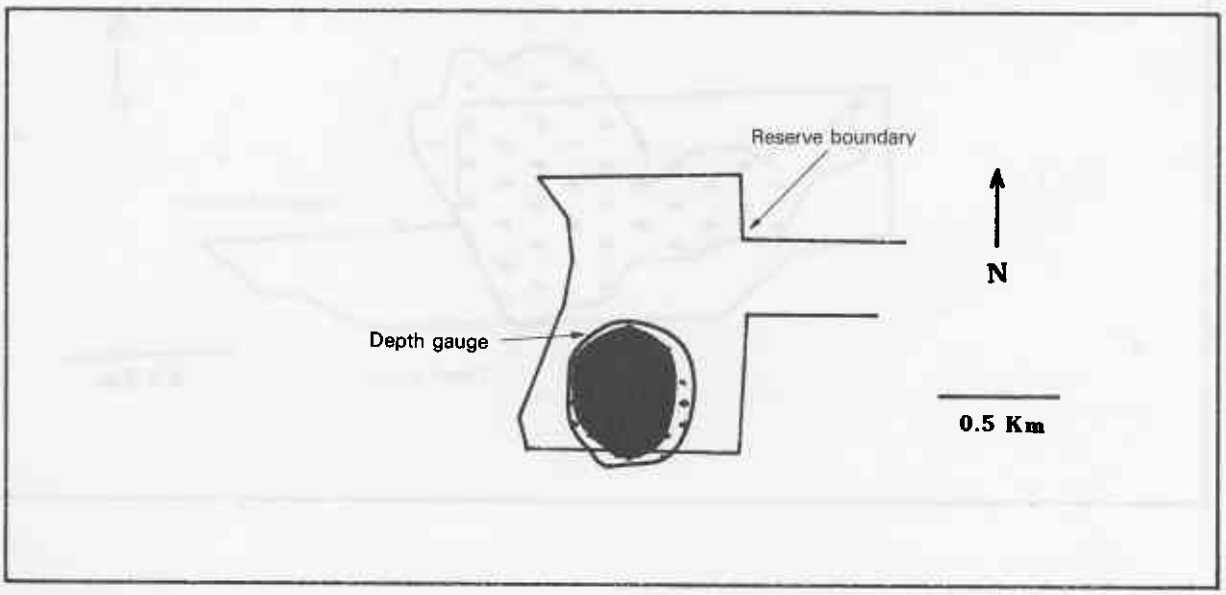
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.30	100	80
saplings	4.00	1	70
trees	4.00	5	1
dead shrubs	2.00	10	10
dead trees	4.00	10	1

A moderate-sized open saline lake with a broad belt of samphire below the water mark consisting mainly of *Sarcocornia quinqueflora* and *Halosarcia pergranulata* interspersed with *H. syncarpa* and *Wilsonia humilis*. Above the water mark there is a dense fringing belt of *Melaleuca* sp. (including a few dead trees) with *H. indica* ssp. *bidens* as an understorey. *Casuarina obesa* occurs behind the *Melaleuca* belt. There are a few live and dead *Melaleuca* sp. trees and small thickets below the water mark.

Plant species list (zones indicated by a single numeral)

3	*Halosarcia pergranulata*
3	*Halosarcia syncarpa*
3	*Sarcocornia quinqueflora*
3	*Wilsonia humilis*
4	*Casuarina obesa*
4	*Halosarcia indica* ssp. *bidens*
4	*Melaleuca* sp.



Lake Walbyring

Nature Reserve :	Unnamed	Reserve Number :	14398
Vesting :	NPNCA	Purpose :	Protection of Flora and Fauna
Lake Area :	53.0 ha	Vegetation Area :	53.0 ha
Open Water :	0.0 ha (0.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Brackish
Coordinates :	32.56 S, 117.36 E		

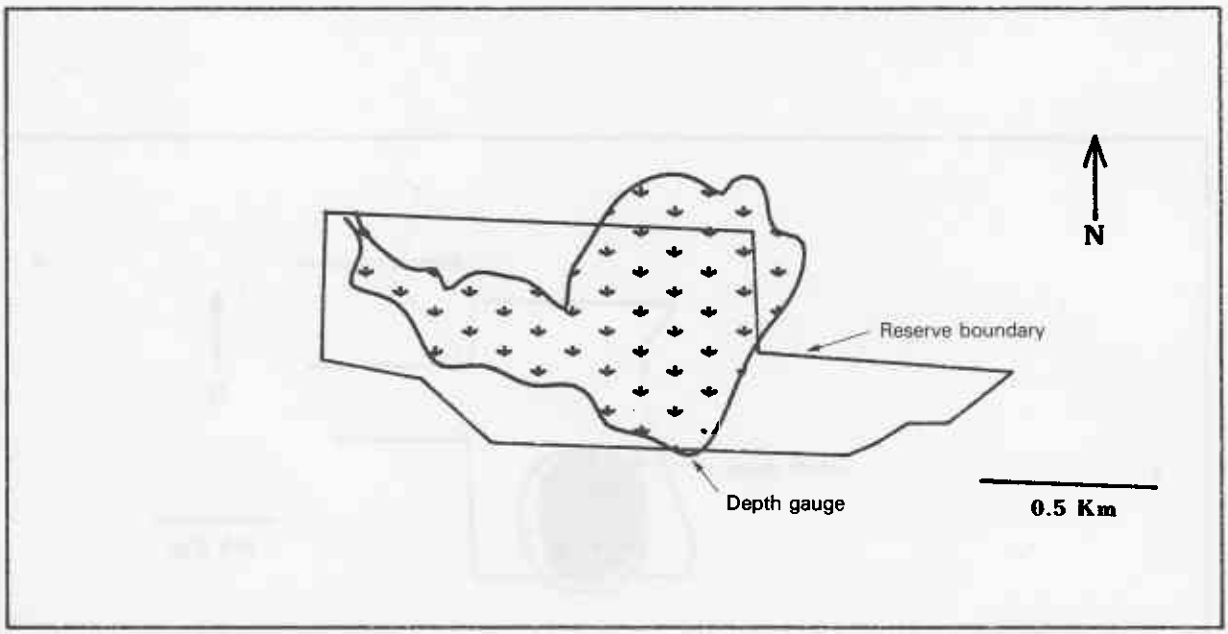
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	60	20
trees	5.00	60	60
dead trees	8.00	40	50

A moderate-sized brackish lake containing extensive sparse thickets of *Casuarina obesa* through the southern end and *Melaleuca* sp. through the northern end. There is a band of dead trees around the edge of the lake with *Halosarcia pergranulata* and *Sarcocornia quinqueflora* growing beneath them. *Halosarcia lepidosperma* occurs at and above the water mark under a dense belt of *C. obesa*.

Plant species list (zones indicated by a single numeral)

2 *Casuarina obesa*
2 *Melaleuca* sp.
3 *Halosarcia lepidosperma*
3 *Halosarcia pergranulata*
3 *Sarcocornia quinqueflora*



Wallering Swamp

Nature Reserve :	Bampanup NR	Reserve Number :	26756
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	8.9 ha	Vegetation Area :	5.6 ha
Open Water :	3.3 ha (37.08%)		
Lake Permanence :	Seasonal	Lake Salinity :	Brackish
Coordinates :	31.27 S, 115.53 E		

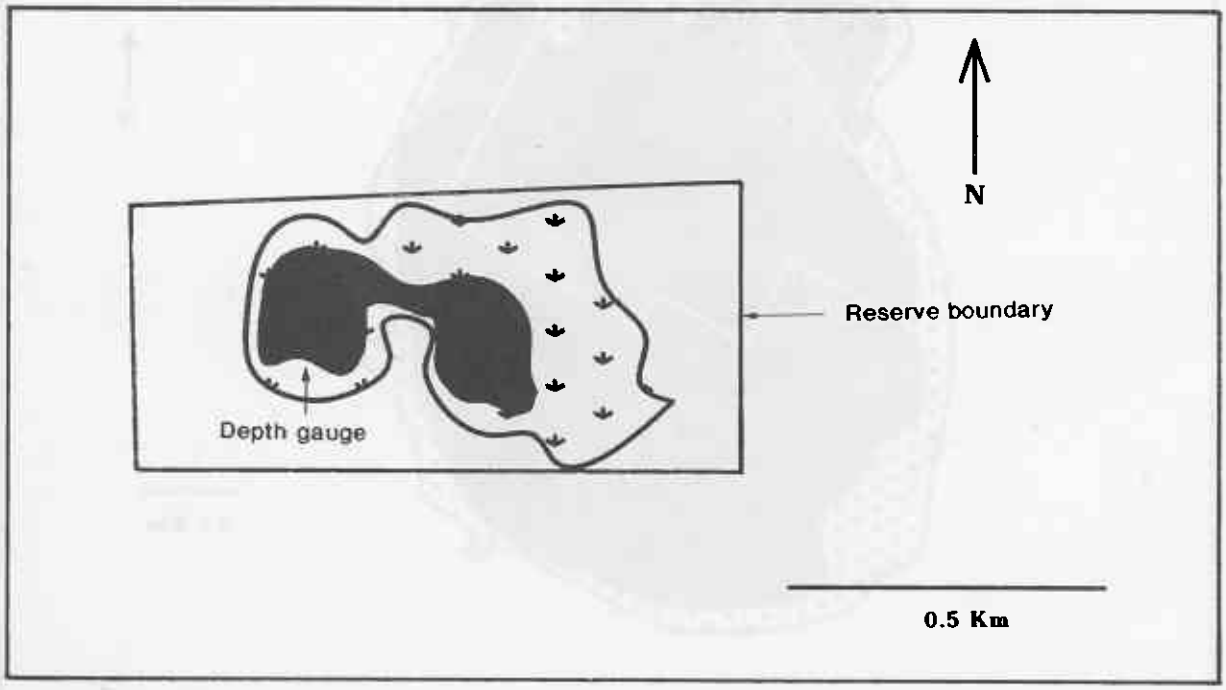
Vegetation Structure :

	Height (m)	% Area	% Cover
shrubs	0.50	1	10
trees	4.00	50	70

A small brackish swamp that contains a dam on the western side. There is substantial regrowth of *Melaleuca rhaphiophylla* thickets (to about 4 m in height) across the lake bed. The original *M. rhaphiophylla* trees were mostly bulldozed. There are occasional small *Eucalyptus rudis* trees in the lake. Above the water mark there are seedling and sapling *E. rudis* that have regenerated since grazing stopped around the lake. There is a single *M. teretifolia* shrub above the usual water mark.

Plant species list (zones indicated by a single numeral)

2 *Melaleuca rhaphiophylla*
3 *Eucalyptus rudis*
4 *Melaleuca teretifolia*



Lake Walyormouring

Nature Reserve :	Walyormouring NR	Reserve Number :	17186
Vesting :	NPNCA	Purpose :	Native Fauna
Lake Area :	1010.0 ha	Vegetation Area :	201.8 ha
Open Water :	808.2 ha (80.02%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	31.08 S, 116.51 E		

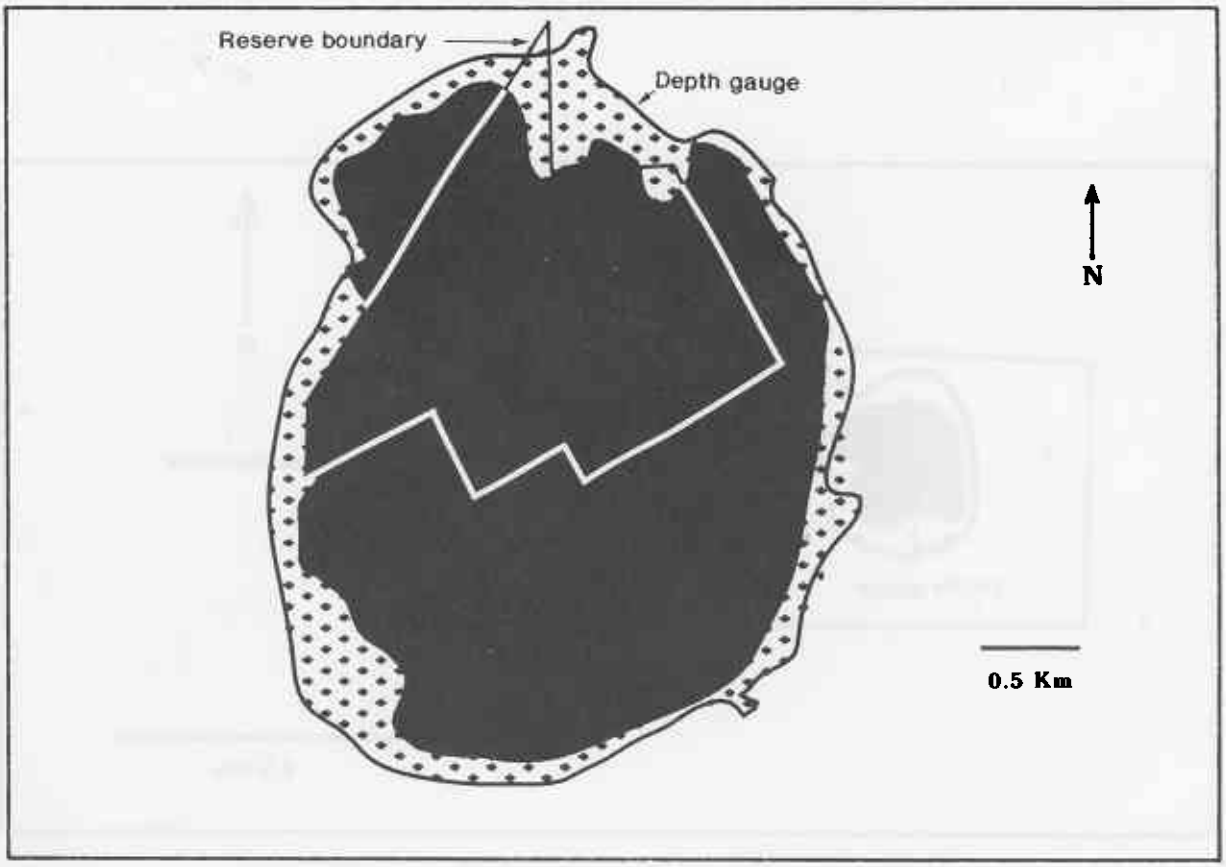
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.30	50	80
dead trees	6.00	40	20

A large saline lake with long-dead *Casuarina obesa* extending above and below the water mark. *Halosarcia pergranulata* grows under the dead trees around the shore line. There are a few live *C. obesa* saplings in higher parts of the inundated area, which will presumably die when the lake next floods.

Plant species list (zones indicated by a single numeral)

3 *Casuarina obesa*
3 *Halosarcia pergranulata*



Lake Wannamal

Nature Reserve :	Lake Wannamal NR	Reserve Number :	9838
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	240.0 ha	Vegetation Area :	164.0 ha
Open Water :	76.0 ha (31.67%)		
Lake Permanence :	Permanent	Lake Salinity :	Brackish
Coordinates :	31.08 S, 116.03 E		

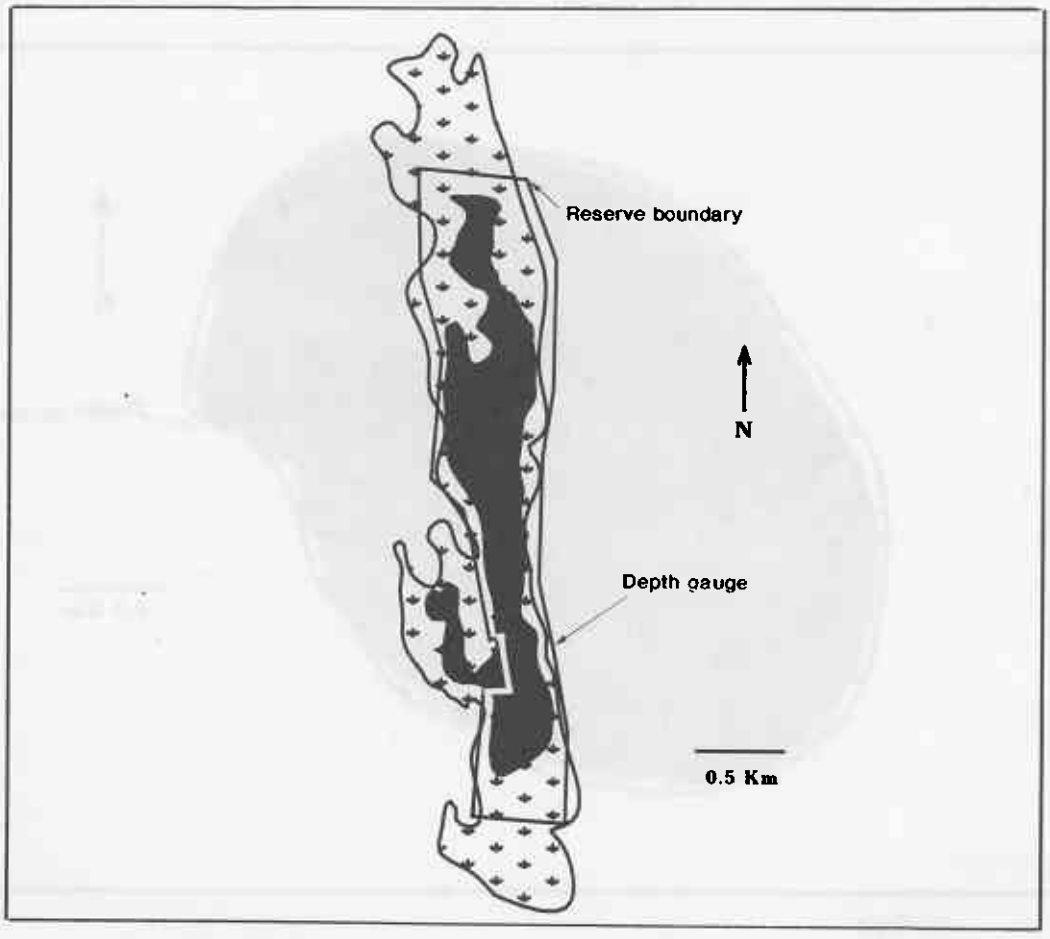
Vegetation Structure :

	Height (m)	% Area	% Cover
grasses	0.05	5	60
grasses	0.01	3	80
samphires	0.50	15	10
sedges	1.00	1	1
shrubs	2.00	60	80
trees	15.00	5	20
trees	5.00	15	3
dead trees	8.00	30	40

A moderate-sized brackish lake with extensive areas of live *M. teretifolia* thicket at each end and scattered *Melaleuca rhaphiophylla* trees at the southern end. Stags of dead *M. rhaphiophylla* occur around the edge of the open water area and thickets of dead *M. teretifolia* occur along the eastern shore and towards the northern end of the lake. Live *M. teretifolia* grows around the edge of the lake below the water mark. On the western shore *Baumea articulata* grows among the *M. teretifolia* and there is a patch of *Typha ?orientalis*. Above the water mark there is a narrow belt of *Eucalyptus rudis* and a few *Casuarina obesa* trees. *Sporobolus virginicus* and *Halosarcia indica* ssp. *bidens* grow beneath the trees.

Plant species list (zones indicated by a single numeral)

1	*Baumea articulata*	3	*Halosarcia indica* ssp. *bidens*
1	*Melaleuca teretifolia*	4	*Casuarina obesa*
2	*Melaleuca rhaphiophylla*	4	*Eucalyptus rudis*
2	**Typha ?orientalis*	4	*Sporobolus virginicus*



Lake Warden

Nature Reserve :	Unnamed	Reserve Number :	32257
Vesting :	NPNCA	Purpose :	Recreation and Cons. Flora and Fauna
Lake Area :	665.0 ha	Vegetation Area :	31.0 ha
Open Water :	634.0 ha (95.34%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Hypersaline
Coordinates :	33.50 S, 121.53 E		

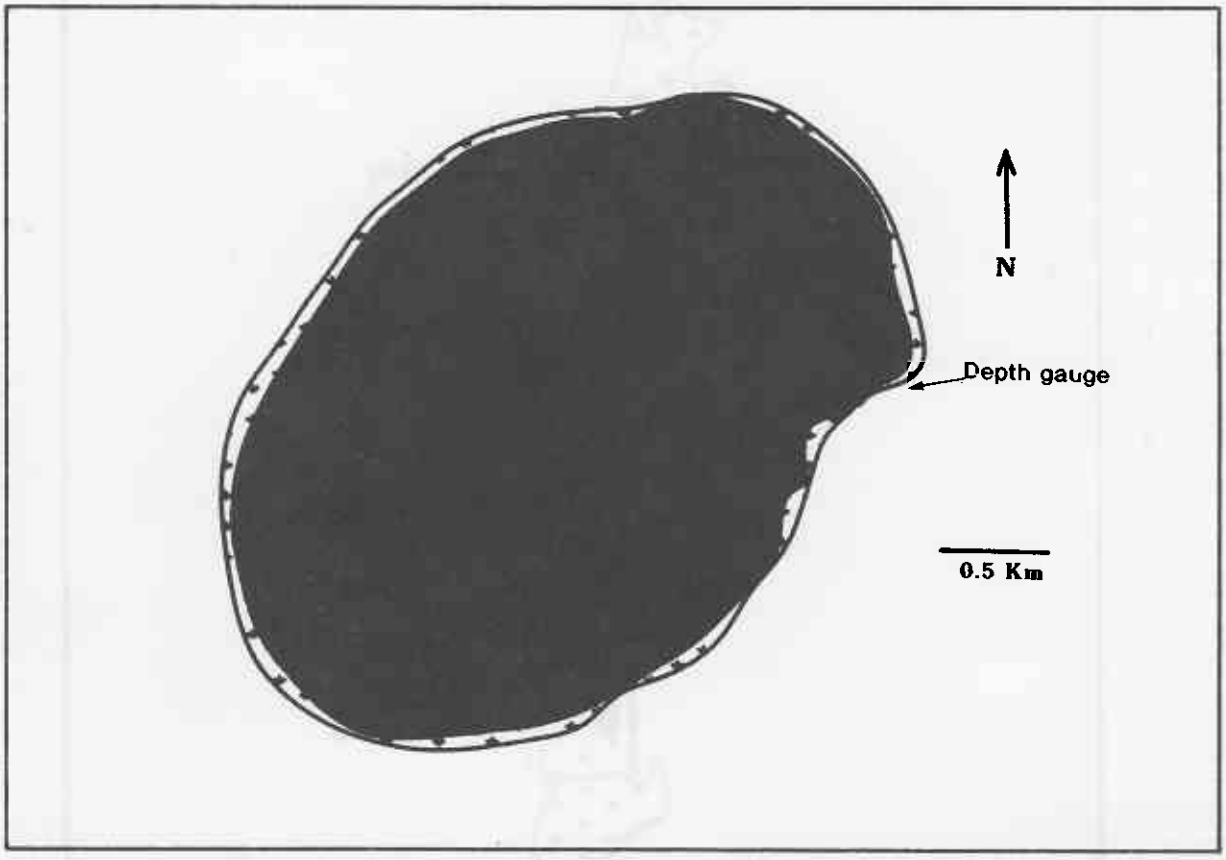
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.40	60	50
trees	4.00	30	5
dead trees	4.00	30	20

A large saline lake with a belt of samphire below the water mark that contains *Sarcocornia quinqueflora, Halosarcia pergranulata, H. lepidosperma* and sparse clumps of *Chenopodium glaucum* as a low succulent shrubland. Around the high water mark *Isolepis nodosa, Schoenus brevifolius* and *Juncus* sp. occur. Small *Melaleuca cuticularis* trees occur fairly sparsely on and above the water mark. *Acacia* sp. occurs at the back of the *M. cuticularis* zone.

Plant species list (zones indicated by a single numeral)

3	**Chenopodium glaucum*
3	*Halosarcia lepidosperma*
3	*Halosarcia pergranulata*
3	*Isolepis nodosa*
3	*Juncus* sp.
3	*Melaleuca cuticularis*
3	*Sarcocornia quinqueflora*
3	*Schoenus brevifolius*
4	*Acacia* sp.



Lake Wardering

Nature Reserve :	Unnamed	Reserve Number :	17258
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	44.9 ha	Vegetation Area :	9.4 ha
Open Water :	35.5 ha (79.06%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.32 S, 117.15 E		

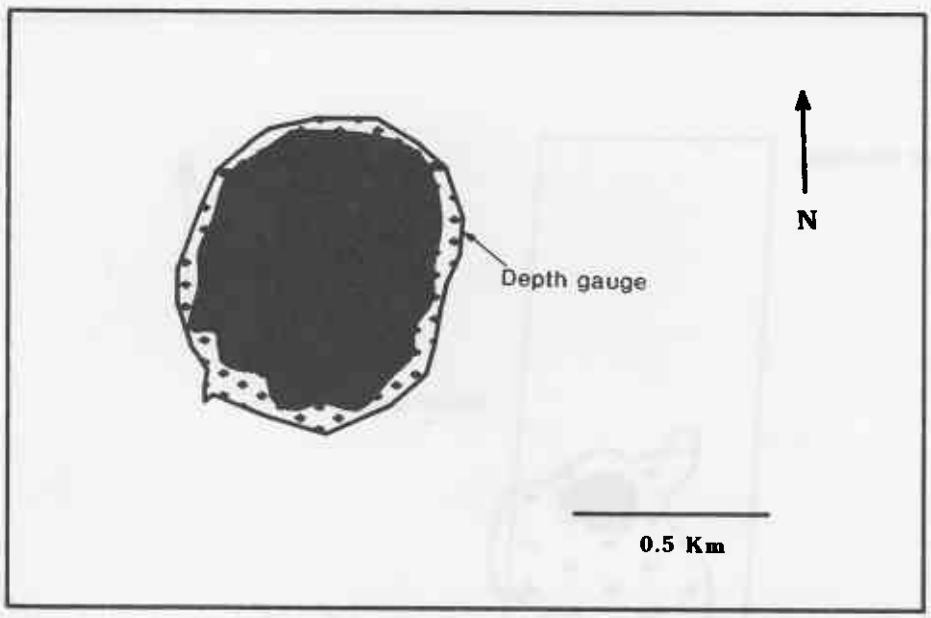
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	1	10
sedges	0.50	1	10
trees	4.00	10	30

A small saline lake with occasional dead trees below the water mark and, at one end, a narrow but extensive stand of dead *Melaleuca* sp. trees. At the rear of the dead trees and scattered around the lake just below the water mark there are small live *Melaleuca* sp. A belt of dense samphire occurs just below the water mark. Above the water mark *Casuarina obesa* and *Eucalyptus rudis* occur with an understorey of *Sporobolus virginicus* and occasional clumps of *Juncus* sp.

Plant species list (zones indicated by a single numeral)

3	*Melaleuca* sp.
4	*Casuarina obesa*
4	*Eucalyptus rudis*
4	*Juncus* sp.
4	*Sporobolus virginicus*



White Lake (Albany)

Nature Reserve :	Unnamed	Reserve Number :	36550
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	32.2 ha	Vegetation Area :	32.2 ha
Open Water :	0.0 ha (0.00%)		
Lake Permanence :	Seasonal	Lake Salinity :	Fresh
Coordinates :	34.46 S, 118.10 E		

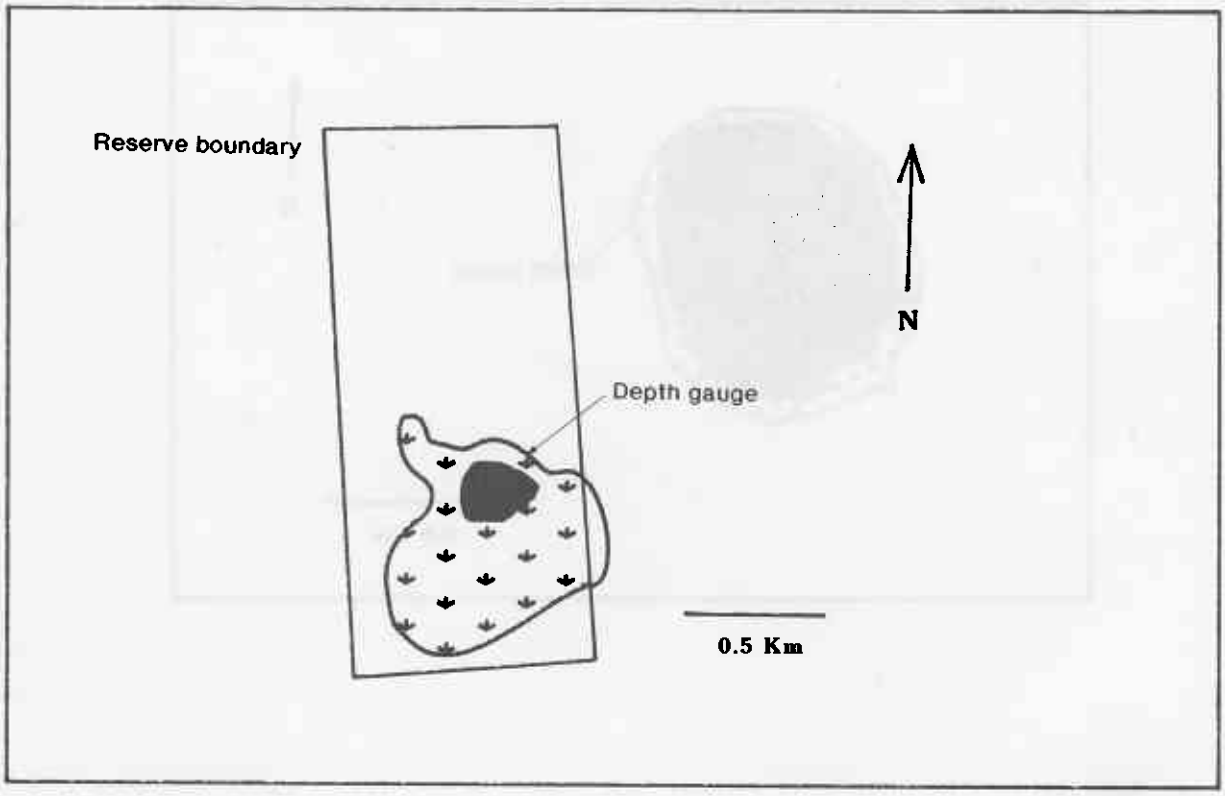
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	0.40	50	80
sedges	2.00	50	100
shrubs	1.00	1	5
trees	5.00	1	2

A moderate-sized fresh sedge lake with an extensive area of *Baumea articulata* in the centre that is surrounded by *Lepidosperma* aff. *leptostachyum* and then *Restio leptocarpoides*, which extends to the water mark. There is a narrow band of sapling *M. cuticularis* amongst the *R. leptocarpoides*. *Villarsia* aff. *parnassifolia* grows under the sedges throughout the lake. Above the water mark there are low *Daviesia incrassata* shrubs and taller *Melaleuca cuticularis* in occasional clumps or as dense thickets in places. There are a few raised 'islands' in the lake supporting *M. cuticularis* and *D. incrassata*.

Plant species list (zones indicated by a single numeral)

2	*Baumea articulata*
2	*Lepidosperma* aff. *leptostachyum*
2	*Villarsia* aff. *parnassifolia*
3	*Melaleuca cuticularis*
3	*Restio leptocarpoides*
4	*Daviesia incrassata*



White Lake (Narrogin)

Nature Reserve :	Quongunnerunding NR	Reserve Number :	21284
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	208.0 ha	Vegetation Area :	60.0 ha
Open Water :	148.0 ha (71.15%)		
Lake Permanence :	Seasonal	Lake Salinity :	Saline
Coordinates :	33.01 S, 117.27 E		

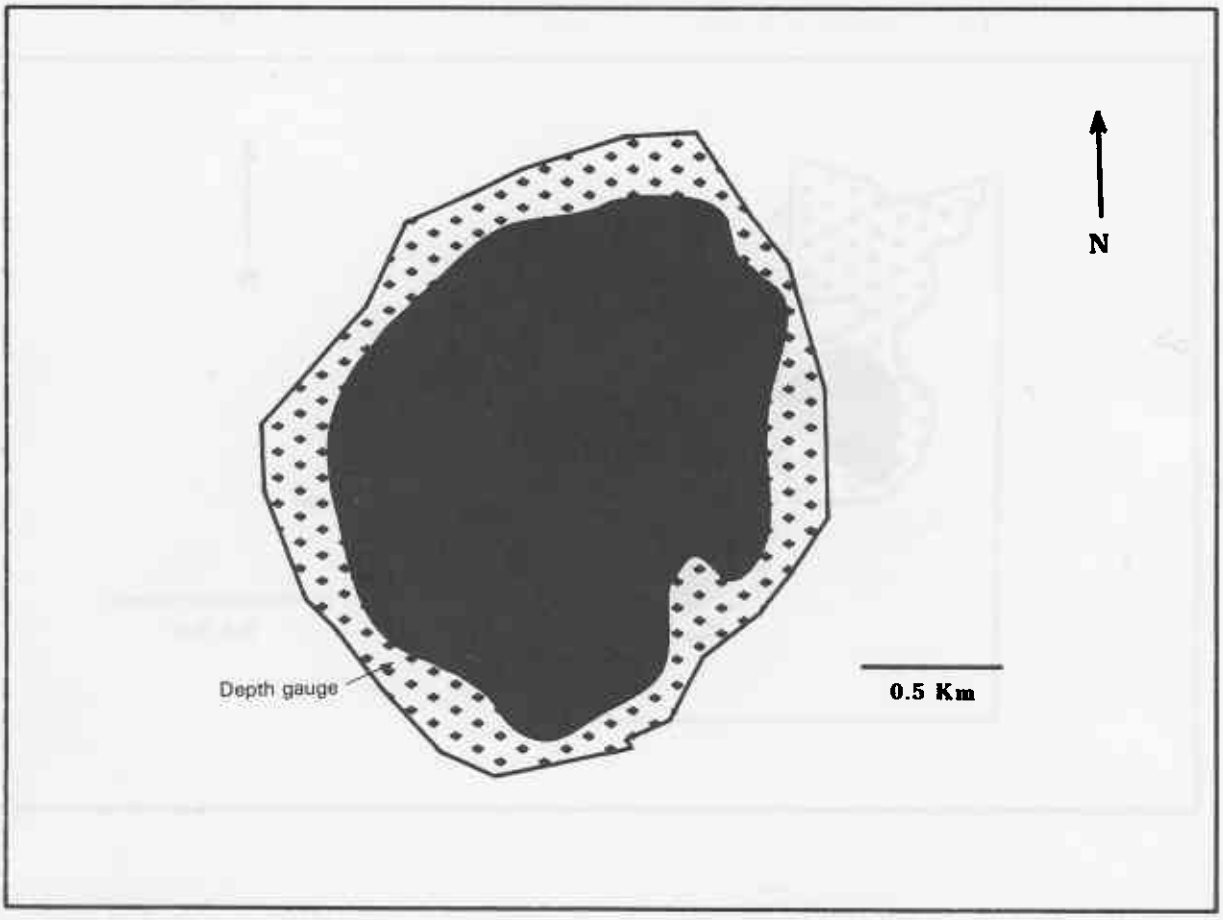
Vegetation Structure :

	Height (m)	% Area	% Cover
samphires	0.20	20	60
trees	3.00	15	60
dead trees	4.00	60	40

A moderate-sized saline lake with a belt of dead *Melaleuca* aff. *halmaturorum* and *Casuarina obesa* trees below the water mark. Occasional live *M.* aff. *halmaturorum* occur near the water mark with *Halosarcia syncarpa* and *H. pergranulata* forming an understorey. Above the water mark *M.* aff. *halmaturorum* and *Casuarina obesa* occur as a low woodland with occasional *Melaleuca* sp. trees present that are up to 10 m high.

Plant species list (zones indicated by a single numeral)

3	*Halosarcia pergranulata*
3	*Halosarcia syncarpa*
3	*Villarsia parnassifolia*
4	*Casuarina obesa*
4	*Melaleuca* aff. *halmaturorum*
4	*Melaleuca* sp.



Wildhorse Swamp

Nature Reserve :	Wildhorse Swamp NR	Reserve Number :	1740
Vesting :	NPNCA	Purpose :	Recreation and Cons Flora and Fauna
Lake Area :	4.2 ha	Vegetation Area :	3.9 ha
Open Water :	0.3 ha (6.01%)		
Lake Permanence :	Seasonal	Lake Salinity :	Brackish
Coordinates :	33.40 S, 116.44 E		

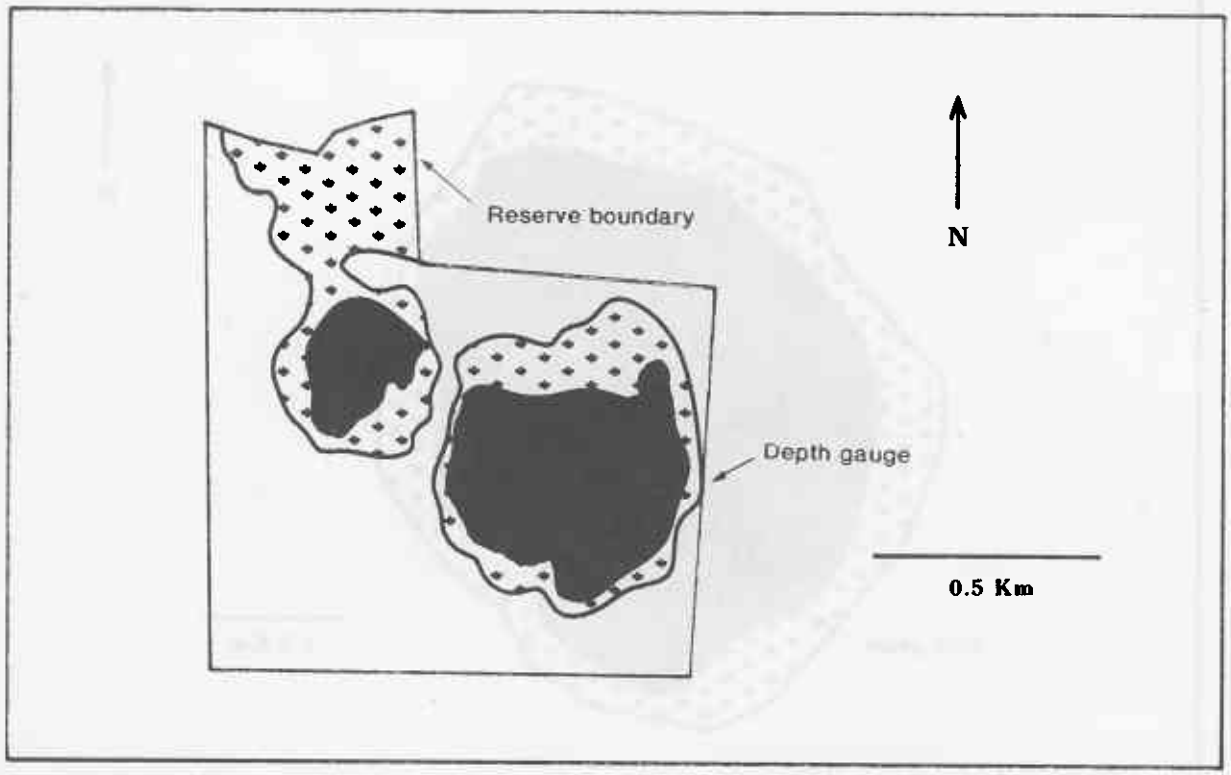
Vegetation Structure :

	Height (m)	% Area	% Cover
dead shrubs	3.00	50	30
dead trees	5.00	100	40

A small brackish swamp containing dense stands of dead *Melaleuca rhaphiophylla* throughout the lake bed with occasional *Halosarcia lepidosperma* growing beneath them. Above the water mark there is a closed woodland of *M. rhaphiophylla* trees and smaller *M.* aff. *viminea* thickets. The sedge *Schoenus brevifolius* grows under *M. rhaphiophylla*. Behind the *Melaleuca* zone is a woodland of *Eucalyptus rudis*.

Plant species list (zones indicated by a single numeral)

3	*Halosarcia lepidosperma*
4	*Eucalyptus rudis*
4	*Melaleuca rhaphiophylla*
4	*Melaleuca* aff. *viminea*
4	*Schoenus brevifolius*



Yaalup Lagoon

Nature Reserve :	Unnamed	Reserve Number :	36967
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	15.7 ha	Vegetation Area :	6.5 ha
Open Water :	9.2 ha (58.60%)		
Lake Permanence :	Semi-permanent	Lake Salinity :	Fresh
Coordinates :	33.45 S, 118.34 E		

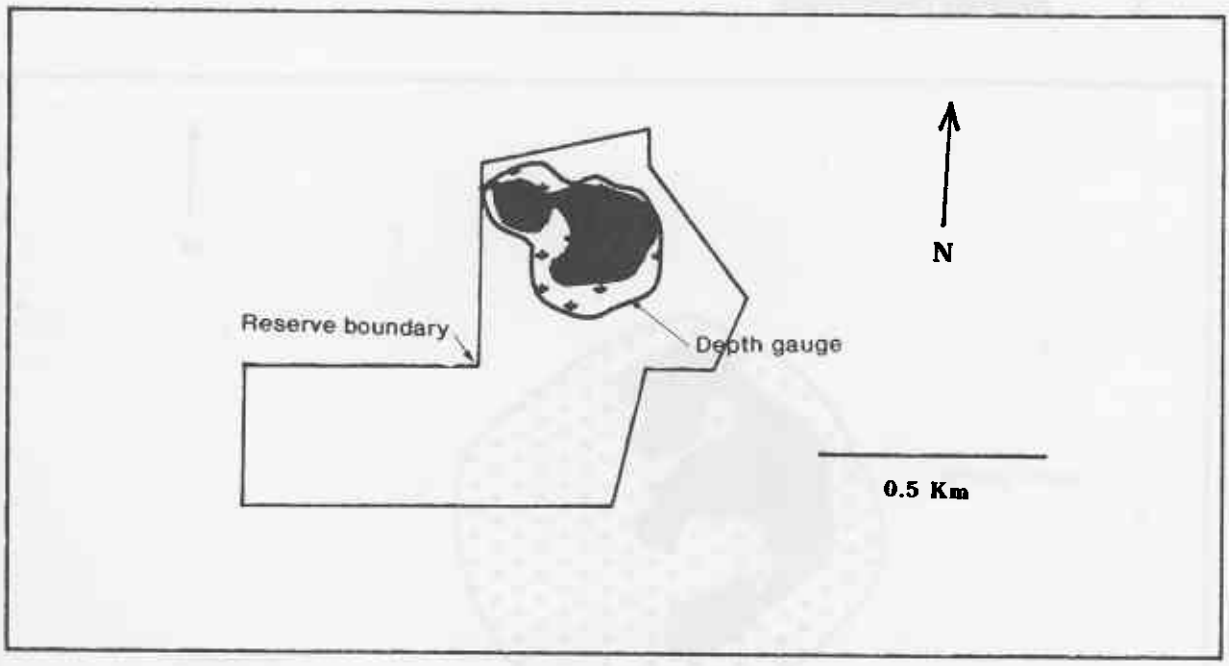
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	0.30	5	1
shrubs	1.50	10	50
saplings	4.00	10	90
trees	15.00	100	20
trees	6.00	100	10

A small fresh lake within an extensive additional area subject to occasional flooding. There is a small area of open water surrounded by a wide belt of eucalypt woodland dominated by *Eucalyptus occidentalis*. Scattered trees and thickets of *Melaleuca lanceolata* occur throughout the woodland. Above the water mark but in the area subject to flooding *Melaleuca* aff. *acuminata* shrubs and scattered *Juncus capitatus* occur.

Plant species list (zones indicated by a single numeral)

2 *Melaleuca lanceolata*
3 *Eucalyptus occidentalis*
4 **Juncus capitatus*
4 *Melaleuca* aff. *acuminata*



Yarnup Lagoon

Nature Reserve :	Yarnup NR	Reserve Number :	29601
Vesting :	NPNCA	Purpose :	Water and Cons. Flora and Fauna
Lake Area :	25.4 ha	Vegetation Area :	17.7 ha
Open Water :	7.7 ha (30.31%)		
Lake Permanence :	Permanent	Lake Salinity :	Fresh
Coordinates :	34.23 S, 116.51 E		

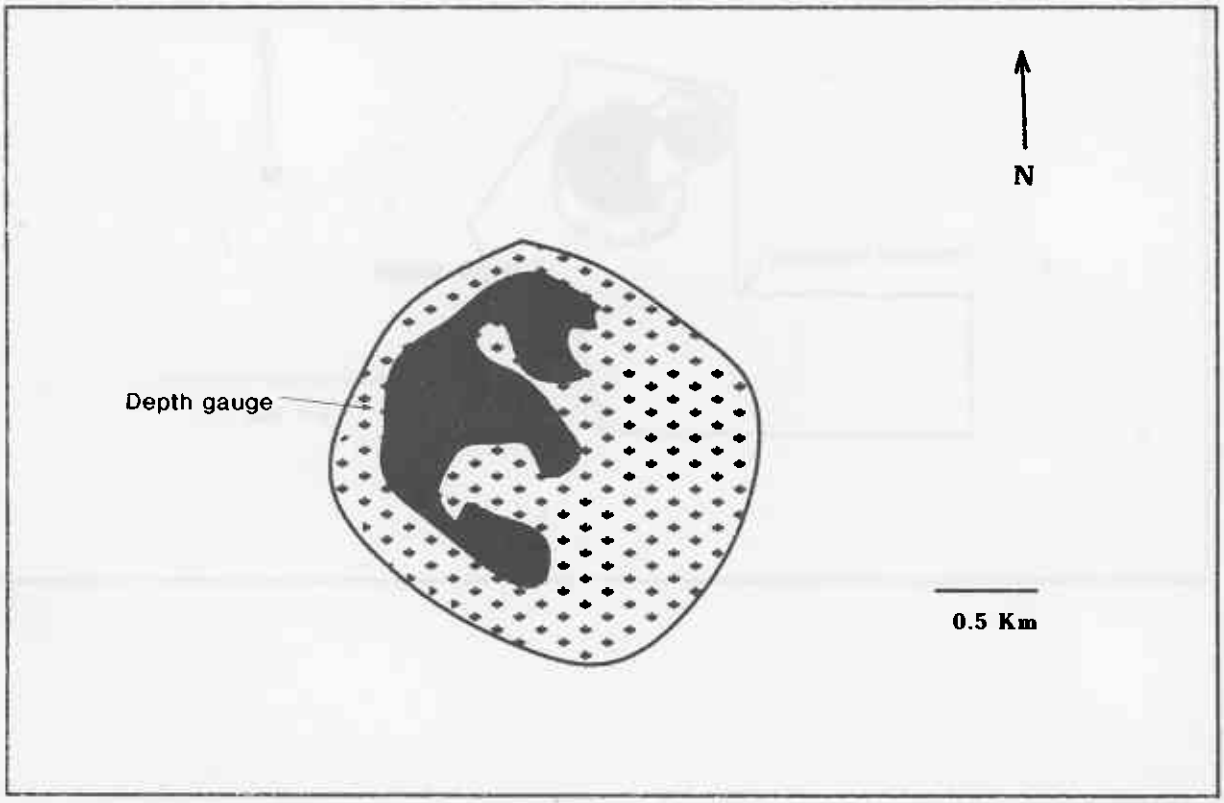
Vegetation Structure :

	Height (m)	% Area	% Cover
sedges	4.00	95	100
sedges	1.00	5	70
shrubs	4.00	5	100
trees	6.00	1	20

A small fresh swamp with dense beds of *Baumea articulata*. There are small areas of open water. Around the edge of the lake below the water mark there is a narrow belt of *Melaleuca lateritia* with an understorey of *Schoenus brevifolius*, *Gahnia drummondii* and *Haloragis* sp. There are a few *M. rhaphiophylla* trees in the water but most of the *M. rhaphiophylla* trees occur on and above the water mark with an understorey of *S. brevifolius* and *G. drummondii*. A few *Eucalyptus rudis* occur in the *M. rhaphiophylla* zone, behind which jarrah/marri woodland occurs. According to local farmers the salt-scalds evident in the bush around Yarnup Lake have appeared during the past five years.

Plant species list (zones indicated by a single numeral)

1 *Baumea articulata*
2 *Melaleuca lateritia*
2 *Schoenus brevifolius*
3 *Eucalyptus rudis*
3 *Gahnia drummondii*
3 *Haloragis* sp.
3 *Melaleuca rhaphiophylla*



Yarra Yarra Lake

Nature Reserve :	Unnamed	Reserve Number :	26442
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	1213.0 ha	Vegetation Area :	41.0 ha
Open Water :	1172.0 ha (96.62%)		
Lake Permanence :	Ephemeral	Lake Salinity :	Hypersaline
Coordinates :	29.35 E, 115.46 E		

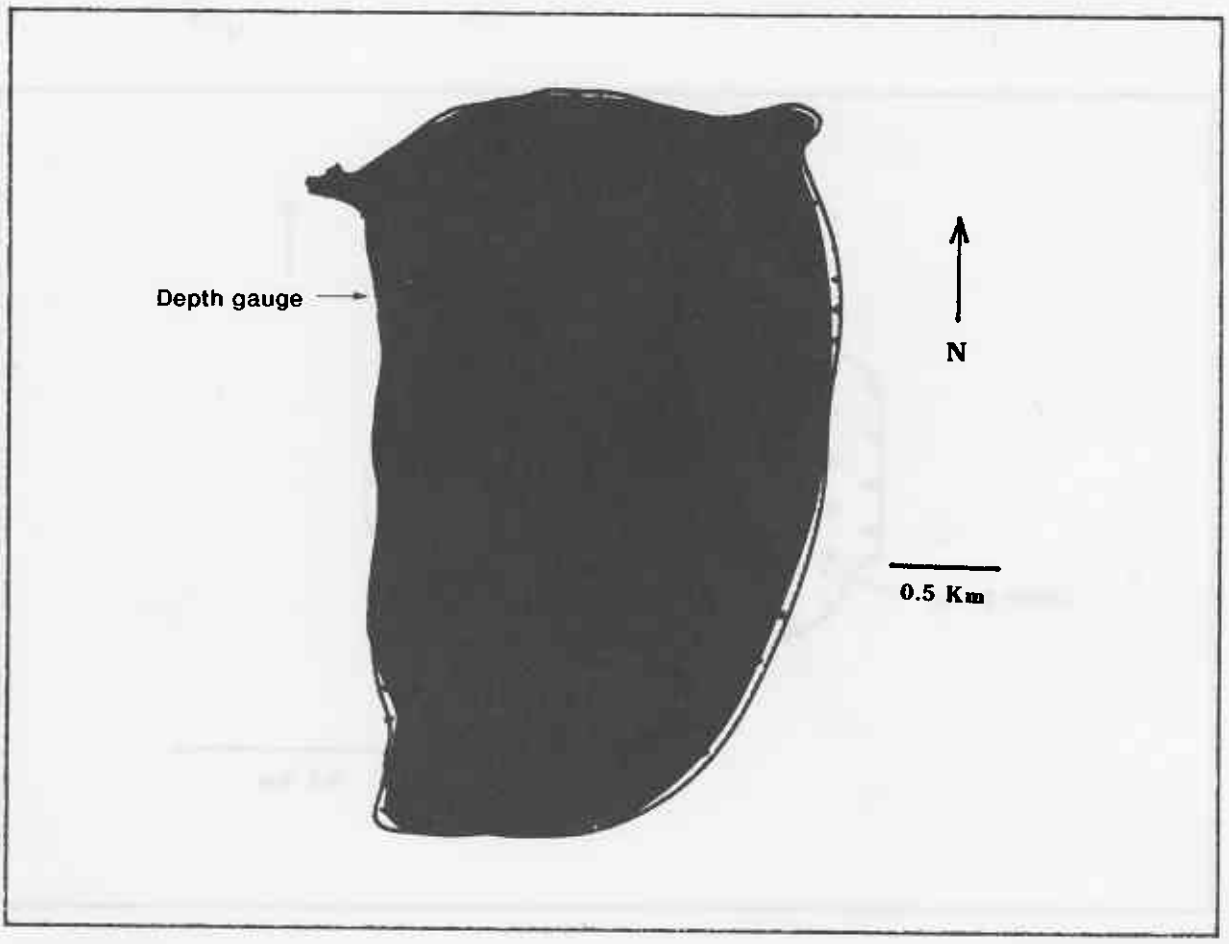
Vegetation Structure :

	Height (m)	% Area	% Cover
grasses	0.05	10	10
samphires	0.50	70	50
trees	6.00	5	70

A very large hypersaline lake with a narrow belt of samphire below the water mark containing *Halosarcia halocnemoides*, *H. indica* ssp. *bidens* and *H. pergranulata*. A narrow belt of *Casuarina obesa* trees occurs above the water mark around part of the lake.

Plant species list (zones indicated by a single numeral)

3 *Halosarcia halocnemoides*
3 *Halosarcia indica* ssp. *bidens*
3 *Halosarcia pergranulata*
4 *Casuarina obesa*



Yurine Swamp

Nature Reserve :	Yurine Swamp NR	Reserve Number :	9676
Vesting :	NPNCA	Purpose :	Cons. Flora and Fauna
Lake Area :	7.5 ha	Vegetation Area :	2.9 ha
Open Water :	4.6 ha (61.33%)		
Lake Permanence :	Permanent	Lake Salinity :	Fresh
Coordinates :	31.15 S, 115.47 E		

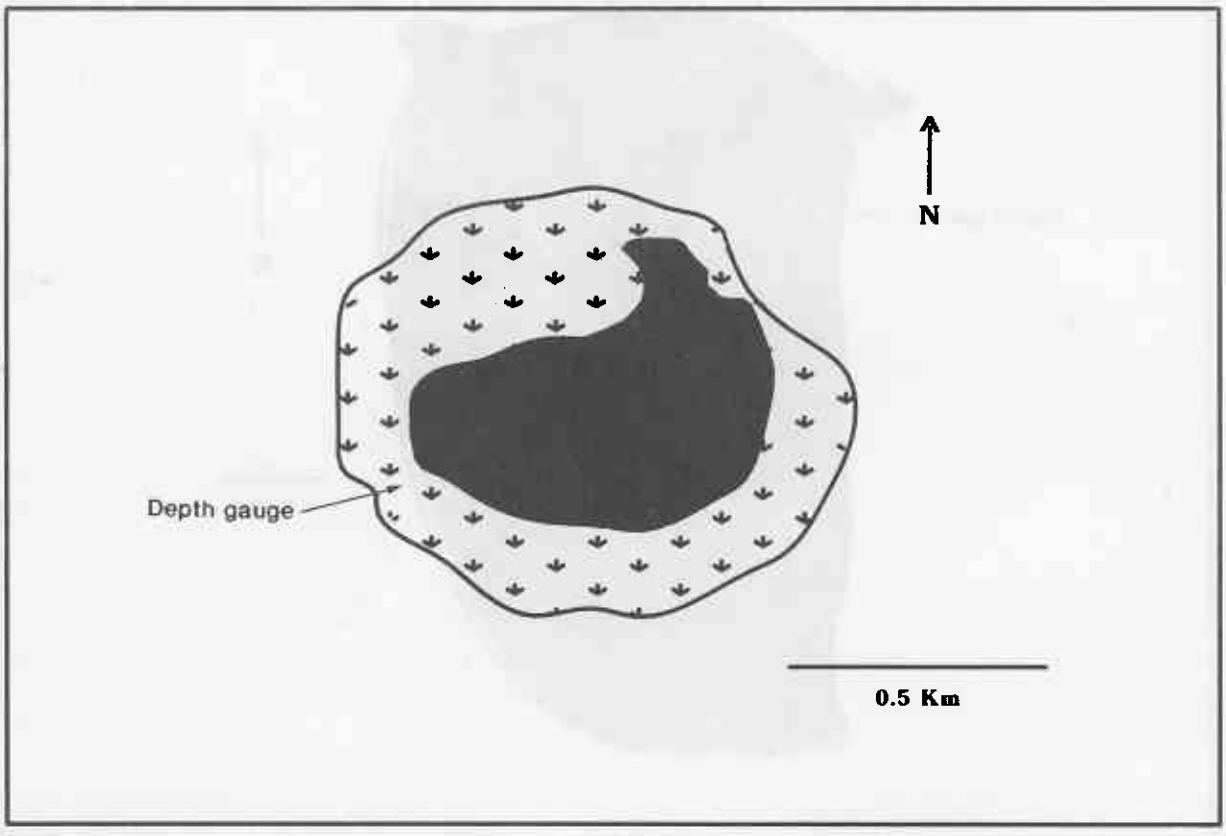
Vegetation Structure :

	Height (m)	% Area	% Cover
grasses	0.10	5	80
herbs	1.00	1	70
sedges	0.50	1	70
trees	8.00	20	30
trees	6.00	30	60

A small fresh lake fringed by *Eucalyptus rudis* and *Melaleuca rhaphiophylla* that extend into the water and form a riparian band. The understorey on the shore (on and above the water mark) consists of grass *Cynodon dactylon*, clumps of sedges *Cyperus alterniflorus* and *C. tenuiflorus* and the annual *Aster subulatus*.

Plant species list (zones indicated by a single numeral)

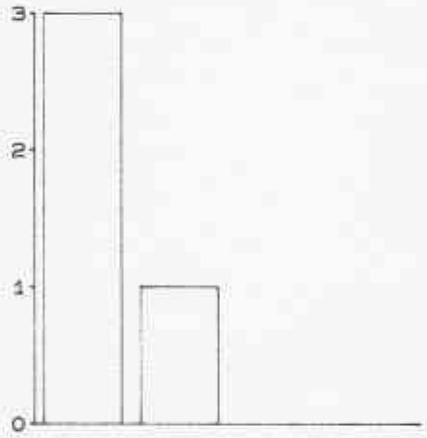
3 *Eucalyptus rudis*
3 *Melaleuca rhaphiophylla*
4 **Aster subulatus*
4 *Cynodon dactylon*
4 *Cyperus alterniflorus*
4 **Cyperus tenuiflorus*



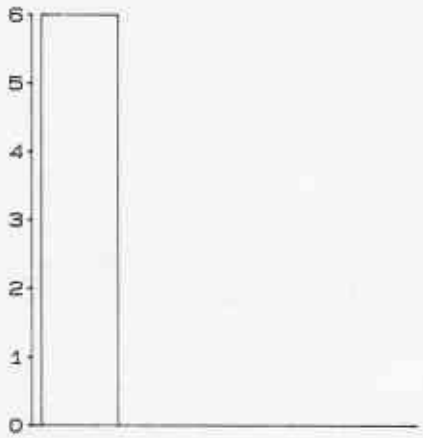
Appendix 2

Number of occurrences (vertical axes) of 44 plant species according to wetland salinity (horizontal axes) (1 = fresh, 2 = brackish, 3 = saline, 4 = hypersaline).

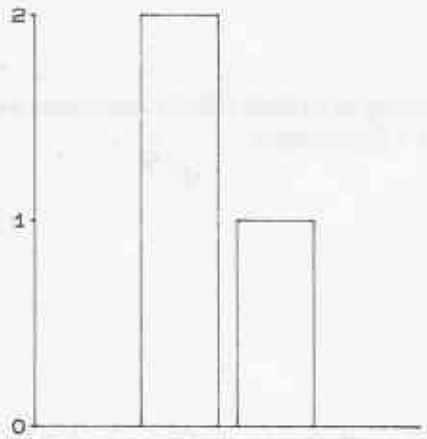
Agonis juniperina



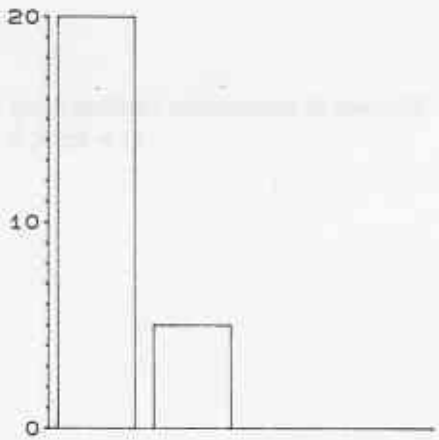
Astartea fascicularis



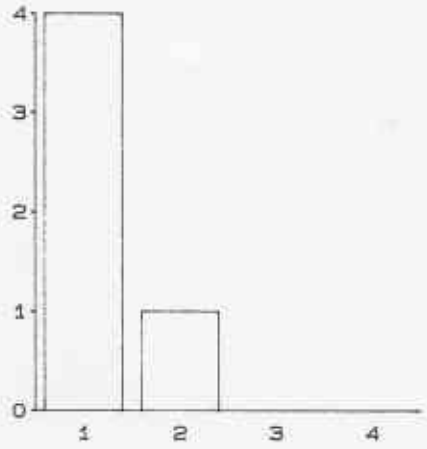
Atriplex exilifolia



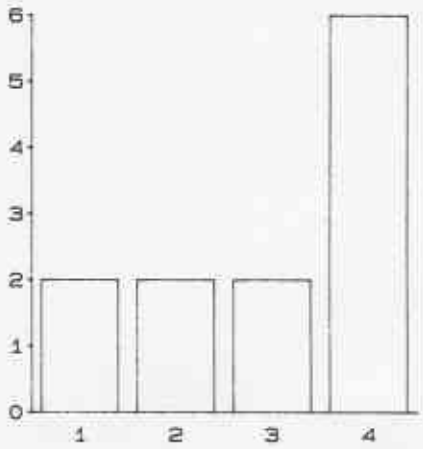
Baumea articulata



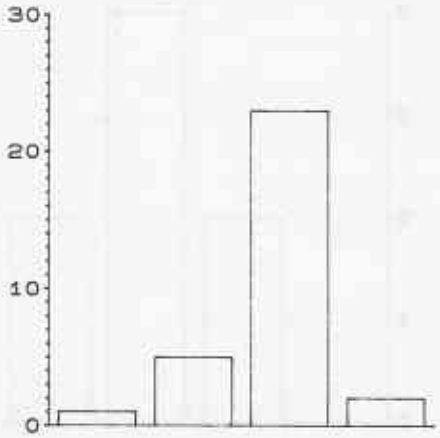
Baumea juncea



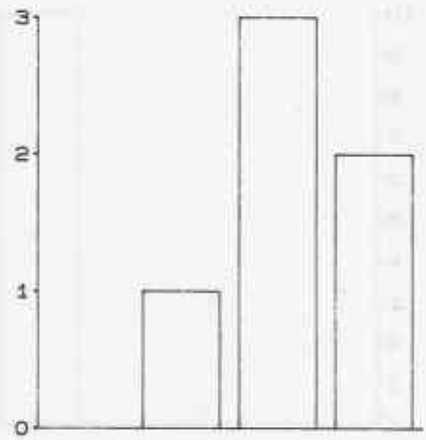
Carpobrotus sp.



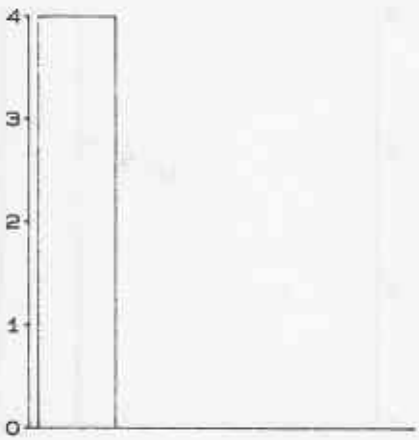
Casuarina obesa



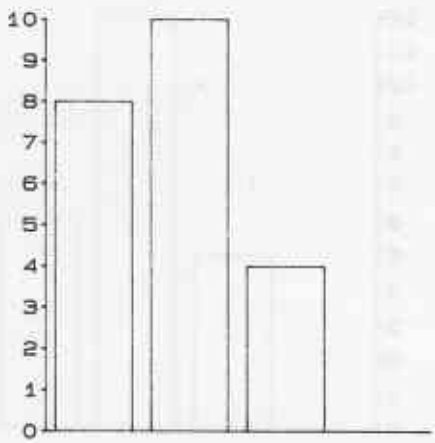
Disphyma crassifolium



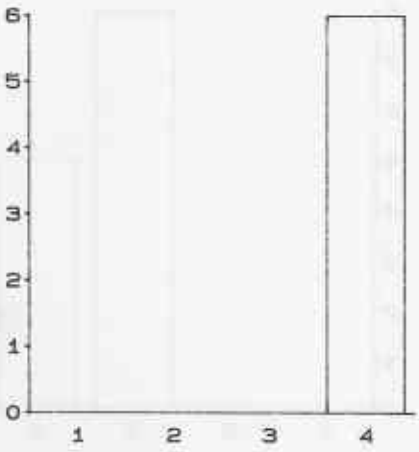
Eucalyptus occidentalis



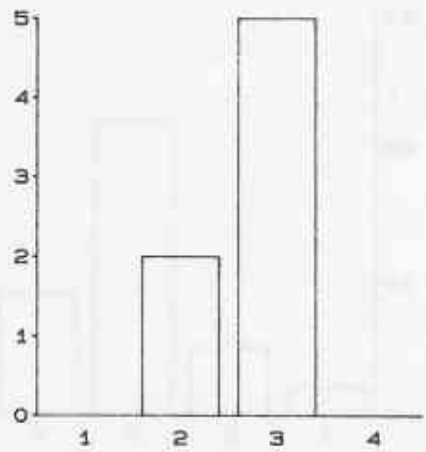
Eucalyptus rudis



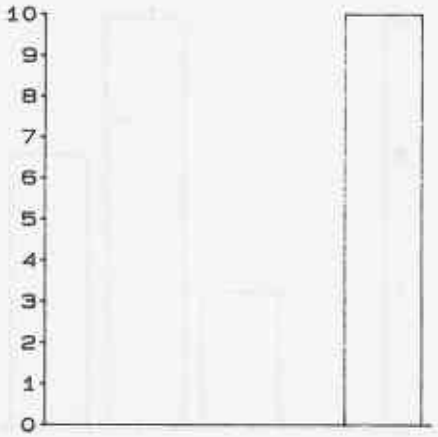
Frankenia spp.



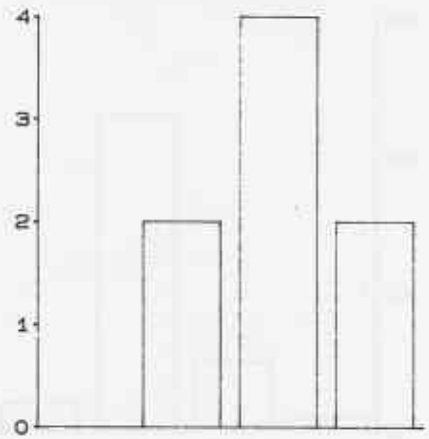
Gahnia trifida



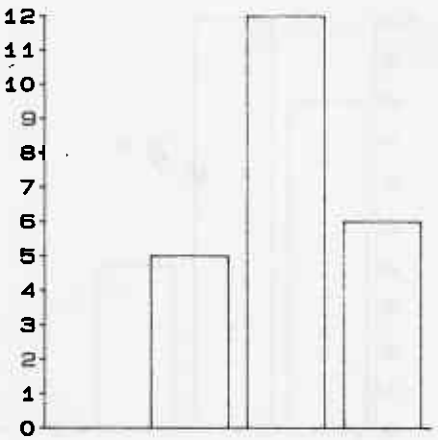
Halosarcia haloconemoides



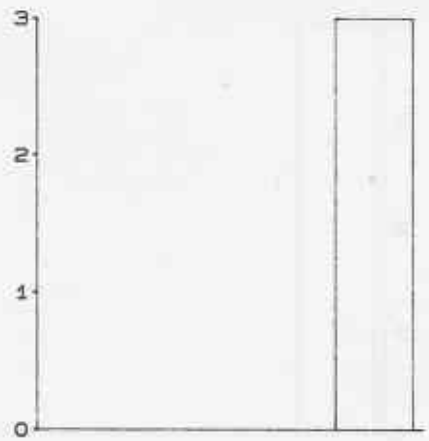
Halosarcia indica bidens



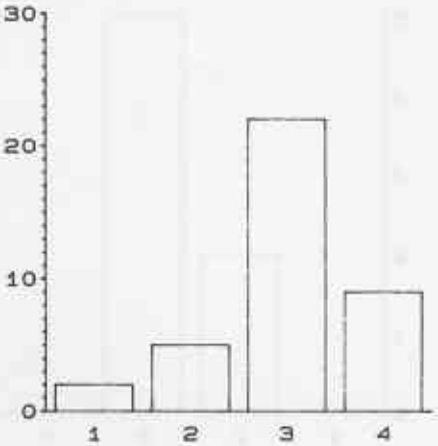
Halosarcia lepidosperma



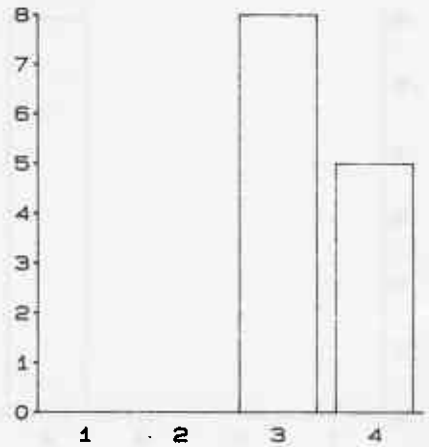
Halosarcia lylei



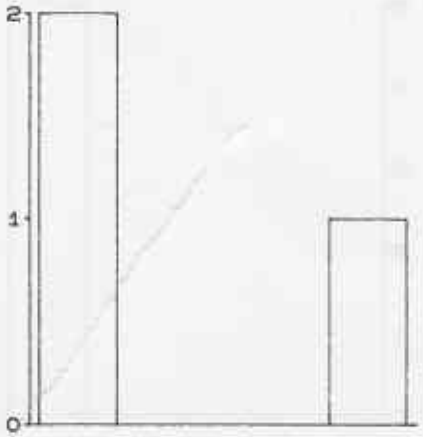
Halosarcia pergranulata



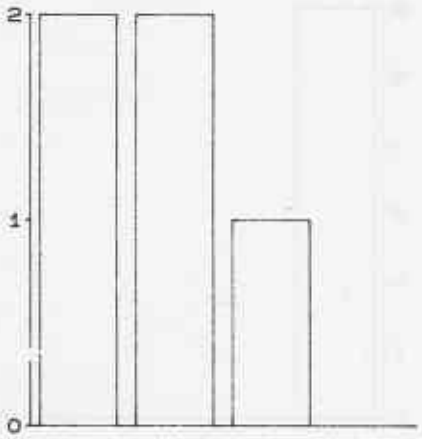
Halosarcia syncarpa



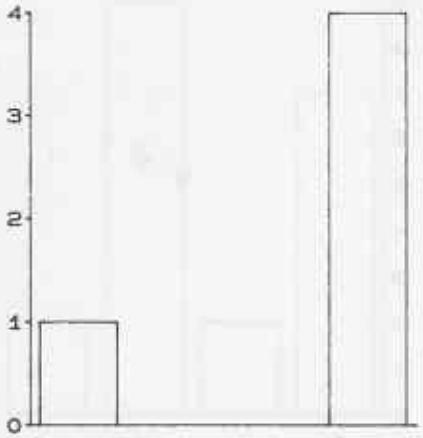
Isolepis nodosa



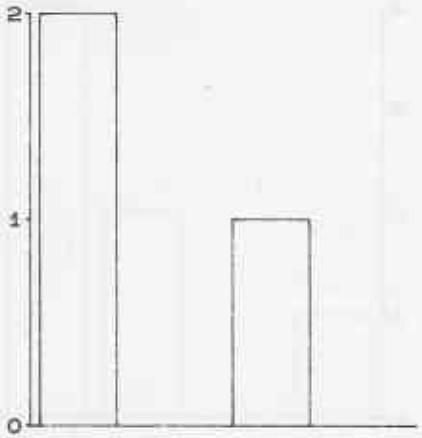
Juncus pallidus



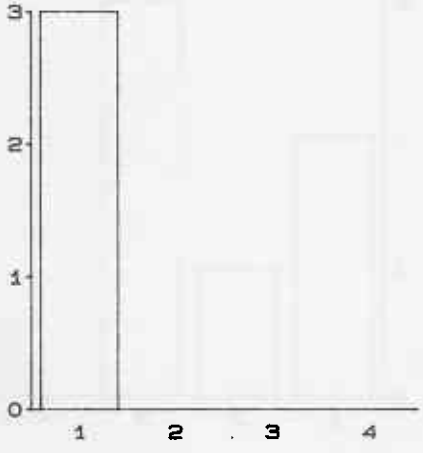
Lawrencia squamata



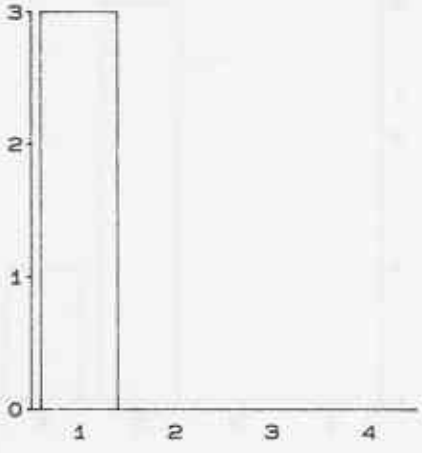
Lepidosperma effusum



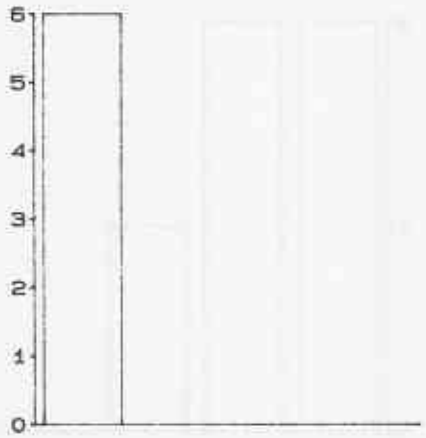
Lepidosperma tenue



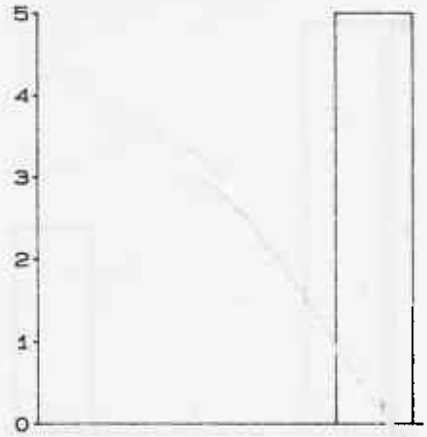
Leptocarpus coangustatus



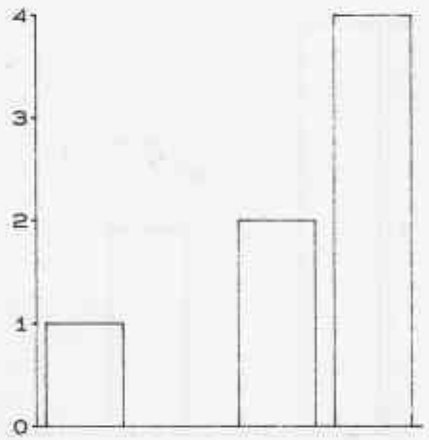
Leptocarpus scariosus



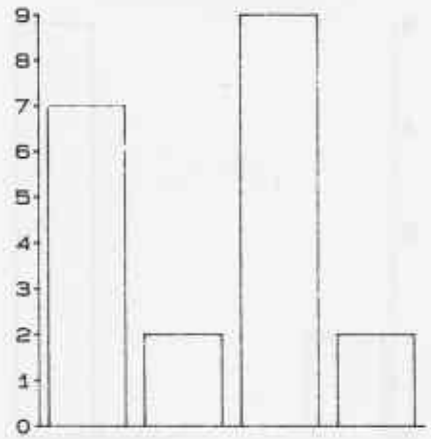
Maireana oppositifolia



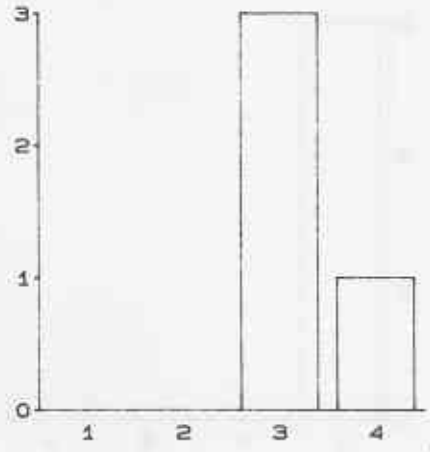
Melaleuca aff acuminata



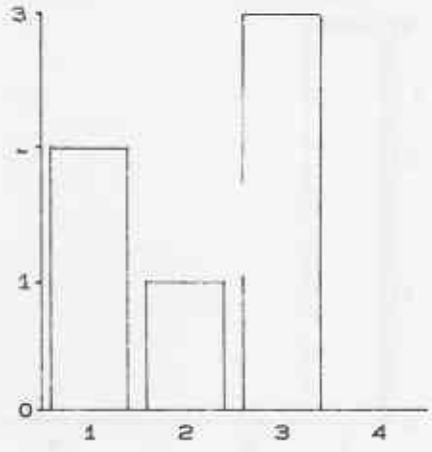
Melaleuca cuticularis



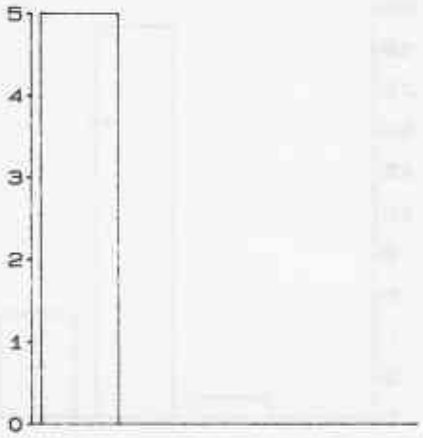
Melaleuca cymbifolia



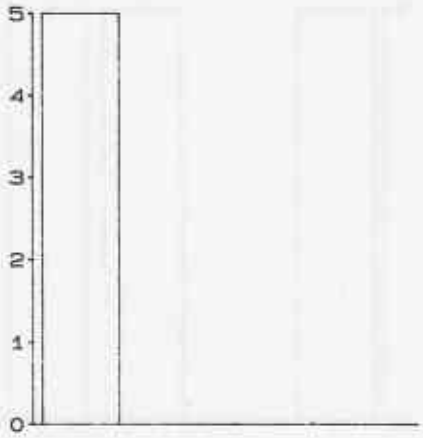
Melaleuca lanceolata



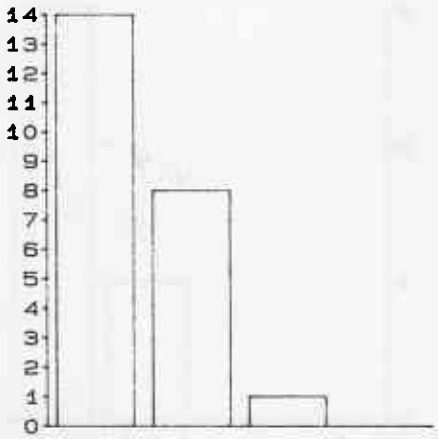
Melaleuca lateritia



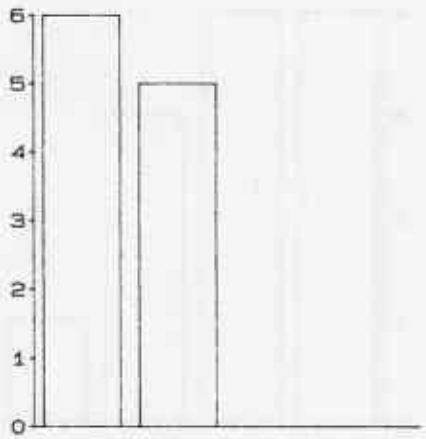
Melaleuca preissiana



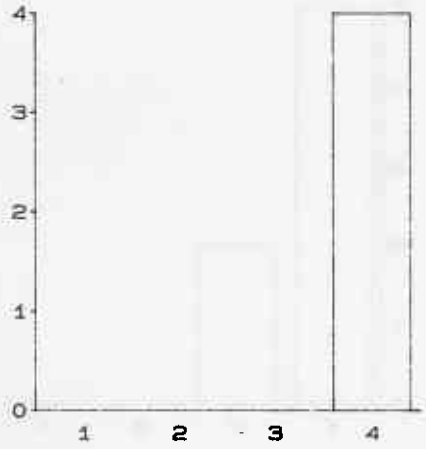
Melaleuca rhaphiophylla



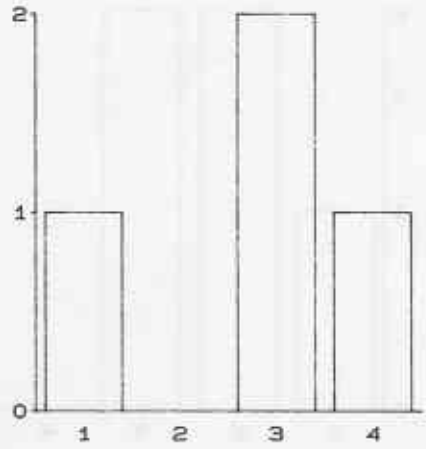
Melaleuca teretifolia



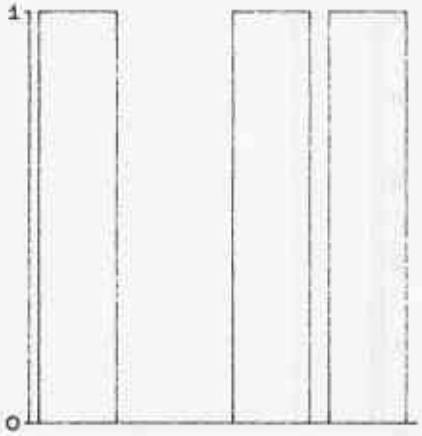
Melaleuca thyoides



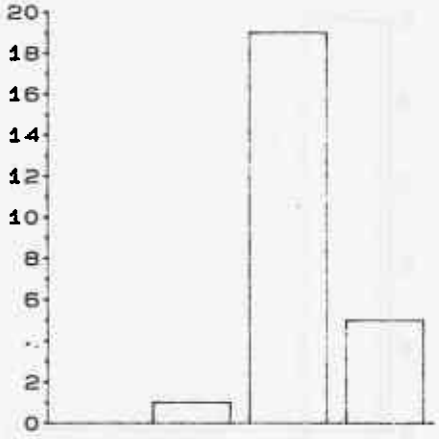
Melaleuca uncinata



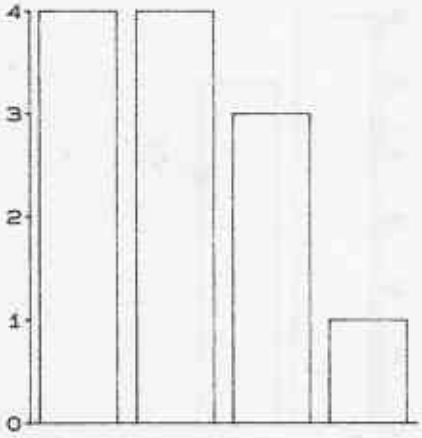
Sarcocornia blackiana



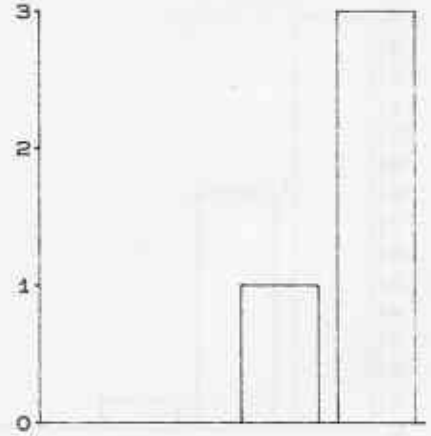
Sarcocornia quinqueflora



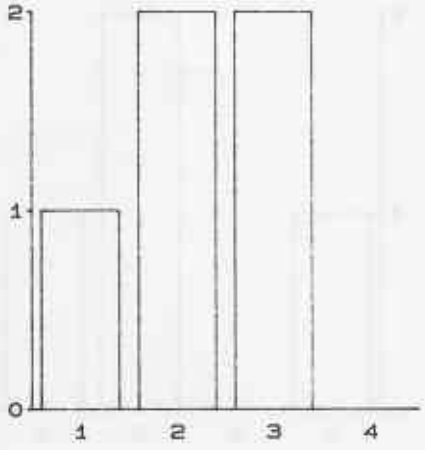
Schoenus brevifolius



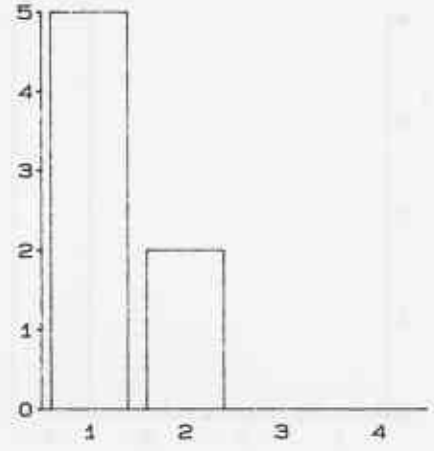
Sclerostegia moniliformis



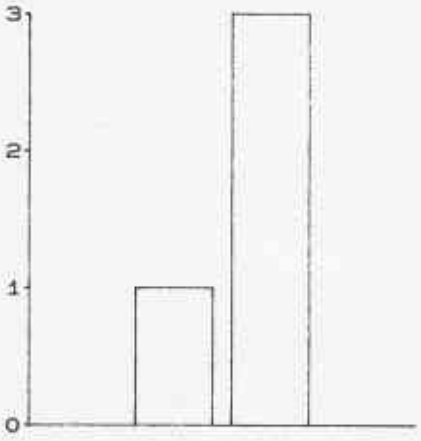
Sporobolus virginicus



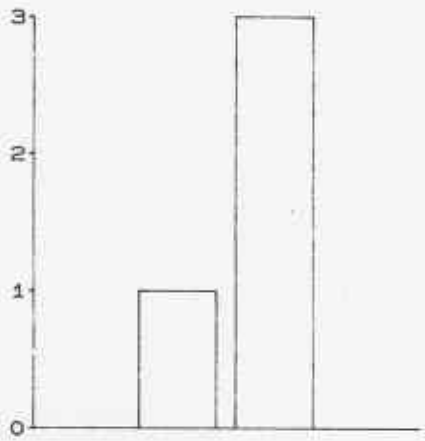
Typha sp.



Wilsonia backhousei



Wilsonia humilis



Appendix 3

Plant species and wetlands in which they were recorded.
Four-letter codes are used for wetland names; the wetlands are in the same order as in Appendix 1.

CODE	SPECIES	ACE	ALB1	ALB2	ALTH	ANDE	ANGO	BAMB	BEVE	BIDD	BOKA	BOYU	BROW	BRYD	BYEN
ACACYC	Acacia cyclops	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACAGLA	Acacia glaucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACARYS	Acacia nyssophylla	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ACASAL	Acacia saligna	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACASP	Acacia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACTCUN	Actinodium cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADEOBO	Adenanthus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGOJUN	Agonis juniperina	0	0	0	0	0	1	0	0	0	0	0	0	0	0
AGOLIN	Agonis linearifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGRAVE	Agrostis avenacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ALYHAK	Alyogyne hakeifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AMPNEE	Amphibromus neesii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANASCA	Anarthria scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANASP	Anarthria sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AOTSP	Aotus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ASTFAS	Astartea fascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ASTSUB	*Aster subulatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATREXI	Atriplex exilifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATRPAB	Atriplex paludosa	0	0	0	1	0	0	0	0	1	0	0	0	0	2
ATRSEM	Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATRSP	Atriplex sp.	1	0	0	0	0	0	0	0	0	0	0	0	0	0
BANLIT	Banksia littoralis	0	1	0	0	0	0	0	0	0	0	0	0	0	0
BAUART	Baumea articulata	0	1	1	0	0	1	1	0	0	0	1	0	0	1
BAUJUN	Baumea juncea	0	0	0	0	0	1	0	0	0	0	0	0	0	0
BAUPR?	Baumea ?preissii	0	0	0	0	0	1	0	0	0	0	0	0	0	0
BAUVAG	Baumea vaginalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BORDEN	Boronia denticulata	0	0	1	0	0	0	0	0	0	0	0	0	0	0
BULCAL	Bolboschoenus caldwellii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CALSP	Calandrinia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CALVER	Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CARSP	#Carpobrotus sp.	1	0	0	0	0	0	0	0	0	0	0	0	1	0
CASGLA	Cassytha glabella	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CASOBE	Casuarina obesa	0	0	0	0	0	0	0	1	0	1	0	1	0	0
CENASI	Centella asiatica	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CENCOR	Centella cordifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHEGLA	*Chenopodium glaucum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHESP	Chenopodium sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CORENO	Chorizandra enodis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COSRUB	Cosmelia rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COTCOR	Cotula coronopifolia	0	0	0	0	0	1	0	0	0	0	0	0	0	0
CRASP	#Crassula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYNDAC	Cynodon dactylon	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPALT	Cyperus alterniflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPCON	*Cyperus congestus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPSP	Cyperaceae sp.	0	0	0	0	1	0	0	0	0	0	0	0	0	0
CYPTE?	*Cyperus ?tenuiflorus	0	0	0	0	0	0	1	0	0	0	0	0	0	0
CYPTEN	*Cyperus tenuiflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPVAG	Cyperus vaginatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAMSP	Dampiera sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DASBRO	Dasypogon bromeliifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAVINC	Daviesia incrassata	0	1	0	0	0	0	0	0	0	0	0	0	0	0
DISCRA	Disphyma crassifolium	0	0	0	0	1	0	0	0	0	1	0	0	0	0
ELEAEN	Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENCTOM	Enchylaena tomentosa	0	0	0	0	0	0	0	0	1	0	0	0	0	0
EPISP	#Epilobium sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ERACUR	*Eragrostis curvula	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCLOX	Eucalyptus loxophleba	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCOCC	Eucalyptus occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	1	0
EUCRUD	Eucalyptus rudis	0	0	0	0	0	0	1	0	0	0	0	0	0	1

CODE	SPECIES	ACE	ALB1	ALB2	ALTH	ANDE	ANGO	BAMB	BEVE	BIDD	BOKA	BOYU	BROW	BRYD	BYEN
EUCSAL	Eucalyptus salmonophloia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCSP	Eucalyptus sp.	1	0	0	0	0	0	0	0	0	0	0	0	0	0
EVAARI	Evandra aristata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRAPA1	Frankenia aff. pauciflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRAPAU	Frankenia pauciflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRASP	Frankenia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHDRU	Gahnia drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHSP1	Gahnia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHTR?	Gahnia ?trifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHTRI	Gahnia trifida	0	0	0	0	1	0	0	0	0	0	0	0	0	1
GASSP	Gastrolobium sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GLYACA	Glycyrrhiza acanthocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GOOVIS	Goodenia viscida	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAICYL	*Hainardia cylindrica	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKPRE	Hakea preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKSP	Hakea sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKSUL	Hakea sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKVAR	Hakea varia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALDOL	Halosarcia doleiformis	0	0	0	0	0	0	0	0	1	0	0	0	0	0
HALFIM	Halosarcia fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALHAL	Halosarcia halocnemoides	1	0	0	0	0	0	0	0	0	0	0	0	0	0
HALINB	Halosarcia indica	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALLEI	Halosarcia leptoclada	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALLEP	Halosarcia lepidosperma	0	0	0	0	0	0	0	0	0	1	0	0	0	0
HALLYL	Halosarcia lylei	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALPER	Halosarcia pergranulata	1	0	0	1	1	0	0	1	1	1	0	0	1	0
HALSP	Halosarcia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALSYN	Halosarcia syncarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAOSP	Haloragis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISONOD	Isolepis nodosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISOPRO	*Isolepis prolifera	0	0	0	0	0	1	0	0	0	0	0	0	0	0
ISOSP	Isolepis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISOSTE	Isolepis stellata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACFUR	Jacksonia furcellata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNCAP	*Juncus capitatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNPAL	Juncus pallidus	0	0	0	0	0	1	0	0	0	0	0	0	0	0
JUNPAU	Juncus pauciflorus	0	0	1	0	0	0	0	0	0	0	0	0	0	0
JUNPLA	Juncus planifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNSP	Juncus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KIPSUA	Kippistia suaedifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KUNER1	Kunzea aff. ericifolia	0	0	0	0	0	1	0	0	0	0	0	0	0	0
KUNERI	Kunzea ericifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAWSQU	Lawrencia squamata	1	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPARI	Leptocarpus aristatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPCOA	Leptocarpus coangustatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPSCA	Leptocarpus scariosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPEFF	Lepidosperma effusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPLE1	Lepidosperma aff. leptostachyum	0	1	0	0	0	0	0	0	0	0	0	0	0	0
LEPLEP	Lepidosperma leptostachyum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPLON	Lepidosperma longitudinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPSP	Lepidosperma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPTE1	Lepidosperma aff. tenue	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPTEN	Lepidosperma tenue	0	0	1	0	0	0	0	0	0	0	0	0	0	0
LOBALA	Lobelia alata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LYCAUS	Lycium australe	0	0	0	1	0	0	0	0	0	0	0	0	0	0
MAIBRE	Maireana brevifolia	0	0	0	1	0	0	0	0	0	0	0	0	0	0
MAIOPP	Maireana oppositifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELAC1	Melaleuca aff. acuminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELCON	Melaleuca conothamnoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CODE	SPECIES	ACE	ALB1	ALB2	ALTH	ANDE	ANGO	BAMB	BEVE	BIDD	BOKA	BOYU	BROW	BRYD	BYEN
MELCUT	Melaleuca cuticularis	0	1	1	0	1	0	0	0	0	0	1	0	0	0
MELCY2	Melaleuca cymbifolia s. l.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELCYM	Melaleuca halmaturorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELGLA	Melaleuca glaberrima	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELHA1	Melaleuca aff. hamulosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELLAF	Melaleuca lateriflora	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MELLAN	Melaleuca lanceolata	0	0	0	0	0	0	0	0	1	0	0	0	0	0
MELLAT	Melaleuca lateritia	0	0	0	0	0	0	J	0	0	0	0	0	0	0
MELPR?	Melaleuca ?preissiana	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MELPRE	Melaleuca preissiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELRH1	Melaleuca aff. rhaphiophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELRHA	Melaleuca rhaphiophylla	0	0	0	0	0	0	1	0	0	0	0	0	0	1
MELSP	Melaleuca sp.	1	0	0	1	0	0	0	0	0	0	0	1	1	0
MELSTR	Melaleuca strobophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELTER	Melaleuca teretifolia	0	0	0	0	0	0	1	0	0	0	0	0	0	0
MELTHM	Melaleuca thymoides	0	0	0	0	0	1	0	0	0	0	0	0	0	0
MELTHY	Melaleuca thyoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELUNC	Melaleuca uncinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELVI1	Melaleuca aff. viminea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MESNOD	*Mesembryanthemum nodiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MORFLO	Morgania floribunda	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUESP	Muehlenbeckia sp.	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MYRTIL	Myriophyllum tillaeoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PASDIS	*Paspalum distichum	0	0	0	0	0	0	1	0	0	0	0	0	0	0
PIMIMB	Pimelea imbricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REGCIL	Regelia ciliata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RESLEP	Restio leptocarpoides	0	1	0	0	0	0	0	0	0	0	0	0	0	0
RESSP1	Restio sp.	0	0	1	0	0	0	0	0	0	0	1	0	0	0
RHASP	Rhagodia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAMREP	Samolus repens	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SARBLA	Sarcocornia blackiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SARQUI	Sarcocornia quinqueflora	1	0	0	1	1	0	0	1	0	1	0	1	0	0
SCHBRE	Schoenus brevifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	1
SCHFA1	Schoenus subfascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SCHSP	Schoenus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SCLMON	Sclerostegia moniliformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPERUB	*Spergularia rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPHSP	Sphenotoma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIVIR	Sporobolus virginicus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STISP	Stipa sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STYSCA	Stylidium scandens	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUAAUS	Suaeda australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TECVER	Tecticornia verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	1	0
TEGUNI	Tegicornia uniflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TETOCT	Tetraria octandra	0	1	0	0	0	0	0	0	0	0	0	0	0	0
THRDIF	Threlkeldia diffusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
THYSP	Thysanotus sp.	0	1	0	0	0	0	0	0	0	0	0	0	0	0
TRIPRO	Triglochin procera	0	0	0	0	0	1	0	0	0	0	0	0	0	0
TYPOR?	*Typha ?orientalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPORI	*Typha orientalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPSP	#Typha sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VILPA1	Villarsia aff. parnassifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VILPAR	Villarsia parnassifolia	0	1	0	0	0	0	0	0	0	0	0	0	0	0
VILSP	Villarsia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIMJUN	Viminaria juncea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WILBAC	Wilsonia backhousei	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WILHUM	Wilsonia humilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WILROT	Wilsonia rotundifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XANROT	Xanthosia rotundifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CODE	CAIR	CAME	CAMP	CAPA	CASU	CHAN	CHIT	COBL	COOM	COYR	CRA1	CRA2	CRA3	CRAN	CRON	DOBA	DULB	DUMB	DUND	EGAN
ACACYC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACAGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACARYS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACASAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACTCUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADEOBO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGOJUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGOLIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGRAVE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ALYHAK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AMPNEE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
ANASCA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANASP	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
AOTSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ASTFAS	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
ASTSUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATREXI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATRPAB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATRSEM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
ATRSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BANLIT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAUART	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
BAUJUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAUPR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAUVAG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BORDEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BULCAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CALSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CALVER	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CARSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CASGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CASOBE	0	0	0	1	1	0	0	1	1	1	0	0	0	0	0	0	1	1	0	1
CENASI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CENCOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHEGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHESP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
CORENO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
COSRUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COTCOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRASP	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
CYNDAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPALT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPCON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPSP	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
CYPTE?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPTEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPVAG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
DAMSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DASBRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAVINC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DISCRA	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ELEAEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
ENCTOM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
EPISP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
ERACUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCLOX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCOCC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCRUD	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1

CODE	CAIR	CAME	CAMP	CAPA	CASU	CHAN	CHIT	COBL	COOM	COYR	CRA1	CRA2	CRA3	CRAN	CRON	DOBA	DULB	DUMB	DUND	EGAN
EUCSAL	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCSP	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
EVAARI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRAPA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
FRAPAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRASP	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHDRU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHSP1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHTR?	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
GAHTRI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GASSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GLYACA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
GOOVIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
HAICYL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKPRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKSP	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKSUL	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
HAKVAR	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
HALDOL	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
HALFIM	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALHAL	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALINB	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALLEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALLEP	0	0	1	0	1	0	0	1	1	1	0	0	0	1	0	0	1	0	0	0
HALLYL	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
HALPER	0	0	1	0	0	0	0	1	1	1	0	0	0	1	0	0	1	1	0	1
HALSP	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALSYN	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
HAOSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISONOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISOPRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISOSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISOSTE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACFUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNCAP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNPAL	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
JUNPAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNPLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KIPSUA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KUNER1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KUNERI	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAWSQU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPARI	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
LEPCOA	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
LEPEFF	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
LEPLE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPLEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPLON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPSCA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPSP	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
LEPTE1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
LEPTEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LOBALA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LYCAUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIBRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIOPP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELAC1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELCON	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CODE	CAIR	CAME	CAMP	CAPA	CASU	CHAN	CHIT	COBL	COOM	COYR	CRA1	CRA2	CRA3	CRAN	CRON	DOBA	DULB	DUMB	DUND	EGAN
MELCUT	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
MELCY2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELCYM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELHA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
MELLAF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELLAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
MELLAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
MELPR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELPRE	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
MELRH1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELRHA	0	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0
MELSP	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	1	1
MELSTR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELTER	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0
MELTHM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELTHY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELUNC	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELVI1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MESNOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MORFLO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
MUESP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MYRTIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PASDIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PIMIMB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REGCIL	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
RESLEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RESSP1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RHASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAMREP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SARBLA	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SARQUI	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0
SCHBRE	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
SCHFA1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SCHSP	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
SCLMON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPERUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPHSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIVIR	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STISP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STYSCA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUAAUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TECVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TEGUNI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TETOCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
THRDIF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
THYSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRIPRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPOR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPORI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VILPA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VILPAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VILSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIMJUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WILBAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WILHUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WILROT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XANROT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CODE	ENEM	ESP1	ESP2	ESP3	ESP4	FLAG	FORR	GARD	GING	GNO1	GNO2	GORE	GOUN	GUND	GURA	HARV	HIND	JAND	JERD	JOON
ACACYC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACAGLA	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACARYS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACASAL	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ACASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACTCUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADEOBO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGOJUN	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
AGOLIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGRAVE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
ALYHAK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AMPNEE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANASCA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AOTSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ASTFAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
ASTSUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATREXI	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
ATRPAB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATRSEM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATRSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BANLIT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAUART	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	1
BAUJUN	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
BAUPR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAUVAG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BORDEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BULCAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CALSP	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CALVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CARSP	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0
CASGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CASOBE	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
CENASI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
CENCOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHEGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHESP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CORENO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COSRUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COTCOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYNDAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPALT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPCON	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
CYPTE?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPTEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPVAG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAMSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DASBRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAVINC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DISCRA	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ELEAEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENCTOM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EPISP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ERACUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCLOX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCOCC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCRUD	1	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0

CODE	ENEM	ESP1	ESP2	ESP3	ESP4	FLAG	FORR	GARD	GING	GNO1	GNO2	GORE	GOUN	GUND	GURA	HARV	HIND	JAND	JERD	JOON
EUCSAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EVAARI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRAPA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRAPAU	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRASP	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHDRU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHSP1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHTR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHTRI	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
GASSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GLYACA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GOOVIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAICYL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKPRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKSP	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
HAKSUL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKVAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALDOL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALFIM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALHAL	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALINB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
HALLEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALLEP	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0
HALLYL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALPER	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0
HALSP	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALSYN	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAOSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISONOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
ISOPRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISOSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISOSTE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
JACFUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNCAP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNPAL	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNPAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNPLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KIPSUA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KUNER1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KUNERI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAWSQU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPARI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPCOA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPEFF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPLE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPLEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPLON	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
LEPSCA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
LEPSP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
LEPTE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPTEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LOBALA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LYCAUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIBRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIOPP	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELAC1	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
MELCON	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CODE	ENEM	ESP1	ESP2	ESP3	ESP4	FLAG	FORR	GARD	GING	GNO1	GNO2	GORE	GOUN	GUND	GURA	HARV	HIND	JAND	JERD	JOON
MELCUT	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
MELCY2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELCYM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELGLA	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELHA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELLAF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELLAN	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
MELLAT	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
MELPR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELPRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELRH1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
MELRHA	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
MELSP	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
MELSTR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELTER	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
MELTHM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELTHY	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
MELUNC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELVI1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MESNOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MORFLO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUESP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MYRTIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
PASDIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PIMIMB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REGCIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RESLEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RESSP1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
RHASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAMREP	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
SARBLA	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SARQUI	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0
SCHBRE	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
SCHFA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
SCHSP	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
SCLMON	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPERUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPHSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIVIR	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
STISP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STYSCA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUAAUS	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
TECVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TEGUNI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TETOCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
THRDIF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
THYSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRIPRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPOR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPORI	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
VILPA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VILPAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VILSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
VIMJUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WILBAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
WILHUM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WILROT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XANROT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CODE	KENT	KOND	KWOB	KWOR	LITT	LOGU	MART	MEAR	METT	MIRI	MOAT	MOLL	MTMA	MUIR	MUNG	MURA	NAMB	NINA	NINE	NONA
ACACYC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
ACAGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACARYS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACASAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACTCUN	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
ADEOBO	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
AGOJUN	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
AGOLIN	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
AGRAVE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ALYHAK	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AMPNEE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANASCA	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
ANASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AOTSP	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
ASTFAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
ASTSUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATREXI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATRPAB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATRSEM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATRSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BANLIT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAUART	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0
BAUJUN	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
BAUPR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAUVAG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BORDEN	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
BULCAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CALSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CALVER	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
CARSP	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CASGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CASOBE	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	1	0	1
CENASI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CENCOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHEGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHESP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CORENO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COSRUB	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
COTCOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYNDAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPALT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPCON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPSP	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
CYPTE?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
CYPTEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPVAG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAMSP	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
DASBRO	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
DAVINC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DISCRA	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ELEAEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENCTOM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EPISP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ERACUR	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCLOX	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
EUCOCC	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
EUCRUD	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0

CODE	KENT	KOND	KWOB	KWOR	LITT	LOGU	MART	MEAR	METT	MIRI	MOAT	MOLL	MTMA	MUIR	MUNG	MURA	NAMB	NINA	NINE	NONA
EUCSAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCSP	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
EVAARI	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
FRAPA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRAPAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRASP	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
GAHDRU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHSP1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHTR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHTRI	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GASSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GLYACA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GOOVIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAICYL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKPRE	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
HAKSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKSUL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKVAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALDOL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALFIM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALHAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALINB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
HALLEI	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
HALLEP	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0
HALLYL	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
HALPER	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1
HALSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALSYN	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
HAOSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISONOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISOPRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISOSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISOSTE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACFUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNCAP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNPAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNPAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNPLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KIPSUA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KUNER1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KUNERI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
LAWSQU	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPARI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPCOA	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
LEPEFF	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
LEPLE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPLEP	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
LEPLON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPSCA	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
LEPSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
LEPTE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPTEN	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
LOBALA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LYCAUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIBRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIOPP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELAC1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MELCON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CODE	KENT	KOND	KWOB	KWOR	LITT	LOGU	MART	MEAR	METT	MIRI	MOAT	MOLL	MTMA	MUIR	MUNG	MURA	NAMB	NINA	NINE	NONA
MELCUT	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
MELCY2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
MELCYM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
MELGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELHA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELLAF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELLAN	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELLAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELPR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELPRE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MELRH1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELRHA	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	0	1	0
MELSP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELSTR	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
MELTER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
MELTHM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
MELTHY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELUNC	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELVI1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
MESNOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
MORFLO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUESP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MYRTIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PASDIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PIMIMB	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
REGCIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RESLEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RESSP1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RHASP	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
SAMREP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SARBLA	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SARQUI	0	0	1	1	1	0	1	0	0	0	0	0	0	1	0	1	0	1	0	1
SCHBRE	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SCHFA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SCHSP	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
SCLMON	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
SPERUB	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
SPHSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIVIR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STISP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STYSCA	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
SUAAUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TECVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TEGUNI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TETOCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
THRDIF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
THYSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRIPRO	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
TYPOR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPORI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
VILPA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VILPAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VILSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIMJUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WILBAC	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
WILHUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WILROT	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XANROT	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

CODE	NOON	PALL	PARK	PINJ	PLAN	PLEA	POOR	POWE	SHAR	SHAS	STAT	TAAR	THOM	TOOL	TORD	TOWE	UNIC	VARL	WAGI	WALB
ACACYC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACAGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACARYS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACASAL	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
ACASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACTCUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADEOBO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGOJUN	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
AGOLIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AGRAVE	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ALYHAK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AMPNEE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANASCA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AOTSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ASTFAS	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ASTSUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATREXI	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
ATRPAB	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
ATRSEM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATRSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BANLIT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAUART	0	0	0	0	0	1	1	0	1	0	0	0	1	0	1	1	1	0	0	0
BAUJUN	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
BAUPR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAUVAG	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
BORDEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BULCAL	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
CALSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CALVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CARSP	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
CASGLA	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CASOBE	1	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1
CENASI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CENCOR	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
CHEGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHESP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CORENO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COSRUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COTCOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRASP	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
CYNDAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPALT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPCON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPSP	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
CYPTE?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPTEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CYPVAG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAMSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DASBRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAVINC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DISCRA	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
ELEAEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENCTOM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EPISP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ERACUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCLOX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCOCC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCRUD	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0

CODE	NOON	PALL	PARK	PINJ	PLAN	PLEA	POOR	POWE	SHAR	SHAS	STAT	TAAR	THOM	TOOL	TORD	TOWE	UNIC	VARL	WAGI	WALB
EUCSAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EUCSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EVAARI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRAPA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRAPAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHDRU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHSP1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHTR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAHTRI	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
GASSP	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
GLYACA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GOOVIS	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
HAICYL	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
HAKPRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKSUL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAKVAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALDOL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALFIM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALHAL	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
HALINB	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
HALLEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALLEP	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
HALLYL	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALPER	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1	1	1
HALSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HALSYN	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0
HAOSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISONOD	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ISOPRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ISOSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
ISOSTE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACFUR	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
JUNCAP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNPAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
JUNPAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUNPLA	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
JUNSP	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
KIPSUA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
KUNER1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KUNERI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
LAWSQU	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPARI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPCOA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPEFF	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
LEPLE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPLEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPLON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPSCA	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
LEPSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPTE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEPTEN	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LOBALA	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
LYCAUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIBRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIOPP	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
MELAC1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELCON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CODE	NOON	PALL	PARK	PINJ	PLAN	PLEA	POOR	POWE	SHAR	SHAS	STAT	TAAR	THOM	TOOL	TORD	TOWE	UNIC	VARL	WAGI	WALB
MELCUT	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	1	0	0	0
MELCY2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELCYM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELGLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELHA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELLAF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELLAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELLAT	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MELPR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELPRE	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
MELRH1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELRHA	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
MELSP	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	1	1
MELSTR	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
MELTER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELTHM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELTHY	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELUNC	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MELVI1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MESNOD	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MORFLO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUESP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MYRTIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PASDIS	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
PIMIMB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REGCIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RESLEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RESSP1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
RHASP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAMREP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SARBLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SARQUI	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
SCHBRE	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0
SCHFA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SCHSP	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0
SCLMON	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
SPERUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPHSP	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIVIR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STISP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
STYSCA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUAAUS	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
TECVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TEGUNI	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TETOCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
THRDIF	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
THYSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRIPRO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPOR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPORI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPSP	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0
VILPA1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VILPAR	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VILSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIMJUN	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
WILBAC	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
WILHUM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0
WILROT	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
XANROT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CODE	WALL	WALY	WANN	WAR1	WAR2	WHI1	WHI2	WILD	YAAL	YARN	YARR	YURI	TOTAL
ACACYC	0	0	0	0	0	0	0	0	0	0	0	0	1
ACAGLA	0	0	0	0	0	0	0	0	0	0	0	0	1
ACARYS	0	0	0	0	0	0	0	0	0	0	0	0	1
ACASAL	0	0	0	0	0	0	0	0	0	0	0	0	2
ACASP	0	0	0	1	0	0	0	0	0	0	0	0	1
ACTCUN	0	0	0	0	0	0	0	0	0	0	0	0	1
ADEOBO	0	0	0	0	0	0	0	0	0	0	0	0	1
AGOJUN	0	0	0	0	0	0	0	0	0	0	0	0	4
AGOLIN	0	0	0	0	0	0	0	0	0	0	0	0	1
AGRAVE	0	0	0	0	0	0	0	0	0	0	0	0	2
ALYHAK	0	0	0	0	0	0	0	0	0	0	0	0	1
AMPNEE	0	0	0	0	0	0	0	0	0	0	0	0	1
ANASCA	0	0	0	0	0	0	0	0	0	0	0	0	1
ANASP	0	0	0	0	0	0	0	0	0	0	0	0	3
AOTSP	0	0	0	0	0	0	0	0	0	0	0	0	1
ASTFAS	0	0	0	0	0	0	0	0	0	0	0	0	6
ASTSUB	0	0	0	0	0	0	0	0	0	0	0	1	1
ATREXI	0	0	0	0	0	0	0	0	0	0	0	0	3
ATRPAB	0	0	0	0	0	0	0	0	0	0	0	0	4
ATRSEM	0	0	0	0	0	0	0	0	0	0	0	0	2
ATRSP	0	0	0	0	0	0	0	0	0	0	0	0	1
BANLIT	0	0	0	0	0	0	0	0	0	0	0	0	1
BAUART	0	0	1	0	0	1	0	0	0	1	0	0	25
BAUJUN	0	0	0	0	0	0	0	0	0	0	0	0	5
BAUPR?	0	0	0	0	0	0	0	0	0	0	0	0	1
BAUVAG	0	0	0	0	0	0	0	0	0	0	0	0	1
BORDEN	0	0	0	0	0	0	0	0	0	0	0	0	2
BULCAL	0	0	0	0	0	0	0	0	0	0	0	0	1
CALSP	0	0	0	0	0	0	0	0	0	0	0	0	1
CALVER	0	0	0	0	0	0	0	0	0	0	0	0	1
CARSP	0	0	0	0	0	0	0	0	0	0	0	0	12
CASGLA	0	0	0	0	0	0	0	0	0	0	0	0	1
CASOBE	0	1	1	0	1	0	1	0	0	0	1	0	31
CENASI	0	0	0	0	0	0	0	0	0	0	0	0	1
CENCOR	0	0	0	0	0	0	0	0	0	0	0	0	1
CHEGLA	0	0	0	1	0	0	0	0	0	0	0	0	1
CHESP	0	0	0	0	0	0	0	0	0	0	0	0	1
CORENO	0	0	0	0	0	0	0	0	0	0	0	0	1
COSRUB	0	0	0	0	0	0	0	0	0	0	0	0	1
COTCOR	0	0	0	0	0	0	0	0	0	0	0	0	1
CRASP	0	0	0	0	0	0	0	0	0	0	0	0	3
CYNDAC	0	0	0	0	0	0	0	0	0	0	0	1	1
CYPALT	0	0	0	0	0	0	0	0	0	0	0	1	1
CYPCON	0	0	0	0	0	0	0	0	0	0	0	0	1
CYPSP	0	0	0	0	0	0	0	0	0	0	0	0	8
CYPTE?	0	0	0	0	0	0	0	0	0	0	0	0	2
CYPTEN	0	0	0	0	0	0	0	0	0	0	0	1	1
CYPVAG	0	0	0	0	0	0	0	0	0	0	0	0	1
DAMSP	0	0	0	0	0	0	0	0	0	0	0	0	1
DASBRO	0	0	0	0	0	0	0	0	0	0	0	0	1
DAVINC	0	0	0	0	0	1	0	0	0	0	0	0	2
DISCRA	0	0	0	0	0	0	0	0	0	0	0	0	6
ELEAEN	0	0	0	0	0	0	0	0	0	0	0	0	1
ENCTOM	0	0	0	0	0	0	0	0	0	0	0	0	2
EPISP	0	0	0	0	0	0	0	0	0	0	0	0	1
ERACUR	0	0	0	0	0	0	0	0	0	0	0	0	1
EUCLOX	0	0	0	0	0	0	0	0	0	0	0	0	1
EUCOCC	0	0	0	0	0	0	0	0	1	0	0	0	4
EUCRUD	1	0	1	0	1	0	0	1	0	1	0	1	22

CODE	WALL	WALY	WANN	WAR1	WAR2	WHI1	WHI2	WILD	YAAL	YARN	YARR	YURI	TOTAL
EUCSAL	0	0	0	0	0	0	0	0	0	0	0	0	1
EUCSP	0	0	0	0	0	0	0	0	0	0	0	0	6
EVAARI	0	0	0	0	0	0	0	0	0	0	0	0	1
FRAPA1	0	0	0	0	0	0	0	0	0	0	0	0	1
FRAPAU	0	0	0	0	0	0	0	0	0	0	0	0	2
FRASP	0	0	0	0	0	0	0	0	0	0	0	0	3
GAHDRU	0	0	0	0	0	0	0	0	0	1	0	0	1
GAHSP1	0	0	0	0	0	0	0	0	0	0	0	0	4
GAHTR?	0	0	0	0	0	0	0	0	0	0	0	0	1
GAHTRI	0	0	0	0	0	0	0	0	0	0	0	0	7
GASSP	0	0	0	0	0	0	0	0	0	0	0	0	1
GLYACA	0	0	0	0	0	0	0	0	0	0	0	0	1
GOOVIS	0	0	0	0	0	0	0	0	0	0	0	0	2
HAICYL	0	0	0	0	0	0	0	0	0	0	0	0	1
HAKPRE	0	0	0	0	0	0	0	0	0	0	0	0	1
HAKSP	0	0	0	0	0	0	0	0	0	0	0	0	2
HAKSUL	0	0	0	0	0	0	0	0	0	0	0	0	1
HAKVAR	0	0	0	0	0	0	0	0	0	0	0	0	1
HALDOL	0	0	0	0	0	0	0	0	0	0	0	0	2
HALFIM	0	0	0	0	0	0	0	0	0	0	0	0	1
HALHAL	0	0	0	0	0	0	0	0	0	0	1	0	10
HALINB	0	0	1	0	0	0	0	0	0	0	1	0	8
HALLEI	0	0	0	0	0	0	0	0	0	0	0	0	1
HALLEP	0	0	0	1	0	0	0	1	0	0	0	0	23
HALLYL	0	0	0	0	0	0	0	0	0	0	0	0	3
HALPER	0	1	0	1	0	0	1	0	0	0	1	0	38
HALSP	0	0	0	0	0	0	0	0	0	0	0	0	2
HALSYN	0	0	0	0	0	0	1	0	0	0	0	0	13
HAOSP	0	0	0	0	0	0	0	0	0	1	0	0	1
ISONOD	0	0	0	1	0	0	0	0	0	0	0	0	3
ISOPRO	0	0	0	0	0	0	0	0	0	0	0	0	1
ISOSP	0	0	0	0	0	0	0	0	0	0	0	0	1
ISOSTE	0	0	0	0	0	0	0	0	0	0	0	0	1
JACFUR	0	0	0	0	0	0	0	0	0	0	0	0	1
JUNCAP	0	0	0	0	0	0	0	0	1	0	0	0	1
JUNPAL	0	0	0	0	0	0	0	0	0	0	0	0	5
JUNPAU	0	0	0	0	0	0	0	0	0	0	0	0	1
JUNPLA	0	0	0	0	0	0	0	0	0	0	0	0	1
JUNSP	0	0	0	1	1	0	0	0	0	0	0	0	4
KIPSUA	0	0	0	0	0	0	0	0	0	0	0	0	1
KUNER1	0	0	0	0	0	0	0	0	0	0	0	0	1
KUNERI	0	0	0	0	0	0	0	0	0	0	0	0	2
LAWSQU	0	0	0	0	0	0	0	0	0	0	0	0	5
LEPARI	0	0	0	0	0	0	0	0	0	0	0	0	1
LEPCOA	0	0	0	0	0	0	0	0	0	0	0	0	3
LEPEFF	0	0	0	0	0	0	0	0	0	0	0	0	3
LEPLE1	0	0	0	0	0	1	0	0	0	0	0	0	2
LEPLEP	0	0	0	0	0	0	0	0	0	0	0	0	1
LEPLON	0	0	0	0	0	0	0	0	0	0	0	0	1
LEPSCA	0	0	0	0	0	0	0	0	0	0	0	0	6
LEPSP	0	0	0	0	0	0	0	0	0	0	0	0	6
LEPTE1	0	0	0	0	0	0	0	0	0	0	0	0	1
LEPTEN	0	0	0	0	0	0	0	0	0	0	0	0	3
LOBALA	0	0	0	0	0	0	0	0	0	0	0	0	1
LYCAUS	0	0	0	0	0	0	0	0	0	0	0	0	1
MAIBRE	0	0	0	0	0	0	0	0	0	0	0	0	1
MAIOPP	0	0	0	0	0	0	0	0	0	0	0	0	5
MELAC1	0	0	0	0	0	0	0	0	1	0	0	0	7
MELCON	0	0	0	0	0	0	0	0	0	0	0	0	1

CODE	WALL	WALY	WANN	WAR1	WAR2	WHI1	WHI2	WILD	YAAL	YARN	YARR	YURI	TOTAL
MELCUT	0	0	0	1	0	1	0	0	0	0	0	0	20
MELCY2	0	0	0	0	0	0	1	0	0	0	0	0	3
MELCYM	0	0	0	0	0	0	0	0	0	0	0	0	4
MELGLA	0	0	0	0	0	0	0	0	0	0	0	0	1
MELHA1	0	0	0	0	0	0	0	0	0	0	0	0	1
MELLAF	0	0	0	0	0	0	0	0	0	0	0	0	1
MELLAN	0	0	0	0	0	0	0	0	1	0	0	0	5
MELLAT	0	0	0	0	0	0	0	0	0	1	0	0	5
MELPR?	0	0	0	0	0	0	0	0	0	0	0	0	1
MELPRE	0	0	0	0	0	0	0	0	0	0	0	0	6
MELRH1	0	0	0	0	0	0	0	0	0	0	0	0	1
MELRHA	1	0	1	0	0	0	0	1	0	1	0	1	23
MELSP	0	0	0	0	1	0	1	0	0	0	0	0	26
MELSTR	0	0	0	0	0	0	0	0	0	0	0	0	1
MELTER	1	0	1	0	0	0	0	0	0	0	0	0	11
MELTHM	0	0	0	0	0	0	0	0	0	0	0	0	2
MELTHY	0	0	0	0	0	0	0	0	0	0	0	0	4
MELUNC	0	0	0	0	0	0	0	0	0	0	0	0	4
MELVI1	0	0	0	0	0	0	0	1	0	0	0	0	2
MESNOD	0	0	0	0	0	0	0	0	0	0	0	0	2
MORFLO	0	0	0	0	0	0	0	0	0	0	0	0	1
MUESP	0	0	0	0	0	0	0	0	0	0	0	0	2
MYRTIL	0	0	0	0	0	0	0	0	0	0	0	0	1
PASDIS	0	0	0	0	0	0	0	0	0	0	0	0	2
PIMIMB	0	0	0	0	0	0	0	0	0	0	0	0	1
REGCIL	0	0	0	0	0	0	0	0	0	0	0	0	2
RESLEP	0	0	0	0	0	1	0	0	0	0	0	0	2
RESSP1	0	0	0	0	0	0	0	0	0	0	0	0	7
RHASP	0	0	0	0	0	0	0	0	0	0	0	0	1
SAMREP	0	0	0	0	0	0	0	0	0	0	0	0	1
SARBLA	0	0	0	0	0	0	0	0	0	0	0	0	3
SARQUI	0	0	0	1	0	0	0	0	0	0	0	0	27
SCHBRE	0	0	0	1	0	0	0	1	0	1	0	0	12
SCHFA1	0	0	0	0	0	0	0	0	0	0	0	0	1
SCHSP	0	0	0	0	0	0	0	0	0	0	0	0	9
SCLMON	0	0	0	0	0	0	0	0	0	0	0	0	4
SPERUB	0	0	0	0	0	0	0	0	0	0	0	0	1
SPHSP	0	0	0	0	0	0	0	0	0	0	0	0	1
SPIVIR	0	0	1	0	1	0	0	0	0	0	0	0	5
STISP	0	0	0	0	0	0	0	0	0	0	0	0	2
STYSCA	0	0	0	0	0	0	0	0	0	0	0	0	1
SUAAUS	0	0	0	0	0	0	0	0	0	0	0	0	2
TECVER	0	0	0	0	0	0	0	0	0	0	0	0	1
TEGUNI	0	0	0	0	0	0	0	0	0	0	0	0	1
TETOCT	0	0	0	0	0	0	0	0	0	0	0	0	1
THRDIF	0	0	0	0	0	0	0	0	0	0	0	0	1
THYSP	0	0	0	0	0	0	0	0	0	0	0	0	1
TRIPRO	0	0	0	0	0	0	0	0	0	0	0	0	2
TYPOR?	0	0	1	0	0	0	0	0	0	0	0	0	1
TYPORI	0	0	0	0	0	0	0	0	0	0	0	0	1
TYPSP	0	0	0	0	0	0	0	0	0	0	0	0	5
VILPA1	0	0	0	0	0	1	0	0	0	0	0	0	1
VILPAR	0	0	0	0	0	0	1	0	0	0	0	0	3
VILSP	0	0	0	0	0	0	0	0	0	0	0	0	1
VIMJUN	0	0	0	0	0	0	0	0	0	0	0	0	2
WILBAC	0	0	0	0	0	0	0	0	0	0	0	0	4
WILHUM	0	0	0	0	0	0	0	0	0	0	0	0	4
WILROT	0	0	0	0	0	0	0	0	0	0	0	0	2
XANROT	0	0	0	0	0	0	0	0	0	0	0	0	1

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