

MANNING LAKE AND ADJACENT BUSHLAND, HAMILTON HILL/SPEARWOOD

Boundary Definition: protected area boundary

SECTION 1: LOCATION INFORMATION

Bush Forever Site no. 247

Area (ha): bushland 50.6 (Site also includes open water.)

Map no. 51, 57, 58

Map sheet series ref. no. 2033-I NW

Other Names: Part Submission Area 336, part of Beeliar Regional Park

Local Authorities (Suburb): City of Cockburn (Spearwood, Hamilton Hill)

System 6 (1983): Part M92 area of bushland goes beyond System area boundaries, all bushland described

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Lagoonal and Estuarine Deposits (within the Spearwood Dunes)

Lagoonal and Estuarine Deposits (Vasse) (Qhg: Sm2)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*17 *Melaleuca raphiophylla* — *Gahnia trifida* seasonal wetlands (effectively most northern occurrence)

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands

WETLANDS

Wetland Types: lake

Natural Wetland Groups

Spearwood Dunes

Coogee (S.3)

Wetland Management Objectives: Conservation (10.8ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: 10.1ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands, limestone ridge

Vegetation and Flora: limited survey (DEP 1999, EPA AND WAWA 1990, Keighery, BJ, 1996a, Semeniuk, V&C Research Group 1997a, Weston 1993)

Structural Units: mapping (EPA AND WAWA 1990, Semeniuk, V&C Research Group 1997a)

Uplands — Tamala Limestone: *Acacia rostellifera* Closed Scrub; *Melaleuca huegelii* Shrubland; Closed Heaths dominated by *Dryandra sessilis* var. *cygnorum* or *Melaleuca systema*; Mixed Low Shrubland; *Alyogyne huegelii* var. *glabrescens* Shrubland

Wetlands: *Melaleuca raphiophylla* Low Open Forest; *Acacia saligna* Low Open Forest to Low Woodland; Halophyte Low Shrubland, Closed Sedgeland to Sedgeland dominated by *Gahnia trifida*, *Scirpus* sp. or *Juncus kraussii*

Scattered Native Plants: *Eucalyptus decipiens* Tree Mallee; *Eucalyptus gomphocephala* Open Woodland — regionally significant vegetation recognised as being included in the area of Site in need of protection

Vegetation Condition: >50% Good, <50% Degraded, with areas of severe localised disturbance (Weston 1993)

Total Flora: 36 native taxa, 17 weed taxa (Keighery, BJ, 1996a, Semeniuk, V&C Research Group 1997a) (estimated <50% expected flora)

Significant Flora: *Alyogyne huegelii* var. *glabrescens* (one of few populations in the PMR, most southern except for outlying populations in Yalgorup National Park); typical Tamala Limestone taxa — *Melaleuca huegelii*, *Grevillea preissii*, *Pimelea calcicola*

Fauna: limited survey for birds (29 species) (RAOU 1996 D, 1 visit). Significant birds species: category 1 (1) and category 3 (3)

Linkage: adjacent bushland, native vegetation on the south and west; part of a regionally significant potential bushland/wetland linkage (Part A, Map 7)

Other Special Attributes: included in Beeliar Regional Park Proposal (DPUD 1992a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Entered in the Interim List of the Register of the National Estate; subject to protection under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, General criteria for the protection of wetland, streamline and estuarine fringing and coastal vegetation, Criteria not relevant to determination of regional significance, but which may be applied when evaluating areas having similar values

Recommendation: Site with Some Existing Protection; the care, control and management of this Site for conservation purposes within Beeliar Regional Park is endorsed (see Table 3, Volume 1).

Significant Flora: *Alyogyne huegelii* var. *glabrescens* (one of few populations in the PMR, most southern except for outlying populations in Yalgorup National Park); typical Tamala Limestone taxa — *Melaleuca huegelii*, *Grevillea preissii*, *Pimelea calcicola*

Fauna: surveyed by RAOU (1996 D), 1 visit, for birds (29). Significant birds species: category 1 (1) and category 3 (3)

Linkage: adjacent bushland, native vegetation on the south and west; part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: included in Beeliam Regional Park Proposal (DPUD 1992a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, General criteria for the protection of wetland, streamline and estuarine fringing and coastal vegetation, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Recommendation: The care, control and management of this area for conservation purposes within Beeliam Regional Park is endorsed.





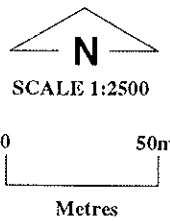
BUSHPLAN SITES CORRECTED



**WESTERN
AUSTRALIAN
PLANNING
COMMISSION**



**CUSTOMER
FOCUS
WESTERN AUSTRALIA**



Flora Manning Lake Reserve

after Keighery 1996 and Semeniuk, V&C 1997

***Anacardaceae**

- * *Schinus terebinthifolius*

Apiaceae*Apium prostratum*

- * *Foeniculum vulgare*

***Asparagaceae**

- * *Asparagus asparagoides*

- * *Asparagus ?officinale*

***Asphodeliaceae**

- * *Trachyandra divaricata*

Asteraceae*Cotula coronopifolia**Olearia axillaris***Chenopodiaceae***Atriplex hypoleuca**Rhagodia baccata**Sarcocornia quinqueflora***Crassulaceae**

- **Crassula glomerata*

Cyperaceae*Gahnia trifida***Dasypogonaceae***Acanthocarpus pressie**Lomandra maritima**Lomandra preissii***Dilleniaceae***Hibbertia hypericoides****Dipsacaceae**

- * *Scabiosa atropurpurea*

Epacridaceae*Leucopogon parviflorus***Euphorbiaceae**

- * *Euphorbia peplus*

- * *Euphorbia terracina*

Phyllanthus calycinus

Taxon	Prio Code	Geographic Range	Recorded Areas
* Ricinus communis			
Geraniaceae			
* Pelargonium capitatum			
Goodenaceae			
Lechenaultia linarioides			
Scaevola nitida			
Juncaceae			
Juncus kraussii			
Malvaceae			
Alyogyne huegelii var. glabrescens		S	Manning L.
Mimosaceae			
Acacia cyclops			
Acacia rostellifera			
Acacia saligna			
Acacia truncata			
Moraceae			
* Ficus carica			
* Morus nigra			
Myrtaceae			
Calothamnus quadrifidus			
* Chamelaucium uncinatum		S	Bold Park
Eucalyptus decipiens			
Eucalyptus gomphocephala			
* Leptospermum laevigatum			
Melaleuca acerosa			
Melaleuca huegelii			
* Melaleuca lanceolata			
Melaleuca rhapsiophylla			
Oxalidaceae			
* Oxalis pes-caprae			
Oleaceae			
* Olea europa			
Papilionaceae			
Gompholobium tomentosum			
Hardenbergia comptoniana			
Templetonia retusa			
Phormilaceae			
Dianella revoluta			

Pinaceae

- * *Pinus* sp

Poaceae

- * *Cortaderia selloana*
- * *Ehrharta calycina*
- * *Pennisetum clandestinum*

Polygonaceae

- * *Emex australis*
- * *Polygonum aviculare*

Proteaceae

- Dryandra lindleyana*
- Dryandra sessilis*
- Grevillea preissii*
- Hakea prostrata*
- Hakea ruscifolia*

Ranunculaceae

- Clematis pubescens*

Restionaceae

- Desmocladius flexuosus*

Rhamnaceae

- Cryptandra* sp.
- Spyridium globulosum*

Rubiaceae

- Opercularia vaginata*

Solanaceae

- * *Nicotiana glauca*

Thymelaeaceae

- Pimelea calcicola*
- Pimelea ferruginea*

Xanthorrhoeaceae

- Xanthorrhoea preissii*

This submission deals mainly with the large sites for bushland preservation but there are many small pockets of quality bushland which will be overlooked. When developers move on these, community dissension will arise. To help remediate this problem, and in recognition of the great loss of urban bushland in the Perth Metropolitan area over the past few decades, I suggest that the Town Planning regulations in relation to preserving portions of land for parks and recreation be amended.

Generally land required for residential development involves the setting aside of 10% for public open space or parks and recreation. I suggest that this is now an inadequate proportion and it should be increased to a range of 15% to 20% at the discretion of MFP (and Councils). Such an arrangement should incorporate a requirement that the best pockets of bush on these parcels should be retained as nature reserves. Perhaps a 50:50 recreation/preservation mix might be achieved.

Higher development densities maybe granted to the landowner or developer to compensate for the higher ratio of parks and recreation. Regardless, landowners of potential residential development sites have benefited greatly in terms of capital appreciation over recent years because of the higher densities e.g. R20:30, compared to previous R.12.5 - R.15 in the early 1980's.

I suggest that this recommendation of a higher proportion of parks and recreation space from such smaller pockets of bushland not covered by Bushplan sites, should be part of the final recommendations of the Bushplan study.

BUSHPLAN RECOMMENDATIONS:-

My attention is primarily concentrated on my local geographic area, south of the Swan River where I have a long term, close knowledge of many sites and potential bushland sites. My recommendations are as under:-

Bushplan Site ~~247~~ - Hamilton Hill:

This site does not include enough of the limestone ridges/bushland extending to the south to the railway line. These hills are a distinctive character feature of the Fremantle/Cockburn area and are one of the last sizeable bird habitats. I recommend expansion of Site 247 to include more of the vegetated ridge.

Site ~~247~~ Southlake:-

This site is only restricted to the actual wetland and some of its periphery. However, there is an excellent stand of bushland adjoining to the west and extending through to Sudlow Road. Currently the land is owned by Amcor which has a papermill on part of the land. Approximately 20 hectares of diverse bushland dominated by Marri with considerable Hybertia is located towards the Sudlow Road/Miguel Road side.

R. A. O. U. TRACKING DATABASE

23/06/96

PARK SIGHTINGS REPORT

Page No.

1

Manning Lake (M92)

ORDER:	REF:	BIRD NAME	NO.	SIGHTINGS
0019	0217	Musk Duck 3	1	
0022	0203	Black Swan	1	
0032	0208	Pacific Black Duck	1	
0035	0211	Grey Teal	1	
0039	0213	Pink-eared Duck 3	1	
0129	0100	Little Pied Cormorant	1	
0139	0188	White-faced Heron	1	
0165	0232	Black-shouldered Kite	1	
0204	0058	Purple Swamphen	1	
0208	0059	Eurasian Coot	1	
0297	0125	Silver Gull	1	
0326	0988	Laughing Turtle-Dove	1	
0356	0794	Short-billed Black-Cockatoo (1	
0359	0273	Galah	1	
0360	0272	Long-billed Corella	1	
0386	0294	Australian Ringneck	1	
0446	0322	Laughing Kookaburra	1	
0524	0476	Inland Thornbill 3	1	
0537	0638	Red Wattlebird	1	
0561	0608	Singing Honeyeater	1	
0583	0597	Brown Honeyeater	1	
0653	0401	Rufous Whistler	1	
0671	0415	Magpie-Lark	1	
0676	0364	Willie Wagtail	1	
0695	0702	Grey Butcherbird	1	
0698	0705	Australian Magpie	1	
0706	0930	Australian Raven	1	
0763	0357	Welcome Swallow	1	
0781	0574	Silvereye	1	

*** END OF REPORT ***

(1) 1
 (2)
 (3) 3
 (4)

SUMMARY REPORT

TOTAL BIRDS SIGHTED	:	29
TOTAL NUMBER OF CARDS	:	1

*** END OF SUMMARY ***

**Searches for Rare and otherwise Significant Flora
and Assessment of Vegetation Condition
Port Catherine Project Area, Spearwood and Coogee
City of Cockburn**

By Arthur S. Weston, PhD (Botany)

29 July 1997

1.0 INTRODUCTION

This report describes the objectives, methods, results and conclusions of searches for Declared Rare Flora (DRF), Priority Flora and other significant flora of the Perth Metropolitan Area and assessment of vegetation condition in the Port Catherine Project Area. The Port Catherine Project Area encompasses the proposed realignment of Cockburn Road and undeveloped areas west of it between the old power station in the north and Woodman Point Recreation Reserve in the south. In particular, the project area includes the six areas outlined in red on an overlay of the mosaic of two enlarged 1996 aerial photos and designated A, B, C, D, E and F.

1.1 OBJECTIVES

The principal objective of the search project was to locate all plants in the project area of the DRF, Priority and other significant taxa listed in a current table of such plants recorded in the Perth Metropolitan Area (Keighery pers. comm. 1997, Table 16) and in CALM 9 July 1997 printouts of Threatened and Priority Flora of the Coogee area from their three relevant databases: *Threatened Flora*, *Priority Species List* and *WA Herbarium Specimen*. The CALM printouts list 14 species, of which none is Threatened or DRF. One species listed by CALM is a Priority 1 taxon: *Acacia lasiocarpa* var. *bracteolata* long peduncle variant.

A supplementary objective of the significant flora search was to identify any areas having suitable habitats for any of these plants.

The objectives of the vegetation project were to identify stands of naturally occurring native vegetation in the project area and to assess their condition, particularly in Areas A, B, C, D, E and F.

1.2 METHODS

The project was divided into five phases, the first of which was a review of relevant literature, lists, tables, maps and aerial photographs. This phase was done during late June and July 1997.

The second and third phases were in the field, one phase being searches for significant flora and their habitats and the other being recording of types and condition of vegetation. The six-step scale modified from Trudgen by Keighery (1994, p. 27) for floristic community surveys was used to assess vegetation condition.

Phases two and three were done on Tuesday, 8 July and Sunday, 27 July 1997.

The fourth phase was checking of plant identifications in the Western Australian Herbarium and the fifth was preparation of the report. These phases were done concurrently, between 8 and 10 July and 24 and 29 July 1997.

2.0 RESULTS

2.1 SIGNIFICANT FLORA

No species of significant flora listed by Keighery or CALM was found nor was any habitat or area in the project area where such flora might occur identified. In fact, very few native herbaceous plants and small shrubs of any type were found in the project area.

The one collection listed by CALM of the Priority 1 taxon *Acacia lasiocarpa* var. *bracteolata* long peduncle variant is from a black sandy swampy area with jarrah, between the Nicholson Road bridge and Bibra Lake. There is no such habitat in the project area.

There may be habitats of the Priority 3 taxon *Hibbertia spicata* subsp. *leptotheca* in the project area, but no plants of this hibbertia were found during the searches.

Rottneest Cypress is considered by some, e.g. Powell (1990) and Powell and Emberson (1981), to be significant in the Metropolitan Area, where it has declined markedly in recent times. The species is, however, widespread and locally common on the south coast and its offshore islands.

2.2 VEGETATION

Most of the naturally occurring vegetation in the project area, even shrubby vegetation, is totally weedy and without any native species in the understorey. The most common shrub is Coast Teatree (*Leptospermum laevigatum*), an eastern states import, while Castor Oil Plant (*Ricinus communis*) runs a distant second for commonness. There are also thickets of self-sown pines, mainly along the railway and north of it, i.e. in Area F and east of it, and prickly shrubs of African Boxthorn (*Lycium ferocissimum*), mainly south of the railway and east of the project area.

Other alien species which are well-established in the project area and abundant include *Pelargonium capitatum*, *Euphorbia terracina*, *Trachyandra divaricata*, *Lupinus* sp. and several African grasses.

There are concentrations of native shrubs in Areas B, C, D, E and F, and of native graminoids in coastal dune vegetation, particularly in Area A (the vegetation types and conditions of Areas A, B, C, D, E and F and selected other areas in and east of the project area are described in more detail below).

There are scattered individuals and small populations of native shrubs of several species among weedy growth on limestone in the part of the project area south of the railway. The most common and widespread are Parrotbush (*Dryandra sessilis*), *Hakea prostrata*, *Templetonia retusa*, *Acacia rostellifera*, *Acacia saligna* and *Acacia cyclops*, most of which are mainly in the eastern part of the project area and east of it. *Xanthorrhoea preissii* is common near the railway but uncommon elsewhere, and there are also a few young trees of *Callitris preissii* in the southwestern corner, east of Area A on the eastern side of Cockburn Road. A few small trees of Limestone Marlock (*Eucalyptus decipiens*) are near Ocean Road in the eastern part of the project area.

2.2.1 Area A (at the northern end of System 6 Recommendation M90)

Between the access trail to the beach from the north end of the parking lot, the cycle/pedestrian path and the beach is low mobile dune vegetation of a type described by Powell and Emberson (1981) as seaside community and by Rippey and Rowland (1995) as dune heath. The vegetation is dominated by two established introductions from South Africa, Sea Spinach (*Tetragonia decumbens*) and *Trachyandra divaricata*, with other alien grasses and forbs and Rose Pelargonium (*Pelargonium capitatum*), which is also South African, being common. The perennial grasses *Spinifex hirsutus*, *Spinifex longifolius* and *Ammophila arenaria*, the saltbush *Atriplex ?isatidea* and Sea Rocket (*Cakile maritima*) are conspicuous on the coastal side of the dunes; there are patches of Coast Sword-sedge (*Lepidosperma gladiatum*) on internal slopes and swales, and there are very few small stands of the shrubs *Acacia cochlearis*, *Acacia cyclops* and *Scaevola crassifolia* and of Rottneest Cypress (*Callitris preissii*), mainly on the inland side of the dunes.

The vegetation type represented in Area A comes closest to matching Floristic Community Type S14.

Condition of vegetation in Area A is assessed as 4 (=Good), or better. In spite of the intrusion of aliens, the vegetation retains a basic structure upon which rehabilitation is being based and is in better condition than the rest of the seaside vegetation in the project area.

2.2.2 Area B (old Coogee Siding, north of Woodman Point Recreation Reserve)

The vegetation of Area B is currently mainly weedy, particularly comprising annual grasses and forbs, Rose Pelargonium, *Euphorbia terracina* and, to a lesser extent, Bridal Creeper (*Asparagus asparagoides*), but it was probably previously transitional between what Powell and Emberson (1981) describe for Woodman Point as Cypress Belt and Tuart Woodland vegetation, with treeless patches of heath and scrub. This native vegetation is now represented by scattered clumps, small groves and individuals of Rottnest Cypress (*Callitris preissii*), both mature and young, *Acacia saligna*, *Acacia cyclops*, *Acacia cochlearis* and *Spyridium globulosum*. South of the area, nearby, there are a few Tuart (*Eucalyptus gomphocephala*) trees. There are also plantings of Coastal Moort (*Eucalyptus platypus* var. *heterophylla*) and other trees and shrubs. According to French (1997), Coastal Moort is cultivated extensively in the Perth area. The Peppermint (*Agonis flexuosa*) in Area B may also be planted; it is not in the Powell and Emberson (1981, p. 83) list of native plants in their Woodman Point Study Area.

The vegetation type represented in Area B comes closest to matching Floristic Community Types 30a and 30b.

Condition of vegetation in Area B is assessed as >40% 5 (=Degraded) and >60% 4 (=Good) to 5. A large proportion of the native vegetation and its structure have been severely altered and would require intensive rehabilitation and management to improve them to a level of better than Good.

Area B has some value, however, for its Rottnest Cypress trees, which are rare in the Perth Metropolitan Area outside Woodman Point and which appear to be reproducing spontaneously. Powell (1990), in writing about the decline of Rottnest Cypress since European settlement, states that "Although once common along the mainland coast, its major populations in the Perth area are now limited to Garden Island and Woodman Point. It also survives in the Trigg dunes and at Peppermint Grove by the Swan River." Powell (1990) and Powell and Emberson (1981) add that there are still a few naturally occurring cypress trees on Rottnest Island and at south Swanbourne and Coogee north of the caravan park. The relatively dense, Woodman Point population extends north to Coogee Beach and the caravan park.

2.2.3 Area C (native vegetation between Robb Road and the railway)

The native vegetation of Area C is Closed Tall Scrub to Closed Heath of *Acacia rostellifera*, with an understorey of Rose Pelargonium, *Euphorbia terracina*, Bridal Creeper, other weeds and very few, if any, native plants. It, along with the *Acacia rostellifera* in Area E, is the densest naturally occurring native vegetation in the part of the project area south (or west) of the railway.

The vegetation type represented in Area C comes closest to matching Floristic Community Type 29b.

Condition of vegetation in Area C is assessed as 3 (=Very Good) to 4 (=Good), because the structure and composition of the overstorey is largely intact. The rating would be higher if native species constituted a significant part of the understorey and if the three aggressive weeds Rose Pelargonium, *Euphorbia terracina* and Bridal Creeper were absent. The aggressiveness and spread of these weeds in the community appears to be worsening its condition.

2.2.4 Area D (just south of railway, east of Cockburn Road and southeast of Area C)

Between the railway and the former industrial area south of it is a small stand of shrubs which appears never to have been totally cleared. There are now a few shrubs of *Hakea prostrata* and *Petrophile serruriae* with an almost totally weedy understorey.

Condition of vegetation in Area D is assessed as 5 (=Degraded) to 4 (=Good). The native vegetation and its structure have been altered and would require rehabilitation and management to improve them to a level of Good or better.

2.2.5 Area E (just south of railway in proposed realignment of Cockburn Road)

Area E vegetation is a dense stand of *Acacia rostellifera*, with a few Parrotbush and *Spyridium globulosum* bushes and a weedy understorey. The stand is spreading southward and westward.

The vegetation type represented in Area E comes closest to matching Floristic Community Type 29b.

Condition of vegetation in Area E is assessed as 3 (=Very Good) to 4 (=Good), because the structure and composition of the overstorey is largely intact. The rating would be higher if native species constituted a significant part of the understorey and if aggressive weeds were absent.

Immediately west of Area E, in what was first a quarry and then a flyash dump, is a mosaic of *Acacia rostellifera* and alien trees and shrubs, mainly pines, *Eucalyptus ?saligna*, Coast Teatree and Castor Oil Plant.

2.2.6 Area F (north of railway and east of Cockburn Road, including proposed Cockburn Road realignment and interchange area)

Area F has a patchy distribution of shrubs with a ground layer which, for the most part, is almost totally weedy. The principal, most widespread shrubs in the area are Coast Teatree, Parrotbush (*Dryandra sessilis*) and Red-eyed Wattle (*Acacia cyclops*), but there are also other species which are less common and have restricted distributions. These less common, more restricted species include *Hakea prostrata*, *Petrophile serruriae*, *Templetonia retusa*, *Scaevola ?crassifolia*, *Spyridium globulosum*, *Banksia attenuata*, Geraldton Wax, Olive Tree, African Boxthorn, *Nicotiana glauca*, *Ricinus communis* and *Pinus* sp. There are impenetrable thickets of Bridal Creeper in a few areas.

There are many four-wheel drive and motorcycle tracks and piles of rubbish in the area, especially in its western part. There is also a recently constructed bitumen cycle/foot path along the southern boundary.

The eastern edge of Area F borders an abandoned large quarry and limestone ridges with Floristic Community Type 26a vegetation which is less modified by disturbance than any native vegetation in the project area.

The vegetation type represented in Area F comes closest to matching Floristic Community Type 26a/b.

Condition of vegetation in Area F is assessed as >80% 4 (=Good) to 5 (=Degraded), with <20% 3 (=Very Good: mainly thickets of Parrotbush and wattle).

2.2.7 East of the Project Area

Lowland linkage between Market Garden Swamp and Manning Lake

There is no continuous strip of native vegetation between Market Garden Swamp and Manning Lake either through the lowlands or across the ridge, but there are stepping stones of shrubby plants and other perennial vegetation along both routes. The stepping stones vary in number, size and composition. On the ridge in the project area they are numerous, small, open and largely of alien shrubs, while along the lowland route, east of the project area, they are fewer, larger, largely of native paperbarks and closer to directly in line between the swamp and the lake.

For instance, the main lowland stepping stone, between Ocean, Cross, Entrance and Hamilton Roads, is, like the swamp and the lake, a wetland with a forest of Swamp or Freshwater Paperbark (*Melaleuca raphitophylla*). Another lowland stepping stone, one without paperbarks, is a pond behind the *Watsonia* plant east of Hamilton Road and south of the railway; the pond is open water with belts of bulrush (*Typha* sp.) and Castor Bean (*Rcinus communis*) bordering it.

***Melaleuca huegelii* - *M. acerosa* Shrublands of Limestone Ridges (Floristic Community Type 26a)**

The vegetation near the project area in best condition belongs to Floristic Community Type 26a (see Gibson *et al.* 1994), variations of which probably covered most of the upper slopes and ridges of the project area before they were cleared. Gibson *et al.* (1994) gives the conservation status of this community type as unreserved.

No examples of this community type were found in the project area which are in better condition than a poor 5, very degraded.

Currently, the best representations of this community type near the project area are, south of the railway, near the Rotary Lookout and, north of the railway, east of the abandoned large quarry. Both of these representations are in System Six Recommended area M92.

Immediately northeast of Rotary Lookout there is a limestone crest with shallow and skeletal soils and a weedy remnant of Floristic Community Type 26a. Principal native species in the stand include *Melaleuca huegelii*, *Grevillea preissii*, *Hakea prostrata*, *Templetonia retusa*, *Xanthorrhoea preissii*, *Acacia rostellifera*, *Spyridium globulosum*, *Dryandra 'nivea'*, *Hardenbergia comptoniana*, *Dianella revoluta*, *Opercularia vaginata* and *Acanthocarpus preissii*. The condition of the core of this stand is rated 3 (=Very Good).

A larger representation of Floristic Community Type 26a covers the top of the highest ridge east of the abandoned large quarry east of the part of the project area which is north of the railway. This stand has all of the native species found in the Rotary Lookout stand, all of the shrubs and vines listed for this community type by Gibson *et al.* and most listed for it in a 1997 unpublished study of this community type by Weston and Gibson (Weston pers. comm.). The condition of this stand is rated 2 (=Excellent) to 3 (=Very Good).

A poorer representation of this community type is on the lower ridge north of the quarry and bordering the project area.

3.0 CONCLUSIONS AND DISCUSSION

The likelihood that any species of Declared Rare or Priority Flora occurs in the project area is minimal or less. One locally important species which is not, however, listed as significant does occur in Areas A and B: Rottnest Cypress. Its occurrence in Area B, the old Coogee Siding, renders that area more important than it would otherwise be.

All of the project area east of Cockburn Road except the railway reserve and a few trees and shrubs had been cleared by the end of 1953 (see aerial photograph WA 125 Run 14: 276, 7920' 6", 6.11.53). Most of it that was not industrialised or in Lot 50 north of Ocean Road was beginning to regenerate, especially north of the railway, by late 1963 (see aerial photograph WA 838 Run 27: 5341, 7000' 6", 14.10.63). Lot 50 was in agricultural use until after 1973.

Areas A, B, C, D, E and F have importance for stands of vegetation in them, but the stands of vegetation are relatively poor examples of the vegetation types they represent. Furthermore, the types are more extensively and better-represented elsewhere, nearby examples being Woodman Point Reserve (System 6 M90) and south of Manning Lake (System 6 M92 in part).

4.0 REFERENCES

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- Keighery, B. (1994). *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc.), Nedlands.
- Powell, R. (1990). *Leaf and Branch: Trees and Tall Shrubs of Perth*. Department of Conservation and Land Management, Perth.
- Powell, R. and Emberson, J. (1981). *Woodman Point: A Relic of Perth's Coastal Vegetation*. Artlook, Perth.
- Ripley, E. and Rowland, B. (1995). *Plants of the Perth Coast and Islands*. University of Western Australia Press, Nedlands.






VEGETATION ASSOCIATIONS

Floristic Community Types
(Gibson et al 1994)

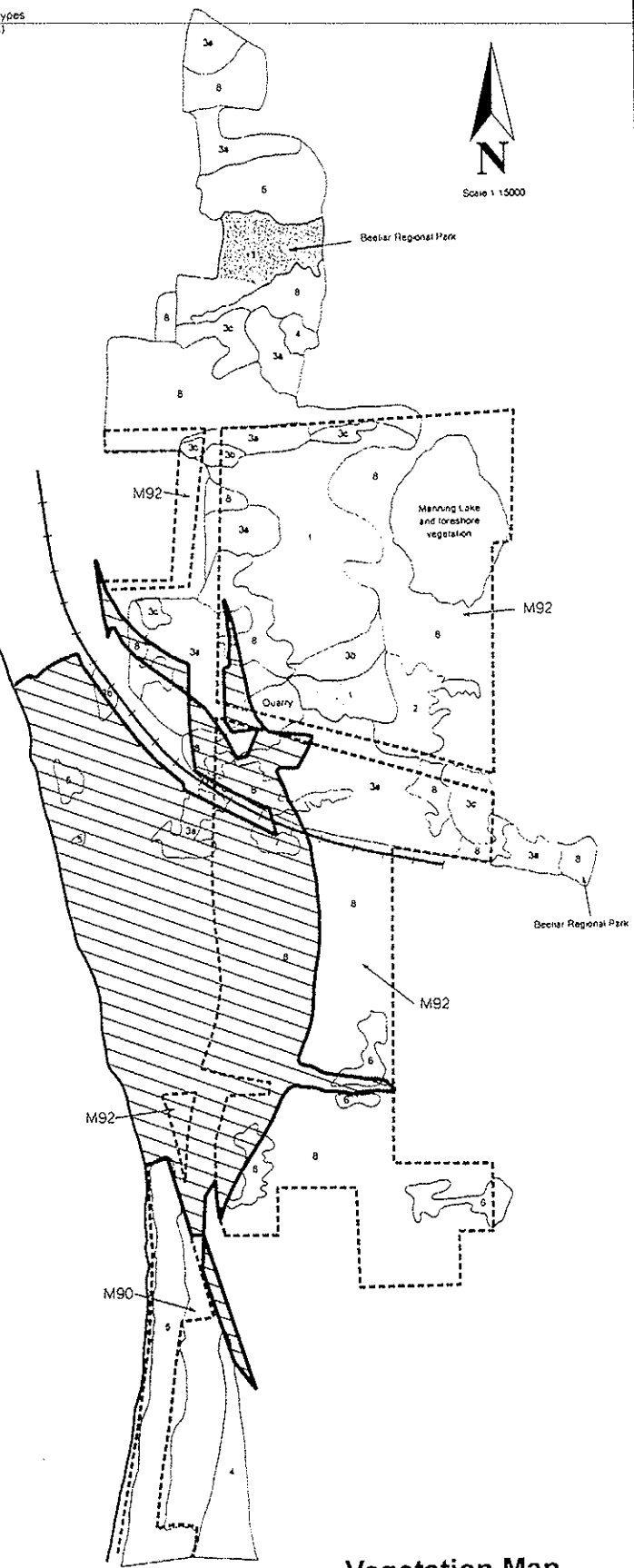
1	<i>Metaleuca hughesii</i> - <i>Metaleuca acerosa</i> Shrubland/Heath	26a
2	Species poor Mallee and Woodland on Limestone - <i>Eucalyptus decipiens</i> Woodland Variant	27
3a	<i>Acacia</i> Shrublands on Teller Dunes - Mixed Shrubland Variant	29b
3b	<i>Acacia rostellata</i> Thicket Variant	29b
3c	<i>Dryandra sessilis</i> Scrub Thicket Variant	29b
4	<i>Callitris preissii</i> (or <i>Metaleuca lanceolata</i>) Forests and Woodlands/ <i>Eucalyptus gomphocephala</i> and/or <i>Agonis flexuosa</i> Woodlands	30a/30b
5	Foredune Vegetation	S14
6	<i>Leptospermum laevigatum</i> Scrub (Alien Vegetation type)	
7	<i>Eucalyptus ? camaldulensis</i> Woodland over <i>Acacia saligna</i> Scrub (Alien Vegetation type)	
8	Exotic Grassland (Alien Vegetation type)	



CONDITION
Legend to mapped vegetation associations and land encompassed by M91, M92 and rezonings

-  Good representation and species diversity remains intact
-  Mostly good vegetation cover of native shrubs remain (or has regrown) however diversity is reduced and alien grasses are dominant in the understorey
-  Dominated by alien shrubs or grasses, with or without scattered native shrubs
-  Boundary of amendment area (Onshore only)
-  System 6 Areas (M90, M92)

Source: Environmental Survey and Management, 1997
Note: Vegetation mapped from aerial photography not corrected for distortion



Vegetation Map

BOWMAN BISHAW GORHAM
ENVIRONMENTAL MANAGEMENT CONSULTANTS

ATTACHMENT

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

RARE FLORA INFORMATION

CONDITIONS IN RESPECT OF SUPPLY OF INFORMATION

1. All requests for data to be made in writing to the Executive Director, Department of Conservation and Land Management, Attention: Administrative Officer Flora, Wildlife Branch.
 2. The data supplied may not be supplied to other organisations, nor be used for any purpose other than for the project for which they have been provided, without the prior written consent of the Executive Director, Department of Conservation and Land Management.
 3. Specific locality information for Declared Rare Flora is regarded as confidential, and should be treated as such by receiving organisations. Specific locality information for DRF may not be used in reports without the written permission of the Executive Director, Department of Conservation and Land Management. Reports may only show generalised locations or, where necessary, show specific locations without identifying species. The Administrative Officer Flora is to be contacted for guidance on the presentation of rare flora information.
 4. Note that the Department of Conservation and Land Management respects the privacy of private landowners who may have rare flora on their property. Rare flora locations identified in the data as being on private property should be treated in confidence, and contact with property owners made through the Department of Conservation and Land Management.
 5. Receiving organisations should note that while every effort has been made to prevent errors and omissions in the data provided, they may be present. The Department of Conservation and Land Management accepts no responsibility for this.
 6. Receiving organisations must also recognise that the database is subject to continual updating and amendment, and such considerations should be taken into account by the user.
 7. It should be noted that the supplied data do not necessarily represent a comprehensive listing of the rare flora of the area in question. Its comprehensiveness is dependant on the amount of survey carried out within the specified area. The receiving organisation should employ a botanist, if required, to undertake a survey of the area under consideration.
- Acknowledgment** of the Department of Conservation and Land Management as source of the data is to be made in any published material. Copies of all such publications are to be forwarded to the Department of Conservation and Land Management, Attention: Principal Botanist, Wildlife Branch.

WAHERB SPECIMEN DATABASE

GENERAL ENQUIRY

Grevillea olivacea A.S. George (Proteaceae)

CONSERVATION STATUS: P4

Coll.: G.J. Keighery 13063 Date: 13 07 1993 (PERTH 03358232)

LOCALITY Woodman Point; Rockingham WA

Lat.: 32° 08' 11" S Long.: 115° 44' 23" E

Open erect shrub 1-2 m, style red; perianth green-red.

Coastal dunes.

Abundance: self seeding from plantings.

31-JUL-97

Summary of Threatened Flora Data

Pa

<u>Taxon Name</u>	<u>Cons.</u>	<u>Pop ID</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Purpose</u>	<u>V</u>
Dodonaea hackettiana	4	16	32^08'00"	115^45'50"	REC	S

A total of 1 records were printed.
⌘

31-JUL-97

Threatened Flora Species Summary

Species: *Dodonaea hackettiana*

Common Name: _____ Flowering Period: _____

Photos: _____ Description: _____ Line Drawing: _____

Pop ID	District	Location	Vesting	Purpose	No. Plants	Last Inspect	Noti
16	Perth	Clarence Townsite, 377 Cockburn Rd. 0.25 km W of Cockburn Rd and 0.5 km E of The D.Y.S.R. camp.	SHI	REC		15-JUN-87	

❖

1193
1995
1996

Part Report:
Value identification
not objection
assessment section
(Contact Heritage
Commission, Melinda
Brown for complete
report) 13/5/96

**Objection Assessment of the
values of the vegetation and flora of the
Beeliar Wetlands**



Alogyne huegelii var. *glabrescens* to the west of Manning Lake

Prepared for the Australian Heritage Commission

by Bronwen Keighery, Consultant Botanist
November 1995 and February 1996

Table 2: Bushland Areas listed on the National Estate or being considered for listing.
Bushland Areas listed/interim listed on the National Estate

Bushland Area	Area (ha)	Native Flora	Flor. Com ¹⁰	Veg. Assoc#.	Veg. Comp. ¹⁸
✓ Hepburn Heights/Pinnaroo	90	230* ¹ ✓	3*	19 ¹¹	3
✓ Trigg/Karrinyup Reserves	120	175 ² ✓	4		2
✓ Banksia Road Nature Reserve	33	150 ³ ✓	3		1
✓ Marangaroo (Res 20091)	30*	130 * ⁴ ✓	1		1
✓ Neerabup National Park	1,111	242 ⁵ ✓	2		?2
✓ Star Swamp	100	191 ⁶ ✓	3	13 ¹¹	?2
✓ Woodvale Nature Reserve	44	170 ⁷ ✓	1		1
Beelihar Wetlands	2700	406 ²²	7	31 ¹⁸	4
✓ Thompsons Lake NR	509	199 ¹⁴ ✓		15 ¹⁴ 12 ¹⁸	3
✓ Baganup Lake	254	279 ¹⁵ ✗	4	10 ¹⁵	3
✓ Murdoch University	?	200 ¹³		5 ¹³	2
✓ Yangebup Lake	103*	140 ¹⁶ ✓		5 ¹⁶ 7 ¹⁸	2
✓ Piney Lake	68	96 ¹⁰ ✓		6 ¹⁰	1
✓ Booragoon Lake	13	34 ¹² ✓		3 ¹²	1
✓ Market Garden Lake	38	21 ¹⁷ ✓		7 ¹⁷	1

Unlisted areas subject to current nominations

✓ Kings Park	400	290 ²⁰ ✓	1	5 ²⁰	1
✓ Bold Park	221	221 ²¹ ✓	4		3
✓ M91	56	86 ²³ ✓	2		1

these are not directly compatible as they are based on variety of approaches to describing vegetation associations

* estimate of area, flora or floristic community types

1 estimate based on Keighery (1991), Tingay (1991), Foulds (1988) and AHC Listing Document

2+ G. Keighery pers. comm.

3+ G. Keighery pers. comm.

4 estimate from knowledge of the area

5+ G. Keighery pers. comm.

6 Bell *et al.* (1984)

7 Keighery and Langley (1994)

8 Gibson *et al.* (1994) and System 6 Update

9 Tingay (1991)

10 Rodda (1986)

11 Weston and Clay (1980)

12 Smith (1985)

13 Dell and Bennett (1986)

14 Crook and Evans (1981)

15 Clay (1986)

16 Ecoscape (1994)

17 Ecoscape (1995)

18 Newman *et al.* (1976)

19 Heddle *et al.* (1980)

20 Bennet in Kings Park Bushland Draft Management Plan (1993)

21 Keighery, Harvey and Keighery (1991)

22 Appendix Flora

23 Keighery and Keighery 1993

+ Reserve flora lists for bushland areas on the Swan Coastal Plain are being compiled by G.J. Keighery with assistance from B.J. Keighery and N. Gibson to establish a better knowledge of the flora of these areas and to address species conservation status for the Swan Coastal Plain.

Table 3: Floristic Community Types found in the study area

Each site is located Map 1. Study site codes refer to the following areas:

- Thom - Thomson Lake Nature Reserve (Gibson *et al.* 1994)
 Harry - Banganup Lake and adjacent bushland, Harry Waring Marsupial Reserve
 or Jandakot Research Station (Gibson *et al.* 1994)
 MTB - Lakes Mount Brown and Brownman Swamps and adjacent bushland (Gibson *et al.* 1994)
 NAVB - M 91 (Gibson *et al.* 1994)
 Beel - 1 & 2 North Lake and adjacent bushland (System 6 Update 1995)
 - 3 Murdoch University

Floristic Community Type (site)	Generalised Description	Predominant Landform Type (after Churchward and McArthur 1980)
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Wetland Super Group

5 (Map 2a) Harry 3	Mixed shrub damplands Mean species richness per site: 38.4 Av.Cond: 2.1, Cons status: Low risk	Bassendean/Pinjarra
11 (Map 2a) Harry 6 Beel 3	Wet forests and woodlands Mean species richness per site: 27.2 Av.Cond: 2.7, Cons status: Low risk	Bassendean/Pinjarra
16 (Map 2a) *NAVB 1	Highly saline seasonal wetlands Mean species richness per site: 13.5 Av.Cond: 2.9, Cons status: Vulnerable	coastal and esturine
17 (Map 2a) MTB 05	<i>Melaleuca raphiophylla</i> - <i>Ghania trifida</i> seasonal wetlands Mean species richness per site: 13.6 Av.Cond: 2.3, Cons status: Low risk	Quindalup/ Spearwood

Bassendean Dune Super Group

21a (Map 2b) Harry 05	Central <i>Banksia attenuata</i> - <i>E. marginata</i> woodlands Mean species richness per site: 54.6 Av.Cond: 2.5, Cons status: Low risk	Bassendean/ Spearwood
23a Map 2b) Harry 04 #Beel 02	Central <i>Banksia attenuata</i> - <i>B.menziesii</i> woodlands Mean species richness per site: 62.8 Av.Cond: 2, Cons status: Low risk	Bassendean

Spearwood/Quindalup Dune Super Group

24 (Map 2b) Thom 02 MTB 1, 2, 3 & 4 *NAVB3 &4	Northern Spearwood shrublands and woodlands Mean species richness per site: 41.8 Av.Cond: 3, Cons status: Susceptible	Spearwood
28 (Map 2b) #Beel 1 Harry 1 & 2	Spearwood <i>Banksia attenuata</i> or <i>Banksia attenuata</i> - <i>Eucalyptus</i> woodlands Mean species richness per site: 55.2 Av.Cond: 2.5, Cons status: Low risk	Spearwood
29a (Map 2b) *NAVB 2	Coastal shrublands on shallow sands Mean species richness per site: 40.7 Av.Cond: 2.3, Cons status: Susceptible	Quindalup

Appendix 1

This list was compiled from a series of published and unpublished lists for the study area. The principle references are cited in the key to column 4. Records were also extracted from the text of Environmental Science Murdoch University (1986) and Newman et al (1980). As most of these lists date from the 1980's there was a need to update the nomenclature.

Some additions have also been made from field visits in October and November 1995 for this study.

Key

Column 1: Taxon

Taxa are listed alphabetically in family, genera and species. Nomenclature is after Gibson *et al.* (1994). A * preceding a the genus name indicate a non-native taxon, these may be naturalised taxa or planted taxa.

Column 2: Priority Code (Department of Conservation and Land Management 1995)

Column 3: Geographical Range/Significant Taxa

N = Populations at the northern limit of their known range

S = Populations at the southern limit of their known range

W = Populations at the western limit of their known range

Geographic Limit - Location of limits as defined above.

= Significant taxa (see Sections 3.3.1 and 3.4.1.2 for details of significance)

Column 4: Areas

P Piney Lake Reserve (Rodda 1986)

Ba Banganup Lake (Weston and Clay 1980)

Bo Booragoon (Lake Smith 1985)

M Murdoch University (Dell and Bennett 1986)

T Thompson's Lake Nature Reserve (Crook and Evans 1981)

S The Spectacles (Clay 1986)

Y Yangebup Lake (Ecoscape 1994)

Ma Manning Lake (this report)

MG Market Garden Swamps (Ecoscape 1995)

MB Floristic Database for Swan Coastal Plain (Gibson *et al.* 1994) and System 6 Update

F Floristic Database for Swan Coastal Plain (Gibson *et al.* 1994) and System 6 Update.

91 System 6 area M91 (Keighery and Keighery 1993)

Taxon	Prio Code	Geographic Range	Recorded Areas	29
Aizoaceae				
*Carpobrotus aquilaterale			P, Ba, T, S	
*Carpobrotus edulis			Ba, Bo, M, T, Y, F, 91	
Carpobrotus virescens			91	
Carpobrotus virescens X edulis			91	
*Tetragonia decumbens			F, 91	
Amaranthaceae				
Ptilotus drummondii			Ba, T, Y, 91	
Ptilotus ?manglesii			P	
Ptilotus polystachyus			M, Y	
Anredaceae				
*Anredera cordifolia			MG	
Anthericaceae				
Arnocrinum preissii			Ba, T, Y	
Caesia micrantha			Ba, M, T	
Caesia occidentalis			F	
Chamaescilla corymbosa			Ba, M, T, S, F	
Corynotheca micrantha			Ba, M, T, S, Y	
Dichopogon capillipes			Ba, T, Y, F	
Laxmannia ramosa			Ba	
Laxmannia squarrosa			P, Ba, T, M, F	
Sowerbaea laxiflora			P, Ba, M, T, S, Y, F	
Thysanotus arenarius			Y	
Thysanotus asper			M	
Thysanotus manglesianus/patersonii complex			P, Ba, T, Y, F, 91	
Thysanotus multiflorus			M	
Thysanotus sparteus			Ba, T, Y, F	
Thysanotus thyrsoideus			F	
Thysanotus triandrus			Ba, M, Y, F	
Tricoryne elatior			Ba, Bo, M, T, S, Y	
Tricoryne tenella			F	
Amaryllidaceae				
*Narcissus tazetta				
Apiaceae				
Apium annuum			F, 91	
Apium prostratum			F	
Centella cordifolia			Ba, Bo, M, T, S, Y	
Daucus glochidiatus			F, 91	

Taxon	Prio Code	Geographic Range	Recorded Areas	30
<i>Eryngium pinnatifidum</i> subsp. <i>pinnatifidum</i>			Ba, M, T, Y, F	
* <i>Foeniculum vulgare</i>			T, Y, Mg, Ma, 91	
<i>Homalosciadium homalocarpum</i>			Ba, Y, F	
<i>Hydrocotyle diantha</i>			F	
<i>Hydrocotyle scutellifera</i>			F	
<i>Platysace compressa</i>			Ba, M, T, F	
<i>Trachymene pilosa</i>			M, Y, F	
<i>Xanthosia huegelii</i>			Ba, M, , S, Y, F	
Araceae				
* <i>Zantedeschia aethiopica</i>			S, Y, H, MG, F	
Asclepidaceae				
* <i>Gomphocarpus fruticosus</i>			MG	
Asparagaceae				
* <i>Myrsiphyllum asparagoides</i>			Ma	
Asphodelaceae				
* <i>Asphodelus fistulosus</i>			Ba, M, T, 91	
* <i>Trachyandra divaricata</i>			91	
Asteraceae				
* <i>Arctotheca calendula</i>			Ba, T, S, Y, 91	
* <i>Aster subulatus</i>			Ba, T, F	
<i>Asteridea pulverulenta</i>			Ba, Y	
<i>Brachyscome iberidifolia</i>			Ba, M	
* <i>Carduus pycnocephalus</i>			Ba	
* <i>Centaurea melitensis</i>			Ba, F, 91	
* <i>Cirsium vulgare</i>			Ba, MG, 91	
* <i>Conyza albida</i>			F, 91	
* <i>Conyza bonariensis</i>			Bo, F, 91	
<i>Cotula coronopifolia</i>			Ma	
* <i>Dittrichia graveolens</i>			MG, 91	
* <i>Helianthus annua</i>			MG	
<i>Helichrysum cordatum</i>			M, 91	
<i>Hyalosperma cotula</i>			Ba, T, F, 91	
* <i>Hypochoeris glabra</i>			Ba, Bo, S, Y, MG, F, 9	
<i>Ixiolaena viscosa</i>	N	North Lake	Bi, N, F	
* <i>Lactuca serriola</i>			Y, F	
<i>Lagenifera huegelii</i>			Ba, S, Y, F	
<i>Millotia myosotidifolia</i>			Ba, M, t	
<i>Millotia tenuifolia</i>			F	

Taxon	Prio Code	Geographic Range	Recorded Areas	31
<i>Olearia axillaris</i>			Ba, M, T, F, 91	
<i>Olearia elaeophila</i>			Y	
<i>Pithocarpa corymbulosa</i>			Y	
<i>Podolepis canescens</i>			Ba, T	
<i>Podolepis gracilis</i>			Ba, M, T, Y, F	
<i>Podotheca angustifolia</i>			Y, F	
<i>Podotheca chrysantha</i>			Ba, M, T, F	
<i>Podotheca gnaphalioides</i>			P	
<i>Pseudognaphalium luteoalbum</i>			Ba, F	
<i>Quinetia urvillei</i>			Y, F	
<i>Senecio hispidulus</i>			Ba, T	
<i>Senecio lautus</i>			Ba, M, T, Y, F, 91	
<i>Siloxerus humifusus</i>			Ba, M, F	
* <i>Solidago canadensis</i>			MG	
* <i>Sonchus asper</i>			Ba, M, F, 91	
<i>Sonchus hydrophilus</i>			F, 91	
* <i>Sonchus oleraceus</i>			F, 91	
* <i>Taraxacum officinale</i>			MG	
* <i>Urospermum picroides</i>			F, 91	
* <i>Ursinia anthemoides</i>			Ba, S, Y, F	
* <i>Vellereophyton dealbatum</i>			Ba, T, F, 91	
<i>Waitzia citrina</i>			T, F	
<i>Waitzia suaveolens</i>			F	
Azollaceae				
<i>Azolla filiculoides</i>			Y, H	
Brassicaceae				
* <i>Brassica oxyrrhina</i>			Y	
* <i>Brassica tournefortii</i>			Ba, MG, F, 91	
* <i>Heliophila pusilla</i>			Ba, F, 91	
* <i>Lobularia maritima</i>			MG	
* <i>Sisymbrium orientale</i>			MG	
* <i>Raphanus raphanistrum</i>			BO, MG	
* <i>Rorippa nasturtium-aquaticum</i>			Ba, T	
Callitrichaceae				
* <i>Callitriche stagnalis</i>			Ba	
Campanulaceae				
* <i>Wahlenbergia capensis</i>			Ba, Y	
<i>Wahlenbergia preissii</i>			Ba, F	

Taxon	Prio Code	Geographic Range	Recorded Areas	32
Cannaceae				
* <i>Canna generalis</i>			MG	
* <i>Canna ochnoides</i>			MG	
Caryophyllaceae				
* <i>Arenaria serpyllifolia</i>			F	
* <i>Cerastium glomeratum</i>			Ba, F	
* <i>Minuartia hybrida</i>			F, 91	
* <i>Petrohragia velutina</i>			Ba, T, Y, 91	
* <i>Sagina apetala</i>			Ba, F	
* <i>Sagina maritima</i>			F, 91	
* <i>Silene gallica</i>			Ba, T, Y, F, 91	
* <i>Stellaria media</i>			Ba, F, 91	
Casuarinaceae				
<i>Allocasuarina fraseriana</i>			P, Ba, M,, T, S, Y, F	
<i>Allocasuarina humilis</i>			P, Ba, M,, T, S, F, 91	
Centrolepidaceae				
<i>Centrolepis aristata</i>			Ba	
<i>Centrolepis drummondiana</i>			Ba, T, Y, F	
Chenopodiaceae				
<i>Atriplex cinerea</i>			F, 91	
<i>Atriplex hypoleuca</i>			Ma	
* <i>Atriplex prostrata</i>			T	
* <i>Chenopodium album</i>			MG	
* <i>Chenopodium ambrosioides</i>			Ba, T	
* <i>Chenopodium murale</i>			91	
<i>Chenopodium pumilio</i>	N	Balangup L	Ba	
<i>Rhagodia baccata</i>			F	
<i>Rhagodia baccata</i> subsp. <i>baccata</i>			91	
# <i>Rhagodia baccata</i> subsp. <i>dioica</i>			91	
<i>Sarcocornia quinqueflora</i>			MG, Ma, F, 91	
<i>Suaeda australis</i>			MG, 91	
<i>Threlkeldia diffusa</i>			F, 91	
Colchicaceae				
<i>Burchardia congesta</i>			P, Ba, Bo, M,, T, S, Y,F	
Commelinaceae				
<i>Cartonema philydroides</i>			Ba, M, T	
* <i>Tradescantia fluminense</i>			Bo	

Taxon	Prio Code	Geographic Range	Recorded Areas	33
Convolvulaceae				
# <i>Wilsonia backhousei</i>			91	
# <i>Wilsonia humilis</i>			91	
Crassulaceae				
<i>Crassula colorata</i>			P, Ba, Y, F, 91	
<i>Crassula exserta</i>			F, 91	
* <i>Crassula glomerata</i>			Ma, F, 91	
<i>Crassula pedicellosa</i>			F	
Cucurbitaceae				
* <i>Citrullus lanatus</i>			MG	
* <i>Cucumis myriocarpus</i>			S, MG	
Cuscutaceae				
* <i>Cuscuta epithymum</i>			Ba	
Cyperaceae				
<i>Baumea arthrophylla</i>			Ba, T	
<i>Baumea articulata</i>			P, Ba, M, T, S, F	
<i>Baumea juncea</i>			T, Y, F	
<i>Baumea preissi</i>			Ba, T	
<i>Baumea riparia</i>			Ba, T	
<i>Baumea rubigenosa</i>			Ba, T	
<i>Bolboschoenus caldwellii</i>			Ba, T, MG	
<i>Carex preissii</i>			F	
* <i>Cyperus congestus</i>			Ba, T, S, Y, MG	
* <i>Cyperus eragrostis</i>			Y	
<i>Cyperus polystachyos</i>			Ba, T	
* <i>Cyperus rotundus</i>			Bo, MG	
* <i>Cyperus tenellus</i>			P	
* <i>Cyperus tenuiflora</i>			Bo, M	
# <i>Eleocharis sphacelata</i>			K	
# <i>Fimbristylis vilata</i>			M, S	
<i>Gahnia trifida</i>			Ma, MG, F, MB	
<i>Isolepis cernua</i>			F, 91	
<i>Isolepis marginata</i>			Ba, T, F	
<i>Lepidosperma angustatum</i>			M, S, Y, F, 91	
<i>Lepidosperma costale</i>			Ba, T	
<i>Lepidosperma drummondii</i>			M	
# <i>Lepidosperma gracile</i>			M	
<i>Lepidosperma longitudinale</i>			Ba, Bo, M, T, S, F	

Taxon	Prio Code	Geographic Range	Recorded Areas	34
<i>Lepidosperma scabrum</i>			Ba, T, S	
<i>Lepidosperma</i> sp. (Coastal terete BJK & NG 231)			F	
<i>Lepidosperma tenue</i>			M, S	
<i>Lepidosperma squamatum</i>			Y, F	
<i>Mesomelaena pseudostygia</i>			P, Ba, M, T, S, Y, F	
<i>Mesomelaena tetragona</i>			P	
<i>Schoenus</i> aff. <i>laevigatus</i>			F	
<i>Schoenus brevisetis</i>			F	
<i>Schoenus brevifolius</i>			Ba, T	
<i>Schoenus clandestinus</i>			Ba, Y, F	
<i>Schoenus curvifolius</i>			Ba, M, T, S, Y, F	
<i>Schoenus grandiflorus</i>			Ba, T, S, Y, 91	
<i>Schoenus rodwayanus</i>			F	
<i>Schoenus subflavus</i>			Ba, T	
<i>Tetraria octandra</i>			P, M, Y, F	
Dasyogonaceae				
<i>Acanthocarpus preissii</i>			F, 91	
<i>Calectasia cyanea</i>			Ba, M, T, S	
<i>Dasyogon bromeliifolius</i>			P, Ba, M, T, S, F	
<i>Lomandra caespitosa</i>			F	
<i>Lomandra hermaphrodita</i>			F	
<i>Lomandra integra</i>			M	
<i>Lomandra maritima</i>			Ma, F, 91	
<i>Lomandra micrantha</i>			Ba	
<i>Lomandra nigricans</i>			Ba, T, F	
<i>Lomandra preissii</i>			F	
<i>Lomandra suaveolens</i>			Ba, M, F	
Dennstaedtiaceae				
<i>Pteridium esculentum</i>			Bo, T, S, P, H, N	
Dilleniaceae				
<i>Hibbertia acerosa</i>			91	
<i>Hibbertia huegelii</i>			Ba, M, T, Y, F	
<i>Hibbertia hypericoides</i>			P, Ba, M, T, S, Y, Ma F, 91	
<i>Hibbertia racemosa</i>			P, Ba, M, T, S, Y, F, 91	
<i>Hibbertia spicata</i> subsp. <i>leptotheca</i>	3	S	Yalgorup	F, 91
<i>Hibbertia stellaris</i>			P, M	
<i>Hibbertia subvaginata</i>			M, T, F	

Taxon	Prio Code	Geographic Range	Recorded Areas	35
Droseraceae				
<i>Drosera erythrorhiza</i>			Ba, M, T, S, Y, F	
<i>Drosera gigantea</i> subsp. <i>gigantea</i>			P	
<i>Drosera glanduligera</i>			Ba, M, T	
<i>Drosera macrantha</i>			Ba, M, T, S, F	
<i>Drosera menziesii</i> subsp. <i>penicillaris</i>			P, Ba, M, T, F	
<i>Drosera paleacea</i>			Ba, M, Y, F	
<i>Drosera pallida</i>			Ba, M, Y, F	
<i>Drosera stolonifera</i>			M, Y, F	
Epacridaceae				
<i>Acrotriche cordata</i>			91	
<i>Astroloma pallidum</i>			Ba, M, T, S, Y, F	
<i>Brachyloma preissii</i>			Ba, M, F	
<i>Conostephium pendulum</i>			P, T, S, Y, F	
<i>Conostephium preissii</i>			Ba, M, T, Y	
<i>Leucopogon australis</i>			P, M, 91	
<i>Leucopogon conostephioides</i>			Ba, M, T, Y	
<i>Leucopogon gracillimus</i>			F	
<i>Leucopogon oxycedrus</i>			Ba	
<i>Leucopogon parviflorus</i>			M, Ma, F	
<i>Leucopogon propinquus</i>			Ba, Bo, M, T, S, Y, F	
<i>Leucopogon racemulosus</i>			M, F	
<i>Lysinema ciliatum</i>			P, Ba, M, T, S	
Euphorbiaceae				
* <i>Euphorbia peplus</i>			Ba, T, Y, Ma, MG, F, 91	
* <i>Euphorbia terracina</i>			Y, Ma, 91	
<i>Monotaxis grandiflora</i>			P, Ba, M	
<i>Monotaxis occidentalis</i>			Ba, Y	
<i>Phyllanthus calycinus</i>			Ba, M, T, S, Ma, F, 91	
<i>Poranthera microphylla</i>			Ba, F	
* <i>Ricinus communis</i>			Y, MG	
Fagaceae				
* <i>Quercus suberus</i>			P	
* <i>Quercus</i> sp.			S	
Frankeniaceae				
<i>Frankenia pauciflora</i>			91	
Fumariaceae				
* <i>Fumaria capreolata</i>			Ba, T	

Taxon	Prio Code	Geographic Range	Recorded Areas	36
* <i>Fumaria muralis</i>			Ba, T	
Gentianaceae				
* <i>Centaurium erythraea</i>			F	
* <i>Centaurium spicatum</i>			Ba	
Geraniaceae				
* <i>Erodium botrys</i>			Ba, T	
* <i>Erodium cicutarium</i>			Ba, T, F, 91	
* <i>Geranium molle</i>			Ba, T, F, 91	
* <i>Pelargonium capitatum</i>			P, T, S, Ma, MG, F, 91	
* <i>Pelargonium domesticum</i>			Bo	
<i>Pelargonium littorale</i>			F	
Goodeniaceae				
<i>Dampiera linearis</i>			P, Ba, M, T, S, F	
# <i>Dampiera triloba</i>			M	
<i>Goodenia ?pulchella</i>			Ba, M, T	
# <i>Lechenaultia biloba</i>		W	M	
<i>Lechenaultia expansa</i>			Ba, T	
<i>Lechenaultia floribunda</i>			P, M, S, Y	
<i>Lechenaultia linarioides</i>		S	Spectacle S	
<i>Scaevola canescens</i>			Ba, M, T, S, Y	
<i>Scaevola crassifolia</i>			91	
<i>Scaevola globulifera</i>			M	
<i>Scaevola repens</i>			M, Y	
Haemodoraceae				
<i>Anigozanthos humilis</i>			P, Ba, M, T, S, Y, F	
<i>Anigozanthos manglesii</i>			P, Ba, M, T, S, Y	
<i>Anigozanthos viridis</i>			T	
<i>Conostylis aculeata</i>			P, Ba, M, T, S, Y, F, 91	
<i>Conostylis candicans</i>			P, M, T, F	
<i>Conostylis setigera</i>			P, Ba, M, T, Y, F	
<i>Haemodorum paniculatum</i>			Ba, M, T, Y	
<i>Haemodorum spicatum</i>			Ba, Bo, T, Y	
<i>Phlebocarya ciliata</i>			P, Ba, M, T, S, F	
<i>Tribonantes ?uniflora</i>			P	
Gyrostemonaceae				
<i>Tersonia cyathiflora</i>			MB	
Haloragaceae				
<i>Glischrocaryon aureum</i>			Ba	

Taxon	Prio Code	Geographic Range	Recorded Areas	37
Gonocarpus cordiger			Ba	
Gonocarpus pithyoides			F	
Myriophyllum crispatum			Ba	
Myriophyllum integrifolia			Ba	
Iridaceae				
* Chasmanthe floribunda			S	
* Gladiolus caryophyllaceus			P, Ba, M, T, S, Y, F, 91	
* Homeria flaccida			Ba, Y, F, 91	
* Ixia paniculata			Ba	
Patersonia occidentalis			P, Ba, M, T, S, Y, F	
Patersonia occidentalis (swamp form)			N	
* Romulea rosea			Ba, M, T, S, Y, F, 91	
* Tritonia sp.			B	
Juncaceae				
* Juncus acutus			MG, C	
* Juncus articulatus			Ba	
* Juncus bufonius			Ba	
Juncus caespiticius			Ba	
Juncus kraussii			MG, Ma	
Juncus pallidus			P, Bo, M, T, S, Y	
Luzula meridionalis			Ba, T	
Juncaginaceae				
Triglochin calcitrapum			91	
Triglochin procerum			Ba, M, T, F	
Lamiaceae				
# Hemigenia sericea			MB	
Hemiandra pungens			P, Ba, M, T	
* Stachys arvensis			Ba	
Lauraceae				
Cassytha flava			F, 91	
Cassytha glabella			M	
Cassytha pubescens			91	
Cassytha racemosa			Ba, M, T, F, 91	
Lemnaceae				
Lemna disperma			Ba	
Lobeliaceae				
Lobelia alata			F	
Lobelia tenuior			F	

Taxon	Prio Code	Geographic Range	Recorded Areas	38
Loganiaceae				
Mitrasacme paradoxa			Ba	
Loranthaceae				
Nuytsia floribunda			P, Ba, Bo, M, T	
Lythraceae				
* Lythrum hyssopifolia			Ba	
Malvaceae				
Allogyne huegelii var. glabrescens		^S Manning L. Ma		
* Lavatera plebeia		<i>in Metro area, in Yalgump</i>	MG, 91	
Lawrenzia spicata			91	
* Malva parviflora			MG	
Menyanthaceae				
Villarsia albiflora			Ba	
Villarsia ?capitata			Ba, T	
Mimosaceae				
Acacia cochlearis			Ba, T, Y, F	
Acacia cyclops			Ba, M, T, Y, MG, 91	
Acacia huegelii			Ba, M, T, Y, MG, 91	
Acacia lasiocarpa var. lasiocarpa			F, 91	
* Acacia longifolia			Y, Bl	
Acacia pulchella			P, Ba, Bo, M, T, Y, MG, F, 91	
Acacia rostellifera			T, Ma, F, 91	
Acacia saligna			P, Ba, Bo, M, T, Y, MG, Ma, F, 91	
Acacia stenoptera			Ba, M, T, S, Y, F	
Acacia truncata			Ma, 91	
Acacia willdenowiana			P, M, T, Y	
Molluginaceae				
Macarthuria australis			Ba, T	
Moraceae				
* Ficus carica			MG, H, Ma	
* Morus nigra			MG, Ma, S	
Myoporaceae				
Eremophila glabra			F, 91	
Myoporum insulare			91	
Myrtaceae				
Agonis linearifolia			M, N, H	
Astartea aff. fascicularis			Ba, Bo, M, T, S, Y, F	
Baekkea camphorosmae			Ba, T, S	

Taxon	Prio Code	Geographic Range	Recorded Areas	39
<i>Beaufortia elegans</i>			M	
<i>Calothamnus lateralis</i>			P	
<i>Calothamnus quadrifidus</i>			Ma, 91	
<i>Calytrix angulata</i>			Ba, T, S	
<i>Calytrix flavescens</i>			Ba, M, T, F	
<i>Calytrix fraseri</i>			Ba, M, T, F	
* <i>Chamelaucium uncinatum</i>	S	Bold Park	P, M, Ma, Y	
<i>Eremaea ?asterocarpa</i>			Ba, T	
<i>Eremaea pauciflora</i>			Ba, M, T	
<i>Eucalyptus calophylla</i>			P, Ba, M, S, Y, F	
* <i>Eucalyptus citriodora</i>			P	
<i>Eucalyptus decipiens</i>			Ma, MB, 91	
<i>Eucalyptus gomphocephala</i>		Ba, M, T, S, Y, Ma, MG, MB, Ma, F		
<i>Eucalyptus marginata</i>			P, Ba, M, T, S, Y, F	
<i>Eucalyptus rudis</i>			P, Ba, Bo, M, T, S, Y, F	
<i>Eucalyptus todtiana</i>			Ba, T, Y, F	
<i>Hypocalymma angustifolium</i>			P, Ba, M, T, F	
<i>Hypocalymma robustum</i>			P, Ba, M, T, S, Y, F	
<i>Kunzea ericifolia</i>			Ba, M, T, S, Y, F	
* <i>Leptospermum laevigatum</i>			P, M, S, Y, MG	
<i>Melaleuca acerosa</i>			Ma, F, 91	
<i>Melaleuca cuticularis</i>			Co, MG	
<i>Melaleuca huegelii</i>			Ma, MB, 91	
<i>Melaleuca incana</i>			S	
* <i>Melaleuca lanceolata</i>			Ma	
<i>Melaleuca lateritia</i>			P, M, Ro, S, F	
<i>Melaleuca preissiana</i>			Ba, Bo, M, T, S, Y, F	
<i>Melaleuca raphiophylla</i>		P, Bo, M, S, Y, Ma, MG, Co, Ma, F		
<i>Melaleuca seriata</i>			Ba, M	
<i>Melaleuca teretifolia</i>			P, Ba, Bo, M, T, S, MG, F	
<i>Melaleuca thymoides</i>			P, Ba, M, T, F	
<i>Melaleuca viminea</i>			MG	
<i>Pericalymma ellipticum</i>			P, Ba, M, F	
<i>Regelia inops</i>			M	
<i>Scholtzia involucrata</i>			Ba, M, T, S, F	
<i>Verticordia drummondii</i>			Ba, T	
Oleaceae				
* <i>Olea europea</i>			MG	

Taxon	Prio Code	Geographic Range	Recorded Areas	40
Onagraceae				
Epilobium billardierianum			Ba, F	
Epilobium hirtigerum			Ba, F	
* Oenothera stricta			MG	
Orchidaceae				
Caladenia deformis			Ba, T, S, Y	
Caladenia denticulata			Ba, T	
Caladenia discoidea			Ba, T	
Caladenia flava			P, Ba, T, S, Y, F	
Caladenia gemmata			Ba, T	
Caladenia latifolia			Ba, T, Y, F, 91	
Caladenia longicauda			Ba, M, T	
Caladenia ?paludosa			Ba, M, T	
Diuris emarginata			Ba, T	
Diuris longifolia			P, Ba, M, T, F	
Elythranthera brunonis			P, Ba, M, T, F	
Elythranthera emarginata			M	
# Epiblema grandiflorum			Ba	
Leporella fimbriata			M	
Lyperanthus nigricans			Ba, M, Y	
Microtis media			Ba, M, T, Y, F	
* Monadenia bracteata			F, 91	
Prasophyllum fimbria			Ba	
Prasophyllum ovale			Ba, T	
Prasophyllum parvifolium			Ba	
Pterostylis aff. nana			M, T	
Pterostylis recurva			Ba	
Pterostylis scabra var. robusta			M	
Pterostylis vittata			M, S, Y	
Thelymitra benthamiana			F	
Thelymitra campanulata			Ba, M, T	
Thelymitra crinita			M	
Orobanchaceae				
* Orobanche minor			Ba, M, Y	
Oxalidaceae				
* Oxalis pes-caprae			Ba, T	
* Oxalis purpurea			Ba, T	

Taxon	Prio Code	Geographic Range	Recorded Areas	41
Papilionaceae				
<i>Actus cordifolia</i>			P, Ba, M	
<i>Actus gracillima</i>			P, Ba, M, T	
<i>Actus procumbens</i>			M, Y	
<i>Bossiaea eriocarpa</i>			P, Ba, M, , S, YTF	
? <i>Callistachys lanceolata</i>			P	
* <i>Cystus prolifera</i>			M	
<i>Daviesia decurrens</i>			Ba, M, T, Y	
<i>Daviesia divaricata</i>			P, M, Y, F	
<i>Daviesia nudiflora</i>			Ba, M, T, Y	
<i>Daviesia physodes</i>			P, BL, Ba, M, T, S	
<i>Daviesia triflora</i>			P, Ba, M, T, S, Y, F	
<i>Eutaxia virgata</i>			E, Ba, M	
<i>Gompholobium confertum</i>			M	
<i>Gompholobium tomentosum</i>			P, Ba, M, T, S, Y, F	
<i>Hardenbergia comptoniana</i>			P, Ba, Bo, M, T, S, Y, MG, , 91F	
<i>Hovea pungens</i>			P, Ba, M, T, S, F	
<i>Hovea trisperma</i>			Ba, M, T, S, F	
<i>Isotropis cuneifolia</i>			Ba, M, T, S, Y, F	
<i>Jacksonia</i> aff. <i>sericea</i> (swamp form)	eP		N	
<i>Jacksonia furcellata</i>			P, Ba, Bo, M, T, S, Y, 91	
<i>Jacksonia sternbergiana</i>			P, Ba, Bo, M, T, S, Y, F	
<i>Kennedia coccinea</i>			91	
<i>Kennedia prostrata</i>			P, Ba, Bo, M, T, S, Y, F	
<i>Latrobea tenella</i>			Ba, M	
* <i>Lupinus angustissimus</i>			Y, MG	
* <i>Lupinus cosentinii</i>			Ba, T, S, Y, MG	
* <i>Medicago polymorpha</i>			Ba, T	
* <i>Melilotus indicus</i>			Ba, T, MG, F, 91	
<i>Nemcia capitata</i>			P, Ba, M, T, S, Y, F	
<i>Nemcia reticulata</i>			F, 91	
* <i>Ornithopus sativus</i>			Ba	
<i>Oxylobium lineare</i>			P, M	
<i>Pultenaea ochreatea</i>			Ba, M, T, S	
<i>Pultenaea reticulata</i>			P, Ba, T, S, F	
<i>Sphaerolobium vimineum</i>			Ba, M, F	
<i>Templetonia retusa</i>			Ma, MG	
* <i>Trifolium angustifolium</i>			Ba	

Taxon	Prio Code	Geographic Range	Recorded Areas	42
* <i>Trifolium arvense</i>			MG	
* <i>Trifolium campestre</i>			Ba, T, Y, F, 91	
* <i>Trifolium cernuum</i>			Ba, F, 91	
* <i>Trifolium dubium</i>			Ba, T	
* <i>Trifolium glomeratum</i>			Ba	
* <i>Trifolium pratense</i>			Ba, t	
* <i>Vicia hirsuta</i>			Ba, T	
* <i>Vicia sativa</i>			P, Ba, M, T, M, F	
<i>Viminaria juncea</i>			Ba, M, T, S	
Phytolaccaceae				
* <i>Phytolacca octandra</i>			91	
Phormiaceae				
<i>Dianella revoluta</i>			P, Ba, Bo, M, T, S, Y, MG, 91	
Pinaceae				
* <i>Pinus pinaster</i>			P, Ma	
Pittosporaceae				
<i>Pittosporum phylliraeoides</i>			MG	
<i>Pronaya fraseri</i>			Ba, M	
<i>Sollya heterophylla</i>			MG	
Plantaginaceae				
* <i>Plantago lanceolata</i>			MG	
Poaceae				
* <i>Aira caryophyllea</i>			Ba, Y, F, 91	
* <i>Aira cupaniana</i>			Ba	
* <i>Aira praecox</i>			Ba	
<i>Amphipogon laguroides</i>			Ba, M, T, F	
<i>Amphipogon turbinatus</i>			Ba, M, T, F	
* <i>Arundo donax</i>			Y, MG	
* <i>Avellinia michelii</i>			F	
* <i>Avena barbata</i>			P, Ba, T, F, 91	
* <i>Avena fatua</i>			Y, MG, F	
* <i>Briza maxima</i>			P, Ba, T, S, Y, F, 91	
* <i>Briza minor</i>			P, Ba, T, S, Y, MG, F, 91	
* <i>Bromus diandrus</i>			F, 91	
* <i>Bromus hordeaceus</i>			F, 91	
* <i>Catapodium rigidum</i>			91	
* <i>Cortaderia selloana</i>			T	
<i>Cynodon dactylon</i>			Bo, T, S, Y, MG	

Taxon	Prio Code	Geographic Range	Recorded Areas	43
Danthonia occidentalis			Ba, T, F, 91	
Deyeuxia quadriseta			Ba, T, F	
* Diandrus gussonii			Ba, T	
Dichelachne crinita			F	
* Digitaria sanguinalis			Ba	
* Echinochloa crus-galli			MG	
* Ehrharta calycina			P, Ba, Bo, T, S, Y, MG, F, 91	
* Ehrharta longiflora			Ba, T, Y, F	
Hemarthria uncinata			Ba, T	
* Holcus setiger			F	
* Hordeum leporinum			Y	
* Lagurus ovatus			Ba, T, Y, MG, F, 91	
* Lolium multiflorum			91	
* Lolium perenne			Ba, T	
* Lolium rigidum			Y, F	
Microlaena stipoides			Ba, T, F	
* Paspalum dilatatum			MG	
* Paspalum distichum			Y, MG	
* Paspalum vaginatum			Ba, T, Y	
* Pennisetum clandestinum			Bo, S, Y, MG, Ma	
* Phalaris minor			91	
* Poa annua			F	
Poa drummondiana			Ba, T, 91	
Poa poiformis/porphyroclados			Ba, F, 91	
* Polypogon monspeliensis			Ba, T	
* Rhynchelytrum repens			Y	
* Secale cereale			MG	
Sporobolus virginicus			Y, F, 91	
Spinifex longifolius			91	
* Stenotaphrum secundatum			Ba, Bo, T, MG	
Stipa compressa			Ba, T, Y, F	
Stipa flavescens			Ba, T, Y, 91	
Stipa semibarbata			Ba, T	
Stipa variabilis			Ba, T	
* Vulpia bromoides			Ba, T, F	
* Vulpia myuros			Ba, F, 91	
Polygalaceae				
Comesperma calymega			Ba, M, T, F	

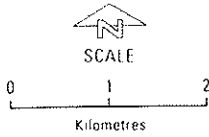
Taxon	Prio Code	Geographic Range	Recorded Areas	44
<i>Comesperma confertum</i>			F, 91	
<i>Comesperma flavum</i>			Ba	
<i>Comesperma virgatum</i>			Ba, M, T	
Polygonaceae				
* <i>Emex australis</i>			MG, Ma	
<i>Muehlenbeckia polybotrya</i>			Ba, T	
* <i>Polygonum aviculare</i>			MG, Ma	
<i>Polygonum salicifolium</i>			Bl, Bo, T	
* <i>Rumex acetosella</i>			Ba, T	
* <i>Rumex crispus</i>			Ba, T	
Portulacaceae				
<i>Calandrinia calyptrata</i>			F	
<i>Calandrinia corrigioloides</i>			Ba, T, F, 91	
<i>Calandrinia granulifera</i>			Ba	
<i>Calandrinia liniflora</i>			Y	
<i>Portulaca oleracea</i>			MG	
Primulaceae				
* <i>Anagallis arvensis</i>			P, Ba, M, T, S	
<i>Samolus junceus</i>			F, 91	
<i>Samolus repens</i>			F, 91	
Proteaceae				
<i>Adenanthos cygnorum</i>			P, Ba, M, T, S	
<i>Adenanthos obovatus</i>			S	
<i>Banksia attenuata</i>			P, Ba, Bo, M, T, S, Y, F, 91	
<i>Banksia grandis</i>			Ba, M, T, Y	
<i>Banksia ilicifolia</i>			P, Ba, Bo, M, T, Y, F	
<i>Banksia littoralis</i>			P, Ba, Bo, M, T, F	
<i>Banksia menziesii</i>			P, Ba, Bo, M, T, S, Y, F, 91	
<i>Conospermum stoechadis</i>			Ba	
<i>Conospermum triplinervium</i>			Ba, T	
<i>Dryandra nivea</i>			Ba, T, S, Y, Ma, F, 91	
<i>Dryandra sessilis</i>			M, T, Y, Ma, F, 91	
<i>Grevillea preissii</i>			Ma, F, 91	
<i>Grevillea vestita</i>			Ba, Y, 91	
<i>Hakea lissocarpha</i>			Ba, S, 91	
<i>Hakea prostrata</i>			Ba, M, T, Y, Ma, F, 91	
<i>Persoonia saccata</i>			P, Ba, T, S, Y	
<i>Petrophile brevifolia</i>			Y	

Taxon	Erio Code	Geographic Range	Recorded Areas	45
<i>Petrophile linearis</i>			P, Ba, M, T, S, Y, F	
<i>Petrophile serruriae</i>			F, 91	
<i>Stirlingia latifolia</i>			P, Ba, M, T, S, Y, F	
<i>Synaphea spinulosa</i>			P, Ba, M, T, S, Y	
<i>Xylomelum occidentale</i>			Ba, M	
Ranunculaceae				
<i>Clematis pubescens</i>			Ba, M, T, Ma	
* <i>Ranunculus muricatus</i>			Ba, M, T	
Restionaceae				
<i>Alexgeorgea nitens</i>			Y	
# <i>Empodisma gracillimum</i>			M	
<i>Hypolaena exsulca</i>			Ba, M, T, F	
<i>Leptocarpus aristatus</i>			P, M, Y	
<i>Leptocarpus coangustatus</i>			F	
<i>Leptocarpus scariosus</i>			Ba	
<i>Lepyrodia muirii</i>			Ba, T	
<i>Loxocarya flexuosa</i>			M, S, Y, F, 91	
<i>Loxocarya pubescens</i>			Ba, T, S	
<i>Lyginia barbata</i>			P, M, T, S, Y	
<i>Restio stenostachyus</i>			Ba, T	
Rhamnaceae				
<i>Cryptandra mutila</i>			F, 91	
<i>Spyridium globulosum</i>			Ma, 91	
Rubiaceae				
* <i>Galium aparine</i>			F, 91	
* <i>Galium murale</i>			F	
<i>Opercularia hispidula</i>			Ba, F	
<i>Opercularia vaginata</i>			Ba, M, S, Y, F, Ma	
Rutaceae				
<i>Boronia crenulata</i>			Ba, M, T, F	
<i>Boronia ramosa</i>			M	
<i>Eriostemon spicatus</i>			P, Ba, M, T, S, Y, F	
Salicaceae				
* <i>Salix babylonica</i>			Bl, Bo, MG	
Santalaceae				
<i>Dodonaea aptera</i>			Y	
<i>Dodonaea hackettiana</i>	4	eW	Ba, T, S	
<i>Exocarpos sparteus</i>			Ba, Bo, M, T, S	

Taxon	Prio Code	Geographic Range	Recorded Areas	46
<i>Leptomeria cunninghamii</i>			F	
<i>Leptomeria empetriformis</i>			Ba, T	
<i>Leptomeria spinosa</i>			Ba	
<i>Santalum acuminatum</i>			Ba, 91	
Scrophulariaceae				
* <i>Bellardia trixago</i>			Ba, F	
* <i>Cymbalaria muralis</i>			Ba	
* <i>Dischisma arenarium</i>			Ba, F	
<i>Gratiola peruviana</i>			Ba	
* <i>Parentucellia latifolia</i>			Ba	
* <i>Parentucellia viscosa</i>			Ba, M, F, 91	
* <i>Verbascum virgatum</i>			M, T, 91	
* <i>Veronica arvensis</i>			F	
Solanaceae				
* <i>Nicotiana glauca</i>			Y, MG, 91	
* <i>Solanum nigrum</i>			Ba, T, S, MG, 91	
<i>Solanum symonii</i>			Y, MG, 91	
Stackhousiaceae				
<i>Stackhousia monogyna</i>			P, Ba, MG	
Sterculiaceae				
<i>Thomasia cognata</i>			F, 91	
Stylidiaceae				
<i>Levenhookia pusilla</i>			F	
<i>Levenhookia stipitata</i>			Ba, M, F	
<i>Stylidium brunonianum</i>			P, Ba, M, T, Y	
<i>Stylidium bulbiferum</i>			F, 91	
<i>Stylidium calcaratum</i>			Ba, M	
<i>Stylidium junceum</i>			P, Ba, T	
<i>Stylidium piliferum</i>			Ba, M, T, S, F	
<i>Stylidium repens</i>			Ba, M, T, F	
<i>Stylidium schoenoides</i>			Ba, M, T, Y, F	
Thymelaeaceae				
<i>Pimelea angustifolia</i>			Ba, M, T	
<i>Pimelea calcicola</i>			Ma, F, 91	
<i>Pimelea rosea</i>			P, Bo, M, T, S, Y, F	
<i>Pimelea sulphurea</i>			M, Y, F	
Tropaeolaceae				
* <i>Tropaeolum majus</i>			Y	

Taxon	Prio Code	Geographic Range	Recorded Areas	47
Tremandraceae				
Platytheca galioides			Ba, M, T	
Typhaceae				
Typha domingensis			Ba, T, S	
* Typha orientalis			Y, MG	
Urticaceae				
Parietaria debilis			91	
Verbenaceae				
* Lantana camera			Y	
Violaceae				
Hybanthus calycinus			P, Ba, M, T, S, Y, F, 91	
Vitaceae				
* Vitus vinifera			MG	
Xanthorrhoeaceae				
Xanthorrhoea brunonis			S	
Xanthorrhoea preissii			P, Ba, Bo, M, T, S, Ma, MG, F	
Zamiaceae				
Macrozamia riedlei			Ba, Bo, M, S, Y, F, 91	
Zygophyllaceae				
Zygophyllum fruticosum	S	Port Kennedy	91	
* Tribulus terrestris			MG	

Prepared by the Department of Planning
and Urban Development Perth, Western Australia
March 1990



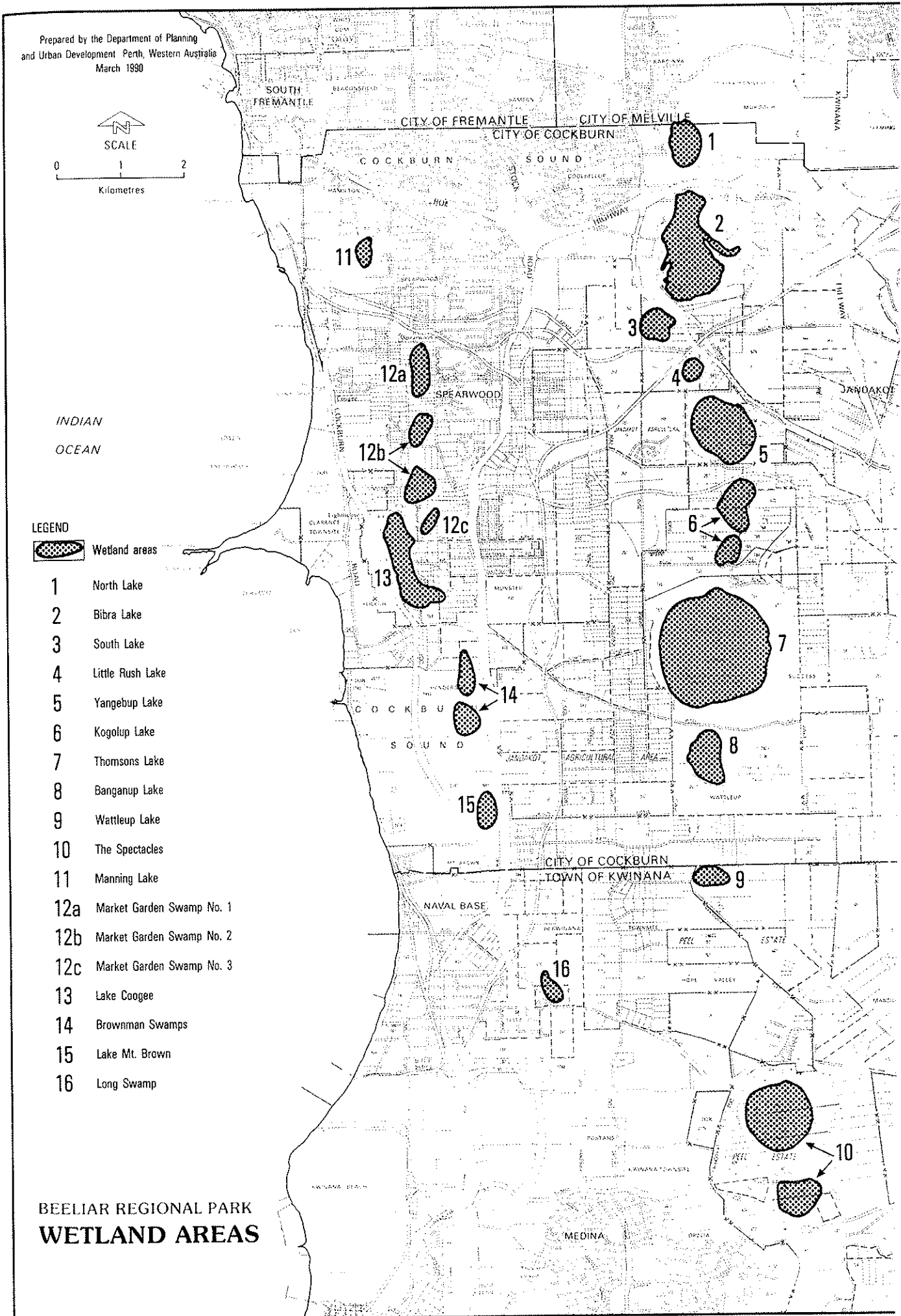
LEGEND



Wetland areas

- 1 North Lake
- 2 Bibra Lake
- 3 South Lake
- 4 Little Rush Lake
- 5 Yangebup Lake
- 6 Kogolup Lake
- 7 Thomsons Lake
- 8 Banganup Lake
- 9 Wattleup Lake
- 10 The Spectacles
- 11 Manning Lake
- 12a Market Garden Swamp No. 1
- 12b Market Garden Swamp No. 2
- 12c Market Garden Swamp No. 3
- 13 Lake Coogee
- 14 Brownman Swamps
- 15 Lake Mt. Brown
- 16 Long Swamp

**BEELIAR REGIONAL PARK
WETLAND AREAS**



BS 247
9/11/97

Natural Reserves Management Study

DEPARTMENT OF ENVIRONMENTAL PROTECTION	
06 NOV 1997	
File No 1	Name
File No 2	Name
File No 3	Name

Report to:

Environmental Division
City of Cockburn

Report by:

V & C Semeniuk Research Group

JUNE 1997

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TABLES

FIGURES

From information collected during this study, the functions of the reserve are cultural and ecological. They are:

1. to maintain a representative example of an uncommon type of vegetation in an undisturbed state, and
2. to provide an important refuge site and sources of food to avifauna in the Perth Metropolitan area.

RESERVE #13 -SHERBROOKE GARDENS RESERVE

The area of reserved remnant vegetation is located on the corner of Phoenix Road and Sudlow Road at Bibra Lake. It is a microscale area (approximately 2.5 ha.), triangular in shape. Sherbrooke Gardens incorporates part of the Spearwood ridges. From on-site investigation it is underlain by yellow quartz sand. The natural vegetation cover is the Cottesloe Complex-central and south (Heddle et al 1978), and contains open forest (*E. gomphocephala*, *C. calophylla*, *B. grandis*, *B. attenuata*). A species list for the reserve is in Table 7. The vegetation is in good condition.

From information collected during this study, the functions of the reserve are cultural and social. They are:

1. to maintain a representative example of an uncommon type of vegetation in an undisturbed state
2. to provide an important buffer zone and aesthetic area between a residential and industrial estate and its heavily used access routes (e.g., Phoenix Road).
3. to provide an area of accessible remnant endemic natural bushland as an informal educational resource for the local community; familiarity with local flora and fauna often results in the development of respect for these habitats and an increased awareness of their values.

RESERVE #14 -MANNING RESERVE UPLAND

The area is located north of Azelia Road at Hamilton Hill. It is a mesoscale area (approximately 25 ha.), rectangular in shape. The Manning upland reserve incorporates part of the Spearwood ridges. It is an undulating hilly area incorporating several geomorphic units: swales, high and low dune ridges, and wetlands. The reserve is underlain by Tamala limestone and shallow brown sands. The natural vegetation cover of the uplands belongs to the Cottesloe Complex-central and south (Heddle et al 1978). It forms a mosaic of five different assemblages: open woodland (*E. gomphocephala*), open low forest (*E. decipiens*), closed scrub (*Acacia rostellifera*, *M. huegelii*), closed heath (*Dryandra sessilis*) and closed heath (*Melaleuca acerosa*,

Melaleuca huegelii, *Lomandra maritima*). A species list for the reserve is in Table 8. The condition of the vegetation varies from good to poor (Figure 6).

Fig 6

The wetland part of the reserve is described under Section 3.2

From information collected during this study, the functions of the upland reserve are mainly cultural (pertaining to heritage and science), and ecological. They are:

1. to conserve the variety of different habitats in order to preserve biodiversity.
2. to maintain representative examples of this type of uncommon remnant vegetation in an undisturbed state, particularly the low closed heath, low woodland and open woodland,
3. to maintain of the link between the Spearwood Dune ridge and its associated swale and wetland in order to preserve sedimentary and hydrologic mechanisms, and ecological processes, such as 1) ground water flow down gradient from dune to wetland, sediment flow down slope, buffering of wetland by dune ridges to the west and south, and preservation of the transition and pathway between upland and wetland fauna habitats.
4. to provide important food sources and habitats for avifauna and reptiles in the coastal heaths and scrub.

15B
RESERVE #15 -HAMMOND ROAD RESERVE

The area of reserved remnant vegetation is located east of Hammond Road and south of Bartram Road at Atwell. It is a microscale L-shaped area (approximately 11 ha.). Hammond Road reserve incorporates part of the Bassendean Dunes. It is an undulating hilly area underlain by Bassendean Sands. The natural vegetation cover is part of the Bassendean Complex-central and south (Heddle et al 1978) but extensive clearing under the power lines has left only patches of vegetation. One small patch is intact, representing the hardier species (*B.ilicifolia*, *B.attenuata*, *Allocasuarina fraseriana*, *Nuytsia floribunda*) some patches have only the understorey remaining (low heath of the following genera: *Stirlingia*, *Allocasuarina*, *Adenanthos*, *Xanthorrhoea*), and some have only the tree cover (*B.attenuata*, *Allocasuarina fraseriana*, *Nuytsia floribunda*). Overall, the condition of the vegetation is poor.

From information collected during this study, the ecological functions of this reserve are difficult to assess and appear to be diminished. The area appears to be an important food source to some avifauna, especially parrots. Re-generation of a low open canopy could enhance its ecological functions by re-creating a habitat suitable to a greater range of avifauna.

16B
RESERVE #16 -TORGOYLE ROAD RESERVE

The area of reserved remnant vegetation is located between Russell and Torgoyle Roads at Wattleup. It is a mesoscale area (approximately 16 ha.), rectangular in shape. Torgoyle Road reserve incorporates part of the Spearwood ridges incorporating several small scale geomorphic units: swales, dunes, and limestone hills. It is underlain by Tamala limestone and shallow brown sands. The natural vegetation

impervious layers until groundwater rise is sufficient to connect the two aquifers. Water is discharged through evaporation. The wetland contains muds (clay minerals) and sands (quartz) and is underlain by Bassendean Sand. The vegetation is maculiform and consists of low woodland (*M. rhapsiophylla*), low open woodland (*Melaleuca preissiana* with u/s *Kunzea ericifolia*, *Astartea fascicularis*, *Hypocalymma angustifolium*), scrubland (*M. rhapsiophylla*) and heath (*Pericalymma ellipticum* and *Calothamnus lateralis*). The wetland vegetation is in good condition (Figure 9).

From on-site investigations, this wetland has important ecological and cultural functions. They are:

1. as a representative of a type of wetland which was once widespread in this area.
2. as a representative of vegetation assemblages which are largely in their natural state and diverse in structure and composition
3. as a refuge for wetland fauna such as quenda, avifauna, invertebrates, amphibia and reptiles

RESERVE #12 - GIL CHALWELL RESERVE

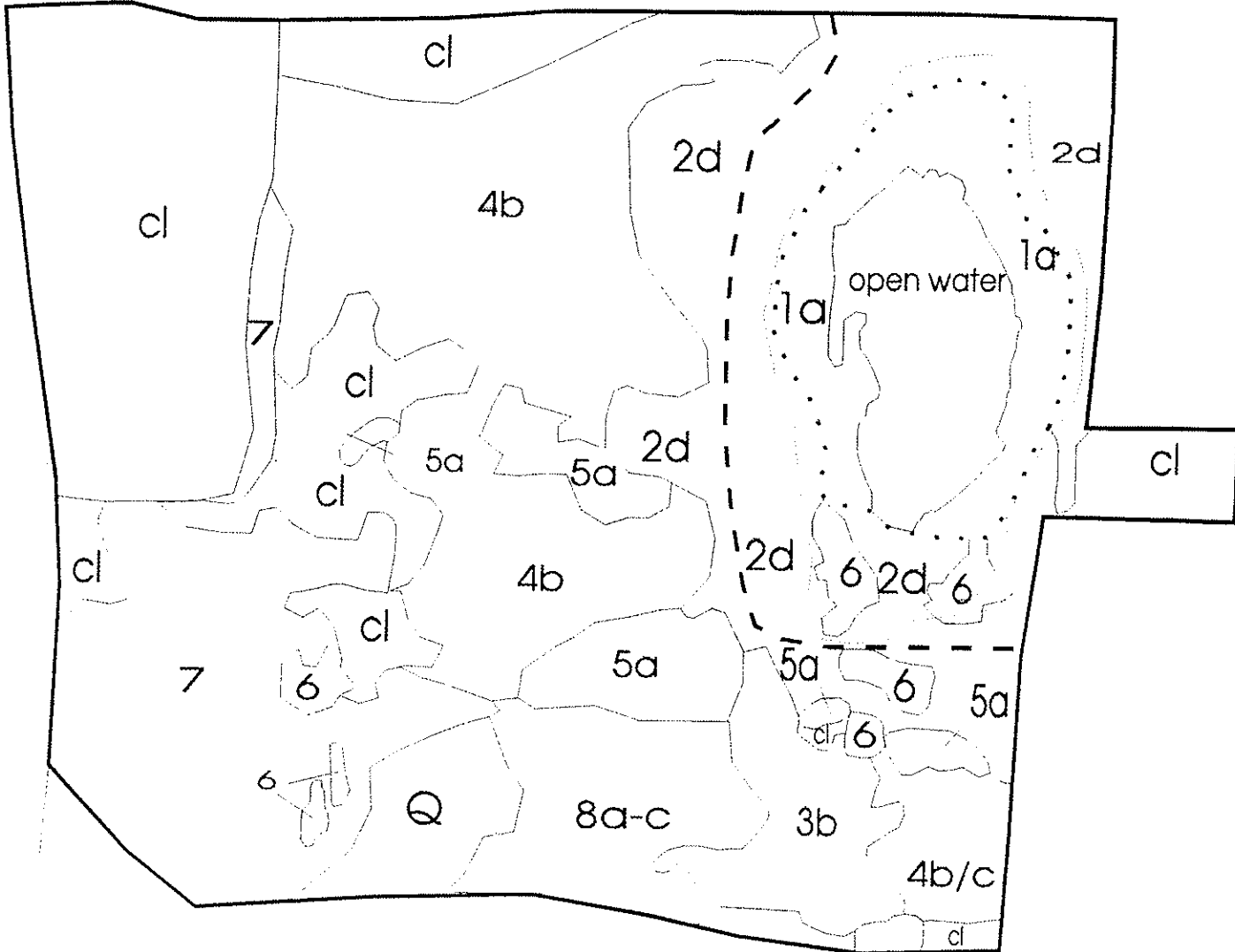
Gil Chalwell reserve includes portion of a wetland. This reserve is located south of Bartram Road and west of Boronia Road at Banjup. The wetland is a remnant of a sumpland and is now microscale and fresh water. It is recharged by rainfall and discharged through evaporation. Drainage of the recharge is retarded by impervious layers in the substrate resulting in a perched water table. Groundwater rise eventually connects the underlying aquifer with this perched water. The wetland contains muds and muddy sands (clays and quartz) and is underlain by Bassendean Sand. The vegetation is now concentriform and consists of an inner zone of sedgeland (*Typha orientalis*), a peripheral zone of low forest (*M. rhapsiophylla*, *E. rudis*) with various understories (open shrubland *M. teretifolia*, heath *Astartea aff. fascicularis*, and sedgeland *Baumea articulata* and *Lepidospermum longitudinale*) and an outer extensive zone of woodland (*M. rhapsiophylla*, *M. preissiana*, *B. illicifolia*, *E. todtiana*) with u/s *Kunzea ericifolia*, *X. preissii*, *Hypocalymma angustifolium*, *Dasyogon bromelifolius*). The wetland vegetation with the exception of the sedgeland of invasive *Typha orientalis*, is in good to fair condition.

The important ecological and cultural functions of this reserve are:

1. as a representative of an uncommon vegetation type (woodland - *M. rhapsiophylla*, *M. preissiana*, *B. illicifolia*, *E. todtiana* with u/s *K. ericifolia*, *X. preissii*, *H. angustifolium*, *D. bromelifolius*) in a largely undisturbed natural state
2. as a refuge for wetland fauna such as avifauna, invertebrates, amphibia and reptiles.

RESERVE #14 - MANNING LAKE RESERVE

Manning Lake reserve includes a wetland and adjoining uplands. This reserve is located north of Azelia Road at Hamilton Hill. The wetland is a microscale freshwater sumpland. It is recharged by rainfall and discharged through evaporation. Drainage of

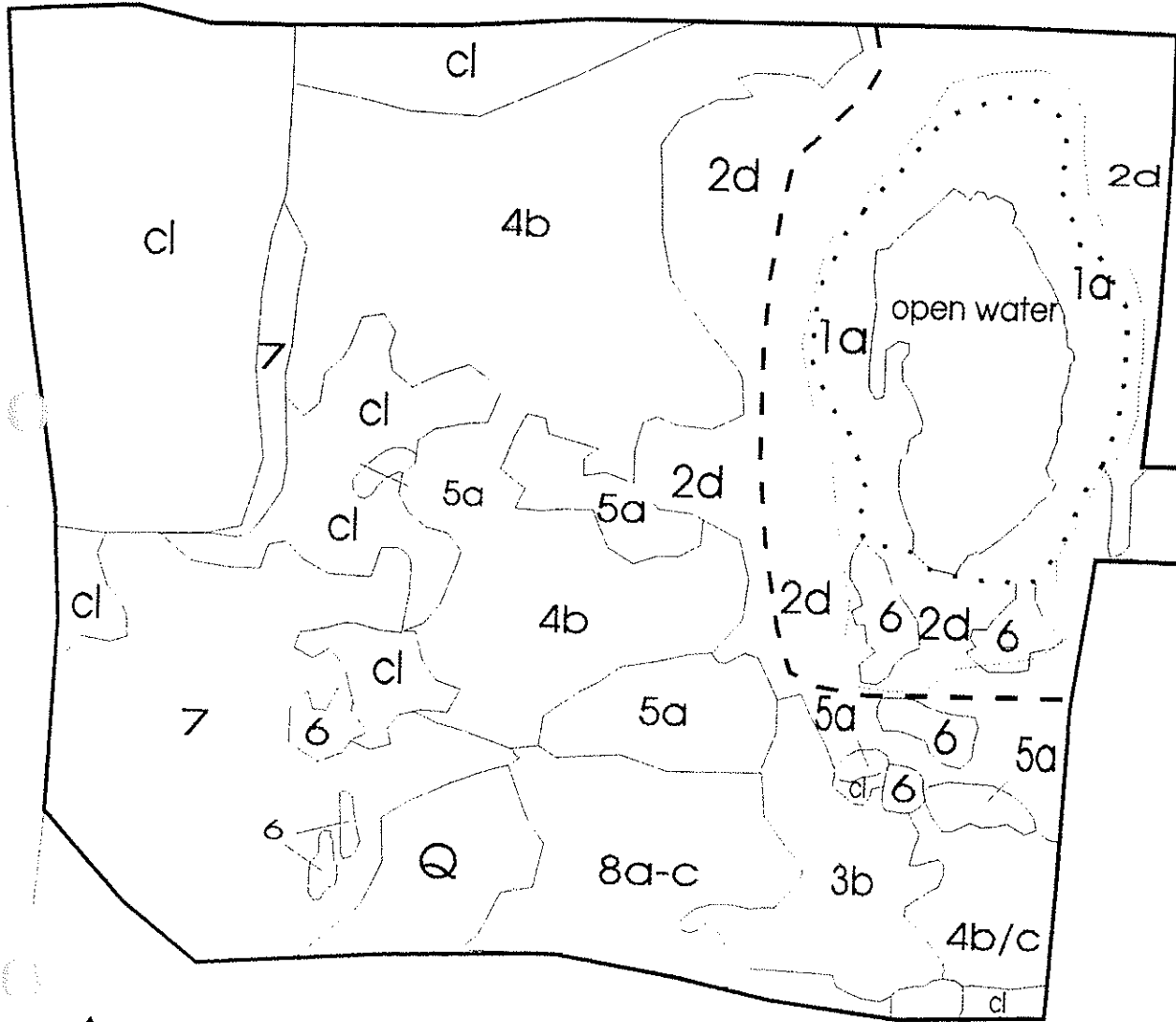


100 m

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Research
Group
1997

Map of Manning Reserve

Figure 6



100 m

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Map of Manning Reserve

Figure 6

- Reserve boundary
- vegetation association boundary
- wetland boundary
- edge of wetland vegetation
- - - - - road
- Q Quarry

VEGETATION ASSEMBLAGES

1. Forest: *Melaleuca raphiophylla* with an understorey of open shrub of *Melaleuca teretifolia* and sedgeland of *Gahnia trifida* and *Baumea juncea*
2. Open woodland: *Eucalyptus gomphocephala*
No understorey
3. Open low forest: *Eucalyptus decipiens*.
4. Heath: *Dryandra sessilis*
Understorey of weeds
5. Closed heath to scrub: *Acacia rostellifera* and *Melaleuca huegelii*
6. Forest: Pine trees.
7. Closed scrub:
**Leptospermum laevigatum*.
8. Mixed heath: *Melaleuca acerosa*, *Melaleuca huegelii*, *Acacia rostellifera*, *Lepidosperma* sp. and *Lomandra maritima*

DEGREES OF DEGRADATION

- a. relatively undisturbed
- b. minor weed invasion
- c. weeds predominate in understorey
- d. tree cover only
- cl. cleared

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Legend to Map of Manning Reserve

Figure 6

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Legend to Map of Manning Reserve

Figure 6

TABLE 8: Species list for Manning Upland Reserve.

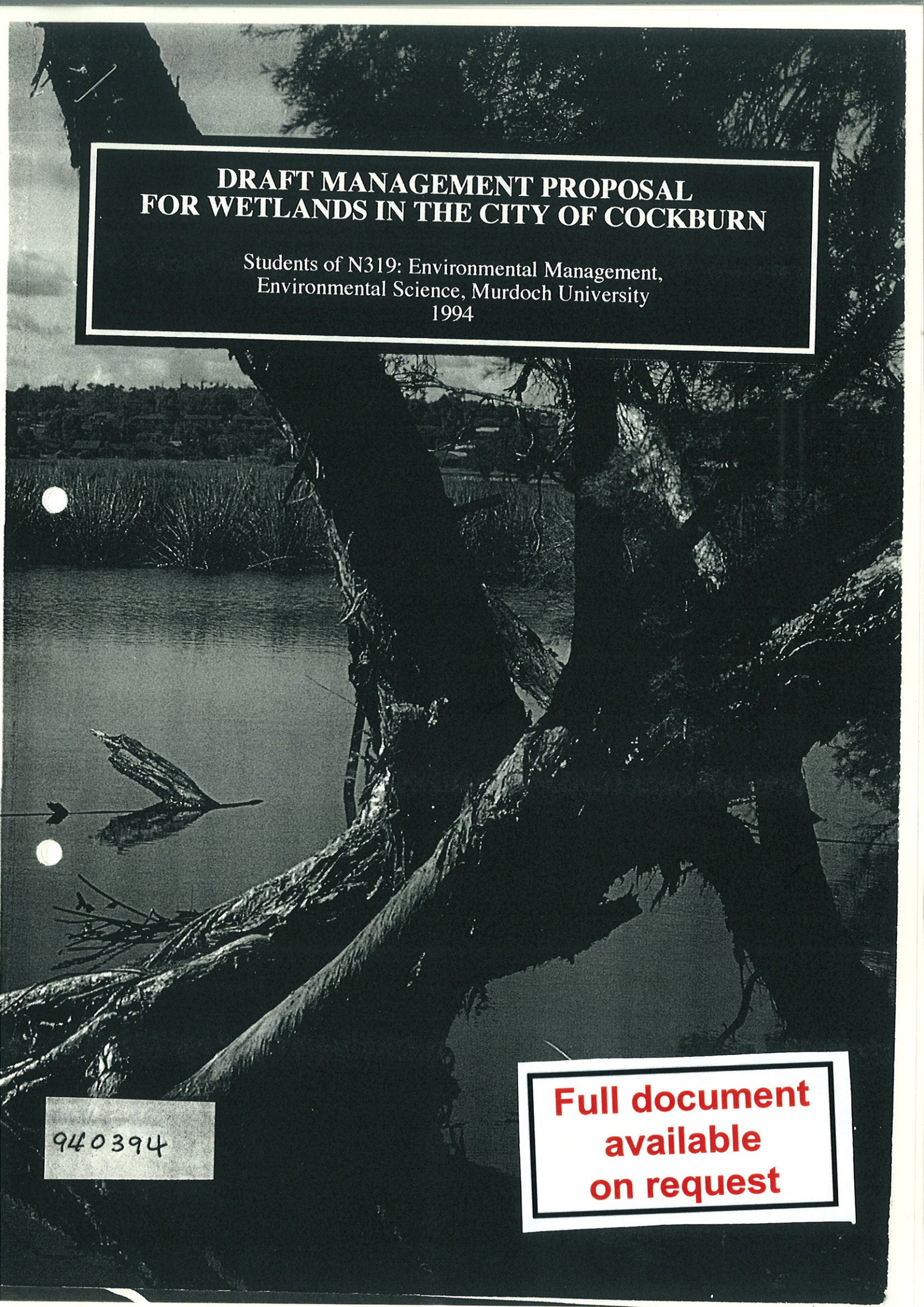
Indigenous taxa	35	34	+1	=	35
ASTERACEAE					
1	<i>Olearia axillaris</i>				
CHENOPODIACEAE					
2	<i>Rhagodia baccata</i>				
CYPERACEAE					
3	<i>Lepidosperma</i> sp				
4	<i>Mesomelaena pseudostygia</i>				
5	<i>Schoenus grandiflorus</i>				
DASYPOGONACEAE					
6	<i>Acanthocarpus preissii</i>				
7	<i>Lomandra maritima</i>				
8	<i>Pimelia preissii</i>				
DILLENiaceae					
9	<i>Hibbertia hypericoides</i>				
EPACRIDACEAE					
10	<i>Leucopogon parviflorus</i>				
GOODENACEAE					
11	<i>Lechenaultia linaroides</i>				
12	<i>Phyllanthus calycinus</i>				
13	<i>Scaevola nitida</i>				
MIMOSACEAE					
14	<i>Acacia cyclops</i>				
15	<i>Acacia rostelifere</i>				
16	<i>Acacia truncata</i>				
MYRTACEAE Exc gomph 35					
17	<i>Eucalyptus decipiens</i>				
18	<i>Calothamnus quadrifidus</i>				
19	<i>Melaleuca acerosa</i>				
20	<i>Melaleuca huegelii</i>				
OXALIDACEAE					
21	<i>Oxalis pes-caprae</i>				
PAPILIONACEAE					
22	<i>Gompholobium tomentosum</i>				
23	<i>Hardenbergia comptoniana</i>				
24	<i>Templetonia retusa</i>				
PHORMILACEAE					
25	<i>Dianella revoluta</i>				
PROTEACEAE					
26	<i>Dryandra lindleyana</i>				
27	<i>Dryandra sessilis</i>				
28	<i>Grevillea thelemanniana</i>				
29	<i>Hakea ruscifolia</i>				
RESTIONACEAE					
30	<i>Desmocladius flexuosus</i>				
RHAMNACEAE					
31	<i>Cryptandra</i> sp				
32	<i>Spyridium globulosum</i>				
THYMELAECEAE					
33	<i>Pimelia calcicola</i>				
34	<i>Pimelia ferruginea</i>				
XANTHORRHOEACEAE					
35	<i>Xanthorrhoea preissii</i>				
36	<i>Allyogyne huegelii</i>				
Weeds 16 + 1					
ANACARDIACEAE					
1	* <i>Schinus terebinthifolius</i>				
APIACEAE					
2	* <i>Foeniculum vulgare</i>				
ASPARAGACEAE					
3	* <i>Asparagus asparagoides</i>				
4	* <i>Asparagus ? officinale</i>				
ASPHODELACEAE					
5	* <i>Trachyandra divaricata</i>				
DIPSACACEAE					
6	* <i>Scabiosa atropurpurea</i>				
EUPHORBIACEAE					
7	* <i>Euphorbia terracina</i>				
8	* <i>Ricinus communis</i>				
GERANIACEAE					
9	* <i>Pelargonium capitatum</i>				

**TABLE 8 cont: Species list for Manning
upland Reserve**

Weeds	
MORACEAE	POACEAE
10 * <i>Ficus carica</i>	13 * <i>Cortaderia selloana</i>
MYRTACEAE	15 * <i>Ehrharta calycina</i>
11 * <i>Leptospermum laevigatum</i>	14 * <i>Lagarus ovatus</i>
OLEACEAE	SOLANACEAE
12 * <i>Olea europa</i>	16 * <i>Nicotiana glauca</i>

TABLE 9: Species list for Fancote Reserve.

Indigenous taxa	PROTEACEAE
ANTHERICACEAE	<i>Banksia attenuata</i>
<i>Tricoryne elatior</i>	<i>Banksia grandis</i>
ASTERACEAE	<i>Dryandra lindleyana</i>
<i>Olearia axillaris</i>	<i>Dryandra sessilis</i>
CASUARINACEAE	<i>Grevillea vestita</i>
<i>Allocasuarina humilis</i>	<i>Petrophile serruriae</i>
CHENOPODIACEAE	RESTIONACEAE
<i>Rhagodia baccata</i>	<i>Desmocladius flexuosus</i>
EPACRIDACEAE	XANTHORRHOEACEAE
<i>Leucopogon parviflorus</i>	<i>Xanthorrhoea preissii</i>
EUPHORBIACEAE	Weeds
<i>Phyllanthus calyoinus</i>	AGAVACEAE
MIMOSACEAE	* <i>Agave sp</i>
<i>Acacia cyclops</i>	ANACARDIACEAE
<i>Acacia rostellifera</i>	* <i>Schinus terebinthifolius</i>
MYRTACEAE	GERANIACEAE
<i>Eucalyptus gomphocephala</i>	* <i>Pelargonium capitatum</i>
PAPILIONACEAE	IRIDACEAE
<i>Hardenbergia comptoniana</i>	* <i>Watsonia sp</i>
<i>Jacksonia sternbergiana</i>	MYRTACEAE
<i>Kenmedia prostrata</i>	* <i>Leptospermum laevigatum</i>
POACEAE	POACEAE
<i>Poa poiformis</i>	* <i>Ehrharta calycina</i>



**DRAFT MANAGEMENT PROPOSAL
FOR WETLANDS IN THE CITY OF COCKBURN**

Students of N319: Environmental Management,
Environmental Science, Murdoch University
1994

**Full document
available
on request**

940394

J Arnold Wetlands

MANNING LAKE

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10.2 MANNING LAKE BS247.

10.2.1 GENERAL INFORMATION

LOCAL AUTHORITY: City of Cockburn
MRS ZONE: Parks and Recreation Reserve
MANAGEMENT: City of Cockburn
RESERVE NUMBERS: C26870 + Freehold (State Pla
SYSTEM 6 RECOMMENDATION: M92
WAC CLASSIFICATION: Le.f/b.s.p.o
DRAINAGE: Local drainage inputs.

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10.2.2 PHYSIOGRAPHY AND GEOLOGICAL SETTING

Lake Manning is a small oval-shaped lake occupying a striking position on the boundary of Hamilton Hill and Spearwood. High limestone dunes lie to the west of the lake. The lake was described in the Cockburn Wetlands Study (Newman, 1976).

10.2.3 AREAS

Area within MRS Reserve	approx 58 ha
Total area of wetland	11.6 ha
Paperbark	6.1 ha
Sedgeland/samphire	1.2 ha
Open water	4.0 ha
Modified area	0.3 ha

10.2.4 HYDROLOGY (Figure 10.3)

The regional water table around Lake Manning is at 1-2 m AHD. There is a relatively thin layer of fresh groundwater overlying saline water. Sources of lake recharge include surface drains and groundwater recharge from the east. No bathymetric contours are available.

At periods of high water in winter, the lake waters extend beyond the paperbark fringe.

The water level record shows that maximum lake levels are between 0.8 and 1.0 m AHD and minimum levels are between 0.1 and 0.2 m AHD. As is to be

BS 247' Spear S

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HARRY WA

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MODONG

STH. LK.

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BASSEND S.
ANST. KEAN

BA
BA

YANGEB.

Prepared for the Western Australian Planning Commission
by the Ministry for Planning
Albert Facey House
469 Wellington Street
Perth 6000 Western Australia

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JANDAKOT

BS 262
BASS. S.

BS 344
March 1995

BS 389





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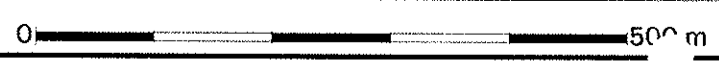


bp site 247

-  AG VEG 1998 BOUNDARY THEME
-  Cadastre
-  Bushplan sites refno 1-500 SCP BOUNDARY THEME
-  cons category wetlands

Map Ident: plot980527_1	DATE: 27 May 98
Prepared By: Andrea Zappacosta	Prepared For:
Scale 1:AUTO	MFP INTERNAL USE ONLY

follow P+K (SEM 1994)





MANNING LAKE





WILD 1574 UAGA
Nr 13037 152.72

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