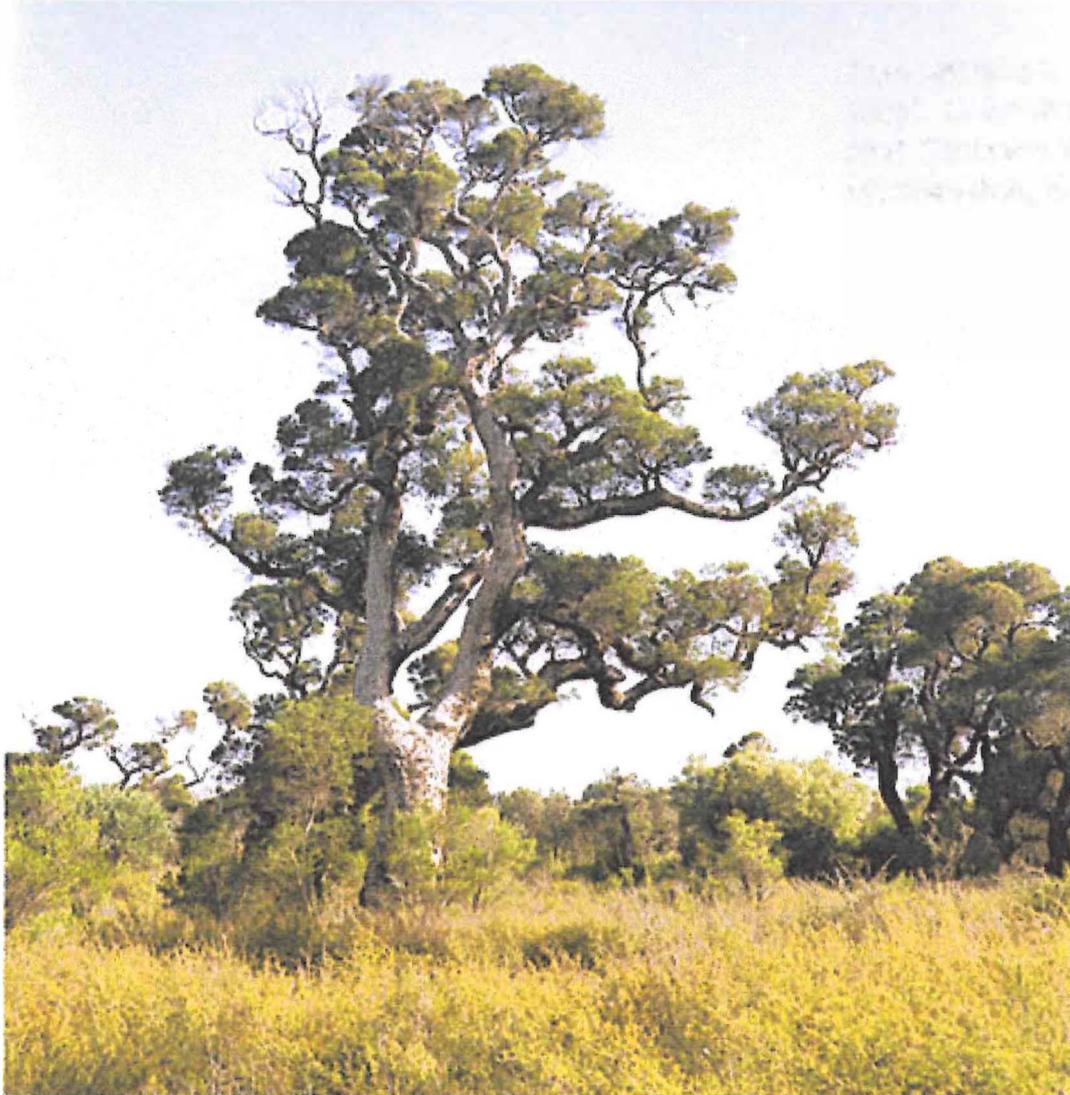


THE VEGETATION AND FLORA OF THE ACOURT ROAD BUSHLAND NORTH

BANJUP, CITY OF CANNING
JANDAKOT REGIONAL BOTANIC PARK



FOR THE BANNISTER CREEK CATCHMENT GROUP (INC.)

by

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Bushcare Program of the Natural Heritage
provided by the Department of Conservation and
of Environmental Protection Ecoplan.

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Front cover: Old mature *Melaleuca preissiana* (Moonah) trees growing as scattered emergents in the *Pericalymma ellipticum-Regelia ciliata* Shrublands that are part of the vegetated wetlands of the Acourt Rd Bushland North. (Photograph by Margaret Langley, April 1999).

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1. Introduction

Western Australia has unique vegetation (plant communities) and flora (individual species), both of which are very diverse. Over 12,500 taxa (species, subspecies and varieties) have been recorded in Western Australia, nearly half the total known for the whole of Australia (WA Herbarium 1998). The south-west of WA is especially diverse and is recognised as one of the world's 25 biodiversity hotspots requiring priority action for conservation (Myers *et al.* 2000). Over 8,000 taxa occur in the south-west with nearly three quarters of these found nowhere else in the world. In the Perth Metropolitan Region (PMR) where most of Western Australia's population lives, there is approximately 10% of WA's flora (Government of Western Australia 1998a). Knowledge of our vegetation and flora is still very incomplete, new plant taxa are being discovered regularly and existing classifications constantly being revised.

The Wildflower Society of Western Australia (Inc.) strongly believes that to protect and manage our vegetation and flora, we need to know what is present. This allows conservation values to be established and management priorities based on the specific characteristics of each site. The management of remnant vegetation often depends on community groups and interested individuals with limited resources. In response the Society has developed a bushland survey project based on scientifically rigorous methods that allow community participation while using limited resources and support from botanists. This project has been running in various forms since 1988. The direct involvement of the local people in each survey is an important part of helping them get to know and understand their local bushland. The data is collected in such a way as to be compatible with CALM's botanical survey database and also contributes to knowledge of our vegetation and flora at a regional level.

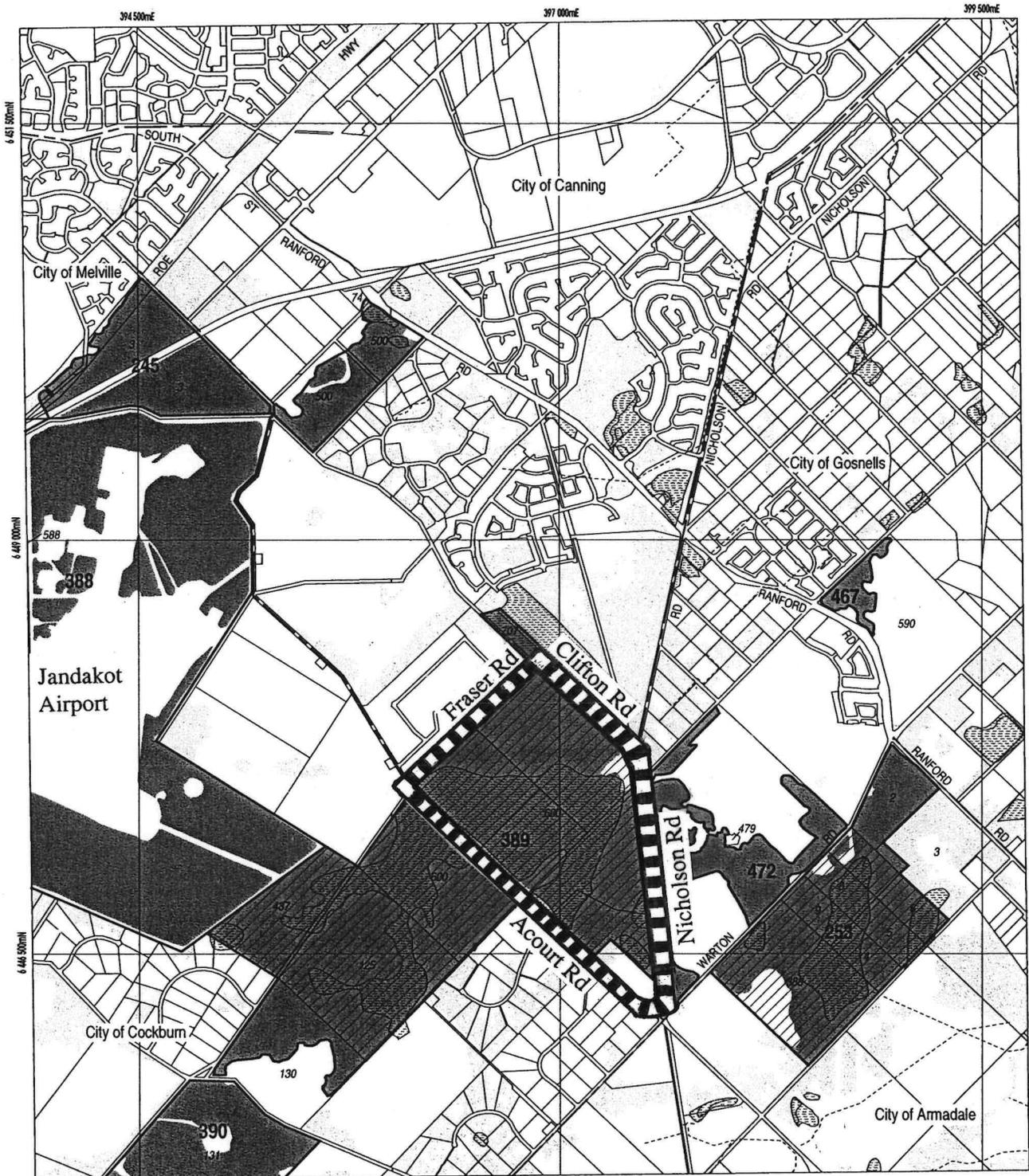
The request to survey the Acourt Rd Bushland North under this project came from the Bannister Creek Catchment Group Inc. (BCCG) who are actively rehabilitating Bannister Creek, a tributary of the Canning River. The aim of this community group is to "coordinate integrated natural resource management over the whole of the Bannister Creek Catchment" (Fisher 1999). Bannister Creek is fed by a spring which is believed to originate just outside the southern boundary of the Acourt Rd Bushland North (Julie Robert, pers. comm. 1999) and flows through this bushland in a north-easterly direction away from the centre of the Jandakot Groundwater Mound (located just south of Jandakot Airport). It flows underground for much of its length, appearing above ground for the last 2 km. A Management Plan (Fisher 1999) has already been released for this section of Bannister Creek.

The BCCG applied for a survey as they wanted to know which plant communities and flora occurred within the catchment of Bannister Creek. This information will help them make informed decisions about management and if revegetation is required, select species in combinations suitable for each location. A survey also provides baseline data on vegetation composition and condition and establishes permanent monitoring sites for future reference.

The northern part of Lot 600 Acourt Rd, bounded by Nicholson, Clifton, Fraser and Acourt Roads, was the subject of this survey (Figure 1). This area is about 60% of the regionally significant bushland described in *Perth's Bushplan* (Government of Western Australia 1998a) as the "Acourt Road Bushland", Bushplan Site No. 389. In this report the area surveyed is referred to as the "Acourt Rd Bushland North" to distinguish it from the larger area described in *Perth's Bushplan*. The Acourt Road Bushland is part of the Jandakot Regional Botanic Park which is managed by the Department of Conservation and Land Management (CALM). The cross hatching in Figure 1 shows the areas that already have some existing level of protection for conservation through zoning as Parks and Recreation.

The Acourt Rd Bushland North covers 182 ha in the south-eastern corner of the City of Canning. There is private property in the south-eastern corner of the site as shown by the white area in Figure 1. In the north-eastern corner the white area indicates degraded weedy vegetation not classed as bushland. Figure 2 is the aerial photograph of the Acourt Rd Bushland North used to map the plant communities present. It gives a clear visual record of the site useful for interpreting the information presented in this report.

**Figure 1: Location of the Acourt Rd Bushland North (Part of Bushplan Site No. 389).
(Bushplan Site Map supplied by the Ministry for Planning)**



LEGEND

- Bushplan Sites With Regionally Significant Bushland
- Other Native Vegetation
- Conservation Category Wetlands
- Bushplan Sites With Some Existing Protection
- Lot Number, Location Number
- Channel Wetlands
- Local Government Boundary

Survey Site Boundary

2033 - I NE

| | | | |
|------|--|----|--|
| NW | | NE | |
| IV | | 63 | |
| SW | | SE | |
| 2033 | | | |
| III | | II | |

1 : 25 000 AMG Reference Grid showing Perth's Bushplan Map Sheet Breakdown

PERTH'S BUSHPLAN MAP INDEX

| | | | | | | | | | | |
|-----|-----|-----|-----|-----|----|----|--|--|--|--|
| 1 | 2 | | | | | | | | | |
| 3 | 4 | 5 | | | | | | | | |
| 6 | 7 | 8 | 9 | 10 | 11 | | | | | |
| 12 | 13 | 14 | 15 | 16 | | | | | | |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | | |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | | | | |
| 31 | 32 | 33 | 34 | 35 | 36 | | | | | |
| 37 | 38 | 39 | 40 | 41 | 42 | | | | | |
| 43 | 44 | 45 | 46 | 47 | 48 | | | | | |
| 49 | 50 | 51 | 52 | 53 | 54 | | | | | |
| 55 | 56 | 57 | 58 | 59 | | | | | | |
| 60 | 61 | 62 | 63 | 64 | | | | | | |
| 65 | 66 | 67 | 68 | 69 | 70 | | | | | |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | | | | |
| 78 | 79 | 80 | 81 | 82 | 83 | 84 | | | | |
| 85 | 86 | 87 | 88 | 89 | 90 | 91 | | | | |
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| 98 | 99 | 100 | 101 | 102 | | | | | | |
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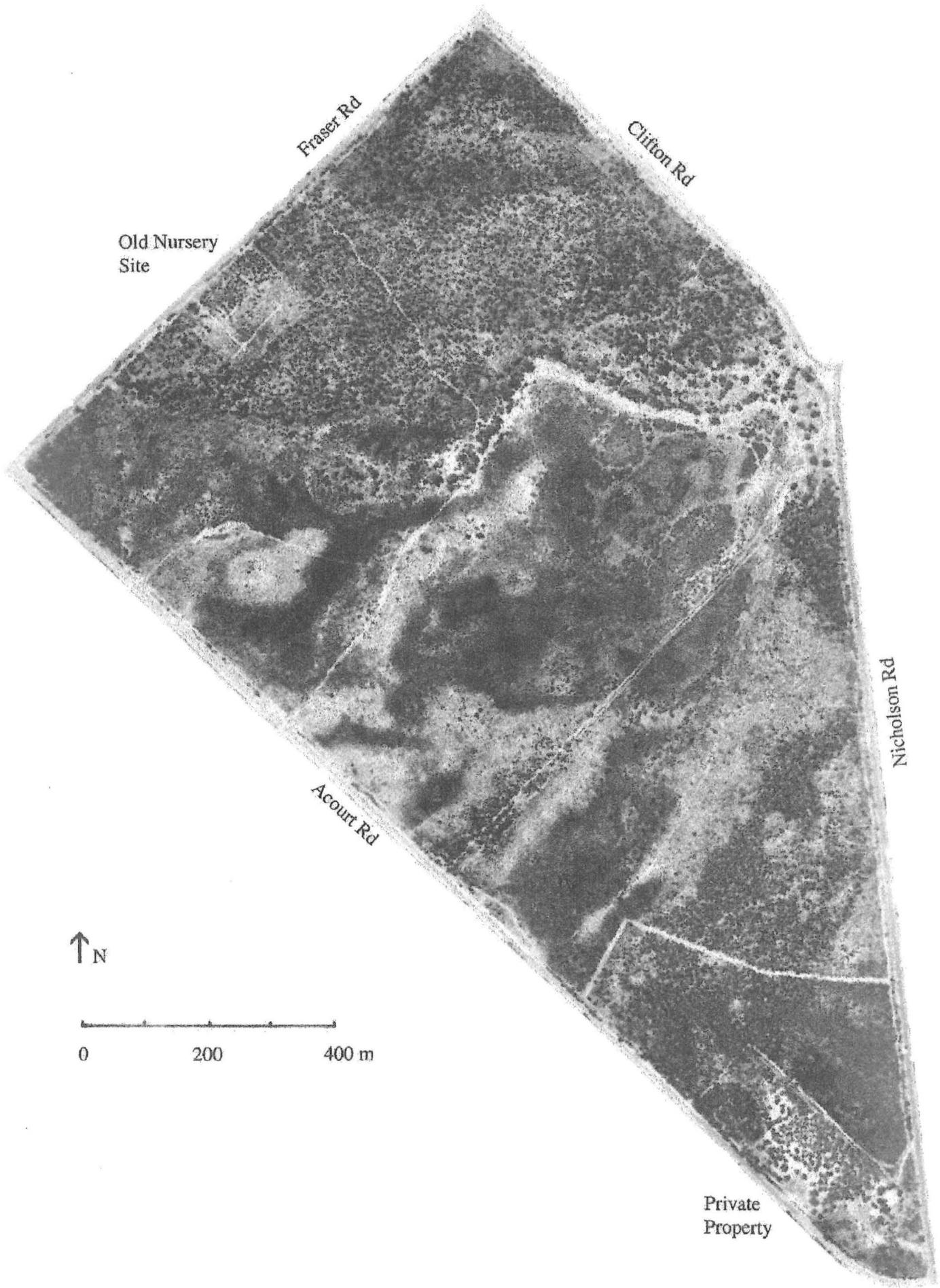
SCALE

0 500 1000 Metres

Produced by Project Mapping Section
Land Information Branch, Ministry for Planning, Perth W.A. November 1998
ntw-map18/environ/bushplan/bushv2_68.dgn

Cadastral Data supplied by Department of Land Administration, W.A.
Wetlands Data supplied by Water and Rivers Commission
Native Vegetation Extent for Study Area supplied by Agriculture Western Australia

Figure 2: Aerial photograph of the Acourt Rd Bushland North. (Taken 5 January 1997).



1.1 History

In 1993 the Canning Property Group put forward a proposal to subdivide the western half of the area being considered by this survey for a housing development (EPA 1994). This proposal covered Lots 122, 123 and 403 Acourt Rd, the north-western part of what is now Lot 600 Acourt Rd. The proposal was refused due to public pressure and the conservation value of the vegetated uplands and wetlands. The area was subsequently included in the final proposals for the Jandakot Regional Botanic Park (State of Western Australia 1995). An amendment to the Metropolitan Region Scheme has now been made to change the zoning of the land from "Rural" to "Parks and Recreation" and the Western Australian Planning Commission purchased the Acourt Rd Bushland North in 1997 for incorporation into the regional park. In mid-1998 the site was handed over to the Department of Conservation and Land Management (CALM) for management purposes.

At some stage a nursery operated in the middle of the western boundary of the site with the glasshouse/shadehouse frames still remaining. The area is now dominated by Woolly Bush, *Adenanthos cygnorum* subsp. *cygnorum*, a local native species. The original nursery fencing still remains.

1.2 Climate

The south-west of Western Australia has a Mediterranean climate with cool, wet winters and hot, dry summers. Rainfall in Perth averages 795 mm per year and falls primarily from late Autumn (May) through to early Spring (September) (Perth Airport Recording Station, Bureau of Meteorology 2000). There can be no rainfall at all for 4-5 month periods over summer combined with regular week long heat waves with temperatures over 30 to 35°C. Average temperatures range from maximums of 31.8°C (Feb.) to 17.7°C (July) and minimums of 17.4°C (Feb.) to 8.1°C (July) (Bureau of Meteorology 2000).

Climate varies across the Swan Coastal Plain with rainfall decreasing on a gradient from south to north, and increasing on the eastern side of the plain at the base of the Darling Scarp (Gibson *et al.* 1994). Mean daily temperatures vary in a similar way, being higher in the north and east, but are accompanied by lower mean minimum temperatures and frosts near the scarp. The Acourt Rd Bushland North is located about the middle of these north-south and east-west gradients, frosts rarely occur, rainfall is moderate and maximum summer temperatures are high due to the reduced effect of the sea breeze this far inland.

1.3 Geomorphology and Soils

The occurrence of plant and animal communities on the Swan Coastal Plain is closely related to the underlying geology, geomorphology and soil types which have developed over millions of years.

The Swan Coastal Plain itself is relatively young having only been formed in the last three million years by a series of wind deposited sand dunes and water-borne and/or erosional deposits. These sand dunes lie parallel to the present day coastline at various distances inland according to where the sea level occurred at the time they were formed. Parts of the most easterly dunes, nearest the Darling Scarp Plateau, have been overlaid with deposits washed down from the plateau by various rivers. This alluvial (water-borne) plain is called the Pinjarra Plain and lies to the east of three major sand dune systems, the Quindalup, Spearwood and Bassendean, which make up the Swan Coastal Plain (McArthur and Bettenay 1960). These four major geomorphological systems are referred to as landform elements and are defined by geology, topography and origin. Between and within these landform elements occur extensive chains of wetlands where drainage is limited.

The Acourt Rd Bushland North occurs on the Bassendean Dunes which are the oldest and least fertile. These dunes have been heavily leached over time (Government of Western Australia 1998a). According to Playford *et al.* (1976), there is a transition zone between the Bassendean Dunes and the Pinjarra Plain in the eastern section of the Acourt Rd Bushland North (Bassendean Dune/Pinjarra Plain element). The Acourt Rd Bushland North also contains extensive areas of seasonal wetlands in the low lying areas as shown by the conservation category wetlands mapped in Figure 1.

The soils of the area are mapped and described in Jordan (1986). Four soil types occur at the site, all being quartz sands with varying amounts of organic matter according to their distribution in relation to the wetlands. The dunes are basically pure sand, however, finer peaty sands occur in the wetlands where the content of organic matter varies in relation to the productivity of the wetland vegetation they support.

1.4 Vegetation and Flora

The maps of Heddle *et al.* (1980) show the vegetation complexes of the Swan Coastal Plain (Government of Western Australia 1998a). They show that most of the Acourt Rd Bushland North belongs to the Bassendean Complex - Central and South, with the eastern side of the site Southern River Complex (Heddle *et al.* 1980).

In general terms the vegetation of the Bassendean Complex - Central and South, ranges from woodlands of Jarrah (*Eucalyptus marginata*), Sheoak (*Allocasuarina fraseriana*) and *Banksia* species on the sand dunes, to low woodlands of paperbarks (*Melaleuca* spp.), and sedgelands on the low-lying depressions and swamps (Heddle *et al.* 1980). This complex is where the transition from Jarrah (*Eucalyptus marginata*) in the south to Coastal Blackbutt (*Eucalyptus tottiana*) in the north occurs. The Southern River Complex occurs where there is a combination of the Bassendean Dunes and Pinjarra Plain. It is typified by an open woodland of Marri (*Eucalyptus calophylla*), Jarrah (*Eucalyptus marginata*) and *Banksia* species on the elevated areas with woodlands of Flooded Gum (*Eucalyptus rudis*) and Swamp Paperbark (*Melaleuca raphiophylla*) fringing the streams (Heddle *et al.* 1980).

A survey by Goble-Garratt (1994) of the western half of the site was conducted at the time of the Canning Property Group's proposal to subdivide and develop housing in the area. This survey found 148 taxa (117 native species and 31 weeds) and mapped and described 9 plant communities based on their structure and dominant species. Greg Keighery (pers. comm. 2000) also collected in the area as part of studies for the proposed Jandakot Regional Botanic Park.

1.5 Wetlands

Over half of the Acourt Rd Bushland North is covered in wetlands of a type known as "damplands" because they are seasonal and develop in natural basins due to waterlogging. A regional study of wetlands on the Swan Coastal Plain (Hill *et al.* 1996) identified the wetlands in the Acourt Rd Bushland North as of "Conservation Category" status with an intended management objective of preserving their natural attributes and functions.

Of particular significance is the location of this area in relation to the Jandakot Groundwater Mound. The Jandakot Mound is a major source of potable water for the population of Perth. In 1997 a draft Statement of Planning Policy titled the "Jandakot Groundwater Protection Policy" was released for public comment (State of Western Australia 1997). Its main aim is to ensure that development does not prevent long-term use of the groundwater for human consumption. The government hopes to protect the quantity and quality of groundwater in the Jandakot Public Water Supply wellfield by controlling land use in the areas zoned Rural, Parks and Recreation or Public Purposes located above the mound. The Acourt Rd Bushland North has been designated a Priority 1 Source Protection Area along with all other bushland, parkland or forested areas under government reservation above the mound. The wetlands of the Acourt Rd Bushland North are an expression of the Jandakot Groundwater Mound which rises to the surface during the winter months due to recharge from natural rainfall.

1.6 Fauna

No detailed fauna surveys have been conducted for this area so little is known about the animals living in and using the site. A limited survey was carried out by Wood and Grieve (1994) as part of the environmental impact assessment of the proposal to develop the area for housing. The significant species Quenda or Southern Brown Bandicoot (*Isodon obesulus fusciventer*) was found to occupy the site. The Quenda is currently listed as a Priority 4 species by CALM (1998) because its population may be under threat due to loss of suitable habitat.

Corridors of vegetation linking bushland areas are important for the continued survival of fauna and flora. They allow movement between suitable habitat during drought, fire and other disturbances and the exchange of genetic material between populations to prevent problems from in-breeding. The Acourt Rd Bushland North as part of the Jandakot Regional Botanic Park forms a major "Greenway" linkage of ecological significance for the movement of fauna and flora on the south-eastern side of the Swan Coastal Plain (Tingay, Alan & Associates 1998).

2. Objectives

The broad objectives of the Bushland Plant Survey Project are to:

- help the community better understand their local bushland by -
 - a) involving them in on the ground survey, including documentation of vegetation structure, recognition of plant communities, species composition (both native species and weeds), vegetation condition and landscape detail
 - b) offering opportunities to learn and practice plant identification skills at workshops and herbarium sessions
- provide the vegetation and flora information needed to contribute towards determining the conservation values of the study area.
- provide the vegetation and flora information needed to determine management priorities and appropriate procedures.
- contribute to regional knowledge of the vegetation and flora.

The specific objectives of this survey, as agreed with the Bannister Creek Catchment Group, were to:

- map the extent of the major plant communities
- establish permanent survey sites (quadrats) in these plant communities
- sample the flora of each quadrat at least once during spring with community participation
- describe the physical parameters, vegetation and flora of each quadrat
- compile a flora list for the survey site showing occurrence by plant community
- prepare a field herbarium with community participation, for use by the local community
- contribute towards describing the conservation values of the survey site.

3. Survey Methods

The survey methods used are described in the publication "Bushland Plant Survey for the Community" by Keighery, BJ (1994). These methods were developed in conjunction with botanists and trialed successfully during the Moore River to Jurien Sandplain Survey (Griffin and Keighery 1989). They have proved successful for volunteer and community participation over a number of years. The use of quadrats (10 x 10 m) and standardised data recording sheets allow the systematic collection of information and ensures that all species are recorded, not just common ones. The quadrats provide the baseline data required for the plant species list and descriptions of the plant communities. Metal fence droppers are used as Quadrat markers in case of fire and are left in place (with the landowner's or land manager's permission) to create permanent monitoring sites. At the end of the project copies of the photographs and field recording sheets are given to the community group for future reference.

The initial survey was conducted on the 8 August 1998. Each quadrat was given a four letter code (JAND representing the Jandakot Regional Botanic Park) plus a sequential number. Quadrats were located away from tracks and areas of disturbance and placed in bushland considered typical of a given plant community, ten quadrats were completed. Volunteers and community group members worked in groups of four or five, each including a volunteer experienced in the survey techniques.

Vegetation structure was recorded using the classification system shown in Appendix 1 and dominant species in each layer noted. A vegetation condition rating was assigned according to the scale in Appendix 1. This data was checked later for consistency by the project leaders.

A list of all the species within the quadrat was then made with specimens being collected where necessary to confirm identification and provide material for the field herbarium. If a species was uncommon and only

one or two plants could be found, a detailed description was made and a photograph taken for identification so as not to remove the species from the site. Care was taken not to trample the bushland, especially within the quadrat. Additional species from the same plant community were recorded from just adjacent to each quadrat (adjacents). Records of species not found in or adjacent to the quadrats were also made across the whole site (opportunistics).

Each quadrat was revisited later in spring on 27 September 1998. Specimens were collected from later flowering species and many annual plants were recorded, substantially expanding the species list. This revisit was particularly important as the initial survey proved to be too early in the season to collect sufficient flowering material for accurate identification of some species. Collections were also made at other times throughout the year by the project leaders during the preliminary site assessments and subsequent visits to finalise the vegetation map.

A plant identification workshop was held on the day following the initial survey allowing some of the plant identification work to be carried out on fresh specimens (Figure 4, photo section). All specimens were pressed and then dried in low temperature ovens at the Western Australian Herbarium before freezing for one week to kill insect pests. Volunteers and the botanists leading the project then completed the identification work on the dried specimens during regular sessions at the Reference Herbarium of the WA Herbarium. A field herbarium was compiled by the volunteers for presentation to the Bannister Creek Catchment Group along with this report. Duplicates of as many species as possible, including any rare or priority species, will be lodged with the WA Herbarium following completion of the project.

It is estimated that this survey will have recorded approximately 75-80% of the plant species present at the site. No survey can claim to fully record the flora and vegetation present on any given site. There are always limitations associated with the survey methods and the season and time period over which it is conducted. The limitations of this study were as follows:

- It was conducted over only one flowering season (spring 1998). Collections need to be made over several flowering seasons and regularly at other times of year, over several years to more fully document the flora and vegetation.
- Estimates of vegetation cover and assessments of vegetation condition are somewhat subjective as they are interpreted slightly differently between individuals. Vegetation condition is considered relative to what we would expect pristine bushland to be.
- No analysis of soil types was carried out, observations of colour and texture for surface soils were made and the sub-surface soil described by digging a pit approximately 0.15 m deep with a trowel. If ant nests were present, the colour and texture of the soil brought to the surface were determined. The assessment of soils at the site is primarily based on the mapping of Jordan (1986) as discussed in Section 1.3.
- Where adequate material is available after construction of the field herbarium, duplicate voucher specimens will be lodged with the WA Herbarium as a lasting record of the species collected. Rare or priority species are always vouchered and most species from the survey will be vouchered. In the future, name changes to any of the vouchered specimens can be corrected with confidence as they will have been verified by the WA Herbarium. For other specimens the field herbarium may need to be taken to the WA Herbarium to ensure the specimen in the field herbarium is the species that has changed its name. This is particularly necessary if a given species is divided up into several new species or subspecies. All of the species identified during the survey were verified against voucher specimens at the WA Herbarium to ensure the accuracy of the identifications.
- Detailed floristic analysis of the data collected was not undertaken due to project resources and was not considered necessary for the project's objectives. All data collected by the Bushland Plant Survey Project is made available to the Department of Conservation and Land Management's (CALM) Biological Survey Unit for use in regional studies of vegetation and flora. The standardised collecting methods used in this survey are compatible with those used by CALM.

4. Results

4.1 Vegetation

The plant communities were determined by assessment of the vegetation structure, dominant species and species composition. Six distinct plant communities were identified from the quadrat data and later it became apparent that a shrubland community existed on the eastern side of the site that had not been sampled. A brief description of this area was made and is referred to as "JAND11". Appendix 2 summarises the information collected for each quadrat grouped according to mapped plant community.

4.1.1 Vegetation Map

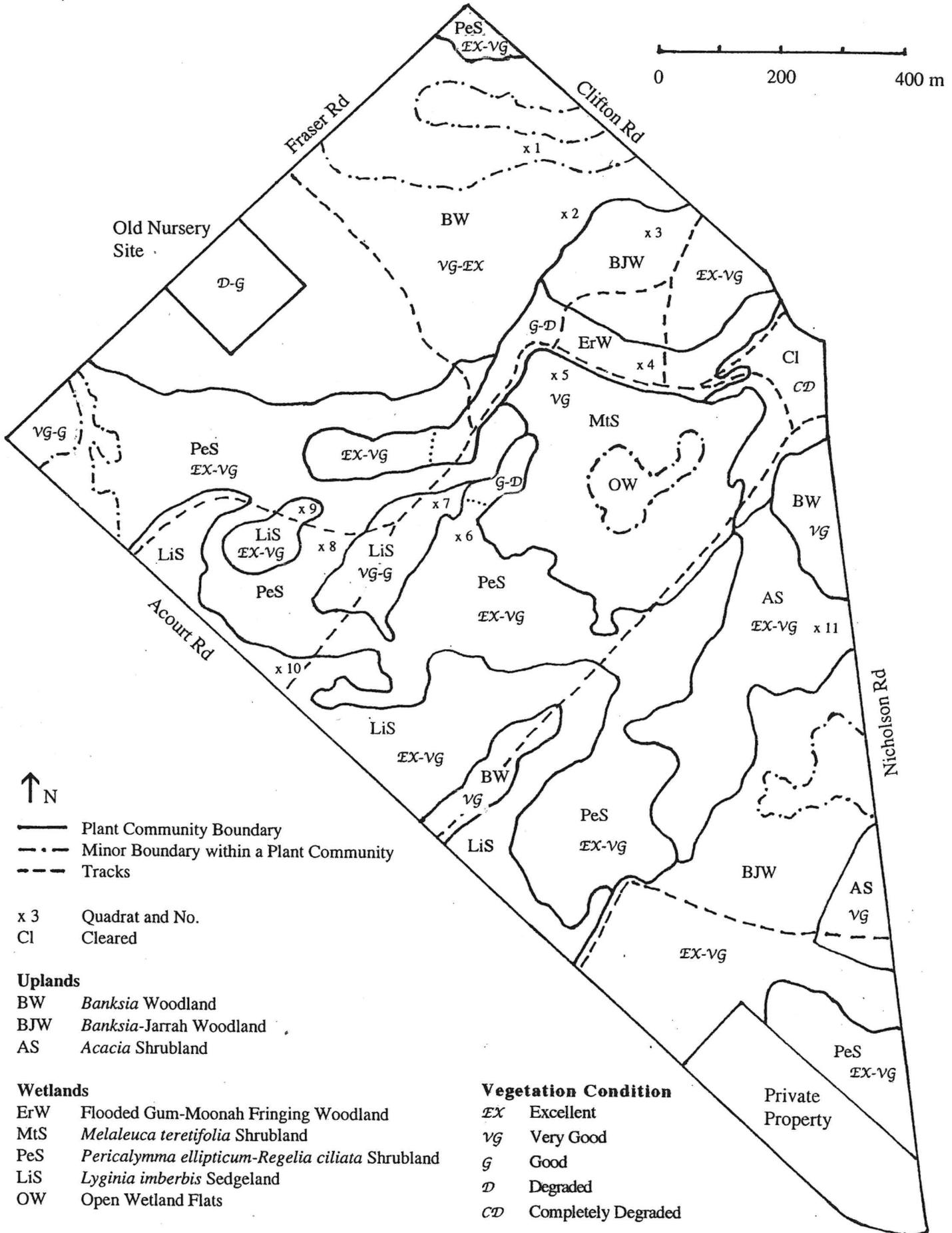
The mapping of Goble-Garratt (1994) for the western half of the site was confirmed with some minor variations. Goble-Garratt (1994) noted that boundaries on her vegetation map were approximate as the boundaries between the ten units she recognised were not distinct. The distribution of each of the seven plant communities described in this report is shown in Figure 3. Several of the units described by Goble-Garratt (1994) have been combined in this study as they were observed to form a mosaic that was difficult to separate for mapping purposes. Table 3 shows how the mapped plant communities in this report relate the vegetation types mapped by Goble-Garratt (1994).

Figure 3 is at the same scale as the aerial photograph in Figure 2 to aid interpretation of the mapped communities on the ground (Figure 3 can be transferred to overhead film and used as an overlay on Figure 2). Below is a brief description of each community, its main characteristics and how it relates to those previously described by Goble-Garratt (1994).

Table 3: Mapped plant communities of the Acourt Rd Bushland North and their relationship to the mapped vegetation types of Goble-Garratt (1994).

| Mapped Plant Community | Equivalent Vegetation Type in Goble-Garratt (1994) |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Uplands | |
| <i>Banksia</i> Woodland (BW) | B. <i>Banksia</i> Low Woodland of the Crests and C. <i>Banksia</i> Low Woodland of the Slopes and Swales |
| <i>Banksia</i> -Jarrah Woodland (BJW) | D. <i>Banksia</i> -Sheoak-Jarrah Woodland |
| <i>Acacia</i> Shrubland (AS) | Outside Goble-Garratt (1994) survey area |
| Wetlands | |
| Flooded Gum-Moonah Fringing Woodland (ErW) | E. Flooded Gum-Moonah Fringing Woodland |
| <i>Melaleuca teretifolia</i> Shrubland (MtS) & Open Wetland Flats (OW) | F. <i>Melaleuca teretifolia</i> Shrubland and FF. Open peaty areas with scattered <i>Melaleuca teretifolia</i> |
| <i>Pericalymma ellipticum</i> - <i>Regelia ciliata</i> Shrubland (PeS) | G. <i>Pericalymma ellipticum</i> Dense Low Shrubland and H. <i>Regelia ciliata</i> - <i>Melaleuca lateritia</i> Shrubland and A. Mixed Low Heath and I. <i>Melaleuca (rhapizophylla)</i> - Spearwood (<i>Kunzea ericifolia</i>) thickets |
| <i>Lyginia imberbis</i> Sedgeland (LiS) | Not recognised as a separate unit, included in G. or H. of Goble-Garratt (1994) |

Figure 3: Plant Communities of the Acourt Rd Bushland North.



| | | |
|---------|----------------------------------------------------|-------------------------|
| UPLANDS | <i>Banksia</i> Woodland Quadrat/s: JAND1, JAND2 | Figure 3 BW Figure 5 |
|---------|----------------------------------------------------|-------------------------|

Banksia Woodland dominates the large dune running east to west across the northern part of the site as well as the dune to the east of the central wetlands (Figure 3). There is also a small low ridge of *Banksia* Woodland extending north-east from half way along Acourt Rd into the wetland communities (Figure 3).

This *Banksia* Woodland is characterised by an overstorey of *Banksia attenuata* (Candle Banksia) and/or *Banksia menziesii* (Firewood Banksia) with trees such as *Allocasuarina fraseriana* (Sheoak) or *Eucalyptus todtiana* (Coastal Blackbutt) forming part of the canopy in places. The understorey varies from low heathlands less than one metre high dominated by *Scholtzia involucrata* (Spiked Scholtzia) to shrublands dominated by thickets of *Calytrix fraseri* (Pink Summer Calytrix) which grows up to two metres tall. Sedges such as *Lyginia imberbis* and *Desmocladius flexuosus* are common in among the perennial herbs *Phlebocarya ciliata*, *Conostylis aculeata* (Prickly Conostylis) and *Dasypogon bromeliifolius* (Pineapple Bush), with a wide variety of annual herbs blooming in spring each year.

This community type can be further subdivided on the basis of topography into that of the dune slopes and swales (depressions between dunes) and that of the dune crests as in Goble-Garratt (1994). Quadrat JAND2 was located on a dune ridge in the north-west corner of the site while JAND1 was located on a dune slope. The division between the easily recognised crests and swales are shown by dotted lines in Figure 3. The vegetation of the dune ridges is typically more open and the trees lower in height than in the slopes/swales where more moisture is likely to be available for plant growth. This can be seen in the aerial photograph (Figure 2) as the dune ridges have a lighter colour and lower density of trees. Goble-Garratt (1994) notes that a characteristic feature of the dune slopes and swales is the presence of *Banksia ilicifolia* (Holly-leaved Banksia) in the overstorey and *Regelia ciliata*, *Melaleuca thymoides* and *Leucopogon sprengelioides* in the shrub layer. While this was not recorded in JAND 1, further down slope in the swale these species were observed as major components of the vegetation structure.

| | | |
|---------|-----------------------------------------------------|--------------------------|
| UPLANDS | <i>Banksia</i> -Jarrah Woodland Quadrat/s: JAND3 | Figure 3 BJW Figure 6 |
|---------|-----------------------------------------------------|--------------------------|

Banksia-Jarrah Woodland occurs on the eastern slope of the large dune in the northern part of the site and across the dune in the southern part of the site (Figure 3). It is similar in species composition to the *Banksia* Woodland community but the canopy can be dominated by large *Eucalyptus marginata* (Jarrah) and *Allocasuarina fraseriana* (Sheoak) trees. *Banksia ilicifolia* (Holly-leaved Banksia) and *Eucalyptus todtiana* (Coastal Blackbutt) are also frequently present in the overstorey. Generally the overstorey is taller in this community probably reflecting a lower position in the landscape and different soils which provide more moisture for plant growth. *Hibbertia hypericoides* (Yellow Buttercup) is often dominant in the understorey. Goble-Garratt (1994) noted that *Conostylis aculeata*, *Bossiaea eriocarpa* and *Calytrix fraseri* were also characteristic of this community but we found these species were also present in communities upslope, especially *Conostylis aculeata*.

Along Nicholson Rd there were two more open areas among the *Banksia*-Jarrah Woodland that were dominated by *Adenanthos cygnorum* subsp. *cygnorum*, shown by the dotted lines on Figure 3. It appeared these areas were more low lying and transitional with the wetland communities, however, they have been mapped as part of the *Banksia*-Jarrah Woodland rather than define a new community for the purposes of this report.

On the southern dune where it joins Acourt Rd, just north-west of the private property, there is a stand of *Xylomelum occidentale* (Woody Pear) trees beneath the canopy of sheoaks and banksias. These trees do not seem to occur anywhere else on the site and would make an interesting feature on any walk trails developed.

UPLANDS

Acacia Shrubland
 Quadrat/s: "JAND11"

Figure 3 AS

This community was not sampled in detail. *Acacia pulchella* (Prickly Moses) and *Calytrix fraseri* formed the overstorey in the area examined, with the herbs *Dasypogon bromeliifolius* (Pineapple Bush) and *Phlebocarya ciliata*, sedge *Schoenus curvifolius* and grass *Amphipogon turbinatus* dominant in the understorey. In many respects this community is like the *Banksia* Woodland community, especially in species composition, but with the layer of *Banksia* trees missing. The Floristic Community Type 21c (Table 3) that seems to equate best to this community can occur as a shrubland or heathland as a variant of the low lying *Banksia attenuata* Woodlands (Gibson *et al.* 1994).

WETLANDS

Flooded Gum-Moonah Fringing Woodland
 Quadrat/s: JAND4

Figure 3 ErW
 Figure 7

The Flooded Gum-Moonah Fringing Woodland grows in the transitional zone between the dunes and wetlands of the central wetland flats (Figure 3). Large *Eucalyptus rudis* (Flooded Gum) trees grow interspersed with the smaller *Melaleuca preissiana* (Moonah) paperbarks. This community has been highly disturbed especially in the eastern section. The understorey is dominated by *Xanthorrhoea preissii* (Balga) and weedy grasses such as **Ehrharta calycina* (Perennial Veldt Grass) and **Eragrostis curvula* (African Love Grass). The area near the corner of Nicholson and Clifton Roads and running down the eastern side of the wetlands is almost entirely African Love Grass. It seems likely this area has been cleared in the past and possibly grazed. The best impression of what this community should look like can be gained by exploring the most western "arm" that projects away from the main access track running through this community (Figure 3). This western area has been subject to much less disturbance. Goble-Garratt (1994) notes that in the undisturbed areas the understorey is dominated by dense beds of the sedge *Schoenus globifer*, with *Lepidosperma longitudinale* and *Lyginia imberbis* common. *Hypocalymma angustifolium*, *Jacksonia furcellata* and *Astartea fascicularis* can form the shrub layer in the understorey below the *Melaleuca preissiana* (Moonah) (Goble-Garratt 1994). The distribution of this community as shown in Figure 3 matches that mapped by Goble-Garratt (1994).

WETLANDS

Melaleuca teretifolia Shrubland
 Quadrat/s: JAND5

Figure 3 MtS
 Figures 8 & 9

The *Melaleuca teretifolia* Shrubland dominates the central wetland area except for a few open peaty flats where deeper pools of water form in winter. *Melaleuca teretifolia* (Banbar) is the dominant shrub in this community growing as a monoculture in the overstorey. *Lepidosperma longitudinale* (Pithy Sword-sedge) grows extensively in the understorey in association with a number of delicate annual herbs. Weeds such as **Eragrostis curvula* (African Love Grass) and **Hypochaeris glabra* (Flat Weed) are unfortunately well established and prolific.

Goble-Garratt (1994) maps this community to the same extent as in Figure 3, however, distinguishes "open peaty areas with scattered *Melaleuca teretifolia*" from areas of dense "*Melaleuca teretifolia* Shrubland". We observed open wetland flats with no vegetation cover and mapped these accordingly, defining the other areas all as *Melaleuca teretifolia* Shrubland. It seems likely that in the five years between the two surveys Goble-Garratt's open areas with scattered *M. teretifolia* have grown substantially and developed into shrublands closing up many of the open peaty areas.

Goble-Garratt (1994) noted that the weedy grass **Sporobolus africanus* (synonym **Sporobolus indicus*) was prominent in the understorey near the edges and in the openings, however, we did not record this species. Goble-Garratt (1994) surveyed the area in late September/early October and again in late October, the latter visit at the peak time for grass development and flowering. Our survey occurred in late August and late September and so may have missed some of the later developing grasses.

The presence of beds of **Typha orientalis*, as reported by Goble-Garratt (1994), was confirmed during subsequent visits where it was found growing on the edges of the open wetland flats.

| | | |
|----------|---------------------------------------------------------------------------------------------|---------------------------------|
| WETLANDS | <i>Pericalymma ellipticum</i> - <i>Regelia ciliata</i> Shrubland Quadrat/s: JAND6, JAND8 | Figure 3 PeS Figures 10 & 11 |
|----------|---------------------------------------------------------------------------------------------|---------------------------------|

Pericalymma ellipticum-Regelia ciliata Shrubland grows across much of the wetland area at the site on slightly higher ground than the *Melaleuca teretifolia* community (Figure 3). There are also two isolated pockets of this community, one in the north-west corner and the other in the south-east corner of the site, beside the private property (Figure 3). These pockets are the remains of the wetland communities that once occurred to the north and south of the site before the area was developed.

In this community both *Pericalymma ellipticum* and *Regelia ciliata* tend to grow in dense thickets dominated by either one or the other species, forming a mosaic throughout the community in association with the other dominant shrub *Calothamnus lateralis*. The tree *Melaleuca preissii* grows as a scattered emergent throughout the community (see the cover of this report), sometimes forming clumps with the occasional *M. raphiophylla* that is also present (Figure 9). The latter prefers wetter conditions and is more typical of deeper wetlands where water is available for most of the year. The damplands at Acourt Rd dry out in summer with only a few pools remaining for longer periods (Goble-Garratt 1994) in the open wetland flats at the centre of the *Melaleuca teretifolia* community (Figure 3). *Kunzea ericifolia* (Spearwood) usually grows in thickets below these two melaleucas where they occur together, such as in the band growing across the south-west corner of the site (Figure 9) indicated by dotted lines in Figure 3. Goble-Garratt (1994) mapped the areas with *Melaleuca raphiophylla* present as a separate community

Goble-Garratt (1994) distinguished the areas dominated by *Regelia* from those dominated by *Pericalymma* but noted that many species were common to both communities.

Much of this community in the central area was burnt by a hot fire in the summer of 1992/93 (Goble-Garratt 1994) and is regenerating well with little weed invasion. The pocket in the south-east corner is where the greatest numbers of Quenda (Southern Brown Bandicoot) are thought to occur. This area has not been burnt for many years. Quenda require dense undergrowth to hide in and *Pericalymma ellipticum-Regelia ciliata* Shrublands provide excellent cover.

| | | |
|----------|----------------------------------------------------------------------|---------------------------|
| WETLANDS | <i>Lyginia imberbis</i> Sedgeland Quadrat/s: JAND7, JAND9, JAND10 | Figure 3 LiS Figure 12 |
|----------|----------------------------------------------------------------------|---------------------------|

The *Lyginia imberbis* Sedgeland grows in close association with the *Pericalymma ellipticum-Regelia ciliata* Shrubland and seems to occur on slightly higher ground again, upslope of the previous two communities. *Lyginia imberbis* dominates this community with small shrubs such as *Pimelea imbricata*, *Hibbertia subvaginata*, *Euchilopsis linearis* (Swamp Pea) and *Adenanthos obovatus* growing as emergents among the sedges.

4.1.2 Regional Floristic Community Types

The occurrence of floristic community types (FCTs) was determined by comparing the species present and absent in each quadrat with the sorted two way table showing species frequency by community type in Gibson *et al.* (1994) and with the descriptions of the FCTs in Gibson *et al.* (1994) and Government of Western Australia (1998b). Assistance was also sort from Bronwen Keighery (pers. comm. 1999) in determining the FCTs from the quadrat data. Table 4 shows the floristic community types expected to occur in the Acourt Road Bushland North. Statistical analysis would be required to confirm these types and it is possible that some of the quadrats may not sort to a community type due to the proportion of weeds present (Bronwen Keighery, pers. comm. 1999).

Table 4: Regional Floristic Community Types in the Study Area. Relationship between the structural units used for mapping and the floristic units determined in the regional survey of Gibson *et al.* (1994) and the System 6 and Part System 1 Update Program (Government of Western Australia 1998b).

| Vegetation Mapping Unit | Quadrats | Floristic Community Types |
|------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------|
| Uplands | | Supergroup 3 - Uplands centred on Bassendean Dunes and Dandaragan Plateau |
| Banksia Woodland | JAND 1 & 2 | 23a. Central <i>Banksia attenuata</i> - <i>Banksia menziesii</i> woodlands |
| Banksia-Jarraah Woodland | JAND 3 | 23a. Central <i>Banksia attenuata</i> - <i>Banksia menziesii</i> woodlands |
| Acacia Shrubland | “JAND 11” | 21c? Low lying <i>Banksia attenuata</i> woodlands or shrublands |
| Wetlands | | Supergroup 2 - Seasonal Wetlands |
| Flooded Gum-Moonah Fringing Woodland | JAND 4 | 11. Wet forests and woodlands |
| <i>Melaleuca teretifolia</i> Shrubland | JAND 5 | 12. <i>Melaleuca teretifolia</i> and/or <i>Astartea fascicularis</i> shrublands |
| <i>Pericalymma ellipticum</i> - <i>Regelia ciliata</i> Shrubland | JAND 6 & 8 | 5. Mixed shrub damplands |
| <i>Lyginia imberbis</i> Sedgeland | JAND 7, 9 & 10 | 5. Mixed shrub damplands |

4.2 Flora

189 vascular plant taxa (species, subspecies and varieties) were recorded in the current survey from 48 different plant families. These consisted of 118 perennials (62% of the flora) and 71 annuals or annually renewed plants. Weed species made up 16% of the flora at 30 species. This brings the total of known plant taxa recorded from this site to at least 240 (197 natives and 43 weeds) (see discussion below).

In the current survey the Myrtle family (Myrtaceae) were the largest group of plants with 21 taxa, all being perennial trees or shrubs. Other families that were particularly well represented on the site were:

| Family | No. Natives | No. Weeds | Total |
|-----------------------------------|-------------|-----------|-------|
| Asteraceae (Daisies) | 12 | 4 | 16 |
| Orchidaceae (Orchids) | 13 | 0 | 13 |
| Poaceae (Grasses) | 3 | 10 | 13 |
| Proteaceae (eg. Banksias, Hakeas) | 12 | 0 | 12 |
| Papilionaceae (Pea Flowers) | 9 | 2 | 11 |

These 6 families together represent 46% of the flora.

The number of species found in the 10 x 10 m quadrats varied from 54 in JAND 2 (48 native and 8 weed species) to 22 in both JAND 6 & JAND8 (19 native and 3 weed species in each quadrat).

A list of the species found across the site and their occurrence is presented alphabetically by family in Appendix 3. Weed species are included in this list and are discussed in detail in Section 5.4.1.

It is very useful to consider the species previously recorded from the site, often at other times of the year, to obtain a more accurate measure of the area's diversity. Previous collections by Goble-Garratt (1994), Greg Keighery (pers. comm. 2000) and recorded in Government of Western Australia (1998b), add another 51 species (38 natives and 13 weeds) to the total flora now recorded for the northern part of this Bushplan Site, bringing the current total to 240 taxa (197 natives and 43 weeds). We estimate this is about 85% of the biodiversity that can be expected. These additional species are listed in Appendix 3 annotated to indicate their source. Additional species are often recorded during separate surveys because of differences in methodology, time of year, variations in plant growth and flowering over time and disturbance factors. For example, walking across the site, especially along existing tracks, picks up the presence of more weed species than using quadrats.

4.2.1 Declared Rare and Priority Flora

The definitions for the declared rare and priority flora classifications are given in Appendix 3 and descriptions of relevant species are given below. Unless otherwise indicated all descriptions in Sections 4.2.1 and 4.2.2 are based on information from Paczkowska and Chapman (2000).

Two species on the Priority Flora List were recorded during this survey, *Byblis lindleyana* (Priority 2) and *Anthotium junciforme* (Priority 4). Both occur in wetland communities, *Byblis lindleyana* was found in the *Lyginia imberbis* Sedgeland and *Anthotium junciforme* in the *Melaleuca teretifolia* Shrublands.

Tripterococcus paniculatus ms (Priority 1) has been previously recorded in the Acourt Road Bushland (Government of Western Australia 1998b) and may be present in the northern section surveyed by this study. *Tripterococcus paniculatus* ms is a wetland species that flowers late in the year and would not have been obvious at the time of our survey.

Goble-Garratt (1994) recorded *Pimelea rara* (Priority 4). However, it seems unlikely that *Pimelea rara*, as the species is currently defined, is present as this species usually only occurs on lateritic soils at the edge of the Darling Scarp in *Eucalyptus marginata* forest (Brown *et al.* 1998).

There are two Declared Rare Flora that could occur at the site as they have been recorded nearby in similar plant communities (Government of Western Australia 1998b). They are two orchid species, *Diuris purdiei* (Purdie's Donkey Orchid) and *Caladenia huegelii* (Grand Spider Orchid). Orchids are annually renewed perennials with leaves that emerge from a below ground tuber each year. Usually these leaves are few and small and orchids are not very obvious unless flowering. Flowering often occurs sporadically or in response to disturbances such as fire.

Caladenia huegelii is known to occur in the southern part of the Acourt Rd Bushland and several other Bushplan Sites near-by. *Caladenia huegelii* is killed by winter or spring fires that occur when the leaves or flowers are present and its growth is suppressed by weed invasion (Brown *et al.* 1998). *Diuris purdiei* flowers in response to summer or early autumn fire (Brown *et al.* 1998) and so would not have been flowering during our survey. A summer fire had burnt part of the wetlands just prior to the survey by Goble-Garratt (1994) and a specific search was made for *D. purdiei* but without success. However, members of the Bannister Creek Catchment Group are certain that they have seen this species in the Acourt Road Bushland North. Further survey for these Declared Rare Flora is recommended under appropriate conditions to determine whether they are present.

***Byblis lindleyana* (Byblidaceae) Priority 2**

Known as the Rainbow Plant, *Byblis lindleyana* is an insect eating plant closely related to the Sundews (Droseraceae). Its long upright leaves are highly modified with long sticky hairs that trap small insects. The insects are dissolved by exudates from the plant and the nutrients absorbed through the leaves. Until recently there was only one species of *Byblis* recognised in the south-west of WA, *Byblis gigantea*, with

two distinct populations, the largest being in the northern sandplains between Cataby and Eneabba (Lowrie 1998). The population in the Perth Region has now been named as a separate species and is endemic to the coastal plain of the Perth Metropolitan Region. *Byblis lindleyana* is an annually renewed perennial herb growing to a height of 20 to 60 cm. It dies down each year in autumn and regrows in spring from its woody basal stems and fleshy root stock. It has pink to purple flowers in mid-summer and grows in winter wet depressions in both sandy or clayey soils.

***Anthotium junciforme* (Goodeniaceae) Priority 4**

This plant is known as the Rush-Like *Anthotium* as it has thin linear to terete leaves giving it a rush-like appearance. It is a small perennial herb growing to between 5 and 40 cm, either erect or prostrate in habit. It produces blue to purple *Dampiera*-like flowers in summer and grows on sandy clay to clay soils in winter wet depressions. It occurs throughout the southwest but is uncommon. It has also been recorded nearby in the *Melaleuca* Shrublands of the Banjup Bushland (Keighery 1992a).

***Tripterococcus paniculatus* ms (Stackhousiaceae) Priority 1**

Yet to be officially described this plant is a thin, upright perennial herb growing occasionally up to 1m in height. Its small, tubular flowers with tentacle-like arms at the mouth are yellow to green in colour and occur from October to November. It is a wetland species and prefers grey, black or peaty sand in winter-wet flats. It is endemic to the coastal plain of the Perth Metropolitan Region. It has also been recorded nearby in the Banjup Bushland (Keighery 1992a).

4.2.2 Other Significant Flora

***Aristida contorta* (Asteraceae)**

A short-lived perennial grass growing from 12 to 44 cm high with brown flowers from February to June. Rarely found on the Swan Coastal Plain (Greg Keighery, pers. comm. 2000).

***Astroloma xerophyllum* (Epacridaceae)**

A prickly leaved, upright shrub with cone-shaped white flowers from July to October. Grows from 25 to 100 cm high and occurs in uplands on both sandy and lateritic soils. Noted as significant flora in Government of Western Australia (1998b) and is near the southern limit of its range (Keighery 1992a). Also occurs nearby at Jandakot Airport and Harrisdale Swamp (Government of Western Australia 1998b).

***Dysphania glomulifera* (Chenopodiaceae)**

A short-lived perennial salt bush that can be either prostrate or erect in habit reaching up to 15 cm in height. Flowers in autumn (March to May) or spring (August to October) with small greenish white flowers. Grows in winter-wet flats or along creeklines. Rarely collected and very uncommon on the Swan Coastal Plain (Keighery 1992b)

***Gonocarpus paniculatus* (Haloragaceae)**

An erect, slender perennial herb that grows from 10 to 65 cm high. Grows in winter wet depressions in sandy soils. Flowers are red-green in colour and appear in October to December/January. This species is not common on the Swan Coastal Plain (Greg Keighery, pers. comm. 2000).

***Hensmania turbinata* (Anthericaceae)**

A species geographically restricted in south-west Western Australia and occurring at this site near the southern limit of its distribution. It is a rhizomatous, perennial herb growing up to 20 cm high with needle sharp leaves emerging from a central base giving the plant a tufted appearance. Flowers are pale yellow and occur from November to December/January. It prefers sandy soils and was found at Acourt Rd North growing in the low lying *Banksia* Woodlands and *Acacia* Shrublands. Also occurs nearby at Jandakot Airport and Harrisdale Swamp and is noted as poorly conserved south of the Swan River (Government of Western Australia 1998b).

Melaleuca teretifolia x *M. lateritia* (Myrtaceae)

A hybrid between two closely associated wetland species, *Melaleuca teretifolia* and *M. lateritia*. The hybrid has bright pink flowers (*Melaleuca teretifolia* has white flowers and *Melaleuca lateritia* has red flowers) and short leaves intermediate in length between the two parent species (Greg Keighery, pers. comm. 2000). This hybrid has also been recorded at Bibra Lake and Roe Swamp (Bronwen Keighery pers. comm. 2000).

Stylidium utricularioides (Stylidiaceae)

The "Pink Fan Trigger Plant" is a slender annual herb that grows to a height of 5 - 12 cm. Flowers are pink and white with a yellow throat and occur from October to December. This plant is endemic to the Swan Coastal Plain (Government of Western Australia 1998b) and grows on sandy clay soils of seasonal wetlands.

4.3 Vegetation Condition

The condition of the vegetation throughout the study area varied from Excellent to Degraded with the lowest condition areas occurring along the boundaries and tracks. Overall the vegetation was in Excellent to Very Good condition (Figure 3 and Appendix 2). Only the area in the north-east corner of the site, which no longer contains native vegetation, is classed as Completely Degraded (Figure 3).

Goble-Garratt (1994) also noted in 1993 that the condition of the area surveyed varied widely but used a different condition scale. The areas equivalent to *Banksia* Woodland, *Pericalymma ellipticum-Regelia ciliata* Shrubland and *Lyginia imberbis* Sedgeland were in very good condition in 1993 with weed invasion limited to the external boundaries and alongside tracks (Goble-Garratt 1994). Only the weeds **Gladiolus caryophyllaceus* and **Briza maxima* were observed occasionally throughout the *Banksia* Woodland in 1993. Parts of the *Banksia*-Jarrah Woodland were noted as particularly disturbed, mainly near the tracks, due to rubbish dumping, partial clearing, firewood collection and weed invasion (Goble-Garratt 1994). We found evidence that people had camped in this area for an extended period of time in the past. Goble-Garratt (1994) had recorded that the Flooded Gum-Moonah Fringing Woodland and periphery of the open wetland flats were highly disturbed and very weedy. This was mostly due to repeated human disturbance. We found evidence that these areas were repeatedly used by off-road vehicles. In the summer of 1993 most of the wetlands in the south-western portion of Goble-Garratt's study area had been burnt and this created a greater diversity and density of weeds the following spring than normally would be expected. Rabbit activity was also particularly high in these burnt areas. The wetland area in the western corner of the site was noted as heavily weed infested and the spread of bulbous garden plants was not observed to be a problem by Goble-Garratt (1994).

Our survey confirmed the observations of Goble-Garratt (1994), with the eastern side of our study area in better overall condition than the western half studied by Goble-Garratt, probably due to the presence of fewer heavily used access tracks. We found that the *Banksia* Woodland and *Banksia*-Jarrah Woodland contained a low level of serious weeds such as **Gladiolus caryophyllaceus* and **Ehrharta calycina*. The latter was not noted by Goble-Garratt (1994) and may indicate conditions have changed in recent years to favour the spread of this grass which is very common in urban bushland and particularly invasive after fire.

Some of the *Banksia* Woodland areas contained dead or dying trees and shrubs, especially along the western boundary (Fraser Rd). This is a major change that has occurred since 1993 and includes a general decline in the numbers of *Banksia ilicifolia*, indicated in the woodlands by the many dead adult trees now present. Accompanying this were scattered deaths of the other dominant trees *B. attenuata* and *B. menziesii* and some of the understorey shrubs such as *Eremaea pauciflora*.

The *Melaleuca teretifolia* Shrubland was generally in Very Good condition. However, many of the *Melaleuca teretifolia* were showing signs of stress such as many apparently dead branches. Large numbers of the non-aggressive weed **Hypochaeris glabra* were also present in the understorey.

The *Pericalymma ellipticum-Regelia ciliata* Shrubland was overall in Excellent to Very Good condition. However, one patch near the centre of the site was only in Good-Degraded condition. This area was the

most seriously affected in the whole study area with many dead shrubs and sedges and with little natural regeneration occurring.

The *Lyginia imberbis* Sedgeland ranged in condition from Excellent to Very Good with only a low incidence of serious weeds, such as **Ehrharta calycina* and **Gladiolus caryophyllaceus*. Some of the small shrubs present were dying back over broad areas and where this occurred there were large numbers of **Hypochoeris glabra*.

Much of the Flooded Gum–Moonah Fringing Woodland was very weedy with little native understorey. In particular, the northern ‘arm’ of this community showed signs of repeated disturbance over many years and was only in a Good to Degraded condition. The understorey appears to have been heavily grazed or perhaps cleared at some time in the past. The wide track, which runs most of the way along this community, has led to continued disturbance and the invasion of weed species. The most significant weed species, of the 12 introduced species found here, were **Pelargonium capitatum*, **Ehrharta calycina*, **Ehrharta longiflora* and **Romulea rosea*. Despite the weediness of this vegetation type 39 species of native plant were recorded during the survey, indicating a good base for rehabilitation work. The southern ‘arm’ of this community, away from the access track, was in Excellent to Very Good condition and shows what this community should look like.

Rabbit activity was noted throughout the site, particularly in the wetlands communities without dense understorey layers of shrubs or sedges, such as the *Melaleuca teretifolia* Shrubland and *Lyginia imberbis* Sedgeland. Rabbits are a threat to native vegetation, particularly if present during other environmental stress events such as drought. Rabbits inhibit natural regeneration by feeding preferentially on young seedlings, they also introduce and spread weed seed in their droppings. Rabbit activity may become critically damaging to bushland which is suffering under other stresses such as drought or in combination with severe disturbance such as too frequent fire. The effect of rabbits alone on bushland condition is difficult to gauge.

In April 2000 we revisited the areas at the site that had declined in condition since 1993 to more closely examine the pattern of plant deaths and which species were affected. The possible cause of these condition changes is discussed in section 5.4.2. On the dune ridge, near the main track leading from the western boundary, there were many dead or dying mature *Banksia* spp., *Melaleuca thymoides*, *M. spathulata*, *Scholtzia involucreta*, *Regelia ciliata*, *Hibbertia subvaginata*, *Leucopogon conostephioides*, *L. sprengelioides* and *Lechenaultia floribunda* (Figures 13 & 14). Some of the large, long-lived herbs, *Dasypogon bromeliifolius*, *Phlebocarya ciliata* and *Patersonia occidentalis*, were also dying back and showing signs of stress in their foliage. Down slope to the north there was a dead stand of mature *Regelia ciliata* in the understorey with stressed or dead *Banksia* spp., *Melaleuca thymoides*, *Leucopogon conostephioides*, *Dasypogon bromeliifolius* and *Phlebocarya ciliata*.

In the *Melaleuca teretifolia* Shrubland there were some dead *M. teretifolia* and many with only a few green branches. The degraded area of *Pericalymma ellipticum-Regelia ciliata* Shrubland at the centre of the site was dominated by scattered clumps of healthy *Lyginia imberbis* but littered with the dead leaves and clumps of the sedge *Schoenus subfascicularis* (Figure 15). At the edges *Calothamnus lateralis* and *Melaleuca lateritia* were dying back and missing altogether from the degraded area. In the *Lyginia imberbis* Sedgeland some of the sedges and small shrubs were dying over broad areas.

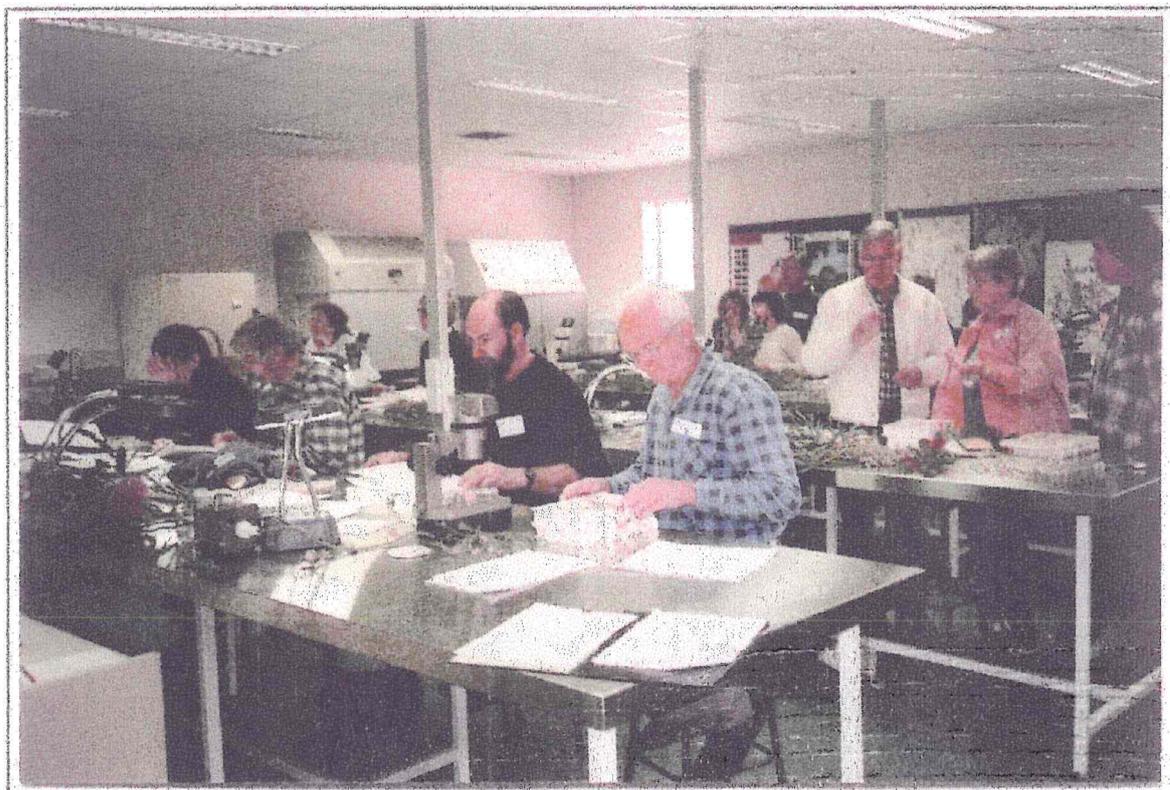


Figure 4: The Plant Identification Workshop held on 9 August 1998 at the Murdoch campus of the South Metropolitan College of Technical and Further Education (TAFE). Participants practised newly learnt plant identification skills on fresh specimens collected from Acourt Rd Bushland North providing valuable follow up to the survey activities of the previous day. (Photograph by Brian Moyle).

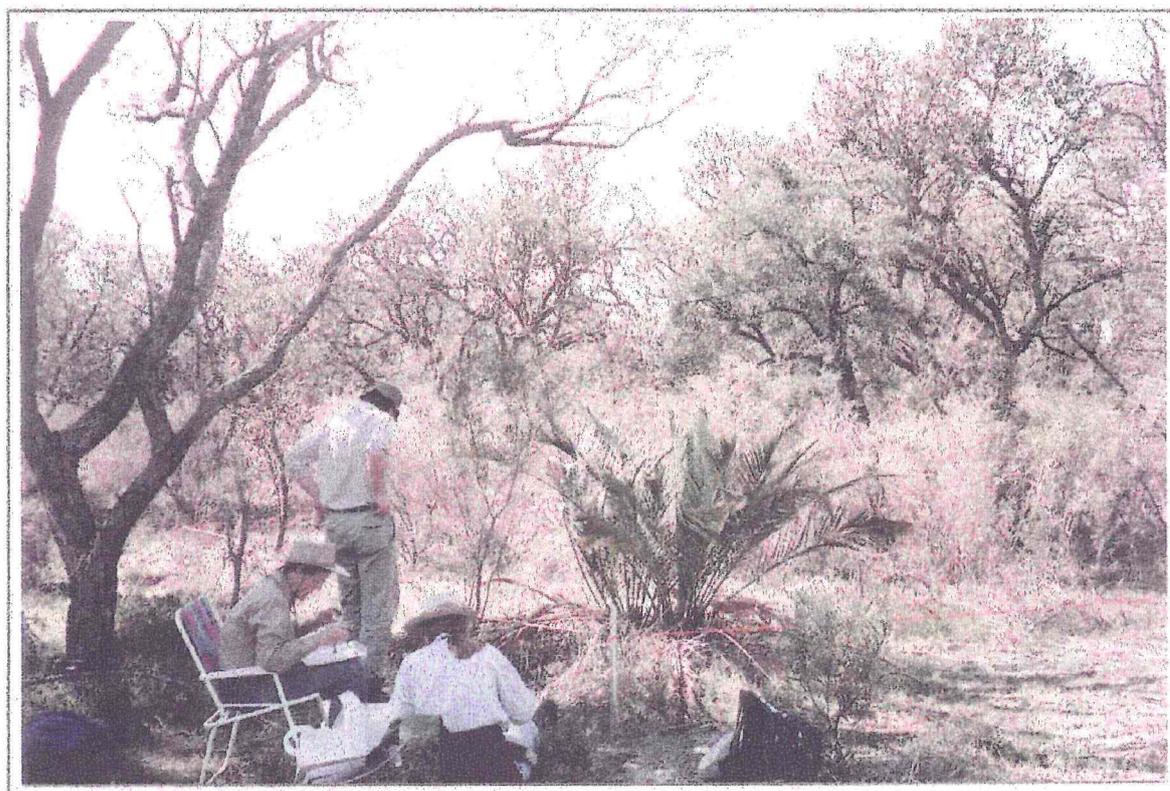


Figure 5: *Banksia* Woodland on the dune crest in the north-west corner of the site. At this site the overstorey was dominated by *Banksia menziesii* (Firewood Banksia) with *Calytrix fraseri* (Pink Summer Calytrix) forming thickets in the understorey over the much smaller shrub *Leucopogon conostephioides*. The volunteers worked in teams of 4 to record the structure and composition of each quadrat carefully searching for all species present. Quadrat JAND2, 8 August 1998 with 46 native species and 8 weed species. (Photograph by Karen Clarke).



Figure 6: *Banksia*-Jarrah Woodland near the northern boundary, Clifton Rd. Here the overstorey was dominated by *Allocasuarina fraseriana* (Sheoak) and *Eucalyptus totitama* (Coastal Blackbutt) with only scattered *Banksia* and Jarrah present. The low understorey was dominated by *Hibbertia hypericoides* (Yellow Buttercup), *Patersonia occidentalis* (Purple Flag), *Phlebocarya ciliata* and *Dasypogon bromeliifolius* (Pineapple Bush). Quadrat JAND3, 8 August 1998 with 40 native species and 9 weed species. (Photograph by Karen Clarke).

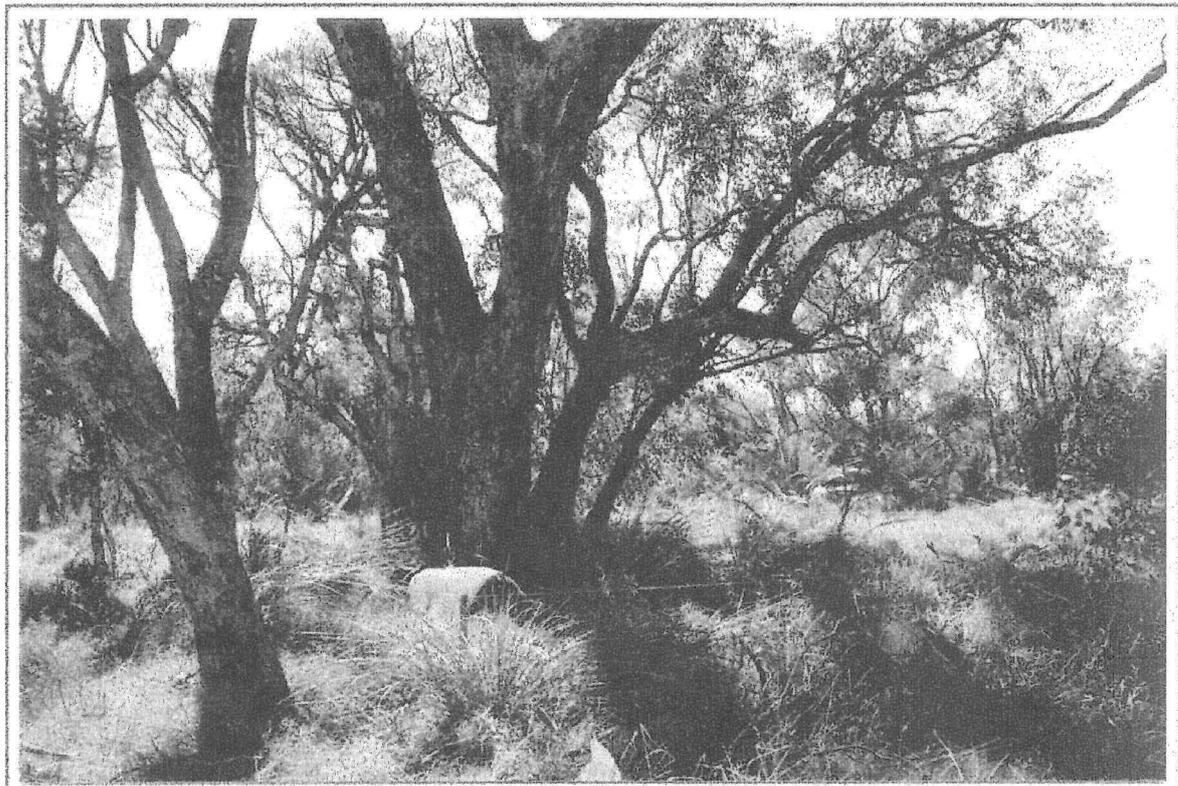


Figure 7: Flooded Gum-Moonah Fringing Woodland on the northern side of the central wetland area. Large *Eucalyptus rudis* (Flooded Gum) trees grow interspersed with smaller *Melaleuca preissiana* (Moonah) trees with an understorey dominated by *Xanthorrhoea preissii* (Balga) and weedy grasses such as *Ehrharta calycina* (Perennial Veld Grass). Quadrat JAND4, 8 August 1998 with 19 native species and 11 weed species. (Photograph by Karen Clarke).



Figure 8: *Melaleuca teretifolia* Shrubland dominates the central wetland area except where water pools form in winter. *Melaleuca teretifolia* (Banbar) is the dominant shrub in this community with *Lepidosperma longitudinale* (Pithy Sword Sedge) forming the understorey in association with the weeds **Eragrostis curvula* (African Lovegrass) and **Hypochaeris glabra* (Smooth Catsear). Quadrat JAND5, 8 August 1998 with 19 native species and 14 weed species. (Photograph by Karen Clarke).

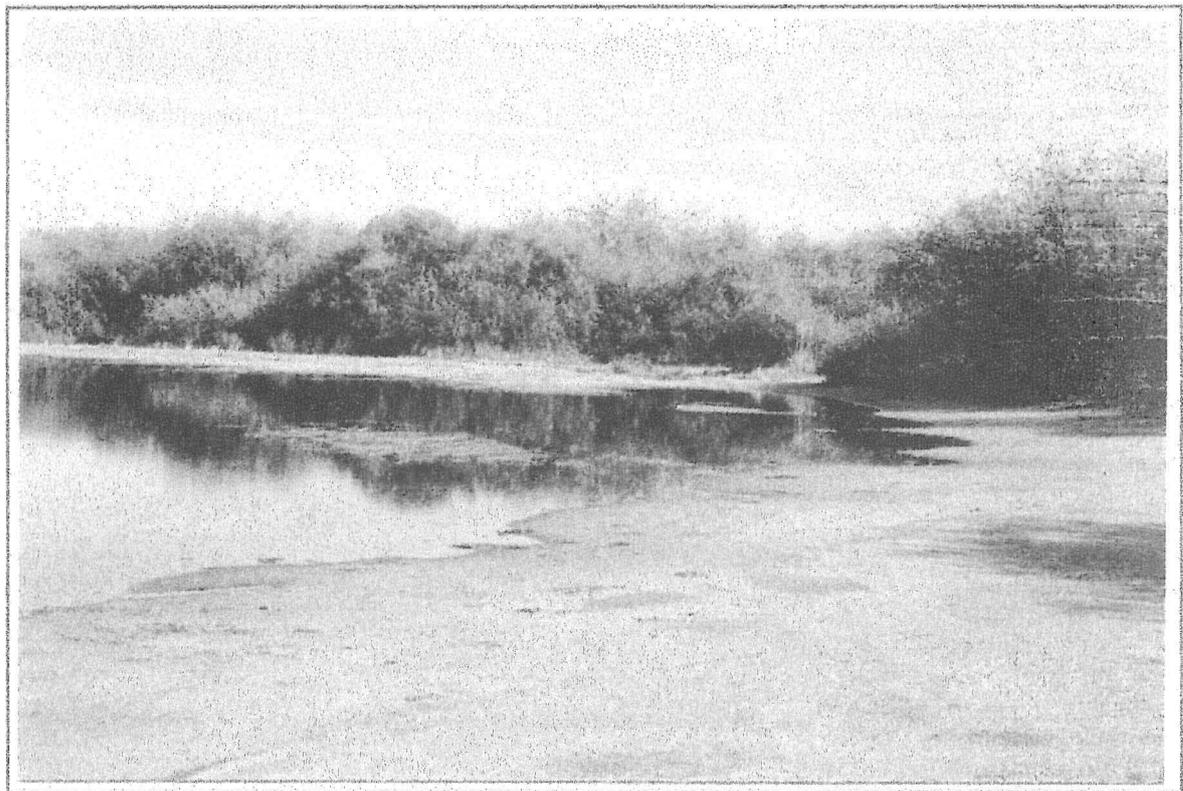


Figure 9: Open wetland flat within the *Melaleuca teretifolia* Shrubland containing water from early autumn rains, April 2000. (Photograph by Karen Clarke).



Figure 10: *Pericalymma ellipticum*-*Regelia ciliata* Shrubland on the southern side of the site near Acourt Rd. *Pericalymma ellipticum* (Swamp Teatree), *Regelia ciliata* and *Calothamnus lateralis* form patches of dense low heath in a mosaic throughout the wetlands that surround the central area of *Melaleuca teretifolia* Shrubland. Quadrat JAND8, 8 August 1998 with 19 native species and 3 weed species. (Photograph by Karen Clarke).



Figure 11: The south-west corner of the study area showing mature *Melaleuca preissii* (left) and *M. raphiophylla* (right) trees growing in a band as emergents in the *Pericalymma ellipticum*-*Regelia ciliata* Shrubland. Spearwood (*Kunzea ericifolia*) often grows in dense thickets below these trees. (Photograph by Karen Clarke).



Figure 12: *Lyginia imberbis* Sedgeland with a patch of *Pericalymna ellipticum-Regelia ciliata* Shrubland in the background (higher vegetation). *Lyginia imberbis* dominates this community with small shrubs such as *Pimelea imbricata*, *Hibbertia subvaginata* and *Euchilopsis linearis* (Swamp Pea) growing as emergents among the sedges. Quadrat JAND9, 8 August 1998 with 22 native species and 6 weed species. (Photograph by Karen Clarke).



Figure 13: *Banksia* Woodland near the western boundary of the site (Fraser Rd). Note the dead mature *Banksia ilicifolia* trees in the overstorey plus several dead individuals of *B. attenuata*. In the understorey there are scattered dead mature shrubs of various species and some individuals are showing signs of stress with dead upper branches or yellowing foliage. (Photograph by Karen Clarke).

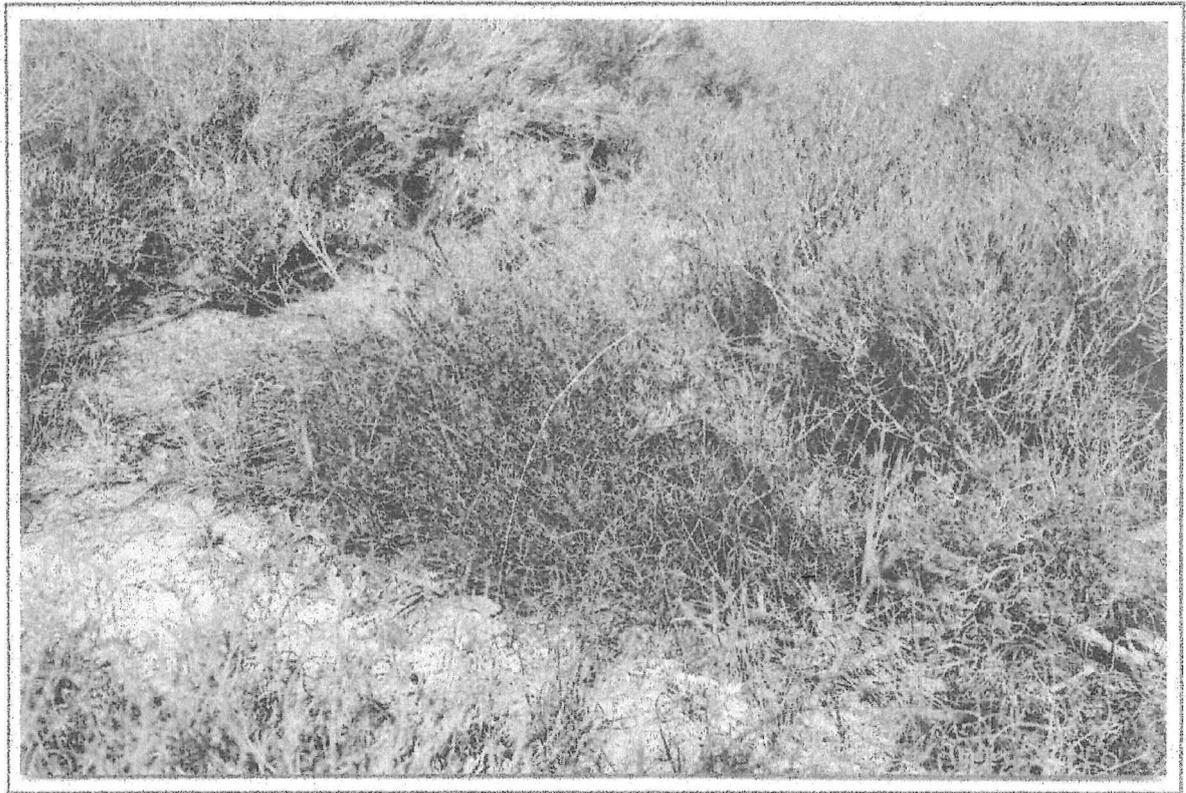


Figure 14: Dead individual of *Leucopogon conostephioides* among other healthy shrubs in the *Banksia* Woodland area shown in Figure 13 (Photograph by Karen Clarke).

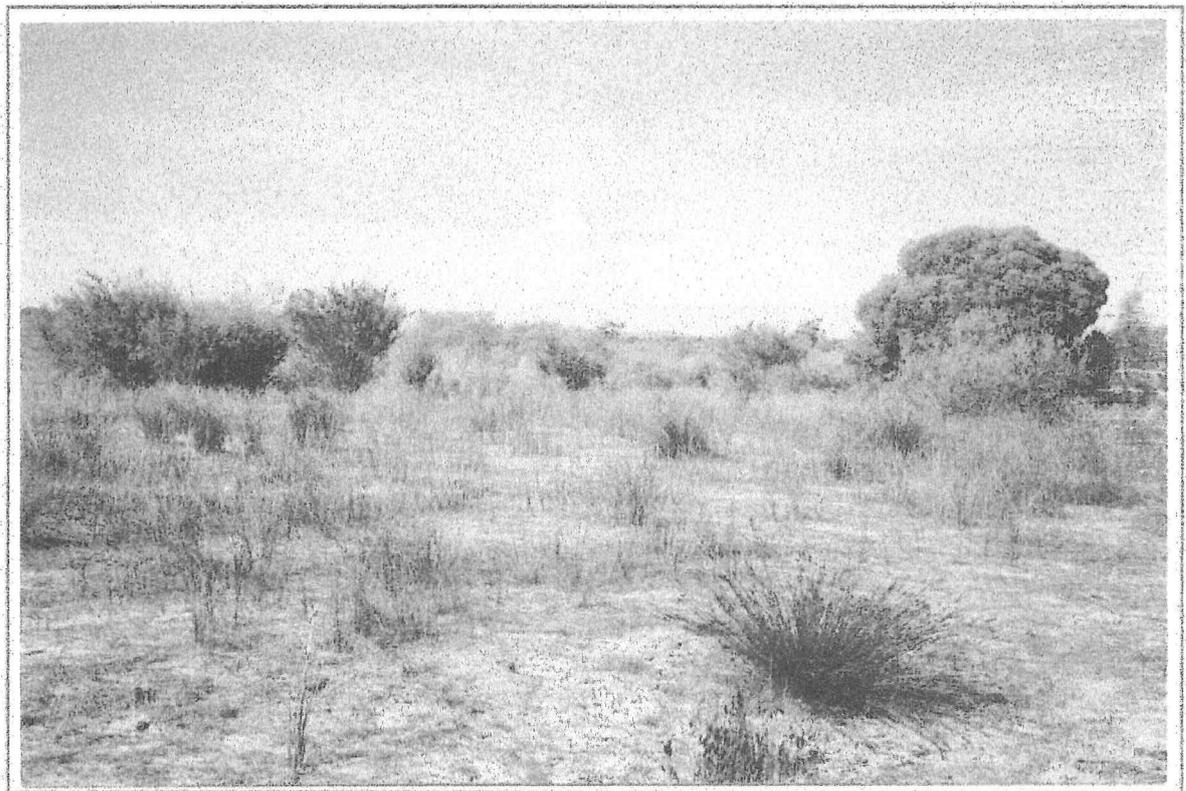


Figure 15: The degraded area of *Pericalymma ellipticum-Regelia ciliata* Shrubland near the centre of the site. Note the healthy clumps of *Lyginia imberbis* among the dominant sedge *Schoenus subfascicularis* that has died back extensively and the lack of wetland shrub species. Compare this Figure to Figure 10 which shows a healthy area of this community. (Photograph by Karen Clarke).

5. Discussion

5.1 Vegetation

This site is basically a snapshot of what was once a series of large sand dunes running parallel across the landscape with wetland communities occurring in the low lying depressions between the dunes.

The change in the type of plant communities that occur across the site is primarily determined by the topography and subsequent moisture availability throughout the year. The mapping of Heddlé *et al.* (1980) suggests that changes should also occur due to basic geology and soil type. This mapping shows the Southern River Vegetation Complex on the eastern side of the site and the Bassendean - Central and South Vegetation Complex on the western side. Thus, a change in the vegetation from west to east due to the presence of heavier clay soils in the Southern River Complex areas should occur but such changes were not present. No species typical of the Southern River Complex were recorded and there were no major soil type changes from west to east. At this small scale discrepancies in the mapping of the vegetation complexes are not uncommon. The Acourt Rd Bushland North is all Bassendean - Central and South Vegetation Complex.

The vegetation mapping of Goble-Garratt (1994) for the western section of the site was confirmed with only minor variation in interpretation of the mosaic of wetland units. An additional plant community was recorded on the eastern side of the site, the low lying *Acacia* Shrubland. The uplands on the eastern side are predominantly *Banksia*-Jarrah Woodland reflecting the overall lower topography to the east.

Over half of the site is dominated by wetlands. They are seasonal damplands covered by a mosaic of plant communities that vary in response to slight changes in topography and moisture availability. A few open areas with deeper water occur within the *Melaleuca teretifolia* Shrubland. Figure 1 shows the wetlands previously recorded on the site which have all been classed as of Conservation Category. This mapping very closely corresponds with the wetland communities mapped during our survey (Figure 3). The only variation is we found that the wetland on the other side of Clifton Rd extends in to the north-west corner of the Acourt Rd Bushland North. The condition of the vegetation in these wetlands is generally Excellent to Very Good confirming their status as Conservation Category wetlands.

At the regional level the site represents at least 5 different Floristic Community Types out of the 58 known types that occur within the Perth Metropolitan Region of the Swan Coastal Plain (Government of Western Australia 1998b). This is quite a high diversity of regional groupings for a site of 182 ha and is due to the large area of wetlands present. It was predicted that possibly 4 types were present for the whole Acourt Rd Bushland Site, Floristic Community Types 5 (Supergroup 2: Seasonal Wetlands) and 21c, 22 and 23a (Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau) (Government of Western Australia 1998b). We found that a greater diversity of wetland types were present with 3 Floristic Community Types, 5, 11 and 12. In contrast most of the upland vegetation was one Floristic Community Type, 23a with only a small area of possibly 21c. The Floristic Community Type 22, *Banksia ilicifolia* Woodlands was not recorded.

The conservation status of these Floristic Community Types is shown in Table 5. All are well reserved as they are known to occur in at least two National Parks or Nature Reserves (Gibson *et al.* 1994) although the extent of these occurrences has not been determined. Only type 21c is considered 'susceptible' as changes in management or land use on the public lands from where it is currently known to occur (Gibson *et al.* 1994), could reduce its extent to unacceptable levels for long term conservation. A further measure of the conservation status of these community types is their overall distribution on the Swan Coastal Plain. Floristic Community Type 23a is restricted entirely to the Perth Metropolitan Region and 5 and 21c are predominantly confined to it (Government of Western Australia 1998b). This makes any remnant vegetation of these community types particularly valuable in a rapidly expanding urban environment as there are no or few opportunities for conservation of these types outside the metropolitan area. The other two wetland community types, 11 and 12, occur throughout the Swan Coastal Plain with the latter primarily distributed on the southern part of the plain (Government of Western Australia 1998b).

Table 5: Regional Conservation Status of the Floristic Community Types from Gibson *et al.* (1994)

| Floristic Community Type | Reservation Status | Conservation Status |
|---------------------------------------------------------------------------------|--------------------|---------------------|
| Uplands | | |
| 21c. Low lying <i>Banksia attenuata</i> woodlands or shrublands | Well Reserved | Susceptible |
| 23a. Central <i>Banksia attenuata</i> - <i>Banksia menziesii</i> woodlands | Well Reserved | Low Risk |
| Wetlands | | |
| 5. Mixed shrub damplands | Well Reserved | Low Risk |
| 11. Wet forests and woodlands | Well Reserved | Low Risk |
| 12. <i>Melaleuca teretifolia</i> and/or <i>Astartea fascicularis</i> shrublands | Well Reserved | Low Risk |

5.2 Flora

This survey has greatly increased the number of species recorded from this remnant of bushland and the number of significant species known to occur on the site. Seven of the ten significant taxa on the site occur only in the wetland communities. This makes care of the wetland vegetation particularly important to conserve these species.

For comparison purposes, Table 6 shows the species diversity recorded for bushland areas on the Bassendean Dunes near the Acourt Rd Bushland North, which contain both vegetated wetlands and uplands within the Bassendean - Central and South Vegetation Complex. Ken Hurst Park has been the most thoroughly surveyed of these areas but is only one third the size with a smaller proportion of wetlands. The

Table 6: Comparison of the Floras of Acourt Rd Bushland North, Jandakot Airport, Ken Hurst Park, Fraser Road Bushland and Banjup Bushland.

| Bushland Area | Area (ha) | Total Native Taxa | Estimated % of Expected flora |
|-------------------------------------------------------------------|-----------|-------------------|-------------------------------|
| Acourt Rd Bushland North, Banjup (Part Bushplan Site 389) | 182.0 | 197 | >85% |
| Jandakot Airport, Jandakot (Bushplan Site 388, System 6 area M94) | 410.9 | 149 ^a | <50% ^c |
| Ken Hurst Park, Leeming (Bushplan Site 245) | 52.7 | 214 ^b | >85% ^c |
| Fraser Road Bushland, Banjup (Bushplan Site 390) | 171.7 | 106 ^c | >50% ^c |
| Banjup Bushland, Banjup (Bushplan Site 263) | 103.9 | 201 ^d | >75% ^c |

^{a,c,e} Government of Western Australia (1998b)

^b Murdoch Branch Wildflower Society of WA (1992)

^d Keighery, GJ (1994)

wetlands are listed in the Resource Enhancement Management Category, this suggests they may not be in as good a condition as those in the Acourt Rd Bushland North. Despite these factors Ken Hurst Park shows a comparable species diversity to the Acourt Rd Bushland North given the % of expected flora recorded. Even though the Acourt Rd site is much larger it contains the same plant communities over bigger areas and this would not be expected to greatly increase species numbers. The Banjup Bushland is similar to the Acourt Rd site in terms of proportion of wetland communities but contains several additional wetland communities not recorded in the Acourt Rd Bushland North, that increase its species diversity (Keighery, GJ, 1994). The other two sites, Jandakot Airport and Fraser Rd Bushland, would be expected to have a similar diversity to the Acourt Rd Bushland North if surveyed in detail.

The main outcomes of a survey such as this are that it contributes towards an assessment of the conservation values of the bushland and provides essential information for management. Both are discussed below but the section on management issues is restricted to the main factors observed affecting the vegetation and flora of the Acourt Rd Bushland North at the time of this survey. Many more management issues exist but these are beyond the scope of this study.

5.3 Conservation Values

Conservation value is assessed at a range of levels according to the value of the site to international, national, regional and local communities. It is a assessment of an area's value to us as a community, both now and in the future. It is important to know the conservation values of an area so that society can make decisions about the site's value relative to other land uses. All remnant bushland in the Perth Metropolitan Region has conservation value due to the high rate of clearing that has occurred since European settlement.

Only 24% of the Bassendean - Central and South Vegetation Complex remains in the metro. region and only 13% is proposed for protection under *Perth's Bushplan* (Government of Western Australia 1998a).

The Acourt Rd Bushland North was identified as part of a regionally significant Bushplan Site for the following reasons which have been confirmed and strengthened by the results of this survey:

1. Representation of ecological communities - it is one of the best available examples, in terms of size, condition and biodiversity of the Bassendean Vegetation Complex - Central and South and the floristic communities of the seasonal wetlands and uplands centred on the Bassendean Dunes. It is also one of the best available examples of damplands in the Jandakot and Bennett Brook Natural Wetland Groups.
2. Diversity - the site contains seven different plant communities and four regional Floristic Community Types (see Table 4) in close proximity due to the presence of both seasonal wetlands and dune uplands. These plant communities support a high diversity of flora with over 197 native species and are likely to support a high diversity of fauna due to the wide range of habitats available. The number of species found per 100 m² in the plant communities of the Acourt Rd Bushland North compare well with the average species richness figures reported for their corresponding floristic community types (Government of Western Australia 1998b). The uplands show the greatest diversity in terms of species richness but the wetlands have three different regional Floristic Community Types present compared to only one main type in the uplands. Wetland sites on the Swan Coastal Plain have been found to have lower species richness than their associated uplands (Griffin and Keighery 1989, Gibson *et al.* 1994) but there is a greater diversity of Floristic Community Types in these wetlands (Gibson *et al.* 1994).
3. Rarity - the presence of ten species of significant flora and the significant fauna species, the Quenda (Southern Brown Bandicoot), greatly increases the conservation value of the site. It is also possible that two species of Declared Rare Flora are present.
4. Maintenance of ecological processes or natural systems - it is a large site which is part of a whole sequence of contiguous (connected) bushland areas (the remainder of the Acourt Rd Bushland, Jandakot Airport, Ken Hurst Park, Fraser Rd Bushland, Canning Vale Prison Bushland and Harrisdale Swamp and Adjacent Bushland, see Figure 1) which are all in very good condition. As a result there is a good chance of

maintaining a complete range of ecological processes, especially due to the presence of a large range of plant communities. Such areas represent core sites in *Perth's Bushplan*. These contiguous areas together make up 17% of the approximately 6 000 ha of Bassendean - Central and South Vegetation Complex that is proposed for protection in the Perth Metropolitan Region. Before European settlement there was approximately 46 000 ha of this vegetation complex on the Swan Coastal Plain (Government of Western Australia 1998a). Large bushland areas in the recharge zones of groundwater mounds such as Jandakot, are particularly valuable for the maintenance of water quality and quantity in the aquifer.

The Acourt Rd Bushland North is also of value at the local conservation level due to its role as a source of water for Bannister Creek. The quantity and quality of water in Bannister Creek depends on the health of the natural ecosystems in the Acourt Rd Bushland North and adjacent areas. This in turn affects the Canning River into which Bannister Creek flows.

One of the main values of any bushland is its intrinsic value in still being present. It shows what used to grow in the Bannister Creek Catchment. This allows groups such as the Bannister Creek Catchment Group to make informed decisions about what to plant in degraded areas of the catchment. Revegetation schemes need to return species in groups that naturally occur together in communities determined by such factors as topography, soil types and aspect.

In a broader context it must be remembered that all the plant communities of the Swan Coastal Plain occur nowhere else in the world and that all remnant vegetation is of conservation value. This site in particular, is of regional conservation value and the decline in vegetation condition observed in some of the plant communities urgently requires further investigation and remedial action if appropriate.

5.4 Management Issues

5.4.1 Ecosystem Health

Overall, since 1993 there has been a general decline in the condition of the *Banksia* Woodland, *Pericalymma ellipticum-Regelia ciliata* Shrubland, *Lyginia imberbis* Sedgeland and *Melaleuca teretifolia* Shrubland. The main factors affecting the condition of the vegetation on the site over time have been clearing, vehicle traffic, firewood collection, rubbish dumping, too frequent fire, weed invasion and grazing by domestic and feral animals. However, these factors do not explain the pattern or types of deaths that have occurred. It seems another factor is selectively affecting vegetation in both upland and wetland areas.

Some of the quadrats contained large numbers of usually non-aggressive weeds such as *Briza maxima* and *Hypochaeris glabra*. This was noted mainly in the *Lyginia imberbis* Sedgeland, *Melaleuca teretifolia* Shrubland and dune slopes of the *Banksia* Woodland. These weeds are not usually present in large numbers in healthy bushland subject to only short term disturbances and their presence indicates an underlying stress on the ecosystem that is reducing vigorous competition by the native flora.

Disease is one possibility. In Western Australia, 'Dieback' is the name for a common plant disease caused by the fungus *Phytophthora cinnamomi* and several related species. The characteristics that indicate *Phytophthora cinnamomi* is the likely cause of observed plant deaths (Kilgour 1999) are:

1. usually plants die completely and quickly with no stress symptoms or gradual dying back branch by branch
2. plants die in lines or groups not as odd scattered individuals in otherwise healthy vegetation
3. there is usually an edge effect or front of most recent deaths
4. there is an age range of deaths, old deaths and recently killed plants present
5. the presence of a vector that introduced the fungus is apparent, such as a road, track or vehicle activity
6. there are deaths in a range of susceptible species.

On the Swan Coastal Plain the common susceptible species are *Hibbertia hypericoides*, *Verticordia nitens*, *Xanthorrhoea* spp., *Lomandra odora*, *Macrozamia riedlei* and many plants in the Proteaceae family, such as *Adenanthos cygnorum*, *Dryandra nivea*, *Dryandra sessilis*, *Banksia attenuata*, *Banksia menziesii*, *Banksia littoralis*, *Isopogon formosus* and *Conospermum stoechadis* (Kilgour 1999).

Six of these susceptible species grow abundantly in the Acourt Rd Bushland North, *Hibbertia hypericoides*, *Xanthorrhoea preissii*, *Macrozamia riedlei*, *Adenanthos cygnorum*, *Banksia attenuata* and *Banksia menziesii*. Of these, only the *Banksia* species were being affected, the others were common and healthy. There was also no definite front of recent plant deaths. The plants were dying at random throughout the communities and some species were showing stress symptoms such as yellowing of the leaves. In addition, most of the deaths appeared to have occurred some time ago. Given this set of observations it is unlikely that *Phytophthora cinnamomi* is the cause of the problem.

Goble-Garratt (1994) reported that there were no signs of dieback in the western half of the site and that species sensitive to *Phytophthora cinnamoni*, such as those in the family Epacridaceae (eg. *Leucopogon*), *Xanthorrhoea preissii* and *Macrozamia riedlei* were common and in good health.

An explanation that does fit the observations made is that the plants have been affected by water stress. Similar deaths in both understorey and overstorey species in *Banksia* Woodlands have occurred at locations on the Gnanagara Groundwater Mound since 1980 (Nicoska 1998). Groundwater abstraction, in combination with low winter rainfall and high summer temperatures has been shown to be the cause of plant deaths in areas adjoining groundwater extraction borefields (Froend *et al.* 1997). A number of water production bores are located along and near Acourt Rd, to extract water from the Jandakot Groundwater Mound for the public water supply. Pumping from private bores is also permitted.

The plant communities most susceptible to groundwater drawdown are those growing on a relatively shallow water table, a situation that frequently occurs in the low lying Bassendean Dunes (Dodd and Bell 1993a). These communities are termed phreatophytic, meaning groundwater dependant. Communities occurring where the groundwater is typically 3-5 m below the surface (usually lower dune slopes) change most in response to a fall in groundwater level (Froend 2000). These communities contain deep-rooted perennial species that depend on groundwater for survival when soil moisture reserves are exhausted towards the end of our long, hot and dry Mediterranean summers (Dodd and Bell 1993a). Some species are facultative phreatophytes as they use groundwater when it is accessible but can survive without it, these species include *Banksia attenuata* and *B. menziesii* (Dodd and Bell 1993a). However, *B. ilicifolia* is more dependant on groundwater. It primarily grows on lowland sites where the groundwater is 3-8 m below the surface and is most susceptible to being affected by water stress where the water table is normally in the range 3-5m (Froend 1998). Another truly phreatophytic species is *Stirlingia latifolia*, while *Eremaea pauciflora* and *Jacksonia floribunda* behave more like *Banksia attenuata* and *B. menziesii* (Dodd and Bell 1993b). The large, mature individuals in any population are the most susceptible to dying from groundwater drawdown but seedling establishment continues to occur and recruit new individuals into the population (Froend 2000). So far, few species have been studied and the amount of water required by phreatophytic plant communities and species is currently poorly understood (Nicoska 1998).

In the uplands, mature individuals of *Banksia ilicifolia*, *B. attenuata*, *B. menziesii*, *Eremaea pauciflora* and a number of other deep-rooted perennial species have died in the Acourt Rd Bushland North without affecting shallow rooted annual and perennial species. These deaths have occurred primarily on the lower slopes of the dunes. Shrubs and sedges in some of the wetland communities are also being affected. In the absence of other factors that could produce such effects it is likely that there is a problem with groundwater drawdown at the site.

Pumping of water from the Jandakot wellfield does have the potential to affect the vegetation and flora of the Acourt Rd Bushland North and adjacent areas. Monitoring of all the production bores and two transects of vegetation is regularly undertaken to determine whether the bores are operating within limits set with the aim of preventing effects on the native vegetation. From 1988 to the period 1996-1999, seasonal minimum groundwater levels fell by more than 0.5 m over most of the Jandakot Mound with the largest falls more

than 1.0m (Water and Rivers Commission 1999). This decrease was due to pumping from the public production wells, use of private bores, lower rainfall and increased evaporation due to sandmining activities (Water and Rivers Commission 1999).

Mattiske Consulting Pty Ltd (1998) have been monitoring the vegetation every 3 years since 1988 with the closest transect to the Acourt Rd site located at Jandakot Airport. This transect samples both upland and wetland communities. Since 1988 a general decrease in soil moisture levels has been observed, with this trend accelerating in 1997 (Mattiske Consulting Pty Ltd 1998). A general decrease in the condition of tree species on the transect, irrespective of soil moisture preferences, was noted in 1997 along with a decrease in the density and frequency of understorey species intolerant of extremes of moisture conditions (Mattiske Consulting Pty Ltd 1998). Similar trends for the tree species were recorded on the Gngangara Groundwater Mound (Mattiske Consulting Pty Ltd 1998). These results are difficult to interpret at present but the monitoring results from spring 2000 (to be published next year) may clarify whether groundwater abstraction in the areas needs to be reviewed.

As the Acourt Rd Bushland North is also in the catchment of Bannister Creek, which flows into the Canning River, changes in the hydrology of the area will affect these systems. The Acourt Rd Bushland North is at the head of the Bannister Creek Catchment and is an important reference site for water flow in the system. The water relations of the site and the cause/s of the plant deaths need further investigation with remedial action being taken where necessary.

5.4.2 Weeds

Weeds are usually a significant component of the flora in urban bushland, almost impossible to totally eradicate and can have a significant impact on the condition and continued survival of plant communities. Weeds are one of the major disturbance factors affecting the Acourt Rd Bushland North. Where time and resources are limited, priorities for weed control need to be established. The first step is to know what weeds are present and observe how they are affecting the ecosystem, those causing significant impacts need to be dealt with as a priority. Detailed information on how to assess the weeds at a site, map weed distribution and vegetation condition and prepare a weed action plan can be obtained through the Environmental Weeds Action Network.

Preventing the introduction and spread of weeds is far easier than removing them. Many of the disturbance factors affecting the Acourt Rd Bushland North in the past have been due to uncontrolled access. Dumping of refuse, especially garden waste, introduces weeds to bushland, many weed invasions start from a pile of dumped garden rubbish. Luckily bulbous garden plants, such as Freesias, have not been introduced and become a problem at the site. Now that the entire area is fenced, with only walk trail access points, further weed introductions should be limited. The main concern now is to deal with the weeds already present.

Dixon and Keighery (1995) provides a ranking of weeds for the Perth Metropolitan Region based on their distribution and invasiveness which can be used as a guide to establish priorities for weed control. The Environmental Weeds Strategy (CALM 1999) also takes into account potential to cause environmental impacts and ranks all known environmental weeds in WA on a state wide basis. However, assessment of risk at a state level is difficult to translate into priorities for an individual site.

To assist in management of the area we have classified the weeds present in the Acourt Rd Bushland North (Table 7) into the following categories on the basis of our observations and information in Dixon and Keighery (1995):

- Category 1: significant weed species present throughout the study area that appear to be displacing native species but for which control is feasible
- Category 2: species present in low numbers but with the potential to become significant weeds in the future (based on observations of similar habitats in the general area) and for which control is feasible

Category 3: species not likely to become significant weeds or for which control is not feasible at present, these species need to be reviewed regularly and new control methods considered as they become available.

The category 1 and 2 weeds are listed in Table 7. This list is not definitive and is given primarily as a basis for discussion. The placing of the weed species in these categories is a management tool that needs to be reviewed regularly as the vegetation changes in response to control procedures and new control methods become available.

Table 7: Weeds Believed to be a Significant or Potentially Significant Problem in the Acourt Rd Bushland North.

| Botanical Name | Family | Common Name | Category |
|------------------------------------|----------------|------------------------|----------|
| * <i>Ehrharta calycina</i> | Poaceae | Perennial Veld Grass | 1 |
| * <i>Eragrostis curvula</i> | Poaceae | African Love Grass | 1 |
| * <i>Gladiolus caryophyllaceus</i> | Iridaceae | Wild Gladiolus | 1 |
| * <i>Pelargonium capitatum</i> | Geraniaceae | Rose Geranium | 1 |
| * <i>Avena barbata</i> | Poaceae | Bearded Oat | 2 |
| * <i>Cortaderia selloana</i> | Poaceae | Pampas Grass | 2 |
| * <i>Cynodon dactylon</i> | Poaceae | Couch | 2 |
| * <i>Echium plantagineum</i> | Boraginaceae | Paterson's Curse | 2 |
| * <i>Gomphocarpus fruticosus</i> | Asclepiadaceae | Narrowleaf Cotton Bush | 2 |
| * <i>Lupinus cosentinii</i> | Papilionaceae | Sandplain Lupin | 2 |
| * <i>Pennisetum clandestinum</i> | Poaceae | Kikuyu | 2 |
| * <i>Ricinus communis</i> | Euphorbiaceae | Castor Oil Plant | 2 |
| * <i>Typha orientalis</i> | Typhaceae | Bulrush | 2 |

The management of weeds needs to be based on what weeds are present, the condition of the vegetation they are in, the likely facilitators of the weed's invasion and whether that facilitator is still acting, the weed species likely impact on the vegetation and what procedures are best for management of the significant weed species.

**Ehrharta calycina* (Perennial Veld Grass) and **Eragrostis curvula* (African Love Grass) both occur over extensive areas in the Acourt Rd Bushland North. They dominate in the Flooded Gum-Moonah Fringing Woodland and *Melaleuca teretifolia* Shrubland communities particularly towards the north-eastern corner of the site. The completely degraded area on the corner of Clifton and Nicholson Rds is a field of African Love Grass. It is likely that these areas were cleared or extensively grazed at some stage in the past. Regeneration of the areas worst affected by these weeds will be difficult and consume time and resources probably better spent in other areas. Using the principles of bush regeneration, work on the most degraded areas would be a low priority as the best quality bushland should be focused on first to ensure it maintains its condition. The presence of Perennial Veld Grass and **Gladiolus caryophyllaceus* (Wild Gladiolus) throughout the very good quality *Banksia* and *Banksia*-Jarrah Woodlands would be a higher priority for treatment. Both these weeds can be treated using herbicides (Dixon and Keighery 1995).

**Pelargonium capitatum* (Rose Geranium) is a particular problem in the Flooded Gum-Moonah Fringing Woodland. It spreads rapidly by seed and vegetative reproduction, smothering small native plants and filling bare sandy areas that are important for burrowing snakes (Dixon and Keighery 1995). It is difficult to control as it reshoots from broken stems even from below ground level (Dixon and Keighery 1995). Herbicide control should be investigated for large infestations such as in the Acourt Rd Bushland North and the best quality areas of the Flooded Gum-Moonah Fringing Woodland treated first, working towards the more degraded areas as time and resources allow. As this Woodland fringes the wetland communities preventing contamination of the wetlands and Bannister Creek catchment should also be considered when investigating control measures.

**Romulea rosea* is another significant weed in the study area but has not been included in Table 7 as we are not aware of any feasible control method that can be used in bushland areas.

The Category 2 weeds are ones for which there is a good chance of bringing them under control before they become a significant problem. For example, **Cortaderia selloana* (Pampas Grass) is potentially a very serious weed of wetland communities and was found just east of Quadrat 6 in the *Pericalymma ellipticum* - *Regelia ciliata* Shrubland. There seems to be only a small clump present at the moment and while Pampas grass is normally difficult to control, a small infestation can be dealt with fairly easily. Its removal should be made a high priority for management as its potential to disrupt the ecosystem of the damplands is substantial if it spreads any further. The damplands contain almost all of the significant flora species present and need protection from highly invasive weed species. **Typha orientalis* (Bulrush) is also an aggressive coloniser of wetland communities on the Swan Coastal Plain (Hussey *et al.* 1997). It is native to eastern Australia and is similar to our local native species *Typha domingensis* but has broader leaf blades. The weed species of *Typha* was recorded by Goble-Garret (1994) in the open peaty flats of the *Melaleuca teretifolia* community. The presence and extent of this species in the wetland needs to be determined as a priority. If the infestation is small it may be possible to eradicate this species from the wetlands to prevent it spreading and displacing native plant communities.

**Echium plantagineum* (Paterson's Curse), **Gomphocarpus fruticosus* (Narrowleaf Cotton Bush), **Lupinus cosentinii* (Sandplain Lupin) and **Ricinus communis* (Castor Oil Plant) were all found in small numbers. An isolated population of Narrowleaf Cotton Bush occurs in the open wetland flats near a bed of **Typha orientalis* that could easily be pulled out and then any seedlings removed by hand in subsequent years. The other 3 species were recorded by Goble-Garratt (1994) and should be relocated and removed before their populations increase further.

Of the 3 remaining grasses listed in Table 7, **Cynodon dactylon* (Couch) and **Pennisetum clandestinum* (Kikuyu), are mainly a problem in wetland communities as they prefer moist conditions. Both species tend to occur in highly disturbed areas but do compete with and smother native species (Dixon and Keighery 1995). Control of these weeds in wetland areas is feasible but needs to be undertaken carefully, herbicide use may not be possible due to contamination problems. **Avena barbata* (Bearded Oat) occurs in the upland woodland communities and can be controlled using the same herbicides as for Perennial Veld Grass (Dixon and Keighery 1995).

6. Conclusion

The Acourt Rd Bushland North is of very high conservation value because it contains:

- several types of mature *Banksia* Woodland in combination with a wide range of wetland plant communities all in Excellent to Very Good condition
- forms part of a large contiguous area of vegetation and flora representative of the Bassendean – Central and South Vegetation Complex on the Swan Coastal Plain
- a diversity of regional Floristic Community Types, several of which are restricted or almost entirely restricted to the Perth Metropolitan Region
- a total of 197 native plant taxa (species, subspecies and varieties)
- 10 species of significant flora of which 3 are currently listed as priority species
- the possible occurrence of 2 species of Declared Rare orchid
- the significant fauna species *Isoodon obesulus fusciventer*, Quenda or Southern Brown Bandicoot and
- a variety of habitats for fauna.

It also plays an important role in the region's natural water cycles as:

- one of the few remaining naturally vegetated areas in the catchment of Bannister Creek and as
- a large area of natural vegetation in the Priority 1 Source Protection Area of the Jandakot Groundwater Mound.

This site is a significant addition to Perth's conservation estate. This survey confirms the regional significance of the site and provides further support for its inclusion in Perth's Bushplan and the Jandakot Regional Botanic Park. The site already has a high level of protection as it has been purchased by the government and ceded to the Department of Conservation and Land Management for management. The challenge now is to maintain the site's condition. Two key factors presently affecting the condition of the vegetation and flora are discussed in this report.

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Appendix 1 - Vegetation Structure Classification Scheme and Vegetation Condition Scale

Classification System Used to Describe Vegetation Structure (Keighery, BJ (1994), as adapted from Muir (1977) and Aplin (1979)).

| Life Form/ Height Class | Canopy Cover | | | |
|----------------------------|---------------------|------------------|-------------------|-----------------------|
| | 100-70 % | 70-30 % | 30-10 % | 10-2 % |
| Trees over 30m | Tall Closed Forest | Tall Open Forest | Tall Woodland | Tall Open Woodland |
| Trees 10-30m | Closed Forest | Open Forest | Woodland | Open Woodland |
| Trees under 10m | Low Closed Forest | Low Open Forest | Low Woodland | Low Open Woodland |
| Tree Mallee | Closed Tree Mallee | Tree Mallee | Open Tree Mallee | Very Open Tree Mallee |
| Shrub Mallee | Closed Shrub Mallee | Shrub Mallee | Open Shrub Mallee | Very Open Shrub |
| Shrubs over 2m | Closed Tall Scrub | Tall Open Scrub | Tall Shrubland | Tall Open Shrubland |
| Shrubs 1-2m | Closed Heath | Open Heath | Shrubland | Open Shrubland |
| Shrubs under 1m | Closed Low Heath | Open Low Heath | Low Shrubland | Very Open Shrubland |
| Grasses | Closed Grassland | Grassland | Open Grassland | Very Open Grassland |
| Herbs | Closed Herbland | Herbland | Open Herbland | Very Open Herbland |
| Sedges | Closed Sedgeland | Sedgeland | Open Sedgeland | Very Open Sedgeland |

Vegetation Condition Scale (Keighery, BJ (1994), as adapted from Trudgen (1991)).

| Condition | Description |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 'Pristine' | Pristine or nearly so, no obvious signs of disturbance. |
| Excellent | Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. For example, damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks. |
| Very Good | Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing. |
| Good | Vegetation structure significantly altered by various obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate to it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing. |
| Degraded | Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing. |
| Completely Degraded | The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs. |

Appendix 2 - Quadrat Descriptions Arranged by Mapped Plant Community

BANKSIA WOODLAND

JAND1 (Inter-dune depression)

Banksia attenuata (Candle Banksia) and *Banksia menziesii* (Firewood Banksia) Low Woodland over *Eremaea pauciflora* and *Scholtzia involucrata* (Spiked Scholtzia) Open Low Heath over *Amphipogon turbinatus* Open Grassland and *Lyginia imberbis* Very Open Sedgeland.

Condition rating: Very Good

Latitude: 32° 05.96' Longitude: 115° 54.54'

Topographic position: dune swale

Slope: flat

Aspect: -

Soil: light grey sand over yellow-grey sand, Bassendean Sand S₈

Drainage: well drained

Litter: 8%, 1 cm deep

Bare ground: 2%

Number of species: 48 (43 natives, 5 weeds)

JAND2 (Crest of Dune)

Banksia menziesii (Firewood Banksia), *Nuytsia floribunda* (Christmas Tree) & *Allocasuarina fraseriana* (Sheoak) Low Open Forest over *Calytrix fraseri* (Pink Summer Calytrix) Open Heath over *Leucopogon conostephioides* Very Open Shrubland over **Briza maxima* (Blowfly Grass) and **Ehrharta calycina* (Perennial Veldtgrass) Very Open Grassland, *Phlebocarya ciliata*, *Conostylis aculeata* (Prickly Conostylis) and *Dasyogon bromeliifolius* (Pineapple Bush) Open Herbland and *Desmocladius flexuosus* Very Open Sedgeland.

Condition rating: Very Good

Latitude: 32° 05.93' Longitude: 115° 54.66'

Topographic position: dune ridge

Slope: flat

Aspect: -

Soil: light grey sand over grey sand, Bassendean Sand S₈

Drainage: well drained

Litter: 15%, 1 cm deep

Bare ground: 15%

Number of species: 54 (46 natives, 8 weeds)

BANKSIA-JARRAH WOODLAND

JAND3

Allocasuarina fraseriana (Sheoak) and *Eucalyptus tottiana* (Coastal Blackbutt) Low Open Forest over *Hibbertia hypericoides* (Yellow Buttercup) Open Low Heath over *Patersonia occidentalis* (Purple Flag), *Phlebocarya ciliata* and *Dasyogon bromeliifolius* (Pineapple Bush) Very Open Herbland. *Eucalyptus marginata* (Jarrah) and *Banksia attenuata* (Candle Banksia) were also dominant in the overstorey surrounding this quadrat and more typical of the general area.

Condition rating: Excellent

Latitude: 32° 06.01' Longitude: 115° 54.66'

Topographic position: dune slope

Slope: gentle

Aspect: N

Soil: grey sand over grey sand, Bassendean Sand S₈
Drainage: well drained
Litter: 100%, 3 - 4 cm deep
Bare ground: 0%
Number of species: 49 (40 natives, 9 weeds)

FLOODED GUM-MOONAH FRINGING WOODLAND

JAND4

Eucalyptus rudis (Flooded Gum) Open Forest over *Melaleuca preissiana* (Moonah) Low Open Woodland over *Xanthorrhoea preissii* (Balga) Open Shrubland over **Ehrharta calycina* (Perennial Veldtgrass) Closed Grassland and *Corynotheca micrantha* subsp. *micrantha* (Sand Lily) Very Open Herbland.

Condition rating: Good to Degraded

Latitude: 32° 06.11' Longitude: 115° 54.65'

Topographic position: dune slope

Slope: gentle

Aspect: SE

Soil: grey sand over grey sandy clay, Bassendean/Guildford S₁₀

Drainage: well drained

Litter: 10%, 3 cm deep

Bare ground: <1%

Number of species: 30 (19 natives, 11 weeds)

MELALEUCA TERETIFOLIA SHRUBLAND

JAND5

Melaleuca teretifolia (Banbar) Open to Very Open Shrubland over **Eragrostis curvula* (African Lovegrass) Open Grassland, **Hypochaeris glabra* (Smooth Catsear) Herbland and *Lepidosperma longitudinale* (Pithy Sword-sedge) Sedgeland.

Condition rating: Very Good

Latitude: 32° 06.11' Longitude: 115° 54.59'

Topographic position: seasonal wetland

Slope: flat

Aspect: -

Soil: dark grey peaty sand over dark grey peaty sand, Peaty Sand Sp₁

Drainage: poor, winter dampland

Litter: 20%, <1 cm deep

Bare ground: 10%

Number of species: 33 (19 natives, 14 weeds)

PERICALYMMMA ELLIPTICUM - REGELIA CILIATA SHRUBLAND

JAND6

Mixed Open Shrubland over Mixed Open Low Heath over *Lepidosperma sp.* Sedgeland.

Condition rating: Excellent

Latitude: 32° 06.26' Longitude: 115° 54.49'

Topographic position: seasonal wetland

Slope: gentle

Aspect: NNE

Soil: light grey peaty sand over mid-grey peaty sand, Peaty Sand Sp₁
Drainage: poor, winter dampland
Litter: 1%, <1 cm deep
Bare ground: 0%, moss covers ground
Number of species: 22 (19 natives, 3 weeds)

JAND8

Pericalymma elliptic (Swamp Teatree), *Regelia ciliata* and *Calothamnus lateralis* Closed Low Heath.

Condition rating: Excellent

Latitude: 32° 06.24' Longitude: 115° 54.48'

Topographic position: wet flat

Slope: flat

Aspect: -

Soil: dark grey-black peat rich sand over dark grey peat rich sand, Peat Rich Sand Sp₂

Drainage: poor, winter dampland

Litter: 5%, <1 cm deep

Bare ground: 0%

Number of species: 22 (19 natives, 3 weeds)

LYGINIA IMBERBIS SEDGELAND

JAND7

Lyginia imberbis and *Hypolaena exsulca* Sedgeland, **Ehrharta calycina* (Perennial Veldtgrass) Very Open Grassland and *Phlebocarya ciliata*, *Calandrinia corrigioloides* (Strap Purslane) and **Hypochaeris glabra* (Smooth Catsear) Very Open Herbland.

Condition rating: Very Good

Latitude: 32° 06.20' Longitude: 115° 54.38'

Topographic position: seasonal wetland

Slope: flat

Aspect: -

Soil: light grey peaty sand over dark grey peaty sand, Peaty Sand Sp₁

Drainage: moderate, winter dampland

Litter: <2%, <1 cm deep

Bare ground: 35%

Number of species: 33 (25 natives, 8 weeds)

JAND9

Lyginia imberbis Closed Sedgeland with emergent scattered *Pimelea imbricata*, *Hibbertia subvaginata* and *Euchilopsis linearis* (Swamp Pea) over **Hypochaeris glabra* (Smooth Catsear) and **Ursinia anthemoides* Very Open Herbland.

Condition rating: Excellent to Very Good

Latitude: 32° 06.24' Longitude: 115° 54.33'

Topographic position: wet flat

Slope: flat

Aspect: -

Soil: dark grey peaty sand over dark grey peaty sand, Peaty Sand Sp₁

Drainage: moderately drained

Litter: 2%, <1 cm deep

Bare ground: 75%

Number of species: 28 (22 natives, 6 weeds)

JAND10

Hypocalymma angustifolium (White Myrtle) Low Shrubland over *Lyginia imberbis* Sedgeland and *Amphipogon turbinatus* Very Open Grassland.

Condition rating: Excellent

Latitude: 32° 06.33' Longitude: 115° 54.27'

Topographic position: dry flat

Slope: flat

Aspect: -

Soil: grey peaty sand over dark grey peaty sand, Peaty Sand Sp₁

Drainage: moderately drained

Litter: 2%, <1 cm deep

Bare ground: 10%

Number of species: 46 (40 natives, 6 weeds)

G. ACACIA SHRUBLAND

"JAND 11"

Acacia pulchella (Prickly Moses) and *Calytrix fraseri* Low Shrubland Over *Dasyogon bromeliifolius* (Pineapple Bush) and *Phlebocarya ciliata* Herbland and *Schoenus curvifolius* Very Open Sedgeland and *Amphipogon turbinatus* Very Open Grassland.

Condition rating: Excellent

no quadrat recorded

Appendix 3 - Species List

All taxa (species, subspecies and varieties) recorded in the quadrats or adjacent to them, as well as taxa recorded opportunistically from elsewhere within the site are listed in the following table. Taxa recorded during previous surveys are also listed with the appropriate reference. The taxa are listed alphabetically by family, and within families alphabetically by genera.

Key:

Column 1 - Botanical Name

* indicates a weed species ("a plant growing where it is not wanted" Hussey *et al.* 1997).

"ms" after a species name means "manuscript" and indicates that this name is unofficial until formally published.

Column 2 - Plant Family

According to the classification scheme of Cronquist (1981)

Column 3 - Common Name

The common name given in Paczkowska and Chapman (2000) or the Preferred Vernacular Name listed in Bennett (1993) has been used for each taxa where a common name exists.

Column 4 - Life Form

a Annual - a plant which completes its life cycle in less than 1 year, germinates, flowers, sets seed and dies all in the same year.

p Perennial - a plant that lives 3 or more years/growing seasons.

p/a Annually Renewed Perennial - plants with perennial rootstocks (eg., bulbs, corms) but with above ground parts which die back each year (eg. Orchids or plants in the family Iridaceae).

Column 5 - Growth Form

The plants have been divided according to the following growth forms adapted from Keighery, BJ (1994):

Tree: woody plant with a trunk and canopy, the canopy is less than or equal to 2/3 of the height of the trunk, no lignotuber apparent.

Shrub: woody plant with one or many woody stems, foliage all or part of the total height of the plant.

Grass: non-woody plant that have inconspicuous individual flowers that are pollinated by wind.

Sedge: non-woody, tufted or spreading plant that comes from the plant family Cyperaceae, most have inconspicuous flowers that are pollinated by wind.

Rush: non-woody, tufted or spreading plant that comes from the plant families Juncaceae, Restionaceae, Typhaceae or Xyridaceae, most have inconspicuous flowers that are pollinated by wind.

Herb: non-woody plant with stems, generally under 0.5 m tall and that is not a grass, sedge or rush.

Column 6 - Conservation Status (Rare/Priority)

The Department of Conservation and Land Management publish a "Declared Rare Flora and Priority Flora List" (Atkins 1999) each year which places taxa that are under threat into various categories according to the threatening processes affecting them. The categories are:

Declared Rare Flora (DRF) - taxa afforded special protection under the *Wildlife Conservation Act 1950* making it illegal for any person to take declared rare flora on any land throughout the State without the consent in writing of the Minister for the Environment. These taxa are also listed each year in a notice published in the Government Gazette. The current knowledge about and threats to DRF are continually assessed. Each taxon is assigned to one of 5 categories, critically endangered, endangered, vulnerable, data deficient or presumed extinct (Brown *et al.* 1998). Resources are

allocated to recover these rare species according to their category, with those critically endangered receiving the highest priority.

Priority Flora are of uncertain conservation status and annually reassessed as new information becomes available. They are also divided into categories according to the degree of threat (Atkins 1999).

Priority 1 (P1) - poorly known taxa - taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size or being on lands under immediate threat, eg., road verges, urban areas, farmland, mineral leases. Many include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as rare but are in urgent need of further survey.

Priority 2 (P2) - poorly known taxa - taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (ie. not currently endangered). Such taxa are under consideration for declaration as rare but are in urgent need of further survey.

Priority 3 (P3) - poorly known taxa - taxa which are known from several populations, at least some of which are not believed to be under immediate threat (ie. not currently endangered). Such taxa are under consideration for declaration as rare but are in urgent need of further survey.

Priority 4 (P4) - rare taxa - taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

The current status of the flora recorded in the Acourt Rd Bushland North, as listed in Atkins (1999), is given in Column 6.

Column 7 - Occurrence

The occurrence of each taxa in the seven plant communities found during the survey is listed. The number of the quadrat that the taxa was found in is given under the appropriate plant community.

Uplands

BW *Banksia* Woodland
BJW *Banksia*-Jarrah Woodland
AS *Acacia* Shrubland

Wetlands

ErW Flooded Gum-Moonah Fringing Woodland
MtS *Melaleuca teretifolia* Shrubland
PeS *Pericalymma ellipticum*-*Regelia ciliata* Shrubland
LiS *Lyginia imberbis* Sedgeland

“a” beside a quadrat number indicates it was found adjacent to that quadrat but within the same plant community.

“+” indicates an opportunistic collection from either a known community type or unknown community type (the latter is indicated in the column headed by +).

| Botanical Name | Family | Common Name | Life Form | Growth Form | Rare/ Priority | Occurrence in Mapped Plant Communities and Quadrats | | | | | | | | | | |
|---------------------------------------------|------------------|----------------------|-----------|-------------|-------------------|--------------------------------------------------------|-----|-----|-----|------|-----|----|----|----|--|---|
| | | | | | | B W | BJW | ErW | MtS | Pe S | LiS | AS | + | | | |
| <i>Siloxerus humifusus</i> | Asteraceae | Procumbent Siloxerus | a | Herb | | | | | 5 | 6 | 8 | 7 | 9 | 10 | | |
| * <i>Sonchus oleraceus</i> | Asteraceae | Common Sowthistle | a | Herb | | | | 4 | 5 | 6a | | | | | | |
| * <i>Ursinia anthemoides</i> | Asteraceae | Ursinia | a | Herb | | 1 | 2 | 3 | 4 | 5 | 8 | 7 | 9 | 10 | | |
| <i>Waitzia suaveolens</i> | Asteraceae | Fragrant Waitzia | a | Herb | | | | | 5 | | | | | | | |
| * <i>Echium plantagineum</i> ¹ | Boraginaceae | Paterson's Curse | a | Herb | | | | | | | | | | | | + |
| * <i>Raphanus raphanistrum</i> ¹ | Brassicaceae | Wild Radish | a | Herb | | | | | | | | | | | | + |
| <i>Byblis lindleyana</i> | Byblidaceae | Rainbow Plant | p | Shrub | P2 | | | | | | | 9 | | | | |
| * <i>Wahlenbergia capensis</i> | Campanulaceae | Cape Bluebell | a | Herb | | | 3 | 4a | | | | 9 | | | | |
| * <i>Petrorhagia velutina</i> | Caryophyllaceae | Velvet Pink | a | Herb | | | | 4a | | | | | | | | |
| * <i>Stellaria media</i> | Caryophyllaceae | Chickweed | a | Herb | | | | 4 | | | | | | | | |
| <i>Allocasuarina fraseriana</i> | Casuarinaceae | Sheoak | p | Tree | | 2 | 3 | | | | | | | | | |
| <i>Aphelia cyperoides</i> | Centrolepidaceae | | a | Herb | | | | | 5 | | | | 10 | | | |
| <i>Centrolepis aristata</i> | Centrolepidaceae | Pointed Centrolepis | a | Herb | | | | | 5 | 6a | | | 10 | | | |
| <i>Centrolepis glabra</i> | Centrolepidaceae | Smooth Centrolepis | a | Herb | | 2 | | | | | | | | | | |
| <i>Dysphania glomulifera</i> ² | Chenopodiaceae | | p/a | Herb | | | | | | | | | | | | + |
| <i>Burchardia umbellata</i> | Colchicaceae | Milkmaids | p/a | Herb | | 1 | 2 | 3 | | | | | | | | |
| <i>Cartonema philydroides</i> | Commelinaceae | | p | Herb | | | 2 | | 4a | | | | | | | |
| <i>Crassula colorata</i> | Crassulaceae | Dense Stonecrop | a | Herb | | 1a | 2 | 3 | 4 | | 8 | 7 | 9 | 10 | | |
| <i>Baumea juncea</i> ¹ | Cyperaceae | Bare Twig Rush | p | Sedge | | | | | | | | | | | | + |
| * <i>Cyperus tenellus</i> ¹ | Cyperaceae | Tiny Flat Sedge | a | Sedge | | | | | | | | | | | | + |
| * <i>Isolepis marginata</i> | Cyperaceae | Coarse Club-Rush | a | Sedge | | 1 | 2 | 3 | 4 | | | | | | | |
| <i>Lepidosperma longitudinale</i> | Cyperaceae | Pithy Sword-Sedge | p | Sedge | | | 3 | | 5 | 6 | 8 | 7a | | | | |
| <i>Lepidosperma</i> sp. | Cyperaceae | | p | Sedge | | | | | | 6 | | | | | | |
| <i>Lepidosperma squamatum</i> | Cyperaceae | | p | Sedge | | 2 | 3 | | | | | | | | | |
| <i>Mesomelaena pseudostygia</i> | Cyperaceae | | p | Sedge | | | | | | | | | 10 | | | |
| <i>Schoenus curvifolius</i> | Cyperaceae | | p | Sedge | | 1 | | | | | | | | | | + |
| <i>Schoenus efoliatus</i> | Cyperaceae | | p | Sedge | | | | | | 8 | | | | | | |
| <i>Schoenus globifer</i> ¹ | Cyperaceae | | p | Sedge | | | | | | | | | | | | + |
| <i>Schoenus nanus</i> | Cyperaceae | Tiny Bog Rush | a | Sedge | | 1 | | | | | | | | | | |
| <i>Schoenus subfascicularis</i> | Cyperaceae | | p | Sedge | | | | | | + | | | | | | |
| <i>Dasypogon bromeliifolius</i> | Dasypogonaceae | Pineapple Bush | p | Herb | | 1 | 2 | 3 | | | | | | | | + |
| <i>Lomandra caespitosa</i> | Dasypogonaceae | Tufted Mat Rush | p | Herb | | 1 | | 3 | | | | | 10 | | | |
| <i>Lomandra hermaphrodita</i> | Dasypogonaceae | | p | Herb | | | 2 | 3 | | | | | | | | |
| <i>Lomandra nigricans</i> | Dasypogonaceae | | p | Herb | | | | | | | | | | | | + |

| Botanical Name | Family | Common Name | Life Form | Growth Form | Rare/ Priority | Occurrence in Mapped Plant Communities and Quadrats | | | | | | | | |
|---------------------------------------------|----------------|------------------------------|-----------|-------------|-------------------|--------------------------------------------------------|-----|-----|-----|------|-----|----|-----|---|
| | | | | | | B W | BJW | ErW | MtS | Pe S | LiS | AS | + | |
| <i>Lomandra preissii</i> | Dasypogonaceae | | p | Herb | | 2a | | | | | | | | + |
| <i>Hibbertia aurea</i> | Dilleniaceae | | p | Shrub | | 1a | | | | | | | | |
| <i>Hibbertia hypericoides</i> | Dilleniaceae | Yellow Buttercups | p | Shrub | | 2 | 3 | | | | | | | |
| <i>Hibbertia racemosa</i> | Dilleniaceae | Stalked Guinea Flower | p | Shrub | | 2 | 3a | | | | | | | |
| <i>Hibbertia stellaris</i> ¹ | Dilleniaceae | Orange Stars | p | Shrub | | | | | | | | | | + |
| <i>Hibbertia subvaginata</i> | Dilleniaceae | | p | Shrub | | 1 | 3 | | | 8a | 9 | 10 | + | |
| <i>Drosera erythrorhiza</i> | Droseraceae | Red Ink Sundew | p/a | Herb | | 1 | 2 | | | | | | | |
| <i>Drosera glanduligera</i> | Droseraceae | Pimpernel Sundew | a | Herb | | | | | 5a | 6a | 8 | | | |
| <i>Drosera leucoblasta</i> | Droseraceae | Wheel Sundew | p | Herb | | 1 | | | | | | | | |
| <i>Drosera menziesii</i> | Droseraceae | Pink Rainbow | p/a | Herb | | 1 | 3a | | | | | | | |
| <i>Astroloma xerophyllum</i> | Epacridaceae | | p | Shrub | | 1a | 3 | | | | | | | |
| <i>Conostephium pendulum</i> | Epacridaceae | Pearl Flower | p | Shrub | | 1 | 3 | | | | | | | |
| <i>Leucopogon conostephioides</i> | Epacridaceae | | p | Shrub | | 1 | 2 | 3 | | | | | | + |
| <i>Leucopogon propinquus</i> | Epacridaceae | | p | Shrub | | | 3a | | | | | | | |
| <i>Leucopogon sprengelioides</i> | Epacridaceae | | p | Shrub | | 1 | | | | | | | | |
| * <i>Euphorbia peplus</i> ¹ | Euphorbiaceae | Petty Spurge | a | Herb | | | | | | | | | | + |
| * <i>Ricinus communis</i> ¹ | Euphorbiaceae | Castor Oil Plant | p | Shrub | | | | | | | | | | + |
| * <i>Cicendia filiformis</i> | Gentianaceae | Slender Cicendia | a | Herb | | | | | 5 | | | | | |
| * <i>Pelargonium capitatum</i> | Geraniaceae | Rose Pelargonium | p | Shrub | | | | | 4 | | | | | |
| <i>Anthotium junciforme</i> | Goodeniaceae | Rush-Like Anthotium | p | Herb | P4 | | | | | 5 | | | | |
| <i>Dampiera linearis</i> | Goodeniaceae | Wedge-Leaved Dampiera | p | Herb | | | | | | 6 | | 9 | 10a | |
| <i>Goodenia pulchella</i> | Goodeniaceae | | p | Herb | | | | | 5 | | | | | |
| <i>Lechenaultia floribunda</i> | Goodeniaceae | Free-Flowering Leschenaultia | p | Herb | | | 2 | | | | | | | |
| <i>Anigozanthos humilis</i> | Haemodoraceae | Catspaw | p/a | Herb | | 1 | 3a | | | | | 7 | | |
| <i>Anigozanthos manglesii</i> | Haemodoraceae | Mangles Kangaroo Paw | p/a | Herb | | | | | | | | | 10a | |
| <i>Conostylis aculeata</i> | Haemodoraceae | Prickly Conostylis | p | Herb | | 1 | 2 | 3 | 4a | | | | | |
| <i>Conostylis juncea</i> | Haemodoraceae | | p | Herb | | 1 | 3 | | | | | | | |
| <i>Phlebocarya ciliata</i> | Haemodoraceae | | p | Herb | | 1 | 2 | 3 | 4a | 5 | | 7 | 10 | + |
| <i>Gonocarpus paniculatus</i> ² | Haloragaceae | | p | Herb | | | | | | | | | | + |
| <i>Gonocarpus pithyoides</i> ¹ | Haloragaceae | | p | Herb | | | | | | | | | | + |
| <i>Myriophyllum drummondii</i> ² | Haloragaceae | | a | Herb | | | | | | | | | | + |
| * <i>Gladiolus caryophyllaceus</i> | Iridaceae | Wild Gladiolus | p/a | Herb | | 1 | 2 | 3 | | 6a | 7 | 9 | 10 | |
| <i>Patersonia occidentalis</i> | Iridaceae | Purple Flag | p | Herb | | 1 | 3 | 4 | | | | 9 | | |
| * <i>Romulea rosea</i> | Iridaceae | Guildford Grass | p/a | Herb | | | 3 | 4 | 5 | | | | | |

| Botanical Name | Family | Common Name | Life Form | Growth Form | Rare/ Priority | Occurrence in Mapped Plant Communities and Quadrats | | | | | | | | | | | |
|-----------------------------------------------------------------|---------------|--------------------------|-----------|-------------|-------------------|-----------------------------------------------------|-----|-----|-----|------|-----|----|----|----|----|--|---|
| | | | | | | B W | BJW | ErW | MtS | Pe S | LiS | | | AS | + | | |
| <i>Luzula meridionalis</i> | Juncaceae | Field Woodrush | p | Rush | | | | 4a | | | | | | | | | |
| <i>Hemiandra pungens</i> | Lamiaceae | Snakebush | p | Shrub | | 2 | 3 | | | | | 7 | 9 | 10 | | | |
| <i>Cassytha glabella</i> | Lauraceae | Tangled Dodder Laurel | p | Herb | | | | | | 6a | | 9a | 10 | | | | |
| <i>Lobelia tenuior</i> ¹ | Lobeliaceae | Slender Lobelia | a | Herb | | | | | | | | | | | | | + |
| * <i>Monopsis debilis</i> | Lobeliaceae | | a | Herb | | | | | 5a | | | | | | | | |
| <i>Phyllangium paradoxum</i> | Loganiaceae | Wiry Mitrewort | a | Herb | | 1 | 2 | | | | 8 | | | | | | |
| <i>Nuytsia floribunda</i> | Loranthaceae | Christmas Tree | p | Tree | | 2 | | 4a | | | | | | 10 | | | |
| <i>Villarsia albiflora</i> ¹ | Menyanthaceae | | p | Herb | | | | | | | | | | | | | + |
| <i>Acacia pulchella</i> | Mimosaceae | Prickly Moses | p | Shrub | | 1a | 2 | 3a | 4a | 5 | 6 | 8a | 7 | 9a | 10 | | + |
| <i>Acacia stenoptera</i> | Mimosaceae | Narrow Winged Wattle | p | Shrub | | | | + | 4 | | | | | 10 | | | + |
| <i>Astartea fascicularis</i> | Myrtaceae | | p | Shrub | | | | | | | | | | 10 | | | |
| <i>Calothamnus lateralis</i> | Myrtaceae | | p | Shrub | | | | | | 5 | 6 | 8 | | | | | |
| <i>Calytrix flavescens</i> | Myrtaceae | Summer Starflower | p | Shrub | | 1 | | 3 | | | | | | | | | |
| <i>Calytrix fraseri</i> | Myrtaceae | Pink Summer Calytrix | p | Shrub | | | 2 | 3a | | | | | | | | | + |
| <i>Eremaea asterocarpa</i> | Myrtaceae | | p | Shrub | | 1a | | | | | | | | | | | |
| <i>Eremaea pauciflora</i> | Myrtaceae | | p | Shrub | | 1 | | | | | | | | | | | |
| <i>Eucalyptus calophylla</i> ¹ | Myrtaceae | Marri | p | Tree | | | | | | | | | | | | | + |
| <i>Eucalyptus marginata</i> | Myrtaceae | Jarraah | p | Tree | | | | 3 | | | | | | | | | |
| <i>Eucalyptus rudis</i> | Myrtaceae | Flooded Gum | p | Tree | | | | | 4 | 5a | | | 7a | | | | |
| <i>Eucalyptus todtiana</i> | Myrtaceae | Coastal Blackbutt | p | Tree | | 2 | 3 | | | | | | | | | | |
| <i>Hypocalymma angustifolium</i> | Myrtaceae | White Myrtle | p | Shrub | | | | | | | | | 7 | | 10 | | + |
| <i>Kunzea ericifolia</i> | Myrtaceae | Spearwood | p | Shrub | | | | | 4a | 5 | 6 | | 7 | | 10 | | |
| <i>Melaleuca lateritia</i> | Myrtaceae | Robin Redbreast Bush | p | Shrub | | | | | | 5 | 6 | 8 | | | | | |
| <i>Melaleuca preissiana</i> | Myrtaceae | Moonah | p | Tree | | | | | 4 | | | | | | | | |
| <i>Melaleuca raphiophylla</i> | Myrtaceae | Swamp Paperbark | p | Tree | | | | | 4a | 5a | + | | | | | | |
| <i>Melaleuca spathulata</i> | Myrtaceae | | p | Shrub | | | | | | | + | 6 | | | 10 | | + |
| <i>Melaleuca teretifolia</i> | Myrtaceae | Banbar | p | Shrub | | | | | | 5 | 6 | 8 | 7a | | | | |
| <i>Melaleuca teretifolia</i> x <i>M. lateritia</i> ² | Myrtaceae | | p | Shrub | | | | | | | | | | | | | + |
| <i>Melaleuca thymoides</i> | Myrtaceae | | p | Shrub | | | | | | | + | | | | | | |
| <i>Pericalymma ellipticum</i> | Myrtaceae | Swamp Teatree | p | Shrub | | | | | | 5a | 6 | 8 | 7 | 9 | 10 | | |
| <i>Regelia ciliata</i> | Myrtaceae | | p | Shrub | | | | | | | 6a | 8 | | | | | |
| <i>Regelia inops</i> ¹ | Myrtaceae | | p | Shrub | | | | | | | | | | | | | + |
| <i>Scholtzia involucrata</i> | Myrtaceae | Spiked Scholtzia | p | Shrub | | 1 | 2a | | | | | | | | | | |
| <i>Verticordia drummondii</i> | Myrtaceae | Drummond's Featherflower | p | Shrub | | | | | | | | | | 9a | 10 | | |

| Botanical Name | Family | Common Name | Life Form | Growth Form | Rare/ Priority | Occurrence in Mapped Plant Communities and Quadrats | | | | | | | | |
|------------------------------------------|---------------|----------------------------|-----------|-------------|-------------------|-----------------------------------------------------|-----|-----|-----|------|-----|-----|----|---|
| | | | | | | B W | BJW | ErW | MtS | Pe S | LiS | AS | + | |
| <i>Caladenia discoidea</i> | Orchidaceae | Dancing Orchid | p/a | Herb | | 2a | | | | | | | | |
| <i>Caladenia flava</i> | Orchidaceae | Cowslip Orchid | p/a | Herb | | 1 | 2 | 3 | 4 | 6a | 7 | | | |
| <i>Caladenia latifolia</i> | Orchidaceae | Pink Fairy Orchid | p/a | Herb | | | | 4a | | | | | | |
| <i>Caladenia longicauda</i> | Orchidaceae | Common White Spider Orchid | p/a | Herb | | 2 | 3 | 4a | | | | | | |
| <i>Caladenia paludosa ms</i> | Orchidaceae | Swamp Spider Orchid | p/a | Herb | | | | | 5 | | | | | |
| <i>Caladenia sp.</i> | Orchidaceae | | p/a | Herb | | 2 | 3 | 4 | 5 | 6a | 8 | | | |
| <i>Cyanicula deformis</i> | Orchidaceae | Blue Fairy Orchid | p/a | Herb | | | | | | | | | | |
| <i>Microtis media</i> ¹ | Orchidaceae | Common Mignonette Orchid | p | Herb | | | | | | | | | | + |
| <i>Prasophyllum parvifolium</i> | Orchidaceae | Autumn Leek Orchid | p/a | Herb | | 1 | | | | | | | | |
| <i>Pterostylis pyramidalis</i> | Orchidaceae | Snail Orchid | p/a | Herb | | | | | 6 | | | | | + |
| <i>Pterostylis recurva</i> | Orchidaceae | Jug Orchid | p/a | Herb | | 1a | | | | | | | | |
| <i>Pterostylis vittata</i> | Orchidaceae | Banded Greenhood | p/a | Herb | | 1 | 3 | | | | 9 | | | |
| <i>Pyrorchis nigricans</i> | Orchidaceae | Red Beak Orchid | p/a | Herb | | 1 | | | | | | | | |
| <i>Thelymitra flexuosa</i> ¹ | Orchidaceae | Twisted Sun Orchid | p | Herb | | | | | | | | | | + |
| <i>Thelymitra pauciflora</i> | Orchidaceae | Slender Sun Orchid | p/a | Herb | | | | | 5a | | | | | |
| * <i>Oxalis pes-caprae</i> | Oxalidaceae | Soursob | p/a | Herb | | | | 4a | | | | | | |
| <i>Bossiaea eriocarpa</i> | Papilionaceae | Common Brown Pea | p | Shrub | | 2 | 3 | 4a | | | | | | |
| <i>Daviesia physodes</i> | Papilionaceae | | p | Shrub | | | | | | | 7 | 10 | | |
| <i>Daviesia preissii</i> ¹ | Papilionaceae | | p | Shrub | | | | | | | | | | + |
| <i>Euchilopsis linearis</i> | Papilionaceae | Swamp Pea | p | Shrub | | | + | | | 8 | 9 | 10a | | |
| <i>Eutaxia virgata</i> | Papilionaceae | | p | Shrub | | | | | 6 | 8 | | | | |
| <i>Gompholobium tomentosum</i> | Papilionaceae | Hairy Yellow Pea | p | Shrub | | 1 | 2 | 3 | 4a | | 7 | | | |
| <i>Hardenbergia comptoniana</i> | Papilionaceae | Native Wisteria | p | Shrub | | | | 3a | 4 | | | | | |
| <i>Jacksonia furcellata</i> | Papilionaceae | Grey Stinkwood | p | Shrub | | 2 | 3 | 4 | | | 7 | | | + |
| <i>Kennedia prostrata</i> ¹ | Papilionaceae | Scarlet Runner | p | Shrub | | | | | | | | | | + |
| <i>Latrobea tenella</i> ¹ | Papilionaceae | | p | Shrub | | | | | | | | | | + |
| * <i>Lotus angustissimus</i> | Papilionaceae | Narrowleaf Trefoil | a | Herb | | | | | 5 | | | | | |
| * <i>Lupinus cosentinii</i> ¹ | Papilionaceae | Sandplain Lupin | a | Herb | | | | | | | | | | + |
| <i>Pultenaea ochreatea</i> | Papilionaceae | | p | Shrub | | | | | | | | | | + |
| <i>Pultenaea reticulata</i> ¹ | Papilionaceae | | p | Shrub | | | | | | | | | | + |
| * <i>Trifolium campestre</i> | Papilionaceae | Hop Clover | a | Herb | | | | 4a | | | | | | |
| <i>Viminaria juncea</i> | Papilionaceae | Swishbush | p | Shrub | | | | | | | | 10 | | |
| <i>Dianella revoluta</i> | Phormiaceae | Blueberry Lily | p | Herb | | 2a | 3 | 4 | | | | | | |
| * <i>Aira caryophylla</i> | Poaceae | Silvery Hairgrass | a | Grass | | 1 | | | 5 | 6 | 8 | 7 | 10 | |

| Botanical Name | Family | Common Name | Life Form | Growth Form | Rare/ Priority | Occurrence in Mapped Plant Communities and Quadrats | | | | | | | | |
|------------------------------------------------------|---------------|------------------------|-----------|-------------|-------------------|--------------------------------------------------------|-----|-----|-----|------|-----|-----|----|----|
| | | | | | | B W | BJW | ErW | MtS | Pe S | LiS | AS | + | |
| <i>Amphipogon turbinatus</i> | Poaceae | | p | Grass | | 1 | | | | | | 10 | + | |
| <i>Austrodanthonia setacea</i> ¹ | Poaceae | | p | Grass | | | | | | | | | | + |
| <i>Austrodanthonia</i> sp. | Poaceae | | p | Grass | | | | | | | | 9 | | |
| <i>Austrostipa compressa</i> | Poaceae | | a | Grass | | | | 3 | | | | 7 | 9 | |
| * <i>Avena barbata</i> | Poaceae | Bearded Oat | a | Grass | | | | + | | | | | | |
| * <i>Briza maxima</i> | Poaceae | Blowfly Grass | a | Grass | | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 7 | 9 |
| * <i>Briza minor</i> | Poaceae | Shivery Grass | a | Grass | | | | | 4a | 5 | 6 | | | |
| * <i>Cortaderia selloana</i> | Poaceae | Pampas Grass | p | Grass | | | | | | | 6a | | | |
| * <i>Cynodon dactylon</i> ¹ | Poaceae | Couch | p | Grass | | | | | | | | | | + |
| * <i>Ehrharta calycina</i> | Poaceae | Perennial Veldtgrass | p | Grass | | 1a | 2 | 3 | 4 | 5 | | 7 | 10 | |
| * <i>Ehrharta longiflora</i> | Poaceae | Annual Veldtgrass | a | Grass | | | 2a | | 4 | | | | | |
| * <i>Eragrostis curvula</i> | Poaceae | African Lovegrass | p | Grass | | | | | 4a | 5 | | | | |
| * <i>Lolium perenne</i> ¹ | Poaceae | Perennial Ryegrass | p | Grass | | | | | | | | | | + |
| <i>Neurachne alopecuroidea</i> ¹ | Poaceae | Foxtail Mulga Grass | p | Grass | | | | | | | | | | + |
| * <i>Pennisetum clandestinum</i> ¹ | Poaceae | Kikuyu Grass | p | Grass | | | | | | | | | | + |
| * <i>Pentaschistis airoides</i> | Poaceae | False Hairgrass | a | Grass | | 2 | | | | | | 9 | | |
| * <i>Sporobolus africanus</i> ¹ | Poaceae | Parramatta Grass | p/a | Grass | | | | | | | | | | + |
| * <i>Vulpia myuros</i> | Poaceae | Rat's Tail Fescue | a | Grass | | 2 | | | | | | 7 | 10 | |
| <i>Calandrinia brevipedata</i> | Portulacaceae | Short-stalked Purslane | a | Herb | | | | | | | 8 | 7 | 9 | |
| <i>Calandrinia corrigioloides</i> | Portulacaceae | Strap Purslane | a | Herb | | 2 | | | 4a | 5a | | 7 | 9a | 10 |
| <i>Calandrinia granulifera</i> | Portulacaceae | Pygmy Purslane | a | Herb | | 2 | | | | 5a | | | 10 | |
| * <i>Anagallis arvensis</i> | Primulaceae | Pimpernel | a | Herb | | | | 3 | 4 | 5 | | | | |
| <i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i> | Proteaceae | Common Woollybush | p | Shrub | | 1 | | + | | | | | | + |
| <i>Adenanthos obovatus</i> | Proteaceae | Basket Flower | p | Shrub | | | | | | | | 10 | | |
| <i>Banksia attenuata</i> | Proteaceae | Slender Banksia | p | Tree | | 1 | | 3 | | | | | | |
| <i>Banksia grandis</i> | Proteaceae | Bull Banksia | p | Tree | | | | + | | | | | | |
| <i>Banksia ilicifolia</i> | Proteaceae | Holly-leaved Banksia | p | Tree | | | | 3a | | | | | | |
| <i>Banksia littoralis</i> | Proteaceae | Swamp Banksia | p | Tree | | | | | | | + | | | |
| <i>Banksia menziesii</i> | Proteaceae | Firewood Banksia | p | Tree | | 1 | | | | | | | | |
| <i>Hakea varia</i> | Proteaceae | Variable-leaved Hakea | p | Shrub | | | | | | | + | | | |
| <i>Persoonia saccata</i> | Proteaceae | Snottygooble | p | Shrub | | | | 3a | | | | | | |
| <i>Petrophile linearis</i> | Proteaceae | Pixie Mops | p | Shrub | | 1 | 2 | 3a | | | | 10a | + | |
| <i>Stirlingia latifolia</i> | Proteaceae | Blueboy | p | Shrub | | 1 | | | | | | | | |

| Botanical Name | Family | Common Name | Life Form | Growth Form | Rare/ Priority | Occurrence in Mapped Plant Communities and Quadrats | | | | | | | | |
|---------------------------------------------------|------------------|--------------------------------|-----------|-------------|-------------------|--------------------------------------------------------|-----|-----|-----|------|-----|-----|----|----|
| | | | | | | B W | BJW | ErW | MtS | Pe S | LiS | AS | + | |
| <i>Xylomelum occidentale</i> | Proteaceae | Woody Pear | p | Tree | | | + | | | | | | | |
| <i>Alexgeorgea nitens</i> | Restionaceae | | p | Rush | | 1a | | | | | | | | |
| <i>Desmocladius flexuosus</i> | Restionaceae | | p | Rush | | 1a | 2 | 3 | 4 | | | | 10 | |
| <i>Hypolaena exsulca</i> | Restionaceae | | p | Rush | | | | 3 | 4 | 6a | | 7 | 9 | 10 |
| <i>Lyginia imberbis</i> | Restionaceae | | p | Rush | | 1 | 2 | | 4 | 6 | 8a | 7 | 9 | 10 |
| <i>Meeboldina cana</i> | Restionaceae | Hoary Twine Rush | p | Rush | | | | | | | 8 | | | |
| <i>Meeboldina coangustata</i> | Restionaceae | | p | Rush | | | | | 5 | | | | | |
| <i>Meeboldina scariosa</i> ¹ | Restionaceae | Velvet Rush | p | Rush | | | | | | | | | | + |
| <i>Meeboldina tephрина</i> ² | Restionaceae | | p | Rush | | | | | | | | | | + |
| <i>Boronia crenulata</i> ¹ | Rutaceae | Aniseed Boronia | p | Shrub | | | | | | | | | | + |
| <i>Boronia dichotoma</i> ¹ | Rutaceae | | p | Shrub | | | | | | | | | | + |
| <i>Boronia racemosa anethifolia</i> | Rutaceae | | p | Shrub | | | | | + | | | | | |
| <i>Boronia spathulata</i> | Rutaceae | Boronia | p | Shrub | | | | | | | | 10a | | |
| <i>Philotheca spicata</i> | Rutaceae | Pepper and Salt | p | Shrub | | 1 | | 3a | | | | | | |
| <i>Pimelea ?rara</i> ¹ | Rutaceae | | p | Shrub | | | | | | | | | | + |
| <i>Leptomeria pauciflora</i> | Santalaceae | Sparse Flowered Current Bush | p | Shrub | | | | | | + | | | | |
| * <i>Dischisma capitatum</i> | Scrophulariaceae | Woolly-headed Dischisma | a | Herb | | | | | 4a | | | | | |
| * <i>Parentucellia latifolia</i> ¹ | Scrophulariaceae | Common Bartsia | a | Herb | | | | | | | | | | + |
| * <i>Parentucellia viscosa</i> | Scrophulariaceae | Sticky Bartsia | a | Herb | | | | | 5 | 6a | | | | |
| <i>Selaginella gracillima</i> | Selaginellaceae | Tiny Clubmoss | a | Herb | | | | | | 6 | | | | |
| <i>Stackhousia monogyna</i> | Stackhousiaceae | | p | Herb | | | | | | | | 9a | | |
| <i>Tripterococcus brunonis</i> | Stackhousiaceae | Winged Stackhousia | p | Herb | | 1 | | | | | | | 10 | |
| <i>Tripterococcus paniculatus</i> ms ³ | Stackhousiaceae | | p | Herb | P1 | | | | | | | | | + |
| <i>Levenhookia pusilla</i> | Stylidiaceae | Midget Stylewort | a | Herb | | 1 | | | | | | | | |
| <i>Levenhookia stipitata</i> ¹ | Stylidiaceae | Common Stylewort | a | Herb | | | | | | | | | | + |
| <i>Stylidium brunonianum</i> | Stylidiaceae | Pink Fountain Trigger Plant | p | Herb | | | | | | 6 | | 9 | | |
| <i>Stylidium divaricatum</i> ¹ | Stylidiaceae | Daddy-Long-Legs | p | Herb | | | | | | | | | | + |
| <i>Stylidium junceum</i> ¹ | Stylidiaceae | Reed Trigger Plant | a | Herb | | | | | | | | | | + |
| <i>Stylidium perpusillum</i> ¹ | Stylidiaceae | Tiny Trigger Plant | a | Herb | | | | | | | | | | + |
| <i>Stylidium piliferum</i> ¹ | Stylidiaceae | Common Butterfly Trigger Plant | p | Herb | | | | | | | | | | + |
| <i>Stylidium repens</i> | Stylidiaceae | Matted Trigger Plant | p | Herb | | 1 | | + | | 6 | 8 | 7 | 9 | 10 |
| <i>Stylidium schoenoides</i> | Stylidiaceae | Cow Kicks | p | Herb | | | | 3a | | | | | | |
| <i>Stylidium utricularioides</i> | Stylidiaceae | Pink Fan Trigger Plant | a | Herb | | | | | 5a | | | | | |
| <i>Pimelea imbricata</i> | Thymelaeaceae | | p | Shrub | | | | | | 6a | | 7 | 9 | 10 |

| Botanical Name | Family | Common Name | Life Form | Growth Form | Rare/ Priority | Occurrence in Mapped Plant Communities and Quadrats | | | | | | | |
|------------------------------------------|------------------|----------------|-----------|-------------|-------------------|-----------------------------------------------------|-----|-----|-----|------|-----|----|---|
| | | | | | | B W | BJW | ErW | MtS | Pe S | LiS | AS | + |
| <i>Pimelea rara</i> ¹ | Thymelaeaceae | Summer Pimelea | p | Shrub | | | | | | | | | + |
| <i>Platytheca galioides</i> ¹ | Tremandraceae | | p | Shrub | | | | | | | | | + |
| * <i>Typha orientalis</i> ¹ | Typhaceae | Bulrush | p | Rush | | | | | | | | | + |
| <i>Xanthorrhoea preissii</i> | Xanthorrhoeaceae | Grasstree | p | Shrub | | | 3 | 4 | | | | | |
| <i>Macrozamia riedlei</i> | Zamiaceae | Zamia | p | Shrub | | 2 | 3a | 4 | | | | | |

¹Goble-Garratt 1994

²Greg Keighery, pers. comm. 2000

³Government of Western Australia 1998b