

**JOHN CURTIN COLLEGE OF THE ARTS
FREMANTLE, WESTERN AUSTRALIA**

BUSHY HILL FLORA SURVEY

AND

FIELD HERBARIUM



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Wildflower Society of Western Australia (Inc.)
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and

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In partnership with Baldivis Children's Forest (Inc.)



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SUMMARY

A total of 54 taxa (species, subspecies and varieties), including 24 local native taxa and 30 weeds or non-local native taxa were recorded from 22 plant families in the course of a survey on a remnant bushland area at John Curtin College of the Arts (JCCA) in September 2010 by volunteers of the Wildflower Society of Western Australia and JCCA students. Four quadrats were established within the remnant bushland area known as 'Bushy Hill'.

A field herbarium of specimens held in two A4 files, and scanned copies of these on disc, have been given to JCCA.

1 INTRODUCTION

The Wildflower Society's Bushland Plant Survey Project is a community project that has been in existence since 1988. It has the combined objectives of learning through involvement and bushland conservation. It is based on the belief that by developing an understanding of our surroundings we are better able to value them. It aims to help community groups and individual landholders know and conserve their bushland by providing training and help to survey, document and monitor vegetation and flora. In particular it encourages the recognition of native plants and plant communities. This knowledge can then be utilised in the management and conservation of the bushland.

This is the first year that the Bushland Plant Survey Project has been involved with school students and the Project's aims and methods have been transferred smoothly to suit this purpose. Jo Tregonning, Project Officer with the Baldy's Children's Forest and parent of a child at the College, and Anne Bellman, Wildflower Society of Western Australia (WSWA) volunteer, initiated this survey. The WSWA applauds the enthusiastic involvement of Julie Boston (Head of Science and co-ordinator of the school environmental group Roots'n'Shoots) and Bruce Ivey (Buildings and Grounds Co-ordinator for the College P&C and a member of the College Council), both of whom understand the importance of protecting the biodiversity of the area.

The aim of the project was to survey the remnant bushland at the College, in order to provide a species list and field herbarium to complement any existing floristic and vegetation information for the College grounds. The survey was conducted by WSWA volunteers, with the help of College students; and the field herbarium was assembled from the specimens collected during the survey and identified by volunteers and students. The resulting information is to be used to enable identification of weeds for removal and to create a list of the correct local native species suitable for use in the rehabilitation of the grounds. It is expected that the list of species generated from this survey will be added to as a result of future survey work at the College.

2 STUDY AREA

John Curtin College of the Arts is in Fremantle, Western Australia. The bushland area surveyed is part of ‘Bushy Hill’, also known by students as ‘The Wasties’. The survey area is bounded by Curtin Theatre to the north, Ellen Street to the south, and north-south lines between Curtin Theatre and Ellen Street at the east and west (Map 1).

Fremantle lies on the Swan Coastal Plain, and is part of the South West Botanical Province which has a very high degree of plant species diversity. The College is situated on soil defined as ‘Cottesloe Ridge’: very shallow brown or bright yellow sand or loam over limestone, with limestone cropping out in places (Powell 1996). As a result, the soil is too shallow for trees which have deep roots. However, there are occasional pockets of deeper sand in depressions in the limestone, where taller, deeper rooted trees can grow. There are small (about 3m high) but sheer Tamala limestone cliffs at the southern boundary and to the west of the area surveyed.

Fremantle has a Mediterranean climate, characterized by warm, dry summers and rainy winters. The average rainfall recorded at Fremantle over the last 26 years is 736.2 mm (BOM 2010).

Over the years, local native and non-local-native plants have been planted across the school grounds, including Bushy Hill. A current revegetation project is that run by the Friends of the Eastern Gates Lookout in the triangle (the Eastern Gates Lookout) in the north-east of the College grounds; care is being taken by this group to plant local native species. Examination of historic aerial photos reveals that the grounds, including Bushy Hill, were almost totally denuded of vegetation in 1943. There have been fires in the Bushy Hill bush and the establishment of many weeds. These events have led to the current plant community being very much altered from the original vegetation.

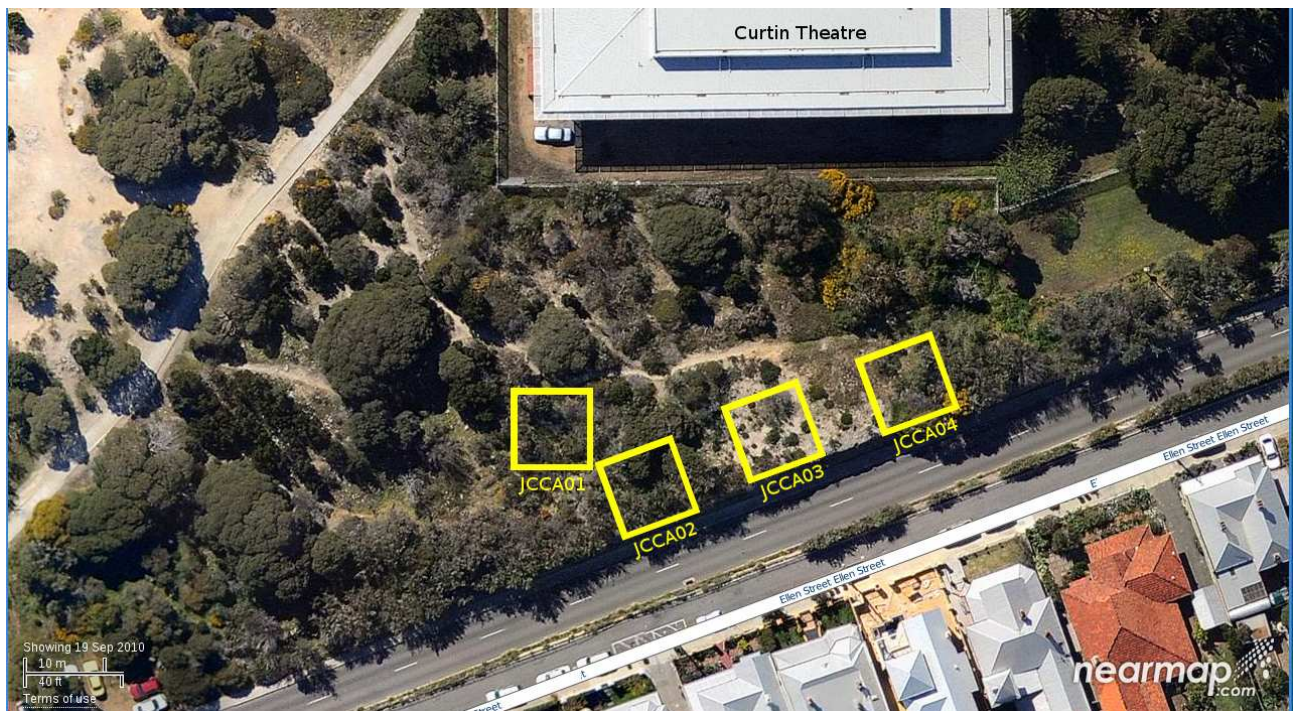


Map 1 Location of the area surveyed at John Curtin College of the Arts, Fremantle

3 METHODS

The standard survey techniques used are well described in the Wildflower Society publication *Bushland Plant Survey for the Community* (Keighery 1994). The methods have proved successful for community participation with the use of quadrats and standardised data sheets providing a systematic procedure for the collection of information, ensuring all species, not just the most conspicuous, are sampled. In this project large 10 m x 10 m quadrats were used in order to adequately sample the vegetation. The quadrats were marked with galvanised steel fence droppers but the markers were removed at the end of the session. Their position was recorded by GPS co-ordinates.

During a previsit on 10th August 2010, suitable quadrat locations were determined to enable relative easy and safe access by the students and to enable sampling of the best remnant bushland area (Bushy Hill) with the most diversity of native species.



Map 2 Quadrat sites at Bushy Hill, John Curtin College of the Arts, Fremantle

The recommended time to survey dryland bushland on the Swan Coastal Plain is spring, when most plants are flowering, to enable collection of adequate flowering material to help with identification. The survey was held on 3rd September 2010. Unfortunately, the 2010 winter was very dry with well below average rainfall but there was still a sufficiently good flowering season.

Eleven WSWA botanists or experienced volunteers, together with Roots'n'Shoots members and year 12 TEE Biology students established four 10 m x 10 m quadrats (JCCA01-04; see Map 2). Data was recorded by the volunteers and the students on the quadrat data sheets and over 100 specimens were collected.

During a revisit to Bushy Hill in late November 2010, some extra information was added to the quadrat data sheets, further photos were taken and species known to flower later in spring were searched for, for addition to the species list.

At the completion of the field work the specimens were pressed and dried for five weeks, during which time the newspapers were changed to prevent growth of mould.

During a two hour session on 13th October 2010, eight WSWA volunteers and Jo Tregonning helped pairs of year 10 students identify the specimens using relevant flora books, computer keys and FloraBase (an online record of the WA Herbarium collection, Western Australian Herbarium 1998-). The students wrote a label for each plant they identified using information from the books and FloraBase, mounted the specimen onto stiff card using special herbarium tape and according to procedures followed by the Western Australian Herbarium and scanned the completed specimen. Only suitable specimens with as much flowering and/or fruiting material as possible were mounted. In some cases there was inadequate material; more could be collected at a later date.

Vegetation descriptions of each quadrat were compiled from the information written on the quadrat data sheets. Specimen data was typed onto the WA Herbarium Max software program and species lists of native and weed/non-local plants recorded during the survey were created. Another list of local native species expected to have originally grown on Bushy Hill was created using data obtained from Department of Environment and Conservation quadrats set up in Buckland and Cantonment Hills and from species lists created by Powell (pers. comm.) and Longman (pers. comm.) at these Hills and Clontarf and Cypress Hills, that is, nearby bushland remnants with the same geology (limestone hills with shallow soils).

4 RESULTS

A total of 54 taxa (species, subspecies and varieties), including 24 local native taxa and 30 weeds or non-local native taxa (listed in Tables 1, 2 and 3; weeds are denoted by an asterisk, *) were found in and adjacent to the four JCCA quadrats. They were recorded from 22 plant families with most plants being from the Myrtaceae family (includes the eucalypts and melaleucas) and the Fabaceae (includes the wattles).

FAMILY	No. local native taxa	No. weed or non-local native taxa	Total no. taxa
Apocynaceae		1	1
Arecaceae		1	1
Asteraceae		2	2
Brassicaceae		1	1
Cupressaceae	1		1
Euphorbiaceae		2	2
Fabaceae	8	2	10
Geraniaceae		1	1
Hemerocallidaceae	2		2
Iridaceae		4	4
Malvaceae		1	1
Moraceae		1	1
Myrtaceae	7	4	11
Oleaceae		1	1
Oxalidaceae		1	1
Papaveraceae		1	1
Poaceae	1	5	6
Primulaceae		1	1
Proteaceae	3		3
Restionaceae	1		1
Rubiaceae		1	1
Sapindaceae	1		1

The plants found comprised 42 perennials (24 local natives and 18 weeds/non-locals) and 12 annuals (all weeds/non-locals). Most taxa found were shrubs and herbs; there were 19 shrub taxa recorded (15 local natives and 4 weeds/non-locals) and 19 herb taxa (2 local natives and 17 weeds/non-locals).

GROWTH FORM	No. local native taxa	No. weed or non-local native taxa	Total no. taxa
Tree	2	4	6
Mallee	3	0	3
Shrub	15	4	19
Herb	2	17	19
Grass	1	5	6
Sedge	1	0	1

No declared rare or priority flora were recorded. Nevertheless, some of the species found are considered uncommon or restricted trees and tall shrubs in the Perth Metropolitan Region (PMR). These uncommon trees and tall shrubs are listed below from Powell (2009), and those also considered significant in *Bush Forever* (Government of WA 2000) are indicated.

PLANT NAME	COMMON NAME	Significant species <i>Bush Forever</i>
<i>Acacia xanthina</i>	White-stemmed wattle	
<i>Callitris preissii</i>	Rottneest cypress	
<i>Dodonaea aptera</i>	Coast hop-bush	
<i>Eucalyptus decipiens</i>	Limestone marlock	
<i>Eucalyptus foecunda</i>	Fremantle mallee	Y
<i>Eucalyptus petrensis</i>	Rock mallee	Y

This survey does not provide a full representation of the flora of the school grounds, having only surveyed one part (about 800 m²) of Bushy Hill, but this area was chosen as it was deemed to have the greatest density of local native species, and to be in the best condition; nevertheless, the condition was still only Good-Degraded.

Site information and vegetation descriptions of each quadrat (Table 4) were compiled from the information written on the quadrat data sheets (scans of the completed quadrat data sheets are found in Appendix 1). Vegetation structure and condition were recorded according to Keighery (1994, see Appendix 2 for keys to vegetation structure and condition).

Table 5 is a longer list of species – it lists native species expected to have grown on Bushy Hill and has been created by looking at the flora of nearby bushland remnants with the same geology and soils.

The field herbarium specimens are held in two files. The specimens have been grouped according to **growth form**, and then alphabetically by plant **family**, then **plant name** (genus, species, and subspecies or variety). Trees and mallees, and grasses and sedges have been grouped together in the field herbarium because superficially they look quite similar. The weeds/non-locals have been grouped separately as it is considered important to any bushland management to be able to distinguish between a native plant and an introduced plant. All specimens in the field herbarium have been scanned and have been given to John Curtin College of the Arts on disc. Notes on how to care for a field herbarium are included at the front of the field herbarium.

Appendix 3 lists some books which are useful for identification of plant species in the Perth region; these include the books used by the students at the identification session.

5 DISCUSSION

Current Flora and Vegetation of Bushy Hill

Although native species found at Bushy Hill are outnumbered by weeds/non-locals, and the condition of the bushland is only Good-Degraded, there is still an interesting collection of local native species present. Most of the local natives found at Bushy Hill are shrubs, mallees and trees, with only a couple of local native herbs and one local native grass being recorded, the herb and grass layers being dominated instead by weeds. There is, however, a local native sedge (*Desmocladus flexuosus*) present in one small area at the edge of the Ellen Street cliff face (in quadrat JCCA02).

It is interesting that out of a list of the 24 plant species considered uncommon in the PMR (see Results), six of them (a quarter) are found at Bushy Hill. Limestone ridges near the coast and in the PMR are uncommon and are quite a restricted habitat; their species were never especially common, and have become less so as these ridges have been cleared for housing or mined for limestone (Powell 2009). This is reflected in the allocation of such bushland to the priority 3 Floristic Community Type 24 (Northern Spearwood shrublands and woodlands); the Bushy Hill bushland aligns itself therefore with this FCT but its condition would have to be significantly improved by weed removal and revegetation with local natives before it could be even considered for listing as a priority ecological community.

FCT 24: Northern Spearwood shrublands and woodlands

Heaths with scattered *Eucalyptus gomphocephala* occurring on deeper soils north from Woodman Point. Most sites occur on the Cottesloe unit of the Spearwood system. The heathlands in this group typically include *Dryandra sessilis*, *Calothamnus quadrifidus* and *Schoenus grandiflorus*.

One of the species uncommon in the PMR, *Eucalyptus foecunda*, was first collected by Ludwig Preiss in 1839 from a limestone slope near Fremantle, hence its common name 'Fremantle Mallee'. It is not too far fetched to suggest that possibly it could have been collected, if not from Bushy Hill itself, from somewhere nearby.

Revegetation

Some of the weed/non-local trees recorded at Bushy Hill have obviously been planted for their showy flowers and fruit (eg. **Eucalyptus erythrocorys*) and are Western Australian, but not local, natives. It is helpful to define local native species at this point: a local native plant is a plant that occurs in a local area, in a particular ecosystem and habitat, either naturally or replanted. A plant that is a local native of the white sand of the beach at South Fremantle is *not necessarily* a local native of the limestone Bushy Hill, less than 3 km away. Which plants are locally native to an area depends very much on the soil type and depth, rainfall and availability of light.

In bushland it is, of course, preferable to replant only local native species. This is because planting local natives is an excellent way of helping maintain biodiversity in the South West of our state, an area deemed to be one of the world's 34 biodiversity hotspots (the only one in Australia). Local natives have evolved to cope with the local soils, the limited rainfall and strong winds so need no extra fertilizer, water or protection from the strong seabreeze; local natives provide food and habitat for local fauna which is under pressure with increased clearing, development and smaller gardens; local natives give us a sense of place, a community of plant species with which to identify and recognize as being associated with our home. Powell and Emberson (1996) further recommend local native species for children to learn about nature: finding out about local species, what natural factors influence their distribution, what plants associate together, what creatures they support and how. These, they say, are learning experiences that cannot be derived from non-local plants planted out of context.

It appears from historical aerial photos that the Bushy Hill area was almost totally cleared in the 1940s. It is unclear where the plants that are now present, particularly the interesting local natives, originated. Possibly seed stored in the soil, or brought in by birds and other fauna, germinated and natural revegetation occurred; alternatively, seedlings could have been planted, which is of course must be the case with the non-locals such as **Eucalyptus erythrocorys*.

In Bushy Hill there is much encouraging regeneration of local natives such as *Acacia* species, *Callitris preissii*, *Calothamnus quadrifidus* and *Templetonia retusa*, as well as regeneration of weeds.

A species regarded in the species lists as a weed or non-local native, **Melaleuca lanceolata* (Rottneest Teatree), is not generally considered by botanists as a species locally native to areas such as Bushy Hill. Although widespread generally throughout Australia, in the PMR and surrounds it only grows on Rottneest and Garden Islands and at a couple of locations on the mainland (City Beach and Yalgorup National Park);

its distribution before European settlement may have been more widespread. Observation of nearby limestone hills revealed no natural occurrence of this species; consequently, it is thought to have been planted at Bushy Hill and no further specimens of this species should be planted here.

Tuart (*Eucalyptus gomphocephala*) in the area of Bushy Hill can only grow in pockets of deeper sands (closer to Curtin Theatre) because its roots cannot penetrate the shallow underlying limestone. Therefore, care must be taken when replanting Tuart. Instead, the shallow soils over limestone of Bushy Hill should instead be the realm of the special mallees, *Eucalyptus decipiens*, *E. petrensis* and *E. foecunda*.

The more aggressive weed shrub species such as **Leptospermum laevigatum*, with their imposing size, should be targeted for removal before local native species are even more crowded out. A good mix of mainly shrubs and herbs, and a smaller number of mallees, should be considered for revegetation (see Table 5).

Fire risk on Bushy Hill is increased by the presence of dried out weed grasses and dead weedy shrubs (see photo 9); there is even a little collection of wood piled into a heap in quadrat JCCA02. It is normally good practice to leave dead plants as habitat for wildlife (eg. hollows for birds' nests, twigs for native bees pupal chambers) but it is acknowledged that it is also necessary to minimise fire risk in the urban environment. Also, frequent fire is very detrimental to the bush, killing juvenile plants before they have managed to set seed that would germinate after fire.

The species listed in Table 5 are those suggested for revegetation of Bushy Hill and, in fact any nearby hills with shallow soil over limestone. Not all the species are readily available at nurseries but seed could be collected from plants on Bushy Hill or from plants near by and then grown up in commercial nurseries or by the children themselves; seed must be of local provenance.

6 ACKNOWLEDGEMENTS

Thank you to the Head of Science, Julie Boston, whose skills and whole-hearted support enabled the involvement of so many students.

The help and enthusiasm of the Wildflower Society botanists and volunteers is greatly appreciated. Participants all gave generously of their time and eagerly took on the challenge of sharing their survey and identification experience with the College students. WSWA participants in the previsit, survey and identification session were Anne Bellman, Jo Tregonning, Geoff Corrick, Joyce Evans, Bronwen Keighery, Vanda & Melissa Longman, Dorothy Perret, Lyn Roberts, Phylis Robertson and Margaret Tyrka. It was a pleasure to have Bruce Ivers (Buildings and Grounds Co-ordinator for the College P&C and a member of the College Council) join us and help out at the identification session. Arthur Blundell helped with the scanning of mounted specimens and compilation of the CD.

The students themselves co-operated with the volunteers fantastically; it was a pleasure working with them.

Thanks to the Robert Powell for providing species lists for nearby limestone hills and the Department of Environment and Conservation for provision of quadrat data from a couple of these hills.

7 REFERENCES

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8 PERSONAL COMMUNICATIONS

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9. TABLES

TABLE 1 Local native and weed/non-local native species recorded by the Wildflower Society of WA / John Curtin College of the Arts survey of Bushy Hill, by supra code

Column 1	SUPRA CODE Indicates broad supra-family classification. FER Ferns GYM Gymnosperms MON Monocotyledons DIC Dicotyledons
Column 2	FAMILY NAME
Column 3	PLANT NAME Genus + Species + Infra Species Rank + Infra Species Name + Informal Name. Taxa (genera, species, sub-species and varieties) are listed alphabetically by supra code, then by family, then by plant name. Names follow Western Australian Herbarium (2010) subsp. Subspecies var. Variety * Weed/non-local native
Column 4	COMMON AND/OR ABORIGINAL NAME
Column 5	ENDEMIC Taxa (species, sub-species and varieties) endemic to Western Australia (WA) or Australia (AUST) or >AUST (cosmopolitan). Origin of weeds/non-local natives are not listed here (see Hussey <i>et al.</i> 2007).
Column 6	GROWTH FORM
Column 7	LIFE FORM A Annual P Perennial PAA Perennial annually renewed from above ground part PAB Perennial annually renewed from below ground part A-PAR Annual - parasite or semi-parasite P-PAR Perennial - parasite or semi-parasite
Columns 8-11	JCCA01 – JCCA04 q Found <i>in</i> the quadrat a Found <i>adjacent</i> to the quadrat
Column 12	NAME ID From the Census of Western Australian Plants (Western Australian Herbarium 1998- and 2010).

SUPRA CODE	FAMILY NAME	PLANT NAME	COMMON AND/OR ABORIGINAL NAME	ENDEMIC	GROWTH FORM	LIFE FORM	JCCA01	JCCA02	JCCA03	JCCA04	NAME ID
GYM	Cupressaceae	<i>Callitris preissii</i>	Rottneest Island Cypress, Rottneest Island Pine	WA	Tree	P	q	q			96
MON	Arecaceae	* <i>Washingtonia filifera</i>	Cotton Palm		Tree	P		a			17910
MON	Hemerocallidaceae	<i>Dianella revoluta</i> var. <i>divaricata</i>	Common Dianella	WA	Herb	P	q				11636
MON	Hemerocallidaceae	<i>Tricoryne elatior</i>	Yellow Summer Lily, Yellow Autumn Lily	AUST	Herb	P		q	q		1361
MON	Iridaceae	* <i>Freesia alba</i> x <i>leichtlinii</i>	Freesia		Herb	PAB	q	q	q	q	18392

SUPRA CODE	FAMILY NAME	PLANT NAME	COMMON AND/OR ABORIGINAL NAME	ENDEMIC	GROWTH FORM	LIFE FORM	JCCA01	JCCA02	JCCA03	JCCA04	NAME ID
MON	Iridaceae	* <i>Gladiolus caryophyllaceus</i>	Pink Gladiolus, Wild Gladiolus		Herb	PAB		a			1520
MON	Iridaceae	* <i>Moraea flaccida</i>	One-leaf Cape Tulip		Herb	PAB	q				19179
MON	Iridaceae	* <i>Romulea rosea</i>	Guildford Grass		Herb	PAB	q	q	q		1556
MON	Iridaceae	* <i>Romulea</i> sp.								q	-20540
MON	Poaceae	<i>Austrostipa flavescens</i>	Tall Speargrass	AUST	Grass	P	q				17240
MON	Poaceae	* <i>Avena barbata</i>	Bearded Oat		Grass	A			q	q	233
MON	Poaceae	* <i>Bromus diandrus</i>	Great Brome		Grass	A	q			q	249
MON	Poaceae	* <i>Lagurus ovatus</i>	Hare's Tail Grass		Grass	A	q	q		q	467
MON	Poaceae	* <i>Pennisetum clandestinum</i>	Kikuyu		Grass	P		q			536
MON	Poaceae	* <i>Stenotaphrum secundatum</i>	Buffalo Grass		Grass	P		a			636
MON	Restionaceae	<i>Desmocladus flexuosus</i>		WA	Sedge	P		q			16595
DIC	Apocynaceae	* <i>Nerium oleander</i>	Oleander		Shrub	P	a	q			18356
DIC	Asteraceae	* <i>Hypochaeris radicata</i>	Flatweed		Herb	A		q	q	q	9352
DIC	Asteraceae	* <i>Sonchus oleraceus</i>	Common Sowthistle		Herb	A		q	q	q	8231
DIC	Brassicaceae	* <i>Lobularia maritima</i>	Alyssum, Sweet Alyssum		Herb	P		a			3048
DIC	Euphorbiaceae	* <i>Euphorbia peplus</i>	Petty Spurge		Herb	A	q	q		q	4638
DIC	Euphorbiaceae	* <i>Euphorbia terracina</i>	Geraldton Carnation Weed		Herb	P		q	q	q	4648
DIC	Fabaceae	<i>Acacia cochlearis</i>	Rigid Wattle	WA	Shrub	P	q	q	q		3262
DIC	Fabaceae	<i>Acacia cyclops</i>	Red-eyed Wattle, Coastal Wattle	AUST	Shrub	P			a		3282
DIC	Fabaceae	<i>Acacia lasiocarpa</i>	Panjang	WA	Shrub	P	q	q	q	a	3409
DIC	Fabaceae	<i>Acacia saligna</i>	Coojong, Orange Wattle, Kudjong	WA	Shrub	P	q		q	q	3527
DIC	Fabaceae	<i>Acacia</i> sp.			Shrub	P		a			-20592
DIC	Fabaceae	<i>Acacia truncata</i>		WA	Shrub	P	q		q		3584
DIC	Fabaceae	<i>Acacia xanthina</i>	White-stemmed Wattle	WA	Shrub	P		q	q	q	3604
DIC	Fabaceae	<i>Hardenbergia comptoniana</i>	Hardenbergia, Native Wisteria	WA	Climbing shrub	P		q		q	3961
DIC	Fabaceae	* <i>Lupinus cosentinii</i>	Sandplain Lupin		Herb	A	q			q	4066
DIC	Fabaceae	* <i>Medicago polymorpha</i>	Burr Medic		Herb	A	q	q		q	4079
DIC	Fabaceae	<i>Templetonia retusa</i>	Cockies' Tongues	AUST	Shrub	P		q	q	q	4256
DIC	Geraniaceae	* <i>Pelargonium capitatum</i>	Rose Pelargonium		Herb	P		q			4343
DIC	Malvaceae	* <i>Malva parviflora</i>	Small-flowered Mallow, Marshmallow		Herb	A				q	4961
DIC	Moraceae	* <i>Ficus macrophylla</i>	Moreton Bay Fig		Tree	P				q	-21449
DIC	Myrtaceae	<i>Calothamnus quadrifidus</i>	One-sided Bottlebrush, Freeway Calothamnus, Kwowdjard	WA	Shrub	P	q		q		5426
DIC	Myrtaceae	<i>Eucalyptus decipiens</i>	Limestone Marlock, Redheart	WA	Mallee	P				q	5615
DIC	Myrtaceae	* <i>Eucalyptus erythrocorys</i>	Ilyyarrie, Ilyari		Tree	P	q				-20422

SUPRA CODE	FAMILY NAME	PLANT NAME	COMMON AND/OR ABORIGINAL NAME	ENDEMIC	GROWTH FORM	LIFE FORM	JCCA01	JCCA02	JCCA03	JCCA04	NAME ID
DIC	Myrtaceae	<i>Eucalyptus foecunda</i>	Fremantle Mallee, Narrow-leaved Red Mallee	WA	Mallee	P	q				5649
DIC	Myrtaceae	<i>Eucalyptus gomphocephala</i>	Tuart	WA	Tree	P	q		q		5659
DIC	Myrtaceae	<i>Eucalyptus petrensis</i>	Rock Mallee	WA	Mallee	P	q	q			13541
DIC	Myrtaceae	<i>Eucalyptus</i> sp.				P			q		-20821
DIC	Myrtaceae	* <i>Eucalyptus utilis</i>		WA	Tree	P				a	-21451
DIC	Myrtaceae	* <i>Leptospermum laevigatum</i>	Victorian Teatree, Coast Teatree		Shrub	P	q	q	q	q	5850
DIC	Myrtaceae	<i>Melaleuca huegelii</i> subsp. <i>huegelii</i>	Chenille Honeymyrtle	WA	Shrub	P	q	q	q	q	13271
DIC	Myrtaceae	* <i>Melaleuca lanceolata</i>	Rottneest Teatree, Moonah	AUST	Shrub	P		q			-20296
DIC	Myrtaceae	<i>Melaleuca systena</i>	Yellow Honeymyrtle	WA	Shrub	P		q	q		18598
DIC	Oleaceae	* <i>Olea europaea</i>	Olive		Shrub	P		q			6503
DIC	Oxalidaceae	* <i>Oxalis pes-caprae</i>	Soursob		Herb	PAB		q	q	q	4356
DIC	Papaveraceae	* <i>Fumaria capreolata</i>	Climbing Fumitory, Whiteflower Fumitory		Climbing Herb	A		a			2969
DIC	Primulaceae	* <i>Lysimachia arvensis</i>	Pimpernel		Herb	A	q		q		36375
DIC	Proteaceae	<i>Dryandra sessilis</i> var. <i>cygnorum</i>	Coast Parrotbush, Pudjak	WA	Shrub	P	q	q			16667
DIC	Proteaceae	<i>Grevillea preissii</i> subsp. <i>preissii</i>	Limestone Spider-net Grevillea	WA	Shrub	P		q	q		15839
DIC	Proteaceae	<i>Hakea prostrata</i>	Harsh Hakea	WA	Shrub	P	q				2197
DIC	Rubiaceae	* <i>Galium</i> sp.			Herb	A		q	q		-21450
DIC	Sapindaceae	<i>Dodonaea aptera</i>	Coast Hopbush	WA	Shrub	P		a	q		4754

TABLE 2 Local native and weed/non-local native species recorded by the Wildflower Society of WA / John Curtin College of the Arts survey of Bushy Hill, by plant name

- Column 1 PLANT NAME**
 Genus + Species + Infra Species Rank + Infra Species Name + Informal Name. Local native taxa are listed first, followed by weed/non-local native taxa. Taxa (genera, species, sub-species and varieties) are listed alphabetically by plant name. Names follow Western Australian Herbarium (2010)
 subsp. Subspecies
 var. Variety
 * Weed/non-local native
- Column 2 COMMON AND/OR ABORIGINAL NAME**
- Column 3 SUPRA CODE**
 Indicates broad supra-family classification.
 FER Ferns
 GYM Gymnosperms
 MON Monocotyledons
 DIC Dicotyledons
- Column 4 FAMILY NAME**
- Column 5 ENDEMIC**
 Taxa (species, sub-species and varieties) endemic to Western Australia (WA) or Australia (AUST) or >AUST (cosmopolitan). Origin of weeds are not listed here (see Hussey *et al.* 2007)
- Column 6 GROWTH FORM**
- Column 7 LIFE FORM**
 A Annual
 P Perennial
 PAA Perennial annually renewed from above ground part
 PAB Perennial annually renewed from below ground part
 A-PAR Annual – parasite or semi-parasite
 P-PAR Perennial – parasite or semi-parasite
- Columns 8-11 JCCA01 – JCCA04**
 q Found *in* the quadrat
 a Found *adjacent* to the quadrat
- Column 12 NAME ID**
 From the Census of Western Australian Plants (Western Australian Herbarium 1998- and 2010).

PLANT NAME	COMMON AND/OR ABORIGINAL NAME	SUPRA CODE	FAMILY NAME	ENDEMIC	GROWTH FORM	LIFE FORM	JCCA01	JCCA02	JCCA03	JCCA04	NAME ID
<i>Acacia cochlearis</i>	Rigid Wattle	DIC	Fabaceae	WA	Shrub	P	q	q	q		3262
<i>Acacia cyclops</i>	Red-eyed Wattle, Coastal Wattle	DIC	Fabaceae	AUST	Shrub	P			a		3282
<i>Acacia lasiocarpa</i>	Panjang	DIC	Fabaceae	WA	Shrub	P	q	q	q	a	3409
<i>Acacia saligna</i>	Coojong, Orange Wattle, Kudjong	DIC	Fabaceae	WA	Shrub	P	q		q	q	3527
<i>Acacia</i> sp.		DIC	Fabaceae		Shrub	P		a			-20592
<i>Acacia truncata</i>		DIC	Fabaceae	WA	Shrub	P	q		q		3584
<i>Acacia xanthina</i>	White-stemmed Wattle	DIC	Fabaceae	WA	Shrub	P		q	q	q	3604
<i>Austrostipa flavescens</i>	Tall Speargrass	MON	Poaceae	AUST	Grass	P	q				17240

PLANT NAME	COMMON AND/OR ABORIGINAL NAME	SUPRA CODE	FAMILY NAME	ENDE MIC	GROWTH FORM	LIFE FORM	JCCA01	JCCA02	JCCA03	JCCA04	NAME ID
<i>Callitris preissii</i>	Rottnest Island Cypress, Rottnest Island Pine	GYM	Cupressaceae	WA	Tree	P	q	q			96
<i>Calothamnus quadrifidus</i>	One-sided Bottlebrush, Freeway Calothamnus, Kwowdjard	DIC	Myrtaceae	WA	Shrub	P	q		q		5426
<i>Desmocladius flexuosus</i>		MON	Restionaceae	WA	Sedge	P		q			16595
<i>Dianella revoluta</i> var. <i>divaricata</i>	Common Dianella	MON	Hemerocallidaceae	WA	Herb	P	q				11636
<i>Dodonaea aptera</i>	Coast Hopbush	DIC	Sapindaceae	WA	Shrub	P		a	q		4754
<i>Dryandra sessilis</i> var. <i>cygnorum</i>	Coast Parrotbush, Pudjak	DIC	Proteaceae	WA	Shrub	P	q	q			16667
<i>Eucalyptus decipiens</i>	Limestone Marlock, Redheart	DIC	Myrtaceae	WA	Mallee	P				q	5615
<i>Eucalyptus foecunda</i>	Fremantle Mallee, Narrow-leaved Red Mallee	DIC	Myrtaceae	WA	Mallee	P	q				5649
<i>Eucalyptus gomphocephala</i>	Tuart	DIC	Myrtaceae	WA	Tree	P	q		q		5659
<i>Eucalyptus petrensis</i>	Rock Mallee	DIC	Myrtaceae	WA	Mallee	P	q	q			13541
<i>Eucalyptus</i> sp.		DIC	Myrtaceae			P			q		-20821
<i>Grevillea preissii</i> subsp. <i>preissii</i>	Limestone Spider-net Grevillea	DIC	Proteaceae	WA	Shrub	P		q	q		15839
<i>Hakea prostrata</i>	Harsh Hakea	DIC	Proteaceae	WA	Shrub	P	q				2197
<i>Hardenbergia comptoniana</i>	Hardenbergia, Native Wisteria	DIC	Fabaceae	WA	Climbing shrub	P		q		q	3961
<i>Melaleuca huegelii</i> subsp. <i>huegelii</i>	Chenille Honeymyrtle	DIC	Myrtaceae	WA	Shrub	P	q	q	q	q	13271
<i>Melaleuca systema</i>	Yellow Honeymyrtle	DIC	Myrtaceae	WA	Shrub	P		q	q		18598
<i>Templetonia retusa</i>	Cookies' Tongues	DIC	Fabaceae	AUST	Shrub	P		q	q	q	4256
<i>Tricoryne elatior</i>	Yellow Summer Lily, Yellow Autumn Lily	MON	Hemerocallidaceae	AUST	Herb	P		q	q		1361
* <i>Avena barbata</i>	Bearded Oat	MON	Poaceae		Grass	A			q	q	233
* <i>Bromus diandrus</i>	Great Brome	MON	Poaceae		Grass	A	q			q	249
* <i>Eucalyptus erythrocorys</i>	Illyarrie, Ilyari	DIC	Myrtaceae		Tree	P	q				-20422
* <i>Eucalyptus utilis</i>		DIC	Myrtaceae		Tree	P				a	-21451
* <i>Euphorbia peplus</i>	Petty Spurge	DIC	Euphorbiaceae		Herb	A	q	q		q	4638
* <i>Euphorbia terracina</i>	Geraldton Carnation Weed	DIC	Euphorbiaceae		Herb	P		q	q	q	4648
* <i>Ficus macrophylla</i>	Moreton Bay Fig	DIC	Moraceae		Tree	P				q	-21449

PLANT NAME	COMMON AND/OR ABORIGINAL NAME	SUPRA CODE	FAMILY NAME	ENDE MIC	GROWTH FORM	LIFE FORM	JCCA01	JCCA02	JCCA03	JCCA04	NAME ID
* <i>Freesia alba x leichtlinii</i>	Freesia	MON	Iridaceae		Herb	PAB	q	q	q	q	18392
* <i>Fumaria capreolata</i>	Climbing Fumitory, Whiteflower Fumitory	DIC	Papaveraceae		Climbing herb	A		a			2969
* <i>Galium</i> sp.		DIC	Rubiaceae		Herb	A		q	q		-21450
* <i>Gladiolus caryophyllaceus</i>	Pink Gladiolus, Wild Gladiolus	MON	Iridaceae		Herb	PAB		a			1520
* <i>Hypochaeris radicata</i>	Flatweed	DIC	Asteraceae		Herb	A		q	q	q	9352
* <i>Lagurus ovatus</i>	Hare's Tail Grass	MON	Poaceae		Grass	A	q	q		q	467
* <i>Leptospermum laevigatum</i>	Victorian Teatree, Coast Teatree	DIC	Myrtaceae		Shrub	P	q	q	q	q	5850
* <i>Lobularia maritima</i>	Alyssum, Sweet Alyssum	DIC	Brassicaceae		Herb	P		a			3048
* <i>Lupinus cosentinii</i>	Sandplain Lupin	DIC	Fabaceae		Herb	A	q			q	4066
* <i>Lysimachia arvensis</i>	Pimpernel	DIC	Primulaceae		Herb	A	q		q		36375
* <i>Malva parviflora</i>	Small-flowered Mallow, Marshmallow	DIC	Malvaceae		Herb	A				q	4961
* <i>Medicago polymorpha</i>	Burr Medic	DIC	Fabaceae		Herb	A	q	q		q	4079
* <i>Melaleuca lanceolata</i>	Rottnest Teatree, Moonah	DIC	Myrtaceae	AUST	Shrub	P		q			-20296
* <i>Moraea flaccida</i>	One-leaf Cape Tulip	MON	Iridaceae		Herb	PAB	q				19179
* <i>Nerium oleander</i>	Oleander	DIC	Apocynaceae		Shrub	P	a	q			18356
* <i>Olea europaea</i>	Olive	DIC	Oleaceae		Shrub	P		q			6503
* <i>Oxalis pes-caprae</i>	Soursob	DIC	Oxalidaceae		Herb	PAB		q	q	q	4356
* <i>Pelargonium capitatum</i>	Rose Pelargonium	DIC	Geraniaceae		Herb	P		q			4343
* <i>Pennisetum clandestinum</i>	Kikuyu	MON	Poaceae		Grass	P		q			536
* <i>Romulea rosea</i>	Guildford Grass	MON	Iridaceae		Herb	PAB	q	q	q		1556
* <i>Romulea</i> sp.		MON	Iridaceae							q	-20540
* <i>Sonchus oleraceus</i>	Common Sowthistle	DIC	Asteraceae		Herb	A		q	q	q	8231
* <i>Stenotaphrum secundatum</i>	Buffalo Grass	MON	Poaceae		Grass	P		a			636
* <i>Washingtonia filifera</i>	Cotton Palm	MON	Arecaceae		Tree	P		a			17910

TABLE 3 Local native and weed/non-local native species recorded by the Wildflower Society of WA / John Curtin College of the Arts survey of Bushy Hill, by growth form

Column 1	GROWTH FORM
Column 2	PLANT NAME Genus + Species + Infra Species Rank + Infra Species Name + Informal Name. Taxa (genera, species, sub-species and varieties) are listed alphabetically by growth form, then by family then by plant name. Names follow Western Australian Herbarium (2010) subsp. Subspecies var. Variety * Weed/non-local native
Column 3	COMMON AND/OR ABORIGINAL NAME
Column 4	SUPRA CODE Indicates broad supra-family classification. FER Ferns GYM Gymnosperms MON Monocotyledons DIC Dicotyledons
Column 5	FAMILY NAME
Column 6	ENDEMIC Taxa (species, sub-species and varieties) endemic to Western Australia (WA) or Australia (AUST) or >AUST (cosmopolitan). Origin of weeds are not listed here (see Hussey <i>et al.</i> 2007)
Column 7	LIFE FORM A Annual P Perennial PAA Perennial annually renewed from above ground part PAB Perennial annually renewed from below ground part A-PAR Annual – parasite or semi-parasite P-PAR Perennial – parasite or semi-parasite
Columns 8-11	JCCA01 – JCCA04 q Found <i>in</i> the quadrat a Found <i>adjacent</i> to the quadrat
Column 12	NAME ID From the Census of Western Australian Plants (Western Australian Herbarium 1998- and 2010).

GROWTH FORM	FAMILY NAME	PLANT NAME	COMMON AND/OR ABORIGINAL NAME	SUPRA CODE	ENDEMIC	LIFE FORM	JCCA01	JCCA02	JCCA03	JCCA04	NAME ID
Tree	Arecaceae	* <i>Washingtonia filifera</i>	Cotton Palm	MON		P		a			17910
Tree	Cupressaceae	<i>Callitris preissii</i>	Rottneest Island Cypress, Rottneest Island Pine	GYM	WA	P	q	q			96
Tree	Moraceae	* <i>Ficus macrophylla</i>	Moreton Bay Fig	DIC		P				q	-21449
Tree	Myrtaceae	* <i>Eucalyptus erythrocorys</i>	Illyarrie, Ilyari	DIC		P	q				-20422
Tree	Myrtaceae	<i>Eucalyptus gomphocephala</i>	Tuart	DIC	WA	P	q		q		5659
Tree	Myrtaceae	* <i>Eucalyptus utilis</i>		DIC	WA	P				a	-21451
Shrub	Apocynaceae	* <i>Nerium oleander</i>	Oleander	DIC		P	a	q			18356

GROWTH FORM	FAMILY NAME	PLANT NAME	COMMON AND/OR ABORIGINAL NAME	SUPRA CODE	ENDE MIC	LIFE FORM	JCCA01	JCCA02	JCCA03	JCCA04	NAME ID
Shrub	Fabaceae	<i>Acacia cochlearis</i>	Rigid Wattle	DIC	WA	P	q	q	q		3262
Shrub	Fabaceae	<i>Acacia cyclops</i>	Red-eyed Wattle	DIC	AUST	P			a		3282
Shrub	Fabaceae	<i>Acacia lasiocarpa</i>	Panjang	DIC	WA	P	q	q	q	a	3409
Shrub	Fabaceae	<i>Acacia saligna</i>	Coojong, Orange Wattle, Kudjong	DIC	WA	P	q		q	q	3527
Shrub	Fabaceae	<i>Acacia</i> sp.		DIC		P		a			-20592
Shrub	Fabaceae	<i>Acacia truncata</i>	Wattle	DIC	WA	P	q		q		3584
Shrub	Fabaceae	<i>Acacia xanthina</i>	White-stemmed Wattle	DIC	WA	P		q	q	q	3604
Shrub	Fabaceae	<i>Templetonia retusa</i>	Cookies' Tongues	DIC	AUST	P		q	q	q	4256
Shrub	Myrtaceae	* <i>Leptospermum laevigatum</i>	Victorian Teatree, Coast Teatree	DIC		P	q	q	q	q	5850
Shrub	Myrtaceae	* <i>Melaleuca lanceolata</i>	Rottnest Teatree, Moonah	DIC	AUST	P		q			-20296
Shrub	Myrtaceae	<i>Calothamnus quadrifidus</i>	One-sided Bottlebrush, Freeway Calothamnus, Kwowdjard	DIC	WA	P	q		q		5426
Shrub	Myrtaceae	<i>Melaleuca huegelii</i> subsp. <i>huegelii</i>	Chenille Honeymyrtle	DIC	WA	P	q	q	q	q	13271
Shrub	Myrtaceae	<i>Melaleuca systema</i>	Yellow Honeymyrtle	DIC	WA	P		q	q		18598
Shrub	Oleaceae	* <i>Olea europaea</i>	Olive	DIC		P		q			6503
Shrub	Proteaceae	<i>Dryandra sessilis</i> var. <i>cygnorum</i>	Coast Parrotbush, Pudjak	DIC	WA	P	q	q			16667
Shrub	Proteaceae	<i>Grevillea preissii</i> subsp. <i>preissii</i>	Limestone Spider-net Grevillea	DIC	WA	P		q	q		15839
Shrub	Proteaceae	<i>Hakea prostrata</i>	Harsh Hakea	DIC	WA	P	q				2197
Shrub	Sapindaceae	<i>Dodonaea aptera</i>	Coast Hopbush	DIC	WA	P		a	q		4754
Sedge	Restionaceae	<i>Desmocladus flexuosus</i>		MON	WA	P		q			16595
Mallee/Tree	Myrtaceae	<i>Eucalyptus</i> sp.		DIC		P			q		-20821
Mallee	Myrtaceae	<i>Eucalyptus decipiens</i>	Limestone Marlock, Redheart	DIC	WA	P				q	5615
Mallee	Myrtaceae	<i>Eucalyptus foecunda</i>	Fremantle Mallee, Narrow-leaved Red Mallee	DIC	WA	P	q				5649
Mallee	Myrtaceae	<i>Eucalyptus petrensis</i>	Rock Mallee	DIC	WA	P	q	q			13541
Herb	Asteraceae	* <i>Hypochaeris radicata</i>	Flatweed	DIC		A		q	q	q	9352
Herb	Asteraceae	* <i>Sonchus oleraceus</i>	Common Sowthistle	DIC		A		q	q	q	8231
Herb	Brassicaceae	* <i>Lobularia maritima</i>	Alyssum, Sweet Alyssum	DIC		P		a			3048
Herb	Euphorbiaceae	* <i>Euphorbia peplus</i>	Petty Spurge	DIC		A	q	q		q	4638
Herb	Euphorbiaceae	* <i>Euphorbia terracina</i>	Geraldton Carnation Weed	DIC		P		q	q	q	4648
Herb	Fabaceae	* <i>Lupinus cosentinii</i>	Sandplain Lupin	DIC		A	q			q	4066
Herb	Fabaceae	* <i>Medicago polymorpha</i>	Burr Medic	DIC		A	q	q		q	4079

GROWTH FORM	FAMILY NAME	PLANT NAME	COMMON AND/OR ABORIGINAL NAME	SUPRA CODE	ENDE MIC	LIFE FORM	JCCA01	JCCA02	JCCA03	JCCA04	NAME ID
Herb	Geraniaceae	* <i>Pelargonium capitatum</i>	Rose Pelargonium	DIC		P		q			4343
Herb	Hemerocallidaceae	<i>Dianella revoluta</i> var. <i>divaricata</i>	Common Dianella	MON	WA	P	q				11636
Herb	Hemerocallidaceae	<i>Tricoryne elatior</i>	Yellow Summer Lily, Yellow Autumn Lily	MON	AUST	P		q	q		1361
Herb	Iridaceae	* <i>Freesia alba</i> x <i>leichtlinii</i>	Freesia	MON		PAB	q	q	q	q	18392
Herb	Iridaceae	* <i>Gladiolus caryophyllaceus</i>	Pink Gladiolus, Wild Gladiolus	MON		PAB		a			1520
Herb	Iridaceae	* <i>Moraea flaccida</i>	One-leaf Cape Tulip	MON		PAB	q				19179
Herb	Iridaceae	* <i>Romulea rosea</i>	Guildford Grass	MON		PAB	q	q	q		1556
Herb	Iridaceae	* <i>Romulea</i> sp.		MON						q	-20540
Herb	Malvaceae	* <i>Malva parviflora</i>	Small-flowered Mallow, Marshmallow	DIC		A				q	4961
Herb	Oxalidaceae	* <i>Oxalis pes-caprae</i>	Soursob	DIC		PAB		q	q	q	4356
Herb	Primulaceae	* <i>Lysimachia arvensis</i>	Pimpernel	DIC		A	q		q		36375
Herb	Rubiaceae	* <i>Galium</i> sp.		DIC		A		q	q		-21450
Grass	Poaceae	* <i>Avena barbata</i>	Bearded Oat	MON		A			q	q	233
Grass	Poaceae	* <i>Bromus diandrus</i>	Great Brome	MON		A	q			q	249
Grass	Poaceae	* <i>Lagurus ovatus</i>	Hare's Tail Grass	MON		A	q	q		q	467
Grass	Poaceae	* <i>Pennisetum clandestinum</i>	Kikuyu	MON		P		q			536
Grass	Poaceae	* <i>Stenotaphrum secundatum</i>	Buffalo Grass	MON		P		a			636
Grass	Poaceae	<i>Austrostipa flavescens</i>	Tall Speargrass	MON	AUST	P	q				17240
Climbing shrub	Fabaceae	<i>Hardenbergia comptoniana</i>	Hardenbergia, Native Wisteria	DIC	WA	P		q		q	3961
Climbing herb	Papaveraceae	* <i>Fumaria capreolata</i>	Climbing Fumitory, Whiteflower Fumitory	DIC		A		a			2969

TABLE 4 Quadrat vegetation, site and species information

Quadrat JCCA01

Vegetation description: **Eucalyptus erythrocorys* and *Eucalyptus gomphocephala* Open Low Woodland, over *Eucalyptus petrensis* Very Open Shrub Mallee, over *Melaleuca huegelii* subsp. *huegelii* Open Tall Shrubland, over *Acacia cochlearis* and *Dryandra sessilis* var. *cygnorum* Open Shrubland, over *Acacia lasiocarpa* Open Low Shrubland, over a mixed weedy Closed Grassland and a **Freesia alba* x *leichtlinii* Herbland.

GPS location (GDA94): 32° 3' 0.5" S 115° 45' 21.5" E

Date Sampled: 3/09/2010

Topographic position: Limestone hill

Site description: Well drained SW facing gently sloping upland site. Grey loamy sand (with humus) with outcropping and subsurface limestone.

Vegetation condition: Good.

Species in the quadrat:

Trees: *Callitris preissii*, **Eucalyptus erythrocorys*, *Eucalyptus gomphocephala*

Mallees: *Eucalyptus foecunda*, *Eucalyptus petrensis*

Shrubs: *Acacia cochlearis*, *Acacia lasiocarpa*, *Acacia saligna*, *Acacia truncata*, *Calothamnus quadrifidus*, *Dryandra sessilis* var. *cygnorum*, *Hakea prostrata*, **Leptospermum laevigatum*, *Melaleuca huegelii* subsp. *huegelii*

Grasses: *Austrostipa flavescens*, **Bromus diandrus*, **Lagurus ovatus*

Herbs: *Dianella revoluta* var. *divaricata*, **Euphorbia peplus*, **Freesia alba* x *leichtlinii*, **Lupinus cosentinii*, **Lysimachia arvensis*, **Medicago polymorpha*, **Moraea flaccida*, **Romulea rosea*

Species adjacent to the quadrat:

Shrubs: **Nerium oleander*

Quadrat JCCA02

Vegetation description: **Melaleuca lanceolata* Low Woodland, over **Leptospermum laevigatum* Tall Shrubland, over *Acacia cochlearis* Shrubland, over **Romulea rosea*, **Freesia alba* x *leichtlinii* and **Oxalis pes-caprae* Herbland

GPS location (GDA94): 32° 3' 0.6" S 115° 45' 22" E

Date Sampled: 3/09/2010

Topographic position: Limestone hill

Site description: Well drained S and WNW facing gently sloping upland site. Grey loamy sand with outcropping and subsurface limestone.

Vegetation condition: Good-Degraded.

Species in the quadrat:

Trees: *Callitris preissii*

Mallees: *Eucalyptus petrensis*

Shrubs: *Acacia cochlearis*, *Acacia lasiocarpa*, *Acacia xanthina*, *Dryandra sessilis* var. *cygnorum*, *Grevillea preissii* subsp. *preissii*, *Hardenbergia comptoniana*, **Leptospermum laevigatum*, *Melaleuca huegelii* subsp. *huegelii*, *Melaleuca lanceolata*, *Melaleuca systema*, **Nerium oleander*, **Olea europaea*, *Templetonia retusa*

Grasses: **Lagurus ovatus*, **Pennisetum clandestinum*

Herbs: **Euphorbia peplus*, **Euphorbia terracina*, **Freesia alba* x *leichtlinii*, **Galium* sp., **Hypochaeris radicata*, **Medicago polymorpha*, **Oxalis pes-caprae*, **Pelargonium capitatum*, **Romulea rosea*, **Sonchus oleraceus*, *Tricoryne elatior*

Sedges: *Desmocladius flexuosus*

Species adjacent to the quadrat:

Trees: **Washingtonia filifera* (seedling)

Shrubs: *Acacia* sp., *Dodonaea aptera*

Grasses: **Stenotaphrum secundatum*

Herbs: **Fumaria capreolata*, **Gladiolus caryophyllaceus*, **Lobularia maritima*

Quadrat JCCA03

Vegetation description: *Eucalyptus gomphocephala* Open Low Woodland, over **Leptospermum laevigatum* Tall Shrubland, over *Acacia cochlearis* and *Acacia xanthina* Shrubland, over *Acacia lasiocarpa* Low Shrubland, over **Freesia alba* x *leichtlinii* and **Hypochaeris radicata* Very Open Herbland.

GPS location (GDA94): 32° 3' 0.3" S 115° 45' 22.3" E

Date Sampled: 3/09/2010

Topographic position: Limestone hill

Site description: Well drained SSW facing gently sloping upland site. Grey-white sand with outcropping and subsurface limestone.

Vegetation condition: Good.

Species in the quadrat:

Trees: *Eucalyptus gomphocephala*

Shrubs: *Acacia cochlearis*, *Acacia lasiocarpa*, *Acacia saligna*, *Acacia truncata*, *Acacia xanthina*, *Calothamnus quadrifidus*, *Dodonaea aptera*, *Grevillea preissii* subsp. *preissii*, **Leptospermum laevigatum*, *Melaleuca huegelii* subsp. *huegelii*, *Melaleuca systema*, *Templetonia retusa*

Grasses: **Avena barbata*

Herbs: **Euphorbia terracina*, **Freesia alba* x *leichtlinii*, **Galium* sp., **Hypochaeris radicata*, **Lysimachia arvensis*, **Oxalis pes-caprae*, **Romulea rosea*, **Sonchus oleraceus*, *Tricoryne elatior*

Species adjacent to the quadrat:

Shrubs: *Acacia cyclops*

Quadrat JCCA04

Vegetation description: **Ficus macrophylla* Open Low Woodland, over **Leptospermum laevigatum*, *Acacia saligna* and *Acacia xanthina* Tall Shrubland, over *Melaleuca huegelii* subsp. *huegelii* Open Shrubland, over mixed weedy Grassland and mixed weedy Herbland.

GPS location (GDA94): 32° 3' 0.2" S 115° 45' 23.1" E

Date Sampled: 3/09/2010

Topographic position: Limestone hill

Site description: Well drained flat upland site. Grey sand with outcropping and subsurface limestone.

Vegetation condition: Degraded.

Species in the quadrat:

Trees: **Ficus macrophylla*

Mallees: *Eucalyptus decipiens*

Shrubs: *Acacia saligna*, *Acacia xanthina*, *Hardenbergia comptoniana*, **Leptospermum laevigatum*, *Melaleuca huegelii* subsp. *huegelii*, *Templetonia retusa*

Grasses: **Avena barbata*, **Bromus diandrus*, **Lagurus ovatus*

Herbs: **Euphorbia peplus*, **Euphorbia terracina*, **Freesia alba* x *leichtlinii*, **Hypochaeris radicata*, **Lupinus cosentinii*, **Malva parviflora*, **Medicago polymorpha*, **Oxalis pes-caprae*, **Sonchus oleraceus*

Species adjacent to the quadrat:

Trees: **Eucalyptus utilis*

Shrubs: *Acacia lasiocarpa*

TABLE 5 Local native plant species recorded on limestone hills in Fremantle, by growth form

This constitutes a list of plants suitable for revegetating Bushy Hill, John Curtin College of the Arts, and similar sites nearby with the same shallow soil over limestone.

- Column 1 GROWTH FORM**
- Column 2 PLANT NAME**
Genus + Species + Infra Species Rank + Infra Species Name + Informal Name. Taxa (genera, species, sub-species and varieties) are listed alphabetically by growth form, then by plant name. Names follow Western Australian Herbarium (2010)
 subsp. Subspecies
 var. Variety
- Column 3 COMMON AND/OR ABORIGINAL NAME**
- Column 4 SUPRA CODE**
Indicates broad supra-family classification.
 FER Ferns
 GYM Gymnosperms
 MON Monocotyledons
 DIC Dicotyledons
- Column 5 FAMILY NAME**
- Column 6 ENDEMIC**
Taxa (species, sub-species and varieties) endemic to Western Australia (WA) or Australia (AUST) or >AUST (cosmopolitan). Origin of weeds are not listed here (see Hussey *et al.* 2007)
- Column 7 LIFE FORM**
 A Annual
 P Perennial
 PAA Perennial annually renewed from above ground part
 PAB Perennial annually renewed from below ground part
 A-PAR Annual - parasite or semi-parasite
 P-PAR Perennial - parasite or semi-parasite
- Columns 8-11 Limestone hill locations in Fremantle and surrounds**
This list of local native species was compiled from Buckland, Cantonment, Clontarf and Cypress Hills (DEC quadrat data, Powell pers. comm., Longman pers. comm.). These lists are not necessarily comprehensive. Local natives from JCCA quadrat data is also listed.
- Column 12 NAME ID**
From the Census of Western Australian Plants (Western Australian Herbarium 1998- and 2010).

GROWTH FORM	PLANT NAME	COMMON AND/OR ABORIGINAL NAME	SUPRA CODE	FAMILY NAME	ENDEMIC	LIFE FORM	BUCKLAND HILL	CANTONMENT HILL	CLONTARF HILL	CYPRESS HILL	JCCA	NAME ID
Tree	<i>Callitris preissii</i>	Rottneest Island Cypress, Rottneest Island Pine	GYM	Cupressaceae	WA	P				y	y	96
Mallee	<i>Eucalyptus decipiens</i>	Limestone Marlock, Redheart	DIC	Myrtaceae	WA	P			y		y	5615
Mallee	<i>Eucalyptus foecunda</i>	Fremantle Mallee, Narrow-leaved Red Mallee	DIC	Myrtaceae	WA	P		y		y	y	5649

GROWTH FORM	PLANT NAME	COMMON AND/OR ABORIGINAL NAME	SUPRA CODE	FAMILY NAME	ENDEMIC	LIFE FORM	BUCKLAND HILL	CANTONMENT HILL	CLONTARF HILL	CYPRESS HILL	JCCA	NAME ID
Mallee	<i>Eucalyptus petrensis</i>	Rock Mallee	DIC	Myrtaceae	WA	P					y	13541
Shrub	<i>Acacia cochlearis</i>	Rigid Wattle	DIC	Fabaceae	WA	P				y	y	3262
Shrub	<i>Acacia cyclops</i>	Red-eyed Wattle, Coastal Wattle	DIC	Fabaceae	AUST	P	y	y		y	y	3282
Shrub	<i>Acacia lasiocarpa</i>	Panjang	DIC	Fabaceae	WA	P	y				y	3409
Shrub	<i>Acacia saligna</i>	Coojong, Orange Wattle, Kudjong	DIC	Fabaceae	WA	P	y	y		y	y	3527
Shrub	<i>Acacia truncata</i>	Wattle	DIC	Fabaceae	WA	P					y	3584
Shrub	<i>Acacia xanthina</i>	White-stemmed Wattle	DIC	Fabaceae	WA	P	y	y		y	y	3604
Shrub	<i>Beyeria cinerea</i>		DIC	Euphorbiaceae	WA	P	y					4594
Shrub	<i>Calothamnus quadrifidus</i>	One-sided Bottlebrush, Freeway Calothamnus, Kwowdjard	DIC	Myrtaceae	WA	P			y	y	y	5426
Shrub	<i>Cryptandra mutila</i>		DIC	Rhamnaceae	WA	P	y					4802
Shrub	<i>Diplopeltis huegelii</i> subsp. <i>huegelii</i>	Coastal Diplopeltis	DIC	Sapindaceae	WA	P	y					18541
Shrub	<i>Dodonaea aptera</i>	Coast Hopbush	DIC	Sapindaceae	WA	P		y		y	y	4754
Prostrate shrub	<i>Dryandra lindleyana</i>	Couch Honeypot, Pudjam	DIC	Proteaceae	WA	P	y			y		16672
Shrub	<i>Dryandra sessilis</i> var. <i>cygnorum</i>	Coast Parrotbush, Pudjak	DIC	Proteaceae	WA	P	y		y	y	y	16667
Shrub	<i>Eremophila glabra</i> subsp. <i>albicans</i>		DIC	Scrophulariaceae	WA	P		y				17175
Shrub	<i>Gompholobium tomentosum</i>	Common Gompholobium, Hairy Yellow Pea	DIC	Fabaceae	WA	P	y					3957
Shrub	<i>Grevillea preissii</i> subsp. <i>preissii</i>	Limestone Spider-net Grevillea	DIC	Proteaceae	WA	P	y			y	y	15839
Shrub	<i>Hakea prostrata</i>	Harsh Hakea	DIC	Proteaceae	WA	P	y		y		y	2197
Climbing shrub	<i>Hardenbergia comptoniana</i>	Hardenbergia, Native Wisteria	DIC	Fabaceae	WA	P			y		y	3961
Shrub	<i>Leucopogon parviflorus</i>	Beard Heath, Coast Beard-heath	DIC	Ericaceae	WA	P		y	y			6427
Shrub	<i>Melaleuca huegelii</i> subsp. <i>huegelii</i>	Chenille Honeymyrtle	DIC	Myrtaceae	WA	P	y	y	y	y	y	13271
Shrub	<i>Melaleuca systema</i>	Yellow Honeymyrtle	DIC	Myrtaceae	WA	P	y	y	y	y	y	18598
Shrub	<i>Opercularia vaginata</i>	Opercularia, Dog Weed	DIC	Rubiaceae	WA	P	y	y				18255
Shrub	<i>Pimelea calcicola</i>	Limestone Banjine, Banjin	DIC	Thymelaeaceae	WA	P			y			5237
Shrub	<i>Rhagodia baccata</i> subsp. <i>dioica</i>	Berry Saltbush, Sea Berry Saltbush	DIC	Chenopodiaceae	WA	P	y			y		11930
Shrub	<i>Spyridium globulosum</i>	Basket Bush	DIC	Rhamnaceae	AUST	P		y	y			4828
Shrub	<i>Templetonia retusa</i>	Cockies' Tongues	DIC	Fabaceae	AUST	P	y	y	y	y	y	4256

GROWTH FORM	PLANT NAME	COMMON AND/OR ABORIGINAL NAME	SUPRA CODE	FAMILY NAME	ENDEMIC	LIFE FORM	BUCKLAND HILL	CANTONMENT HILL	CLONTARF HILL	CYPRESS HILL	JCCA	NAME ID
Shrub	<i>Trymalium ledifolium</i>		DIC	Rhamnaceae	WA	P	y					4842
Herb	<i>Acanthocarpus preissii</i>	Prickle Lily	MON	Asparagaceae	WA	P	y	y	y	y		1208
Climbing herb	<i>Clematis linearifolia</i>	Old Man's Beard	DIC	Ranunculaceae	WA	P	y		y			10804
Herb	<i>Conostylis aculeata</i>	Prickly Conostylis	MON	Haemodoraceae	WA	P			y			1418
Herb	<i>Dianella revoluta</i> var. <i>divaricata</i>	Common Dianella	MON	Hemerocallidaceae	WA	P	y		y	y	y	11636
Herb	<i>Hybanthus calycinus</i>	Native Violet, Wild Violet	DIC	Violaceae	WA	P	y					5216
Herb	<i>Lomandra maritima</i>	Coast Lomandra	MON	Asparagaceae	WA	P	y	y	y	y		1231
Herb	<i>Parietaria cardiostegia</i>	Native Pellitory	DIC	Urticaceae	AUST	A						12670
Herb	<i>Parietaria debilis</i>	Native Pellitory	DIC	Urticaceae	AUST	A						1762
Herb	<i>Phyllanthus calycinus</i>	Phyllanthus, False Boronia	DIC	Phyllanthaceae	WA	P	y	y	y			4675
Herb	<i>Picris squarrosa</i>	Hawkweed	DIC	Asteraceae	AUST	PAB	y					8160
Herb	<i>Tricoryne elatior</i>	Yellow Summer Lily, Yellow Autumn Lily	MON	Hemerocallidaceae	AUST	P	y	y	y		y	1361
Grass	<i>Austrostipa elegantissima</i>	Feather Speargrass	MON	Poaceae	AUST	P	y	y		y		17237
Grass	<i>Austrostipa flavescens</i>	Tall Speargrass	MON	Poaceae	AUST	P	y	y			y	17240
Sedge	<i>Desmocladus flexuosus</i>		MON	Restionaceae	WA	P	y	y			y	16595
Sedge	<i>Lepidosperma squamatum</i>	Common Lepidosperma	MON	Cyperaceae	WA	P	y	y	y			945
Sedge	<i>Schoenus lanatus</i>	Woolly Bog-rush	MON	Cyperaceae	WA	P		y				997