

Flora and Vegetation of Dardanup Forest Block

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Abstract

Dardanup Forest Block is the only vegetated conservation area known to encompass the Darling, Whicher Scarp and associated foothills. Three principal plant communities are present in the area: Jarrah Woodland, Marri-Jarrah-Mountain Marri woodland and *Banksia* woodland. Three regional floristic community types are represented in the block, type 1a: *Eucalyptus haematoxylon*-*E. marginata* woodlands of the Whicher Foothills, type 21b: Southern *Banksia* woodlands and Jarrah forest of the Western Edge of the Darling Plateau. Types 1a and 21b are at or near their northern limits in Dardanup Block. These are some of the largest known occurrences of these poorly reserved community types. The block contains a vascular flora of 494 taxa; 455 are natives and 39 weeds. Seven of these taxa are non-flowering plants, 180 are monocotyledons (164 natives and 16 weeds) and 314 are dicotyledons (291 natives and 23 weeds). One declared rare taxa, 4 priority taxa and 4 taxa deserving of listing (*Chamelaucium erythrochlora*, *Acacia semitrullata*, *Lambertia multiflora* var. *darlingensis*, *Pultenea radiata*, *Logania* sp. nov., *Lomandra* sp. nov., *Nemcia whicherensis*, *Synaphaea* aff. *boyaginensis* (G.J. Keighery 14538) and *Xanthorrhoea acanthostachya*) are found on the block. Three (*Logania* sp. nov., *Lomandra* sp. nov. and *Synaphaea* aff. *boyagensis*) of these taxa were discovered during the survey and are only known from this block.

INTRODUCTION

Dardanup Forest Block, part of State forest 27, is located on the conjunction of the Whicher and Darling Scarps, approximately 5 kilometres east of Dardanup along Ironstone Road (Map 1). The block was designated in the Forest's Department Working Plan No. 87 as the Dardanup Management Priority Area for the conservation of flora, fauna and landscape.

The System Six study (Dept. Conserv. Environ., 1983) endorsed this designation and suggested that Reserve 2029 be added to the MPA. This document suggesting that the MPA "conserves a range of vegetation associated with the northern extension of the Blackwood Plateau (Donnybrook Sunklands)". Some of these vegetation associations are unique. Open - forest of Jarrah and Marri and woodland of *Banksia* and Paperbark are dominant, with some Yarri, Bullich and Swamp *Banksia* occurring in moister areas. The MPA also contains the only extensive stands of Mountain Gum in System Six."

The whole of the lower Darling and Whicher Escarpments are subject to major land use conflicts, chiefly from mineral sands mining but, including a golf course proposal for Dardanup Block. Despite these conflicts, there was little detailed botanical data available on this area except for the vegetation maps of Heddle *et al.* (1980) and Smith (1973) used in the System Six Study. This block was studied as part of the Swan Coastal Plain survey in 1993, since the lower section of the block contains the

foothills of the Darling Scarp. A more complete study was undertaken in 1996, at the request of the Minister of the Environment, because of the requests to alienate large sections of the block. The results are presented here.

SURVEY METHOD

Survey work in Dardanup Forest Block was performed over three flowering seasons from 1993 to 1996 in conjunction with regional survey work on the Swan Coastal Plain (Gibson *et al.* 1994).

Twelve sites were located in the block (Map 2) to sample the range of plant communities identified using aerial photographs and field interpretation. Four are permanently located 100 m² sites used in the regional floristic study of the Swan Coastal Plain (Gibson *et al.* 1994). Groups of conservation volunteers established a further eight sites in 1996. All sites were sampled on at least two occasions.

Opportunistic plant collections, that is collections made outside the sites, were made during vehicle and foot traverse at various times of the year, during 1996.

GEOMORPHOLOGY AND SOILS

Dardanup forest block is located on the Darling fault and spans the broad geomorphic units, the Darling Scarp, Whicher Scarp, their foothills, and a section of the Swan Coastal Plain (Churchward and McArthur, 1980).

The soils comprise lateritic uplands and spurs of the western margin of the Darling plateau and escarpment, with small areas of outcropping Quartzite. Below these areas are colluvial sands and loams at the far west is a small area of Yoganup formation (Anon., 1981) of the Swan Coastal Plain.

Dardanup is the only area of the forest/conservation estate which spans the Darling Scarp, Whicher Scarp and the Swan Coastal Plain where they join, south east of Bunbury.

VEGETATION

The vegetation map (Map 2) shows the distribution of the principal plant communities based on the vegetation descriptions of the 12 sites.

Essentially the plant communities can be classed as woodlands.

Banksia/Jarrah woodlands (Map 2: bW)

Banksia attenuata dominates the lowest slopes, however, there are often scattered Jarrah trees throughout this area which increase in density towards the base of the scarp. Other low trees are *Banksia grandis*, *Xylomelon occidentale* and *Persoonia longifolia* over a dense understorey of shrubs, herbs and sedges. The characteristic shrubs are *Xanthorrhoea preissii*, *Stirlingia latifolia*, *Bossiaea eriocarpa*, *Jacksonia sparsa*, *Daviesia physodes*, *Hibbertia hypericoides* and the herbs *Patersonia umbrosa* var *xanthina*, *Phlebocarya ciliata*, *Dasyopogon bromeliifolius*. Two sedges *Hypolaena exsulca* and *Lyginia barbata* dominate the sedge layer.

Jarrah woodland (map 2: jw)

Jarrah woodland to forest mixed with varying amounts of Marri is characteristic of lateritic soils. These trees have a dense understorey of shrubs such as *Xanthorrhoea preissii*, *Hibbertia hypericoides*, *Acacia latericola*, *Xanthorrhoea gracilis*, *Hakea amplexicaulis*, *Hibbertia amplexicaulis*, *Dryandra lindleyana*, *Lechenaultia biloba*,

Bossiaea eriocarpa, *Isopogon sphaerocephalus* and *Eriostemon spicatus*, and the herbs *Patersonia umbrosa* var *xanthina*, *Trichocline spathulata*, *Lagenifera huegelii*, *Patersonia babianoides*. On the lower slopes Marri becomes dominant

Mountain Marri low woodland (Map 2: MmLW)

Mountain Marri woodland to low forest with varying amounts of Jarrah and Marri (which can become dominant in deeper colluvial soils) and scattered trees of *Banksia grandis* and *Persoonia longifolia* over a dense understory of shrubs such as *Xanthorrhoea preissii*, *Hibbertia hypericoides*, *Adenanthos barbigera*, *Kennedia coccinea*, *Xanthorrhoea gracilis*, *Bossiaea ornata*, *Dryandra lindleyana*, *Isopogon sphaerocephalus*, *Eriostemon spicatus*, *Hakea lissocarpha*, *Hibbertia commutata* and the herbs *Patersonia juncea*, *P. umbrosa* var *xanthina*, *Patersonia babianoides*, *Lagenifera huegelii*, *Lomandra sericea* and *Johnsonia lupulina*. *Tetraria octandra* and *Loxocarya fasciculata* dominate the sedge layer.

A very distinctive form of this community occurs on outcropping quartzite ridges along the Darling Scarp. Here *Eucalyptus marginata* and *E. haematoxylon* open low woodland occurs over tall heath of *Xanthorrhoea acanthostachya*, *Nemcia cordata*, *Lambertia multiflora* var *darlingensis*, *Dryandra armata*, *Hakea cyclocarpa* and *Hibbertia hypericoides* over herbs of *Lomandra* aff. *nutans* and *Patersonia limbata*. It is likely with further studies along the southern Darling Scarp this may prove to be a separate floristic community, that is rare and restricted.

Floristic Community Types

The regional floristic survey of the Swan Coastal Plain identified floristic community types, 1a (*Eucalyptus haematoxylon* - *E. marginata* woodlands on Whicher Foothills and type, 21b (Southern *Banksia* woodlands). The first is at its northern limit and the second very near. Both occurrences in Dardanup block of these vulnerable and poorly reserved communities are large and significant for their conservation.

The Jarrah woodlands of the western edge of the Darling Plateau form a new group, but placement of this and the quartzite ridges await completion of the Darling Scarp survey.

FLORA

Dardanup Forest Block contains a vascular flora of at least 494 taxa; 455 are natives and 39 weeds. Seven of these taxa are non-flowering plants, 180 are monocotyledons (164 natives and 16 weeds) and 314 are dicotyledons (291 natives and 23 weeds).

The Orchidaceae (35 natives, 1 weed), Papilionaceae (36 natives, 5 weeds), Proteaceae (35 natives), Myrtaceae (27 natives), Cyperaceae (23 natives, 1 weed), Asteraceae (21 natives, 7 weeds), Anthericaceae (20 natives), Poaceae (14 natives, 6 weeds), Epacridaceae (18 natives), Dasypogonaceae (17 natives), Haemodoraceae (17 natives), Mimosaceae (17 natives) and Stylidiaceae (16 natives) are the most species rich families. The largest genera are *Acacia* (17 species), *Lomandra* (14 species), *Drosera* (14 species), *Stylidium* (13 species) and *Caladenia* (11 species).

SIGNIFICANT FLORA

One species of declared rare flora (Atkins, 1996), *Chamelaucium erythrochlora* is recorded at the northern limit of its' range from Dardanup Block. Three priority taxa

(*Acacia semitrullata*, *Lambertia multiflora* var *darlingensis* and *Pultenea radiata*) are also recorded from Dardanup Block.

Significant flora of particular interest

Thysanotus pseudojunceus (Anthericaceae)

A rhizomatous herb, found from Albany to Alexandra Bridge in low *Eucalyptus marginata* woodland. The population in Dardanup Block is disjunct from Nannup and the northern limit of the species' range.

Actinostrobus acuminatus (Cupressaceae)

A prostrate conifer from an underground stem which occurs from Three Springs to Boyanup. Rarely recorded south of Perth there are three known populations, one at Pinjarra, one in Dardanup and one near Boyanup (in a sand mining lease). The largest and only secure population is in Dardanup Block.

Lomandra aff. *nutans* (GK 15,307)(Dasypogonaceae)

There are 14 species of *Lomandra* recorded from the block, one of the highest diversity of co-occurring and closely allopatric species known for this genus, normally only 3-5 species are found in a block. One of these is a new species allied to *Lomandra nutans*, a species ranging from the Stirling Ranges to York. This species was discovered during the Swan Coastal Plain survey and is currently only known from this block. It should be added to CALM's priority flora list.

Patersonia limbata (Iridaceae)

A tufted rhizomatous herb found from Cape Arid to the Stirling Ranges with disjunct scattered populations north-west of this area.

Five species of *Patersonia* are recorded from the block, also a very high number for this genus.

Logania sp. nov. (GJK 15,234) (Loganiaceae)

This undescribed species of *Logania* is currently only known from Dardanup block where it is found in the Jarrah woodland on colluvial surfaces. It should be added to CALM's priority flora list.

Acacia mooreana (Mimosaceae)

A low shrub to 60 cm tall, occurs from Boyanup to Karridale. The population in Dardanup Block is at the northern limit of the species range.

Acacia semitrullata (Mimosaceae)

A low shrub to 60 cm tall, occurs from Yarloop to Donnybrook and Yallingup on sandy soils.

Calothamnus schaueri (Myrtaceae)

A low spreading shrub found between Pingelly and the Stirling Range. The species is present as a series of disjunct populations in the forest and is rarely recorded this far west.

Chamelaucium erythrochlora (Myrtaceae)

A declared rare species, largely confined to the Blackwood plateau and Whicher Scarp with one population on the Swan Coastal Plain near Busselton. The population in Dardanup Block is the northern most.

Synaphea aff. *boyaginensis* (G.J. Keighery 14538)

A CALM Priority 2 species only known from Dardanup Forest Block.

Nemcia whicherensis (Papilionaceae)

This newly recognised species was previously only recorded from the Whicher Range. The Dardanup population is currently the largest known population. It should be added to Calm's priority flora list.

Pultenea radiata (Papilionaceae)

Largely confined to the western edge of the Blackwood Plateau along the Whicher Scarp, at the northern limit of the species range.

Lambertia multiflora var. *darlingensis* (Proteaceae)

A tall shrub, occurring in scattered populations along the Darling scarp from Gingin to Busselton area. The population in Dardanup block is the southernmost extant (there are old records from the base of the Whicher Range) and disjunct from Pinjarra.

Xanthorrhoea acanthostachya (Xanthorrhoeaceae)

A species confined to the Darling Scarp. Previously recorded from Walyunga National Park to Harvey, it is at the southern margin of its range.

Discussion

Dardanup Forest Block is the only vegetated conservation area known to encompass the Darling, Whicher Scarp and associated foothills of the eastern Swan Coastal Plain.

Three principal plant communities are present in the area: Jarrah Woodland, Marri-Jarrah-Mountain Marri woodland and *Banksia* woodland. Three regional floristic community types (Gibson et al., 1994) are represented in the block, type 1a: *Eucalyptus haematoxylon*-*E. marginata* woodlands of the Whicher Foothills, type 21b: Southern *Banksia* woodlands and Jarrah forest of the Western Edge of the Darling Plateau. Types 1a and 21b are at or near their northern limits in Dardanup Block. These are some of the largest known occurrences of these poorly reserved community types. There is also several outcropping areas of quartzite with a distinctive *Lambertia* dominated heath, which contains several of the most unusual flora records.

The block contains a vascular flora of at least 494 taxa; 455 are natives and 39 weeds. Seven of these taxa are non-flowering plants, 180 are monocotyledons (164 natives and 16 weeds) and 314 are dicotyledons (291 natives and 23 weeds). One declared rare taxa, 4 priority taxa and 4 taxa deserving of listing (*Chamelaucium erythrochlora*, *Acacia semitrullata*, *Lambertia multiflora* var. *darlingensis*, *Pultenea radiata*, *Logania* sp. nov., *Lomandra* sp. nov., *Nemcia whicherensis*, *Synaphea* aff. *boyaginensis* (G.J. Keighery 14538) and *Xanthorrhoea acanthostachya*) are found on the block. Three (*Logania* sp. nov., *Lomandra* sp. nov. and *Synaphea* aff. *boyaginensis*) of these taxa were discovered during the survey and are only known from this block.

This survey demonstrates that the block has very high conservation values and suggests that further detailed flora surveys are required in adjacent forest blocks that encompass similar landforms to ascertain the ranges of these restricted species and to document their values.

Acknowledgments

A weekend field session was held in the study area in 1996 when the survey was supported by the enthusiastic and effective participation of Anne B, Anne T, Bernhard Bischoff, Brian Moyle, Diane Matthews, Gary Matthews, Harry, Logan, Margaret, Nicky, Peter, Rosemary and Shirley.

Aspects of this study were funded by the National Estates program, administered by the Australian Heritage Commission in 1992/93 and 1993/94. In 1996 funding for the volunteer survey was provided by Ecoplan, a DEP community participation program.

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Smith, F.G. (1973) Vegetation Map of Collie. Western Australian Department of Agriculture, Perth.

ENTERED ON GIS

Name: Reserves near Dalyellup – Biological Data
Date: 05/05/2006
Capture Author: Thomas Leong / Ian Steward

Comments:

Polygon

Created to match documented study area with high level of accuracy

Accuracy Levels:

- High = Document contained visual and or described spatial references easily copied, resulting in little or no polygon boundary errors
- Acceptable = Document contained visual and or described spatial references with complex boundaries, resulting in minor boundary errors
- Low = Document contained little or no visual and or described spatial references, resulting in polygon boundary errors

Attributes

Report Info – Captured without problems

Custodial/Contact – Captured without problems

Content – Captured without problems

CONTACT DR N. GIBSON CALM WOODVALE for further information.

Flora list for C71 Reserves Near Dalyellup (extracted from Swan Coastal Plain database, C71 1-4, 141 taxa, 4/5/1995).

Department of Environmental Protection System 6 Update: Site Based Flora List C71 Reserves Near Dalyellup

(extracted from the CALM Swan Coastal Plain database, C71 1-4, 141 taxa, 4/5/95)

Anthericaceae

Agrostocrinum scabrum
Caesia micrantha
Caesia occidentalis
Corynotheca micrantha
Dichopogon capillipes
Sowerbaea laxiflora
Thysanotus arenarius
Thysanotus multiflorus
Thysanotus patersonii
Thysanotus sparteus

Apiaceae

Daucus glochidiatus
Homalosciadium homalocarpum
Platysace compressa
Trachymene pilosa
Xanthosia huegelii

Asteraceae

Asteridea pulverulenta
* Conyza albida
Craspedia sp. scps (Perth Flora, GJK 13121)
Helichrysum cordatum
* Hypochaeris glabra
Lagenifera huegelii
Olearia axillaris
Picris squarrosa
Podolepis gracilis
Siloxerus humifusus
* Sonchus oleraceus
* Ursinia anthemoides
Waitzia suaveolens

Campanulaceae

Wahlenbergia preissii

Caryophyllaceae

* Cerastium glomeratum
* Petrorhagia velutina

Centrolepidaceae

Centrolepis aristata

Colchicaceae

Burchardia umbellata

Cyperaceae

Lepidosperma angustatum
Lepidosperma longitudinale
Schoenus grandiflorus
Schoenus rodwayanus

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Flora list for C71 Reserves Near Dalyellup (extracted from Swan Coastal Plain database, C71 1-4, 141 taxa, 4/5/1995).

Dasygogonaceae

- Acanthocarpus preissii
- Dasygogon bromeliifolius
- Lomandra caespitosa
- Lomandra hermaphrodita
- Lomandra micrantha
- Lomandra preissii
- Lomandra suaveolens

Dilleniaceae

- Hibbertia cunninghamii
- Hibbertia hypericoides
- Hibbertia racemosa
- Hibbertia rhadinopoda
- Hibbertia stellaris

Droseraceae

- Drosera erythrorhiza
- Drosera macrantha sthct subsp. macrantha ms
- Drosera menziesii subsp. penicillaris
- Drosera stolonifera subsp. stolonifera

Epacridaceae

- Astroloma pallidum
- Leucopogon propinquus

Euphorbiaceae

- Monotaxis occidentalis
- Phyllanthus calycinus

Geraniaceae

- Geranium retrorsum

Goodeniaceae

- Dampiera linearis
- Lechenaultia expansa

Haemodoraceae

- Conostylis aculeata
- Phlebocarya ciliata

Iridaceae

- Orthrosanthus laxus
- Patersonia occidentalis

Lamiaceae

- Hemiandra pungens

Lauraceae

- Cassytha racemosa

Lobeliaceae

- Lobelia tenuior

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Flora list for C71 Reserves Near Dalyellup (extracted from Swan Coastal Plain database, C71 1-4, 141 taxa, 4/5/1995).

Mimosaceae

- Acacia flagelliformis
- Acacia huegelii
- Acacia pulchella
- Acacia saligna
- Acacia stenoptera
- Acacia willdenowiana

Myrtaceae

- Agonis flexuosa
- Astartea aff. fascicularis sthst
- Eucalyptus calophylla
- Eucalyptus gomphocephala
- Eucalyptus marginata
- Melaleuca preissiana
- Melaleuca thymoides

Orchidaceae

- Caladenia "speciosa" scps
- Caladenia flava
- Caladenia flava warr subsp. flava
- Caladenia latifolia
- Caladenia paludosa Hopper & AP Brown scps
- Leporella fimbriata
- Lyperanthus nigricans
- * Monadenia bracteata

Oxalidaceae

- Oxalis perennans

Papilionaceae

- Aotus gracillima
- Bossiaea eriocarpa
- Daviesia divaricata
- Gompholobium tomentosum
- Hardenbergia comptoniana
- Hovea trisperma var. trisperma
- Isotropis cuneifolia
- Jacksonia furcellata
- Jacksonia sternbergiana
- Kennedia prostrata
- * Trifolium campestre
- * Vicia sativa

Phormiaceae

- Dianella revoluta

Poaceae

- * Aira caryophyllea
- * Avena fatua
- * Briza maxima
- * Briza minor
- * Bromus diandrus
- Danthonia occidentalis
- Deyeuxia quadriseta
- Dichelachne crinita

CONTACT DR N. GIBSON CALM WOODVALE for further information.

Flora list for C71 Reserves Near Dalyellup (extracted from Swan Coastal Plain database, C71 1-4, 141 taxa, 4/5/1995).

- * *Ehrharta calycina*
- Microlaena stipoides*
- Poa drummondiana*
- Stipa flavescens*
- Stipa semibarbata* group scps

Proteaceae

- Adenanthos meisneri*
- Banksia attenuata*
- Banksia ilicifolia*
- Banksia littoralis*
- Grevillea vestita*
- Persoonia saccata*
- Petrophile linearis*
- Xylomelum occidentale*

Restionaceae

- Hypolaena exsulca*
- Loxocarya fasciculata*
- Loxocarya pubescens*
- Lyginia barbata*

Rhamnaceae

- Cryptandra* sp. scps

Rubiaceae

- * *Galium murale*
- Opercularia apiciflora*
- Opercularia hispidula*
- Opercularia vaginata*

Rutaceae

- Eriostemon spicatus*

Scrophulariaceae

- * *Bellardia trixago*

Stylidiaceae

- Levenhookia stipitata*
- Stylidium brunonianum*
- Stylidium junceum*
- Stylidium schoenoides*

Tremandraceae

- Tetratheca hirsuta*

Xanthorrhoeaceae

- Xanthorrhoea preissii*

Zamiaceae

- Macrozamia riedlei*

AREA INFORMATION

System 6 Area (C or M) or Update Area (Update)

C71

| |
|--|
| Conservation Area |
| Nature Reserve |
| Reserve No |
| National Park |
| Reserve No |
| Local Government |
| Reserve No |
| Other |
| Proposed Conservation Areas C71 |
| Local Government Shire of Capel |
| Reserve No # 28825, # 3600, # 23000 |
| Other |

| |
|--------------------------|
| Conservation Area |
| Nature Reserve |
| Reserve No |
| National Park |
| Reserve No |
| Local Government |
| Reserve No |
| Other |

TOTAL AREA

| | | |
|---------------------|---|----------|
| Bushland Area | 184.375 | hectares |
| Completely Degraded | Conditions Very Good → Poor, areas along roads & drain completely degraded, 2ha degraded by logging, too frequent fires; 27.6875 ha | |

* NO CALM boundaries

AREA MAPPED FLORISTIC UNITS

| Units | Site (Condition) | Code G: C71 | Bound | Area (ha) |
|-------|------------------|-------------|-------|-----------|
| 11 | φ1 (2.05) | | B | 1.25 |
| 21a | φ2 (2), φ3 (3.5) | | B | 148.0625 |
| 25 | φ4 (4) | | B | 7.375 |
| | | | | |
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Boundaries determined by use of

| | | |
|-------------------|-------------------------------|----------|
| aerial photograph | Swan Coastal Plain run 6 5188 | 28/11/90 |
| orthophoto | 2031 III SW | 12/1991 |
| vegetation map | | |
| soil map | | |

CALM MAP - BUNBURY

CTI RESERVES NEAR DALYELLUP

total area 154 375 ha
21a 148 0625
25 1 375
degraded 27 6875
11 1 25



373200

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Name: Distribution of Vertebrate Fauna Recorded March 1998
Date: 05/05/2006
Capture Author: Thomas Leong / Ian Steward

Comments:

Polygon

Created to match documented study area with high level of accuracy

Accuracy Levels:

- High = Document contained visual and or described spatial references easily copied, resulting in little or no polygon boundary errors
- Acceptable = Document contained visual and or described spatial references with complex boundaries, resulting in minor boundary errors
- Low = Document contained little or no visual and or described spatial references, resulting in polygon boundary errors

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| | | | |
|-----------------|---------------------------|--------------------|-----------|
| TO: | John Dell | FAX NO: | 9322 2850 |
| COMPANY: | EPA Service Unit | DATE: | 10/04/03 |
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| SUBJECT: | Dalyellup -- fauna survey | PAGE: | 1 of 8 |

Please check all sheets have been transmitted and are legible. If not, ring or send a fax immediately.

Hi John

As discussed, please find following a copy of Appendix 3 from the vertebrate fauna survey report for Dalyellup Beach Estate outlining the species recorded within each of the survey sites, and a copy of Figure 3 showing the location of the sites.

It is understood that you have a full copy of the report but are unable to locate the report, and that the information supplied is all that is presently required.

If you would like clarification or require any additional information please let me know.

Could you also please advise the EPA library that you have received the information you were seeking.

Have a good day!

Kind regards

KAYE GODWIN
Senior Environmental Scientist

APPENDIX 3

DISTRIBUTION OF VERTEBRATE FAUNA RECORDED MARCH 1998

| Scientific Name | Common Name | Total | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 | Site 6 | Site 7 | Site 8 | Other | Adjacent |
|---------------------------------------|--------------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|----------|
| AMPHIBIANS | | | | | | | | | | | | |
| MYOBATRACHIDAE | | | | | | | | | | | | |
| <i>Crinia Insignifera</i> | Sandplain froglet | X | | | | | | | X | | | |
| <i>Heleloporus eyrei</i> | Moaning frog | X | X | | | X | X | X | | | | |
| <i>Limnodystes dorsalis</i> | Western banjo frog/Pobblebonk | X | X | X | X | X | X | | | | | |
| HYLIDAE | | | | | | | | | | | | |
| <i>Litoria adelaidensis</i> | Slender tree frog | X | | | X | | | | | X | | |
| REPTILES | | | | | | | | | | | | |
| GEKKONIDAE | | | | | | | | | | | | |
| <i>Phyllodactylus marmoratus</i> | Marbled gecko | X | X | X | X | | | | | | | |
| PYGOPODIDAE | | | | | | | | | | | | |
| <i>Lialis burtonis</i> | Burton's legless lizard | X | | | | | X | X | | | | |
| AGAMIDAE | | | | | | | | | | | | |
| <i>Pogona minor</i> | Western bearded dragon | X | ✓ | | | X | | X | | | | |
| VARANIDAE | | | | | | | | | | | | |
| <i>Varanus sp.</i> | | T | T | | T | | | | | | | |
| SCINCIDAE | | | | | | | | | | | | |
| <i>Bassiana trilineata</i> | South-western cool skink | X | | | | | | | X | | | |
| <i>Cryptoblepharus plagiocephalus</i> | Snake-eyed, fence or sun skink | X | X | X | X | | | | | | | |
| <i>Ctenotus fallens</i> | West coast ctenotus | X | | | | | | X | | | | |
| <i>Egernia napoleonis</i> | South-western crevice egernia | X | | | | X | | | | | | |
| <i>Hemiergis quadrilineata</i> | Two-toed earless skink | X | X | X | X | X | | | | | | X |
| <i>Lerista elegans</i> | West coast four-toed lerista | X | X | | | X | X | | | | | |
| <i>Menetia greyii</i> | Common dwarf skink | X | X | | | | | | | | | |
| <i>Morethia lineoocellata</i> | Western pale-flecked morethia | X | X | X | X | X | X | X | | | | |
| <i>Tiliqua rugosa</i> | Bobtail | T | T | | | | | | | | | |
| TYPHLOPIDAE | | | | | | | | | | | | |
| <i>Ramphotyphlops australis</i> | Southern blind snake | X | | X | | | | | | | | |

10/04/2003

APPENDIX 3

DISTRIBUTION OF VERTEBRATE FAUNA RECORDED MARCH 1998

| Scientific Name | Common Name | Total | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 | Site 6 | Site 7 | Site 8 | Other | Adjacent |
|------------------------------------|-----------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|----------|
| ELAPIDAE | | | | | | | | | | | | |
| <i>Echopsis curta</i> | Bardlok | X | | | | | X | | | | | |
| <i>Rhinoplocephalus gouldii</i> | Gould's snake | X | | | | | | X | | | | |
| BIRDS | | | | | | | | | | | | |
| ANATIDAE | | | | | | | | | | | | |
| <i>Blizura lobata</i> | Musk Duck | X | | | | | | | | | | X |
| <i>Chenonetta jubata</i> | Australian Wood Duck | X | | | | | | | | X | | |
| <i>Anas superciliosa</i> | Pacific Black Duck | X | | | | | | | | X | | X |
| <i>Anas gracilis</i> | Grey Teal | X | | | | | | | X | | | X |
| PODICIPEDIAE | | | | | | | | | | | | |
| <i>Tachybaptus novaehollandiae</i> | Australasian Grebe | X | | | | | | | | | | |
| <i>Podiceps cristatus</i> | Great Crested Grebe | X | | | | | | | | X | | X |
| PHALACROCORACIDAE | | | | | | | | | | | | |
| <i>Phalacrocorax varius</i> | Pied Cormorant | X | | | | | | | | | B | |
| ARDEIDAE | | | | | | | | | | | | |
| <i>Egretta novaehollandiae</i> | White-faced Heron | X | | | | | | | | X | | X |
| THRESKIORNITHIDAE | | | | | | | | | | | | |
| <i>Threskiornis molucca</i> | Australian White Ibis | X | | | | | | | | X | | X |
| <i>Threskiornis spinicollis</i> | Straw-necked Ibis | A | | | | | | | | | | X |
| ACCIPITRIDAE | | | | | | | | | | | | |
| <i>Elanus axillaris</i> | Black-shouldered Kite | X | X | | | | | X | | | | |
| <i>Haliastur sphenurus</i> | Whistling Kite | X | | | | X | | | X | X | | |
| <i>Accipiter cirrocephalus</i> | Collared Sparrowhawk | X | | | ○ | | | | | | | |
| <i>Aquila audax</i> | Wedge-tailed Eagle | A | | | | | | | | | | |
| <i>Hieraaetus morphnoides</i> | Little Eagle | X | | | | | | ○ | | | | X |

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| Scientific Name | Common Name | Total | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 | Site 6 | Site 7 | Site 8 | Other | Adjacent |
|----------------------------------|----------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|----------|
| FALCONIDAE | | | | | | | | | | | | |
| <i>Falco longipennis</i> | Australian Hobby | X | | | | | X | | X | X | | |
| RALLIDAE | | | | | | | | | | | | |
| <i>Fulica atra</i> | Eurasian Coot | X | | | | | | | | | | X |
| TURNICIDAE | | | | | | | | | | | | |
| <i>Turnix varia</i> | Painted Button-quail | X | T | | | T, X | | | | | | |
| LARIDAE | | | | | | | | | | | | |
| <i>Larus novaehollandiae</i> | Silver Gull | X | | | | | | | | | B | |
| <i>Sterna bergii</i> | Crested Tern | X | | | | | | | | | B | |
| COLUMBIDAE | | | | | | | | | | | | |
| <i>Columba livia</i> | Rock Dove | X | | | | | | X | | | B | |
| <i>Streptopella senegalensis</i> | Laughing Turfite-Dove | A | | | | | | | | | | X |
| <i>Phaps chalcoptera</i> | Common Bronzewing | X | | | X | X | X | X | | X | | |
| <i>Ocyphaps lophotes</i> | Crested Pigeon | A | | | | | | | | | | X |
| CACATUIDAE | | | | | | | | | | | | |
| <i>Calyptorhynchus baudinii</i> | Long-billed Black Cockatoo | A | | | | | | | | | | X |
| <i>Cacatua roseicapilla</i> | Galah | X | O | | | | | | | X | | X |
| PSITTACIDAE | | | | | | | | | | | | |
| <i>Polytelus anthopeplus</i> | Regent Parrot | X | | X | X | | | | | X | | |
| <i>Platycercus lateralis</i> | Western Rosella | X | X | X | X | X | X | | | | | X |
| <i>Barnardius zonarius</i> | Australian Ringneck | X | X | X | X | X | X | | X | X | | X |
| <i>Purpurelocephalus spurius</i> | Red-capped Parrot | X | X | X | X | | | | X | | | X |
| STRIGIDAE | | | | | | | | | | | | |
| <i>Ninox novaeseelandiae</i> | Southern Boobook | X | O | O | | | | | | | | |

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| Scientific Name | Common Name | Total | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 | Site 6 | Site 7 | Site 8 | Other | Adjacent |
|--------------------------------------|-------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|----------|
| PODARGIDAE | | | | | | | | | | | | |
| <i>Podargus strigoides</i> | Tawny Frogmouth | X | | O | | X | | | | | | |
| HALCYONIDAE | | | | | | | | | | | | |
| <i>Dacelo novaeguineae</i> | Laughing Kookaburra | X | X | X | | | | | X | X | | X |
| MALURIDAE | | | | | | | | | | | | |
| <i>Malurus splendens</i> | Splendid Fairy-wren | X | X | X | X | X | X | X | X | | | X |
| PARDALOTIDAE | | | | | | | | | | | | |
| <i>Pardalotus punctatus</i> | Spotted Pardalote | X | X | X | X | X | | | X | | | X |
| <i>Pardalotus striatus</i> | Striated Pardalote | X | X | X | X | X | | | | | | X |
| <i>Sericornis frontalis</i> | White-browed Scrubwren | X | | | | X | X | X | X | | | X |
| <i>Sericornis brevirostris</i> | Weebill | X | X | X | X | | | | X | | | X |
| <i>Gerygone fusca</i> | Western Gerygone | X | X | X | X | X | | X | X | | | X |
| <i>Acanthiza apicalis</i> | Inland Thornbill | X | X | O | O | X | X | | X | | | X |
| <i>Acanthiza chrysorrhoa</i> | Yellow-rumped Thornbill | X | | | O | | | | X | | | X |
| MELIPHAGIDAE | | | | | | | | | | | | |
| <i>Anthochaera carunculata</i> | Red Wattlebird | X | X | X | X | | | | X | | | X |
| <i>Lichenostomus virescens</i> | Singing Honeyeater | X | | | | | | | | | | X |
| <i>Lichmera indistincta</i> | Brown Honeyeater | A | | | | | | | | | | X |
| <i>Phylidonyris novaehollandiae</i> | New Holland Honeyeater | X | | O | | | | | | X | | X |
| <i>Acanthorhynchus superciliosus</i> | Western Spinebill | X | | O | | X | | | | | | X |
| PETROICIDAE | | | | | | | | | | | | |
| <i>Petroica multicolor</i> | Scarlet Robin | X | X | X | X | | | | X | | | |
| <i>Eopsaltria georgiana</i> | White-breasted Robin | X | | | | X | | | | | | |
| NEOSITTIDAE | | | | | | | | | | | | |
| <i>Daphoenositta chrysoptera</i> | Varied Sittella | X | | O | | | | | | | | |

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|-----------------------------------|---------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|----------|
| PACHYCEPHALIDAE | | | | | | | | | | | | |
| <i>Pachycephala pectoralis</i> | Golden Whistler | X | X | X | X | X | X | | X | | | |
| <i>Pachycephala rufiventris</i> | Rufous Whistler | X | | O | X | X | | | | | | |
| <i>Colluricincla harmonica</i> | Grey Shrike-thrush | X | X | | X | X | | | | | | X |
| DICRURIDAE | | | | | | | | | | | | |
| <i>Grallina cyanoleuca</i> | Magpie-Lark | X | | | | | | | | X | | X |
| <i>Rhipidura fuliginosa</i> | Grey Fantail | X | X | X | X | X | X | | X | X | | X |
| <i>Rhipidura leucophrys</i> | Willie Wagtail | X | | | | | | | X | X | | |
| CAMPEPHAGIDAE | | | | | | | | | | | | |
| <i>Coracina novaehollandiae</i> | Black-faced Cuckoo-Shrike | X | O | X | O | X | X | X | | X | | X |
| ARTAMIDAE | | | | | | | | | | | | |
| <i>Cracticus torquatus</i> | Grey Butcherbird | X | X | X | X | X | | | X | X | | X |
| <i>Gymnorhina tibicen</i> | Australian Magpie | X | X | X | X | | X | | X | X | B | X |
| CORVIDAE | | | | | | | | | | | | |
| <i>Corvus coronoides</i> | Australian Raven | X | X | X | | X | | | X | X | | X |
| HIRUNDINIDAE | | | | | | | | | | | | |
| <i>Hirundo neoxena</i> | Welcome Swallow | X | | | | | X | | | | | X |
| <i>Hirundo nigricans</i> | Tree Martin | X | | | | | X | | | X | | X |
| ZOSTEROPIDAE | | | | | | | | | | | | |
| <i>Zosterops lateralis</i> | Silvereye | X | X | X | X | X | X | X | X | | | X |
| MAMMALS | | | | | | | | | | | | |
| PERAMELIDAE | | | | | | | | | | | | |
| <i>Isodon obesulus</i> | Southern Brown Bandicoot | X | ?O | | | ?T | | X | | | | |
| PETAURIDAE | | | | | | | | | | | | |
| <i>Pseudocheirus occidentalis</i> | Western Ringtail Possum | X | | O | | X | | | X | | | |

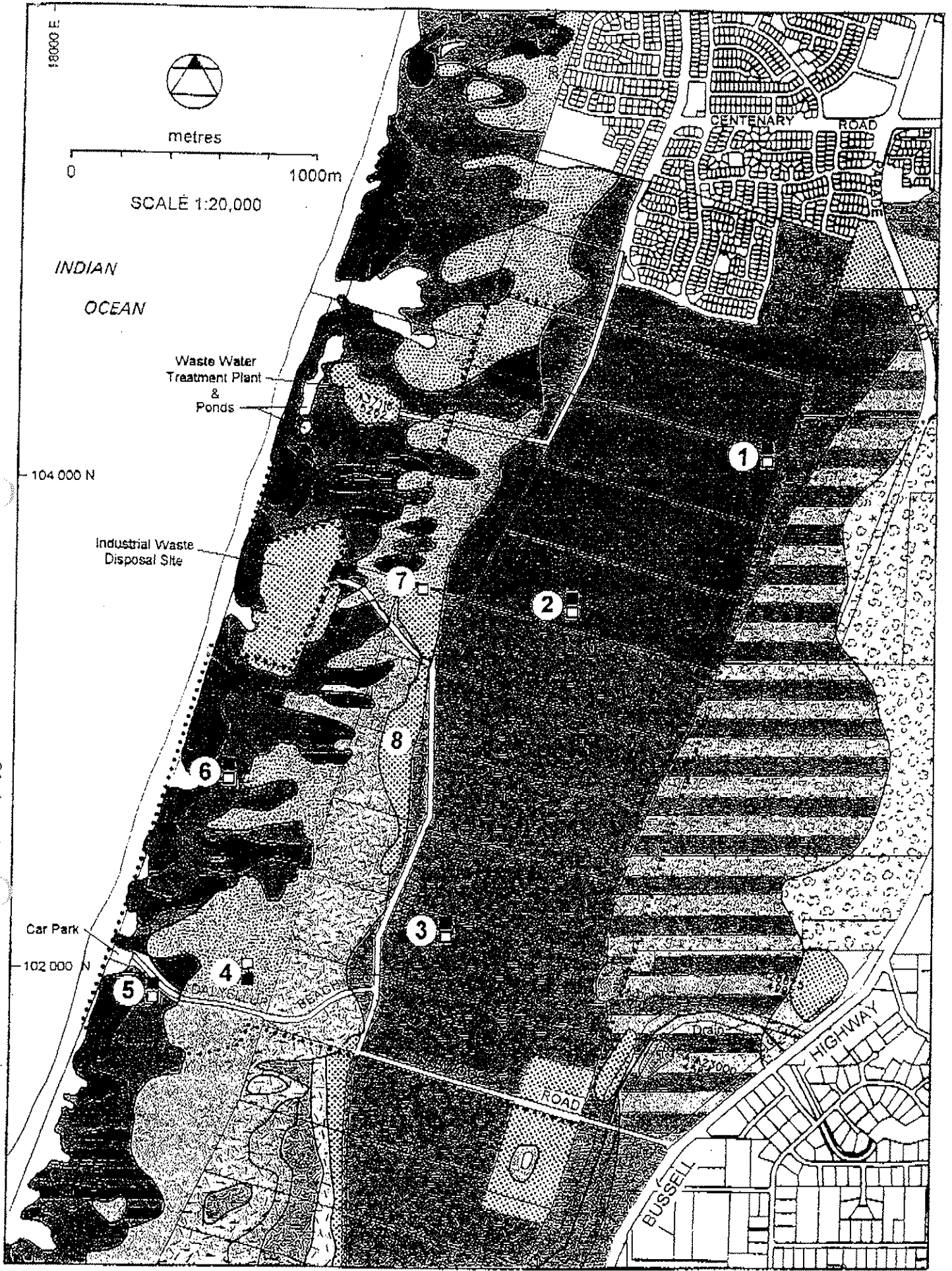
APPENDIX 3

DISTRIBUTION OF VERTEBRATE FAUNA RECORDED MARCH 1998

| Scientific Name | Common Name | Total | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 | Site 6 | Site 7 | Site 8 | Other | Adjacent |
|------------------------------|----------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|----------|
| PHALANGERIDAE | | | | | | | | | | | | |
| <i>Trichosurus vulpecula</i> | Common Brushtail Possum | X | | X | O,T | | | | | | | |
| MACROPODIDAE | | | | | | | | | | | | |
| <i>Macropus fuliginosus</i> | Western Grey Kangaroo | X | X | T,O | T | T | X | | | | | |
| MOLOSSIDAE | | | | | | | | | | | | |
| <i>Nyctinomus australis</i> | White-striped Freetail-bat | X | | X | X | | | | | X | | |
| VESPERTILIONIDAE | | | | | | | | | | | | |
| <i>Nyctophilus</i> sp. | | X | X | | | | | | | X | | |
| MURIDAE | | | | | | | | | | | | |
| <i>Mus musculus</i> | House Mouse | X | X | X | | X | X | X | X | | | |
| <i>Rattus rattus</i> | Black Rat | X | | | | | | | | X | | |
| CANIDAE | | | | | | | | | | | | |
| <i>Vulpes vulpes</i> | Fox | X | T | O | | | | | | | | |
| FELIDAE | | | | | | | | | | | | |
| <i>Felis catus</i> | Cat | T | | | | | T | | | | | |
| LEPORIDAE | | | | | | | | | | | | |
| <i>Oryctolagus cuniculus</i> | Rabbit | X | | | | | | | X | | | |

NOTE:

- X: Recorded during survey
- T: Tracks, scats, burrows or other signs detected
- O: Opportunistic sightings within similar habitat type
- A: Recorded on property adjacent to the study area









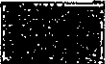





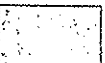



97094/F DRAWN BY: T.J. 21-4-98 CHECKED BY: K.G. 7-5-98


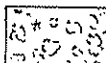
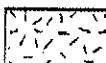

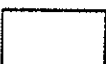

ALAN TINGAY & ASSOCIATES

LEGEND

VEGETATION ASSOCIATIONS

-  *Eucalyptus gomphocephala*/*Agonis flexuosa* Forest with *E.marginata* and *Banksia attenuata* sub-dominant
-  *E.gomphocephala*/*A.flexuosa*/*Accacia saligna* Forest
-  *Banksia attenuata* Woodland
-  *E.gomphocephala*/*A.flexuosa* Forest ✓
-  *E.marginata*/*E.calophylla*/*Banksia attenuata* Woodland
-  *E.rudis*/*Melaleuca pressiana* Woodland
-  *E.rudis*/*E.calophylla*/*A.flexuosa*/*M.preissiana* Woodland
-  *Banksia littoralis*/*Xanthorrhoea preissii* Shrubland
-  *Acacia cochlearis*/*Jacksonia furcellata* Heath ✓
-  *Scaevola crassifolia*/*Diplolaena dampieri*/*Hemiandra pungens* Heath ✓
-  *Agonis flexuosa* Scrub ✓
-  *Melaleuca raphiophylla* Scrub
-  *Typha orientalis*/*Juncus pallidus* Sedgeland
-  Cleared Wetland
-  *Acacia saligna* Scrub
-  Bare to unstable sand dunes

VEGETATION CONDITION

-  Cleared
 -  Semi cleared parkland
 -  Understorey grazed
 -  Overstorey poor condition
 -  Natural condition
 -  Residential
- Study Area
 - 1** Fauna Survey Sites
 - Sites with Pits
 - Sites with Elliots & Cages

**DALYELLUP BEACH ESTATE
FAUNA SURVEY
VEGETATION & SURVEY SITES
FIGURE 4**