Garden Street Extension

Ecological Survey

Biologic Environmental Survey

Report to City of Gosnells

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In this note, a reference to loss and damage includes past and prospective economic loss, loss of profits, damage to property, injury to any person (including death) costs and expenses incurred in taking measures to prevent, mitigate or rectify any harm, loss of opportunity, legal costs, compensation, interest and any other direct, indirect, consequential or financial or other loss.

EXECUTIVE SUMMARY

The proposed Garden Street extension project is a 4.78 hectare (ha) site situated between Harpenden Street and Balfour Street in Huntingdale (located approximately 17 kilometres (km) south-east of Perth) and forms part of the 'Other Regional Roads' reservation under the Metropolitan Region Scheme (hereafter referred to as the Study Area). The Development Envelope of the proposed Garden Street extension (2.65 ha) (hereafter referred to as the Development Envelope) is located within the Study Area. The Study Area has been previously cleared and disturbed; however, areas of remnant native vegetation exist. In order to determine the overall flora and fauna values of the site and provide information for any potential future development of the Study Area, the City of Gosnells commissioned Biologic Environmental Survey Pty Ltd to undertake a two phase (Spring) detailed and targeted flora and vegetation survey, a single season (Spring) Basic (previously Level 1) terrestrial vertebrate fauna survey and black cockatoo habitat assessment.

The flora survey was undertaken over four days on 16th and 17th of September and 10th and 11th of November 2020, while the fauna survey was undertaken over one day on 24th September 2020 (with seven consecutive nights of targeted sampling using motion cameras).

Rainfall in the preceding winter months to the surveys was well below average and is considered to be a minor constraint of the flora portion of the survey. It is considered that the work is of a sufficient level to meet Environmental Protection Authority (EPA) requirements and the objectives of the survey.

Flora and Vegetation

Ten quadrats and one relevé were sampled within the Study Area to characterise the vegetation types and condition, as well as to ensure appropriate representation of the flora and vegetation present. The remainder of the vegetation occurring in the Study Area was traversed on foot to record and describe the vegetation types and condition, and to search for conservation significant, introduced and additional opportunistic flora.

A total of 186 vascular flora taxa from 48 families and 130 genera were recorded from the Study Area by this survey, comprising 153 native taxa and 33 introduced taxa. One introduced taxon is listed as both a Declared Pest and a Weed of National Significance; **Asparagus asparagoides*.

A total of 50 conservation significant flora taxa were identified from the desktop assessment. Of the 50 taxa, 16 are listed as Threatened. Three taxa, *Caladenia huegelii* (T), *Jacksonia gracillima* (P3), and *Styphelia filifolia* (P3), have been previously recorded within the Study Area. The remaining taxa were considered likely (four), possible (14) and unlikely (29) pre-survey.

Two flora taxa of conservation significance were located in the Study Area by this survey;

- *Jacksonia gracillima* (P3) – 18 individuals from 16 point locations, with seven individuals from seven point locations occurring within the Development Envelope. Two additional individuals from two point locations were recorded outside of the Study Area
- *Styphelia filifolia* (P3) – Three individuals from three point locations, all of which occur within the Development Envelope.

The remaining confirmed taxon of conservation significance previously known from the Study Area, *Caladenia huegelii* (T), was not located by this survey. Below average rainfall in the winter months prior to survey is considered to have constrained the survey, particularly with regard to the potential presence *C. huegelii*. However, previous surveys (dating from 2014 to 2018) within the Study Area also revealed no confirmed individuals of this taxon. *Caladenia* leaves, stems and old flowers/fruit were observed at the known location during this survey; however, none were able to be identified and could represent numerous other *Caladenia* species recorded from the Study Area. Furthermore, review of the aerial imagery suggests this location may represent a locally extinct record due to past disturbances (i.e., the record is located within an area that has been cleared). It is therefore considered unlikely that *C. huegelii* occurs within the Study Area post-survey.

Three taxa recorded from the Study Area during the current assessment were considered to be flora of "other" significance as they represent slight range extensions and/or new locations for these taxa:

- *Gastrolobium acutum* (range extension)*;*
- *Goodenia pulchella* subsp. Coastal Plain B (L.W. Sage 2336) (new location); and
- *Lepidosperma* sp. Margaret River (B.J. Lepschi 1841) (new location).

Five vegetation types from three broad floristic formations were described and delineated from the Study Area;

- *Banksia* low woodland –BaBmAlf Dea and BaBmEt Pc;
- *Melaleuca* low sparse woodland – Mep Ls and Mep Rc; and
- *Phlebocarya* low closed shrubland –Adc Pc.

Two additional units, Parkland Cleared and Cleared, were also mapped within the Study Area. The majority of the vegetation within the Study Area was in excellent to very good condition.

Vegetation types BaBmAlf Dea and BaBmEt Pc are considered to represent that of SCP23a (Central *Banksia attenuata - Banksia menziesii* woodlands of the Swan Coastal Plain), which is a component of the federally listed Banksia Dominated Woodlands of the Swan Coastal Plain Region Threatened Ecological Community (TEC). The entirety of these mapped vegetation types is consistent with this Threatened Ecological Community TEC.

Vegetation types Mep Ls and Mep Rc were assessed against the potentially occurring Claypans with Mid Dense Shrublands of *Melaleuca lateritia* over Herbs (WA (P1), EPBC (T-CR)) in the Study Area. Based on floristic analysis and diagnostic criteria assessments (structure and composition), these vegetation types do not represent any vegetation of conservation significance.

Vegetation types Mep Ls and Mep Rc are considered to represent that of the previously mapped Sumpland, which is classified as a 'Conservation Category Wetland', with Mep Ls also supporting a water feature.

Terrestrial Vertebrate Fauna

A desktop assessment was completed prior to the survey, to indicate species that have been recorded in the surrounding area and/or have distributions overlapping the Study Area. The desktop assessment

identified a total of 372 species of vertebrate fauna, which have previously been recorded and/or have the potential to occur within the Study Area. This comprised of 35 mammals (11 introduced, 24 native), 249 birds (5 introduced, 244 native), 75 reptiles and thirteen amphibians. Of the 372 species 49 are of conservation significance; species listed under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act), Biodiversity Conservation Act 2016 (BC Act) and/or listed as Priority by the Department of Biodiversity, Conservation and Attractions (DBCA).

A total of 41 vertebrate fauna species were recorded during the field survey. Three species recorded during the field survey were of conservation significance, which included the Carnaby's cockatoo (*Calyptorhynchus latirostris* - EPBC and BC Act Endangered), forest red-tailed black cockatoo (*Calyptorhynchus banksii naso* - EPBC and BC Act Vulnerable) and quenda (*Isoodon fusciventer* - DBCA Priority 4). A further three species of conservation significance were identified as being potentially present in the Study Area, considered possible to occur.

Three broad fauna habitats are considered to occur within the Study Area and include *Banksia* Woodland (57% of the Study Area and 60% of the Development Envelope), *Melaleuca* Thicket (20% of the Study Area and 17% of the Development Envelope) and Cleared areas (23% of the Study Area and 23% of the Development Envelope), which include tracks and areas devoid of vegetation. The fauna habitat types *Banksia* Woodland and *Melaleuca* Thicket are likely to provide core habitat for species of conservation significance. The fauna habitat present has connectivity extending outside of the Study Area in the broader vicinity, and the habitats present are not restricted to the Study Area.

The *Banksia* Woodland represents very high quality foraging habitat for black cockatoos. This was supported by foraging evidence attributed to Carnaby's cockatoo recorded at multiple locations within the Study Area. The Study Area did not contain any quality night roosting habitat; though instances of the *Banksia* Woodland may be suitable for infrequent night roosting, as there is preferred habitat is known to occur outside the Study Area in the surrounding area. One tree which may support black cockatoo breeding was identified in the Study Area, though no hollows were identified upon the tree or upon other trees in the Study Area.

TABLE OF CONTENTS

Executive Summary i

1 Introduction 1

1.1 Background 1

1.2 Objectives 1

1.3 Background to Protection of Flora and Fauna 3

2 Existing Environment 5

2.1 Physical Environment 5

2.1.1 Climate 5

2.1.2 Landforms, Geology and Soils 5

2.1.3 Hydrology and Hydrogeology 9

2.2 Biological Environment 11

2.2.1 Biogeographical Regionalisation of Australia 11

2.2.2 Vegetation Complexes 11

2.2.3 Bioregional Significance and Conservation Areas 13

2.2.4 Introduced Flora Taxa 17

3 Methodology 19

3.1 Conformance 19

3.2 Desktop Assessment 19

3.2.1 Literature Review 19

3.2.2 Database Searches 21

3.3 Survey Timing and Conditions 22

3.4 Survey Team and Licensing 23

3.5 Detailed and Targeted Flora Field Survey 23

3.5.1 Detailed Flora Survey 23

3.5.2 Targeted Searches for Taxa of Conservation Significance 26

3.5.3 Introduced Taxa 26

3.5.4 Vegetation Mapping 26

3.5.5 Floristic Data Analysis 27

3.5.6 Vegetation Condition 27

3.5.7 Conservation Significant Ecological Communities 27

3.5.8 Specimen Identifications 28

3.6 Basic Terrestrial Vertebrate Fauna Field Survey 28

3.6.1 Habitat Assessments and Mapping 28

3.6.2 Targeted and Opportunistic Vertebrate Fauna Records 28
3.6.3 Motion-sensor Camera Deployments 28
3.6.4 Taxonomy and Nomenclature 29
3.7 Black Cockatoo Habitat Assessment 29
3.7.1 Potential Foraging Habitat 30
3.7.2 Potential Night Roosting Habitat 32
3.7.3 Potential Breeding Habitat 32
3.8 Assessment of Occurrence 35
3.8.1 Flora 35
3.8.2 Fauna 35
3.9 Potential Limitations and Constraints 36
3.9.1 Flora 36
3.9.2 Fauna 38
4 Flora and Vegetation Results and Discussion 40
4.1 Desktop Assessment 40
4.1.1 Flora of Conservation Significance 40
4.1.2 Vegetation of Conservation Significance 44
4.1.3 Vegetation of Other Significance 47
4.1.4 Introduced Flora Taxa 47
4.2 Flora and Vegetation Field Survey Results 47
4.2.1 Flora Composition 47
4.2.2 Survey Adequacy 48
4.2.3 Flora of Conservation Significance 49
4.2.4 Review of Conservation Significant Flora Likelihood of Occurrence 54
4.2.5 Flora of Other Significance 55
4.2.6 Introduced Flora 56
4.2.7 Vegetation Types 59
4.2.8 Floristic Community Type Analysis 65
4.2.9 Vegetation of Conservation Significance 65
4.2.10 Vegetation of Other Significance 73
4.2.11 Vegetation Condition 75
5 Vertebrate Fauna Results and Discussion 77
5.1 Vertebrate Database Search Results 77
5.1.1 General Database Search Results 77
5.1.2 Vertebrate Fauna of Conservation Significance Database Search Results 77
5.1.3 Black Cockatoo Database Search Results 81

5.2 Vertebrate Fauna Field Survey Results 84
5.2.1 Fauna Habitats 84
5.2.2 Fauna Recorded 88
5.2.3 Fauna of Conservation Significance 91
5.2.4 Black Cockatoo Habitat Assessment 97

6 Conclusion 104
6.1 Flora and Vegetation 104
6.2 Vertebrate Fauna 105

7 References 106

8 Appendices 114

LIST OF FIGURES

Figure 1.1: Study Area and regional location 2
Figure 2.1: Long-term averages (LTA) for rainfall and temperature in the vicinity of the Study Area (Jandakot Aero 9172 (BoM, 2020)) 5
Figure 2.2: Soil landscape units of the Study Area 7
Figure 2.3: Broad geology of the Study Area 8
Figure 2.4: Hydrology of the Study Area 10
Figure 2.5: Vegetation complexes of the Study Area 12
Figure 2.6: Land use and ecology of the Study Area 16
Figure 3.1: Monthly recorded and LTA climatic data for Jandakot Aero (BoM, 2020) 23
Figure 3.2: Flora sampling intensity and track data 25
Figure 3.3: Fauna sampling intensity and track data 34
Figure 4.1: Conservation significant flora desktop assessment results 42
Figure 4.2: TEC / PEC desktop assessment results 46
Figure 4.3: Species accumulation curve for the Study Area 48
Figure 4.4: Conservation significant flora observed in the Study Area 51
Figure 4.5: Introduced flora in the Study Area 58
Figure 4.6:Vegetation types in the Study Area 64
Figure 4.7:Conservation significant vegetation in the Study Area 72
Figure 4.8: Wetlands in the Study Area 74

Figure 4.9: Vegetation condition in the Study Area 76

Figure 5.1: Conservation significant fauna database results (excluding black cockatoo) 80

Figure 5.2: Previous records of black cockatoos in the vicinity of the Study Area 83

Figure 5.3: Fauna habitats recorded in the Study Area 87

Figure 5.4: Location of conservation significant fauna during the current survey 96

Figure 5.5: Black cockatoo foraging habitat and potential breeding tree 103

LIST OF TABLES

Table 1.1: Definitions and terms for fauna, flora, and communities of conservation significance 4

Table 2.1: Pre-European and current extent of vegetation complex occurring in the Study Area 11

Table 2.2: Summary of Bush Forever sites within 2 km of the Study Area 13

Table 3.1: Guidelines, technical guidelines and procedures for the field survey 19

Table 3.2: Literature sources used for review 20

Table 3.3: Details of database searches conducted 21

Table 3.4: Habitats used by black cockatoos for breeding, night roosting and foraging (DoEE, 2017) 31

Table 3.5: Habitat quality scoring totals for black cockatoo foraging habitat 31

Table 3.6: Known breeding trees for black cockatoo species 32

Table 3.7: Hollow suitability criteria for potential use by black cockatoo species 33

Table 3.8: Flora species likelihood of occurrence decision matrix 35

Table 3.9: Fauna species likelihood of occurrence decision matrix 36

Table 3.10: Flora survey limitations and constraints 36

Table 3.11: Fauna survey limitations and constraints 38

Table 4.1: Conservation significant flora desktop assessment results 40

Table 4.2: Conservation significant ecological communities desktop assessment results 44

Table 4.3: Expected native species richness for the Study Area 48

Table 4.4: Post-survey likelihood of occurrence for conservation significant flora 54

Table 4.5: Vegetation type descriptions 60

Table 4.6: Determination of floristic community types 65

Table 4.7: Banksia woodland PEC/TEC assessment of vegetation types BaBmAlf Dea and BaBmEt Pc, adapted from (TSSC, 2016) 67

Table 4.8: Claypans with mid dense shrublands of *Melaleuca lateritia* over herbs PEC/TEC assessment of vegetation types Mep Rc and Mep Ls, adapted from (TSSC, 2012a, 2012b) 70

Table 4.9: Vegetation condition extent in the Study Area 75

Table 5.1: Fauna species of conservation significance potentially occurring within the vicinity of the Study Area 78

Table 5.2: Summary of black cockatoo literature review from the surrounding area 82

Table 5.3: Fauna habitat description 85

Table 5.4: Vertebrate species recorded during the current survey 90

Table 5.5: Black cockatoo food resources present in the Study Area, and species utilising them 98

Table 5.6: Summary of foraging habitat quality scores for the Study Area 99

Table 5.7: Summary of potential breeding tree within the Study Area during the current survey 101

LIST OF PLATES

Plate 3.1: Motion-sensor camera deployment. 29

Plate 4.1 *Caladenia* leaves, stems and old flowers observed at the previous known location of *C. huegelii* (T) in the Study Area (Biologic photos) 50

Plate 4.2 *Jacksonia gracillima* (P3) observed in the field (Biologic photos) 52

Plate 4.3: *Styphelia filifolia* (P3) observed in the field (Biologic photos) 53

Plate 4.4: **Ehrharta calycina*, along with other common introduced flora taxa, dominating disturbed areas of the Study Area (Biologic Photos) 56

Plate 4.5: **Asparagus asparagoides*, a WoNS and declared pest, individuals located within the Study Area (Biologic Photos) 57

Plate 4.6: Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region (WA (P3), EPBC (T-EN)) within the Study Area (Biologic Photos) 66

Plate 4.7: Water feature within the Study Area (Biologic Photos) 73

Plate 5.1 Rabbit captured on motion camera during the current survey 89

Plate 5.2: Cat captured on motion camera during the current survey 89

Plate 5.3: Example of quenda (diggings) recorded during the current survey 94

Plate 5.4 Example of quenda captured on motion camera during the current survey 94

Plate 5.5: Evidence of Carnaby's cockatoo feeding in the Study Area 98

Plate 5.6: Jarrah (*Eucalyptus marginata*) potential breeding tree recorded in the Study Area 102

APPENDICES

Appendix A – Conservation Codes 114

Appendix B – Vegetation condition rating scale 123

Appendix C – Flora literature review 125

Appendix D – Flora identified from the desktop assessment 132

Appendix E – Assessment of conservation significant flora likelihood 162

Appendix F – Introduced flora desktop assessment 167

Appendix G – Raw quadrat data 174

Appendix H – Flora taxa list for the Study Area (Flora composition) 196

Appendix I – Conservation significant flora locations 203

Appendix J – Key diagnostic characteristics, criteria, and thresholds for Claypans of the Swan Coastal Plain (encompassing Clay pans with shrubs over herbs), adapted from (TSSC, 2012a, 2012b) 205

Appendix K – Fauna habitat assessment undertaken during the current survey 211

Appendix L – Conservation significant fauna species likelihood assessment 213

Appendix M – Summarised results of vertebrate fauna database searches 217

Appendix N – Conservation significant fauna locations 230

1 INTRODUCTION

1.1 Background

The proposed Garden Street extension (hereafter referred to as the Study Area) is a 4.78 hectare (ha) site owned by the City of Gosnells (the City) (Figure 1.1). The Study Area is located approximately 17 kilometres (km) south-east of Perth city, between Harpenden Street and Balfour Street in Huntingdale, in the City of Gosnells. The Development Envelope of the proposed Garden Street extension (hereafter referred to as the Development Envelope, 2.65 ha) is located within the Study Area. The Study Area has been previously cleared and disturbed; however, areas of remnant native vegetation exist. In order to determine the overall flora and fauna values of the site and provide information for any potential future development of the Study Area, the City commissioned Biologic Environmental Survey Pty Ltd (Biologic) to undertake a two phase (early-Spring and late-Spring) detailed and targeted flora and vegetation survey, a single season (Spring) Basic (previously Level 1) terrestrial vertebrate fauna survey and black cockatoo habitat assessment.

1.2 Objectives

The overarching objective of this survey was to determine the overall flora and fauna values of the site and provide information for any potential future development of the Study Area. Specifically, the key objectives of the assessment were to:

- conduct a comprehensive desktop assessment prior to a field survey to identify biological features which may be in, or nearby the Study Area;
- undertake a detailed flora and vegetation field survey to verify the desktop assessment, assess and delineate the extent of the vegetation communities and their condition within the Study Area;
- undertake a targeted flora survey for species of conservation significance identified in the desktop assessment;
- undertake a basic terrestrial vertebrate fauna field survey to verify the desktop assessment, delineate the extent of fauna habitats within the Study Area, and to determine their ability to support species of conservation significance;
- assess the faunal assemblage likely to occur and likelihood and distribution of vertebrate fauna of conservation significance occurring within the Study Area; and
- determine the potential foraging, night roosting and breeding habitat available to black cockatoos known to occur in the vicinity of the Study Area.

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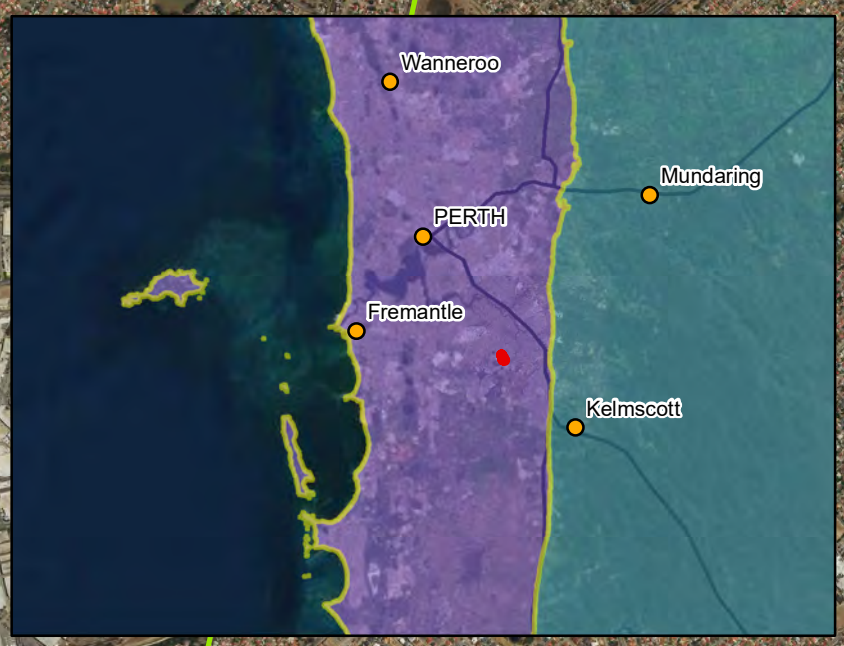

Tonkin Hwy

Legend

- Study Area
- Development Envelope
- City of Gosnells
- Swan Coastal Plain Bioregion

IBRA Subregion

- Northern Jarrah Forest
- Perth

0 0.5 1 1.5 Km

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 22/03/2022

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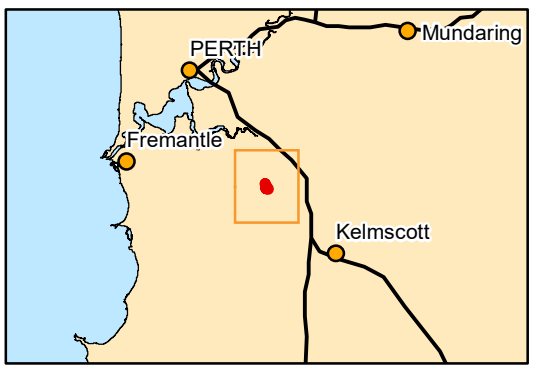
biologic Environmental Survey

Scale: 1:30,000



CITY OF GOSNELLS
Garden Street
Ecological Surveys

Figure 1.1: Study Area and regional location

1.3 Background to Protection of Flora and Fauna

Within Western Australia, native flora and fauna are protected under the *Biodiversity Conservation Act 2016* (BC Act) and at a national level under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Any action that has the potential to impact on native fauna or flora needs to be approved by relevant state and/or federal departments as dictated by the state *Environmental Protection Act 1986* (EP Act).

Some species of flora and fauna that are determined to be at risk of extinction or decline are afforded extra protection under these Acts. For the purposes of this report, these species are deemed to be of conservation significance. A summary of applicable legislation and status codes is provided in Table 1.1 and additional information on status codes is provided in Appendix A.

The EPBC Act identifies Threatened Ecological Communities (TECs) as ecological communities at risk of extinction. The BC Act provides for the statutory listing of TECs by the WA Minister for Environment (the Minister). The Minister has endorsed 69 ecological communities as Threatened under Critically Endangered (20 communities), Endangered (17 communities), Vulnerable (28 communities) and Presumed Totally Destroyed (four communities).

For some species and ecological communities, there is insufficient information to determine their status. These species are generally considered by the Environmental Protection Authority (EPA) and the Department of Biodiversity, Conservation and Attraction's (DBCA) as being of conservation significance for all development related approvals and are listed on a 'Priority List' that is regularly reviewed and maintained by the DBCA (Table 1.1). TECs that do not meet the criteria for statutory listing by the Minister for Environment are added to DBCA's 'Priority Ecological Communities' (PECs) lists under Priorities 1, 2 and 3. Ecological communities that are adequately known and are rare but not threatened or meet criteria for near threatened, or that have been recently removed from the threatened list, are placed in priority 4. These ecological communities require regular monitoring (DBCA, 2019b).

Table 1.1: Definitions and terms for fauna, flora, and communities of conservation significance

Agreement, Act or List	Status Codes
Federal	
***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)** The Department of Agriculture, Water and the Environment (DAWE)[1] lists Threatened flora and fauna, which are determined by the Threatened Species Scientific Committee (TSSC) per criteria set out in the Act. The Act lists flora and fauna that are considered to be of conservation significance under one of eight categories (listed under 'Status Codes').	• Extinct (EX) • Extinct in the Wild (EW) • Critically Endangered (CR) • Endangered (EN) • Vulnerable (VU) • Conservation Dependent (CD) • Migratory (MI)
Threatened Ecological Communities (TECs) are those that are at risk of extinction.	• Critically Endangered (CR) • Endangered (EN) • Vulnerable (VU)
State	
***Biodiversity Conservation Act 2016* (BC Act)** At a state level, native flora and fauna and TECs are protected under the BC Act. Species in need of conservation are given a ranking ranging from Critically Endangered to Vulnerable. TECs are given a ranking ranging from Vulnerable to Presumed Totally Destroyed.	Species • Extinct (EX) • Extinct in the Wild (EW) • Critically Endangered (CR) • Endangered (EN) • Vulnerable (VU) • Migratory (MI) • Conservation Dependent Fauna (CD) • Other specially protected species (OS) Threatened Ecological Communities • Presumed Totally Destroyed (PD) • Critically Endangered (CR) • Endangered (EN) • Vulnerable (VU)
DBCA Priority List DBCA produces a list of Priority species and ecological communities that have not been assigned statutory protection under the BC Act. This system gives a ranking from Priority 1 to Priority 5.	• Priority 1 (Poorly-known species/ ecological communities) (P1) • Priority 2 (Poorly-known species/ ecological communities) (P2) • Priority 3 (Poorly-known species/ ecological communities) (P3) • Priority 4 (Rare, Near Threatened, and other species/ecological communities in need of monitoring) (P4) • Priority 5 (Conservation dependent ecological communities) (P5)

2 EXISTING ENVIRONMENT

2.1 Physical Environment

2.1.1 Climate

The climate of the Swan Coastal Plain (SCP) bioregion is typically cool, with wet winters and warm dry summers. The Bureau of Meteorology's (BoM) closest and most accurate weather station to the Study Area, Jandakot Aero Station (number 009172), has documented the long-term average temperature and rainfall (BoM, 2020). The monthly rainfall average is lowest in December (10.4 millimetres (mm)) and highest during June (152.4 mm), averaging 816 mm annually. (length of record 1972-2020; BoM, 2020) (Figure 2.1). The highest maximum average daily temperature of 31.6°C occurs in February and the lowest minimum average daily temperature of 7°C occurs in July (length of record 1989-2020; BoM, 2020) (Figure 2.1).

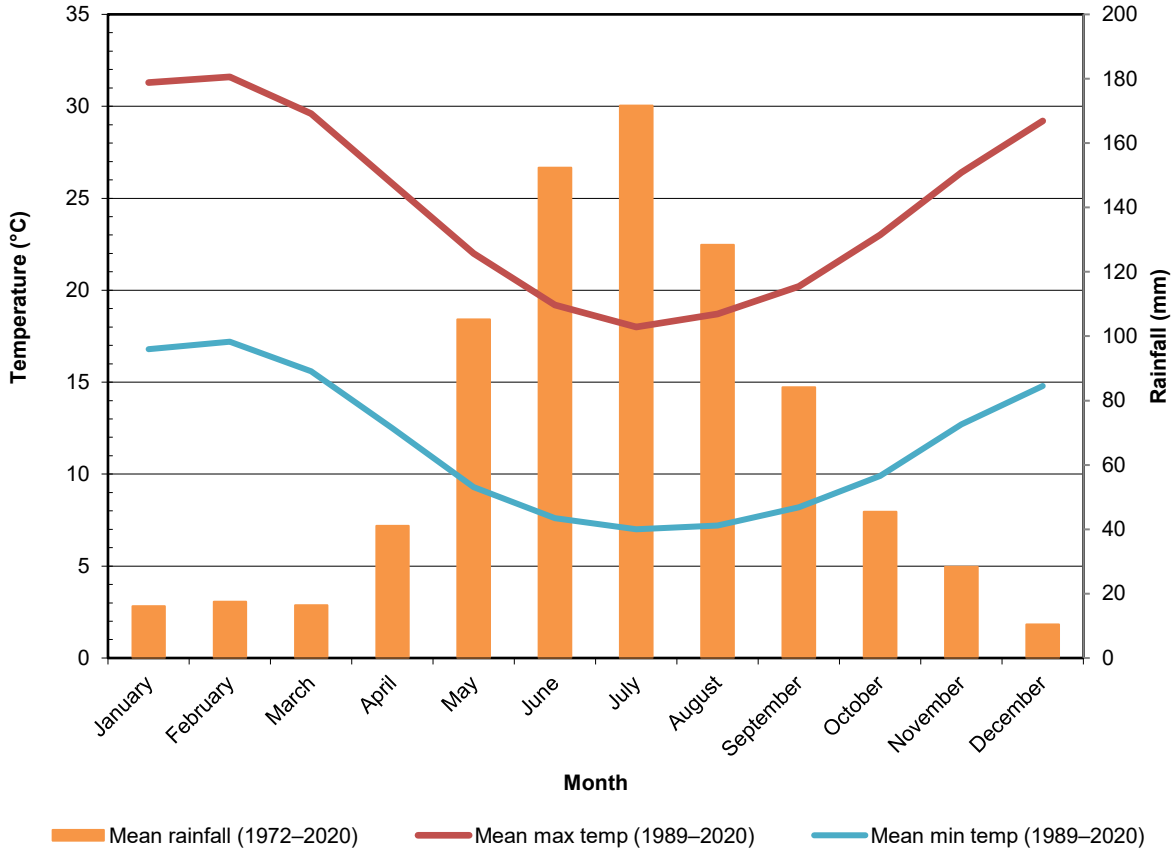


Figure 2.1: Long-term averages (LTA) for rainfall and temperature in the vicinity of the Study Area (Jandakot Aero 9172 (BoM, 2020))

2.1.2 Landforms, Geology and Soils

The terrain of the SCP includes sand, limestone, and fluvial deposits that form a coastal strip between the Darling Scarp and the Indian Ocean. The SCP extends from near Geraldton in the north to Dunsborough in the south. It is bounded by the Darling Fault to the east, in the north by a fault extending

from north-west from Bullsbrook and by the Collie-Naturaliste scarp in the south (McArthur & Bettenay, 1974).

The SCP is formed from the deposition of sediments, from either fluviatile or aeolian activity. The pattern of deposition of these sediments forms a series of geomorphic entities which are subparallel to the coastline (McArthur & Bettenay, 1974). The Ridge Hill Shelf, a series of laterite covered spurs, is the most easterly feature of the plain and forms the foothills of the Darling Scarp. The relatively flat Pinjarra Plain stretches approximately 13 km from the foot of the Ridge Hill Shelf where it terminates in a series of coastal sand dunes in the west. There are three generations of dunes commencing with the Bassendean System in the east, followed by the Spearwood System and the Quindalup System which fringes the coastline (McArthur & Bettenay, 1974).

The Atlas of Australian Soils (Northcote *et al.*, 1968) was compiled by CSIRO (Commonwealth Scientific and Industrial Research Organisation) in the 1960s to provide a consistent national description of Australia's soils. It comprises of a series of ten maps and associated explanatory notes and is published at a scale of 1:2,000,000, but the original compilation was at scales from 1:250,000 to 1:500,000. The Study Area is located within one broad soil landscape unit, Cb38 (Northcote *et al.*, 1968) (Figure 2.2). This unit consists of sandy dunes with intervening sandy and clayey swamp flats. Chief soils are leached sands with periodic subsurface waterlogging (Northcote *et al.*, 1968).

The Quaternary sedimentary units that underlie the SCP have been formally named as geological formations. The Study Area is located within the Bassendean Sand, which is present over much of the central Perth region. It is pale grey to white and includes fine to coarse, but is predominantly medium grained (Davidson, 1995). It comprises moderately sorted, sub-rounded to rounded quartz sand, and commonly exhibits fining upward textures. The Bassendean Sand unconformably overlies the Cretaceous and Tertiary strata, and inter-fingers to the east with the Guildford Formation. To the west, it is unconformably overlain by the Tamala Limestone (Davidson, 1995). The depositional mechanism for this unit is unclear, but it was likely deposited in a variety of fluvial, estuarine, and shallow-marine environments (Davidson, 1995).

At a finer scale (1:500,00) the Study Area (GSWA, 2016) is mapped (Figure 2.3) as:

- Coolyena Group (K-CY-xk-s): Chalk, greensand, glauconitic sandstone, siltstone, marl; characteristically glauconitic. Occurs centrally across 82% (or 3.94 ha) of the Study Area
- Warnbro Group (A-HAu-xsl-ci): Interbedded sandstone, siltstone, and shale; minor conglomerate. Occurs across 18% (or 0.84 ha) of the Study Area.

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Legend

Study Area

Soil Unit

Cb38

Sp2

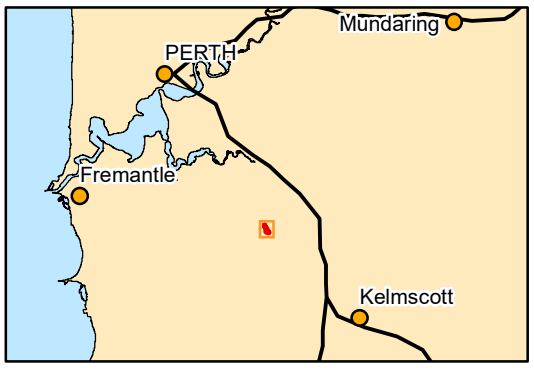
0 100 200 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 22/03/2022

N

biologic Environmental Survey

Scale: 1:5,000



CITY OF GOSNELLS
Garden Street
Ecological Surveys

Figure 2.2: Soils of the Study Area

400167 401167 402167

6450473 6449473 6448473 6447473

Legend

Study Area

Bedrock Geology

K-CY-xk-s: Coolyena Group

K-WR-ss: Warnbro Group

0 200 400 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 22/03/2022

N

biologic Environmental Survey

Scale: 1:10,000

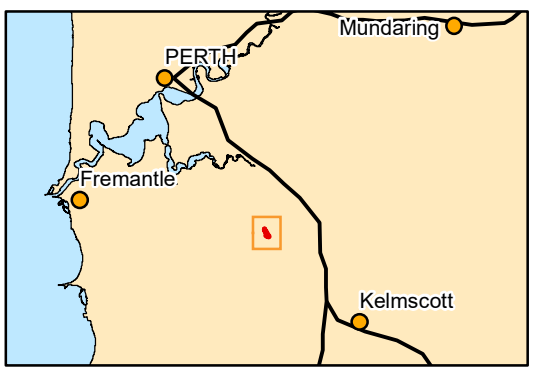


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Figure 2.3: Broad geology of the Study Area

2.1.3 Hydrology and Hydrogeology

On the SCP, surface run-off and groundwater discharge contribute to the flows within the rivers and their tributaries. The major rivers and some tributaries are perennial, having greater flows in winter than in summer, but some rivers and tributaries are also fed by drainage corridors all year round (DPaW, 2016). A major component of the summer flows is from groundwater discharge (Davidson, 1995). The wetlands, such as lakes and swamps, have formed along the boundaries of the dune systems, though some wetlands occur within the dune systems (Davidson, 1995; McArthur & Bettenay, 1974).Many of these wetlands are groundwater dependent.

Approximately 20% (by area) of wetlands across the SCP retain high ecological values, making them the highest priority for conservation (conservation management category). However, approximately 72% of wetlands have been degraded to the extent that they are not a priority for conservation (multiple use management category) (DBCA, 2018b). The wetlands on the SCP have been evaluated, and assigned a management category which provide guidance on how they should be managed and protected (DBCA, 2019a).

The Study Area lies partially within a Sumpland (Unique Feature Identifier 15423; basin, seasonal inundation) (Figure 2.4), which is classified as a 'Conservation Category Wetland' (CCW) (DBCA, 2019a; PGV, 2014). The wetland is categorised as a CCW as it supports high levels of attributes and functions (PGV, 2014). The Study Area is also within the vicinity of a large number of other wetlands, including several of "Conservation", "Resource Enhancement", and "Multiple Use" status (Figure 2.4), for example:

- Unique Feature Identifier 15449; basin; seasonally waterlogged; 0.1 km south-west;
- Unique Feature Identifier 15792; basin; seasonally waterlogged; 0.05 km south-east;

A review of the Perth Groundwater Atlas indicates that the depth from the natural surface level to the base of the aquifer located underneath the Study Area ranges between 31 and 36.5 metres (m) with the water table level located between approximately 3 and 8.5 m from the natural surface level (DoW, 2019).

400862 401362 401862

6449773 6449773

6449273 6449273

6448773 6448773

6448273 6448273

14877 15768 15682 15683 14145 14146 15423 15449 14142 14279 14280 15888 15792 15891 15890 15892 15889 15893 15792 15422

Legend

Study Area

Geomorphic Wetland of the Swan Coastal Plain

Wetland Category

- Conservation
- Resource Enhancement
- Multiple Use

0 100 200 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 22/03/2022

N

biologic Environmental Survey

Scale: 1:5,000

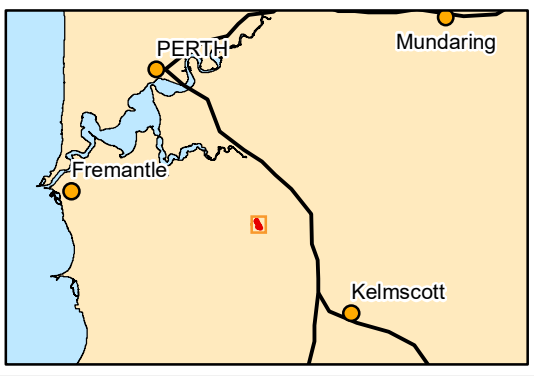

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Figure 2.4: Hydrology of the Study Area

2.2 Biological Environment

2.2.1 Biogeographical Regionalisation of Australia

The Study Area is within the SCP Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (Thackway & Cresswell, 1995). The SCP bioregion is characterised as a low lying coastal plain, mainly covered with woodlands (Mitchell *et al.*, 2002). It is dominated by banksia (*Banksia* spp.) or tuart (*Eucalyptus gomphocephala*) on sandy soils, *Casuarina obesa* on outwash plains, and paperbark (*Melaleuca* spp.) in swampy areas, while the plain rises to duricrusted Mesozoic sediments dominated by jarrah (*Eucalyptus marginata*) woodland in the east (Mitchell *et al.*, 2002). Within the SCP bioregion, the Study Area occurs within the Perth subregion (Figure 1.1).

The Perth subregion is composed of colluvial and aeolian sands, alluvial river flats and coastal limestone. Heath and/or tuart woodlands occur on limestone, banksia and jarrah–banksia woodlands on Quaternary marine dunes, and marri (*Corymbia calophylla*) on colluvial and alluvial soils (Mitchell *et al.*, 2002). This includes a complex series of seasonal wetlands.

The SCP bioregion is part of the South West Botanical Province which has a very high degree of species diversity. Within the bioregion there are areas of relatively high ecosystem or species diversity, particularly on the eastern side of the coastal plain. The bioregion supports several TEC's, as well as a large number of rare and threatened species (Mitchell *et al.*, 2002).

2.2.2 Vegetation Complexes

The vegetation complexes of the SCP are those defined by Heddle *et al.* (1980) at the scale of 1:250,000. The Study Area lies wholly within the Southern River vegetation complex (System 6 code #42) with combinations of Bassendean Dunes and Pinjarra Plain. This is described as open woodland of marri-jarrah-banksia species with fringing woodland of *Eucalyptus rudis* (flooded gum) – *Melaleuca rhaphiophylla* (swamp paperbark) along creek beds (DBCA, 2020d).

The Government of Western Australia reports annually on the statistics of the pre-European and current extent for the vegetation complexes of the south-west of Western Australia (DBCA, 2020d). The updated statistics provide details on the progress towards achieving a conservation reserve system that is comprehensive, adequate and representative (CAR Reserve) and the statistics for each local government area (LGA; City of Gosnells). This vegetation complex extends across eighteen LGAs. The City of Gosnells contains 8.23% of the Southern River vegetation complex extent (Figure 2.5; Table 2.1).

Table 2.1: Pre-European and current extent of vegetation complex occurring in the Study Area

Vegetation Complex & Code	Scale	Pre-European Extent (ha)	Current Extent remaining (ha / %)	Current Extent remaining on DBCA lands (%)
Southern River Complex (#42)	LGA	4,836	554 / 11.5	0
	Bioregion	58,781	10,832 / 18.4	1.6

Source: Government of Western Australia (2019).

400862 401362 401862

6449773 6449273 6448773 6448273

Legend

Study Area

Vegetation Complex

Southern River Complex

0 100 200 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 23/03/2022

N

biologic Environmental Survey

Scale: 1:5,000

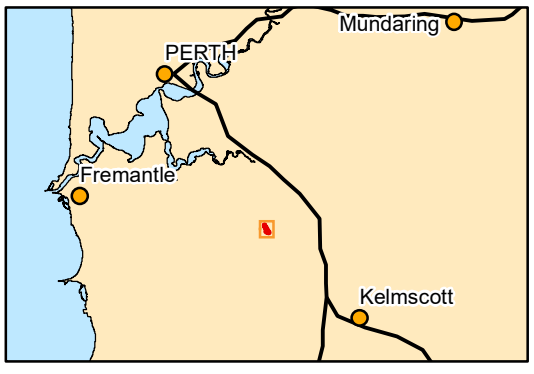

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Figure 2.5: Vegetation complexes of the Study Area

2.2.3 Bioregional Significance and Conservation Areas

Under the Convention of Biological Diversity, Australia has worked towards a target of 17% of the continent to be protected as part of the National Reserve System (NRSTG). In building the NRS, Priority is given to under to under-represented bioregions that have less than 10% of their remaining are protected in reserves (NRSTG, 2009). The SCP is adequately represented with approximately 10.01-15% of the subregional area protected in reserves.

In order to conserve the biodiversity of this area, regionally significant bushland is identified and protected under the Government of Western Australia's strategic plan for the conservation of bushland, "Bush Forever" (Government of Western Australia, 2000b). The Study Area lies partially within Bush Forever site 125 (Holmes Street Bushland), while sites 246 (Canning and Southern Rivers), 464 (Matison Street Bushland), 340 (Phoebe Street Bushland), and 413 (Balannup Lake and Adjacent Bushland) all lie within 2 km of the Study Area (Table 2.2; Figure 2.6). Bush Forever site 125 is inferred to contain three Floristic Community Types (FCTs) Gibson *et al.* (1994):

Supergroup 2: Seasonal Wetlands

- 4 – *Melaleuca preissiana* damplands
- S3 – Wet sedgelands on sandy clays (most southern occurrence)

Supergroup 3: Uplands centred on Bassendean and Dandaragan Plateau

- 23a – *Banksia attenuata – B. menziesii* woodlands (encompassed within Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region (WA (P3), EPBC (T-EN))

Table 2.2: Summary of Bush Forever sites within 2 km of the Study Area

Site No.	Site Name	Location	Landform Element	Potential fauna values	Site Significance
125	Holmes Street Bushland	Partially overlaps Study Area	Vegetated wetland, vegetated uplands	Significant mammal species: quenda Significant bird species: category 1 (1), category 3 (11) and category 4 (2)	• Bennett Brook Wetland Groups (91.6 ha conservation) • Part of regionally significant fragmented bushland/wetland linkage • Inferred to contain SCP23a 'Central *Banksia attenuata – Banksia menziesii* woodlands' (Government of Western Australia, 2000b), which is also encaompassed within the Banksia WL SCP (WA P3, EPBC T-EN) (TSSC, 2016).
246	Canning and Southern Rivers	1.2 km north-east	Vegetated wetland, creek, river, vegetated uplands	Significant mammal species: quenda	• Bennett Brook and Swan River Wetland Groups (149.2 ha conservation) • Part of regionally significant contiguous bushland/wetland linkage
340	Phoebe Street Bushland	1.8 km south-east	Vegetated wetland, vegetated uplands	Not known	• No adjacent bushland • Bennett Brook Wetland Groups (3.5 ha conservation) • Part of regionally significant fragmented bushland/wetland linkage
413	Balannup Lake and Adjacent Bushland	1.7 km south-west	Open water, vegetated wetland, vegetated uplands	Significant mammal species: quenda	• Bennett Brook Wetland Groups (32 ha conservation) • Part of regionally significant fragmented bushland/wetland linkage

Site No.	Site Name	Location	Landform Element	Potential fauna values	Site Significance
464	Matison Street Bushland	1.7 km south-east	Vegetated wetland, creek, vegetated uplands	Not known	• Bennett Brook Wetland Groups (27.5 ha conservation) • Part of regionally significant fragmented bushland/wetland linkage

Although the Study Area is surrounded by a developing urban environment, approximately half of the Study Area is within an area deemed a Regional Ecological Linkage (ID “48”), and is also surrounded by Linkages “45”, “55", and “57” (Perth Biodiversity Project, 2003) (Figure 2.6). These linkages are defined as a series of continuous and non-continuous patches of native vegetation which, by virtue of their proximity to each other, act as stepping stones of habitat which facilitate the maintenance of ecological processes and the movement of organisms within, and across, a landscape (Del Marco, 2004; Molloy *et al.*, 2009). Greenways corridors link bushland remnants and are usually associated with bushland and wildlife corridors, actual or potential. Greenways can also encompass drainage corridors, creek lines and road verges (Government of Western Australia, 2000a).

Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region (WA (P3), EPBC (T-EN))

The Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region (WA (P3), EPBC (T-EN)) (Banksia WL SCP) TEC is restricted to areas in, and immediately adjacent to, the SCP bioregion. These woodlands are the most prominent type of vegetation around Perth and once formed an almost continuous band with a median patch size estimated at 146 ha. They are now heavily fragmented (divided from around 132 into over 12,000 patches), with a median patch size estimated at 1.6 ha. Since the 19th century, the region has been heavily cleared (approximately 60%) for agriculture, housing and associated infrastructure. Small patch sizes make communities more vulnerable to disturbances such as invasion by weeds or feral animals, while separation between patches disrupt ecological processes that support the health of the community (eg. dispersal). This reaffirms that the protection and potential regeneration of the remaining patches of the ecological community are paramount, as they provide important wildlife corridors and refuges in a highly fragmented landscape (DoEE, 2016).

The Banksia WL SCP has a prominent tree layer of Banksia, with scattered Eucalypts and other tree species often present. The understorey is a mix of sclerophyllous shrubs, grasses, rushes, sedges and herbs and is characterised by high diversity and endemism. The TEC mainly occurs on deep Bassendean and Spearwood sands or occasionally on Quindalup sands, and also occurs where there are shallow sands over more complex stratigraphic sequences of foothills (Ridge Hill Shelf), Whicher Scarp and Gingin/Dandaragan Scarp (adapted fromTSSC, 2016).

Regional vegetation mapping at various scales has been produced for the SCP and each of these encompass vegetation units supporting Banksia woodlands. Forty-nine of the vegetation system associations mapped by Beard (1981) contain some component of the Banksia woodlands ecological community, of which fourteen system associations contain the key Banksia species as a major component of the vegetation (TSSC, 2016). The Study Area falls within the Pinjarra system association which has low Banksia woodland as a major component of the vegetation. Vegetation complexes mapped by Heddle *et al.* (1980) have been stratified according to whether they are strongly or

moderately associated with Banksia woodlands. The Southern River complex covers the Study area and is considered to be moderately associated with the Banksia WL SCP ecological community. Fourteen FCTs as defined by Gibson *et al.* (1994) are listed as sub-communities under the federally listed TEC, of which eight are also listed as separate TECs/ PECs at a state level. The Study Area lies partially within Bush Forever site 125 which has inferred to contain FCT SCP23a – *Banksia attenuata* – *B. menziesii* woodlands (encompassed within Banksia Dominated Woodlands of the SCP IBRA Region (WA (P3), EPBC (T-EN)).

398082 400082 402082 404082

6453072 6451072 6449072 6447072 6445072

456 246 467 125 472 472 464 340 255 465 260 342 413

Jandakot Regional Park

253

Balannup Lake Nature Reserve

Legend

- Study Area
- DBCA Managed Land
- DBCA Regional Park
- Bush Forever Site

Regional Ecological Linkage (ID)

- 45
- 48
- 54
- 55
- 57

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 22/03/2022

N

biologic Environmental Survey

Scale: 1:25,000

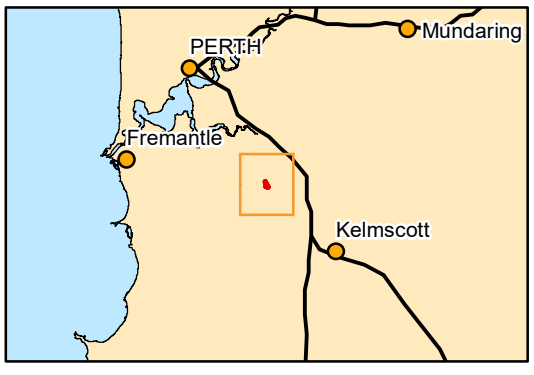

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Figure 2.6: Land use and tenure of the Study Area

2.2.4 Introduced Flora Taxa

Weeds of National Significance

The Commonwealth of Australia, in collaboration with the states and territories, has identified 32 Weeds of National Significance (WoNS) based on an assessment process that prioritises these weeds according to their invasiveness, potential for spread and environmental, social and economic impacts. A list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012.

Landowners and land managers at all levels are responsible for managing WoNS. State and territory governments are responsible for legislation, regulation and administration of weeds. The WoNS were selected as they require coordination among all levels of government, organisations and individuals with weed management responsibilities.

Declared Pests

To protect Western Australian agriculture the Department of Primary Industries and Regional Development (DPIRD) (formerly the Department of Agriculture and Food Western Australia, DAFWA) regulates harmful plants under the *Biosecurity and Agriculture Management Act 2007* (BAM Act). Plants that are prevented entry into the state or have control or keeping requirements within the state are known as declared pests. The main purposes of the BAM Act and its regulations related to Declared Pests are to prevent new plant pests from entering Western Australia, manage the impact and spread of those pests already present in the state and safely manage the use of agricultural chemicals.

The BAM Act has categorised the weeds of Western Australia into four main classifications:

- Declared Pests (under Section 22 of the Act);
- Permitted (under Section 11 of the Act);
- Prohibited (under Section 12 of the Act); and
- Permitted requiring a permit (Section 73, BAM Regulations 2013).

Under the BAM Act all Declared Pests listed under Section 22 (not including pests listed under Section 12 of the BAM Act; Prohibited Pests) are placed in one of three control categories:

- Category 1 (C1) – Exclusion: if in the opinion of the Minister introduction of the declared pest into an area or part of an area for which it is declared should be prevented;
- Category 2 (C2) – Eradication: if in the opinion of the Minister eradication of the declared pest from an area or part of an areas for which is declared is feasible; and
- Category 3 (C3) – Management: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is not feasible but that it is necessary to:
    - Alleviate the harmful impact of the declared pest in the area; or
    - Reduce the number or distribution of the declared pest in the area; or
    - Prevent or contain the spread of the declared pest in the area.

Prohibited pests listed under Section 12 of the BAM Act are assigned separate control categories and include:

- Category 1 (C1) – Exclusion: if in the opinion of the Minister introduction of the prohibited organism into the State or a part of the State should be prevented; and
- Category 2 (C2) – Eradication: if in the opinion of the Minister eradication of the prohibited organism from the State or a part of the State is feasible.

Weed Prioritisation

DBCA (formerly Parks and Wildlife) developed and implemented the Weed Prioritisation Process (DBCA, 2013), an integrated approach to weed management on Parks and Wildlife-managed lands in WA. Weeds were prioritised in each region, based on their:

- invasiveness;
- ecological impact;
- potential and current distribution; and
- feasibility of control.

The resulting priorities focus on weeds considered to be high impact, rapidly invasive and still at a population size that can feasibly be eradicated or contained to a manageable size. This means that weed species that are already widespread may not be ranked as a high priority. The weed prioritisation for the Southern Jarrah Forest bioregion has recently been revised. The key priorities are now centred on 'priority alert' weeds and weeds that receive a rating for 'ecological impact' and 'invasiveness'.

3 METHODOLOGY

3.1 Conformance

This assessment was carried out in a manner consistent with documents developed by EPA, DBCA and the Department of Agriculture, Water and the Environment (DAWE), formerly the Department of Environment and Energy (DoEE) and Department of Sustainability, Water, Population, and Communities (DSEWPaC), as outlined below in Table 3.1.

Table 3.1: Guidelines, technical guidelines and procedures for the field survey

Survey component	Guidance documents
General / EIA	EPA (2018) *Statement of Environmental Principles, Factors and Objectives*
	DoE (2013) *Significant Impact Guidelines*
Detailed and targeted flora survey	EPA (2016c) T*echnical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment*.
	EPA (2016a) *Environmental Factor Guideline: Flora and Vegetation*.
	DoEE (2016) *Banksia Woodlands of the Swan Coastal Plain*
	DAWE (2014) *Survey Guidelines for Australia's Threatened orchids*
Basic terrestrial vertebrate fauna survey	EPA (2016b) *Environmental Factor Guideline: Terrestrial Fauna.*
	EPA (2020) *Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment*
	DEWHA (2010) *Survey Guidelines for Australia's Threatened Birds*
	DSEWPaC (2011a) *Survey Guidelines for Australia's Threatened Mammals*
	DSEWPaC (2011b) *Survey Guidelines for Australia's Threatened Reptiles*
Black cockatoo habitat assessment	DoEE (2017) *Revised draft referral guideline for three threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo, and the Forest Red-tailed Black Cockatoo*
	DSEWPaC (2012) *EPBC Act Referral Guidelines for Three Threatened Black Cockatoo Species: Carnaby's Cockatoo (endangered) Calyptorhynchus latirostris, Baudin's Cockatoo (vulnerable) Calyptorhynchus baudinii, Forest Red-tailed Black Cockatoo (vulnerable) Calyptorhynchus banksii naso*

3.2 Desktop Assessment

3.2.1 Literature Review

Background information on the Study Area and surrounds was compiled prior to, during and after the field survey, to determine likely species assemblages and potential conservation significant taxa. A literature review considered report provided by the City and/or obtained from the Index of Biological Surveys for Assessments (IBSA) online portal. Twenty-three reports were reviewed and of these, nine are combined flora and fauna surveys, one is a targeted fauna survey, one is a fauna management plan, one is a black cockatoo habitat assessment and ten are flora surveys (Table 3.2). All surveys were located within a radius of 10 km from the Study Area.

Table 3.2: Literature sources used for review

Survey Title	Reference	Survey Type	Distance from Study Site (km)
Targeted Flora Survey – Garden St Extension and Widening, Southern River	360 Environmental (2014b)	Targeted Flora Survey	Entire Study Area
Vegetation and Declared Rare and Priority Flora Assessment Garden Street Extension	Woodman (2004)	Detailed Flora and Vegetation Survey	Overlapping current Study Area
Black cockatoo assessment - Garden Street extension	Terrestrial Ecosystems (2014)	Black Cockatoo Assessment	Overlapping current Study Area
Fauna Management Plan Holmes Street Bushland North	Natural Area (2016a)	Fauna Management Plan	Overlapping current Study Area
Garden Street Road Reserve Environmental Assessment	Natural Area (2016b)	Environmental Assessment	Overlapping current Study Area
Garden Street, Southern River, Targeted Conservation Significant Species Survey	PGV (2016)	Targeted Flora and Fauna Survey	Overlapping current Study Area
Australasian bittern survey	Terrestrial Ecosystems (2016)	Targeted Fauna Survey	Overlapping current Study Area
Garden Street Extension, Southern River, Targeted Wetland Vegetation Assessment	PGV (2018)	Targeted Vegetation Survey	Overlapping current Study Area
Ecological Assessment of Sutherlands Park Bushland, City of Gosnells	ENV (2010)	Ecological Assessment	Adjacent east
Precinct 3 – Environmental Review, Southern River	ENV (2006)	Environmental Assessment	1 km SE
Targeted Flora Survey – Southern River Road Duplication	360 Environmental (2014a)	Targeted Flora Survey	2.2 km SW
City of Armadale Skeet Road Reconnaissance Flora Survey	Natural Area (2019)	Reconnaissance Flora and Vegetation Survey, Basic Fauna Survey	2.7 km SSW
Public environmental review: Southern River bridge project for Gosnells City Council	CMPS&F (1993)	Public Environmental Review	2.8 km SW
Flora, Vegetation and Fauna Assessment, Keane Road	ENV (2013)	Detailed Flora and Vegetation Survey, Basic Fauna Survey	4.7 km SSW
City of Gosnells - Station Street Bridge Project: Flora and Fauna Survey	Golder Associates (2016)	Reconnaissance Flora and Vegetation Survey, Basic Fauna Survey	4.7 km SW
Clifton Park Cricket Nets Expansion, Flora and Vegetation	Ecoscape (2019)	Detailed Flora and Vegetation Survey	4.8 km W
Botanical Assessment of Lots 101 and 200 Anstey Road, Forrestdale	Bennett Environmental Consulting (2013)	Detailed Flora and Vegetation Survey	5.2 km SSW
Flora and Vegetation Review, Lot 9103 Warton Road, Piara Waters	Focused Vision (2020)	Reconnaissance Flora and Vegetation Survey	5.6 km SW
Level 2 Flora and Vegetation Survey of Proposed Sand Mining Area at Lot 467, Warton Road	Morgan (2011)	Detailed Flora and Vegetation Survey	6.1 km SW

Survey Title	Reference	Survey Type	Distance from Study Site (km)
Lot 131 Jandakot Road, Banjup Flora and Vegetation Survey	360 Environmental (2015)	Detailed Flora and Vegetation Survey	6.7 km SW
Lot 131 Jandakot Road, Treeby Black cockatoo habitat assessment	360 Environmental (2018b)	Black Cockatoo Assessment	7.4 km SW
Cockburn Central East Local Structure Plan (CCE LSP) Area, Level 1 Flora and Fauna Assessment	Focused Vision (2016)	Reconnaissance Flora and Vegetation Survey, Basic Fauna Survey	9.1 km WSW
Cockburn Central East Local Structure Plan (CCE LSP) Area, Targeted *Caladenia huegelii* Survey	Focused Vision (2018)	Targeted Flora Survey	9.1 km WSW

3.2.2 Database Searches

Database searches were undertaken to generate a comprehensive list of flora and fauna species, including introduced species and taxa of conservation significance, that may occur within the region of the Study Area, based on previous records and potentially identified habitat. The database searches also identified ecological communities/ vegetation types of conservation significance that occur, or may occur, within, and near, the Study Area. Conservation codes for flora, vegetation, and fauna of conservation significance are provided in Appendix A. Database records of historic or presumed erroneous information which do not represent a species' current distribution, or records that represent non-naturalised species (i.e. pet escapes) were removed.

In total, eight databases were searched to gather information on species and communities previously recorded within or near the Study Area around a central coordinate (-32.09056, 115.95694) (Table 3.3). The radius of each search was selected according to experience in the region and relevant guidelines.

Table 3.3: Details of database searches conducted

Purpose	Database	Search radius
Flora		
To identify flora species and communities previously recorded within the Study Area and its vicinity, in particular those of conservation significance	DBCA's NatureMap (DBCA, 2020a)	5 km
	Threatened and Priority Ecological Communities (DBCA, 2020a)	5 km
	Threatened and Priority Flora (DBCA, 2020c)	5 km
	Atlas of Living Australia (ALA) (ALA, 2020)	5 km
To identify potential species listed under the Commonwealth EPBC Act within the Study Area	DAWE Protected Matters Search Tool (PMST) (DAWE, 2020)	5 km
To identify declared pest plants within the Study Area	Declared Plants Database – Western Australian Organism List (WAOL) (DPIRD, 2020)	Search of the entire City of Gosnells
Fauna		
To identify potential species listed under the Commonwealth EPBC Act within the Study Area	DAWE Protected Matters Search Tool (PMST) (DAWE, 2020)	10 km
To identify fauna species previously recorded within the Study Area and its vicinity, in	DBCA's NatureMap (DBCA, 2020a)	10 km
	DBCA's Species & Communities Branch threatened and priority fauna databases (DBCA, 2020b)	10 km

Purpose	Database	Search radius
particular those of conservation significance	Atlas of Living Australia (ALA) (ALA, 2020)	10 km
To identify black cockatoo roosts and potential breeding areas within 12 km of the Study Area	Birdlife Australia custom black cockatoo roost database (BirdLife Australia, 2020b)	12 km

3.3 Survey Timing and Conditions

Phase one of the detailed flora and vegetation survey was completed over two days on 16th and 17th of September 2020, while phase two was also completed over two days on 10th and 11th of November. The flora team spent approximately 90 person hours on site undertaking the assessment. Maximum temperatures experienced in phase one (20.6°C & 20°C,) were consistent with the long-term averages for the area (20.2 °C), however phase two (19.6°C & 20.4°C) experienced slightly cooler temperatures (26.4°C) (Jandakot Aero (BoM, 2020)).

Although the month of May received slightly above average rainfall, the rainfall in the six months leading up to the phase one survey was below average, in particular in the winter months (June – August) which received 149.5 mm below average collectively (451.7 mm (LTA) compared to 303 mm (2020)) (Figure 3.1). This may have caused a “flush” of early flowering and fruiting of flora taxa, particularly in annuals and ephemeral taxa, in response to the below average rainfall in winter. Below average rainfall was received for August and September, while the month of November received well above average rainfall (81.4 mm compared to the LTA of 28.3 – the highest rainfall received for November at this weather station on record) (Jandakot Aero (BoM, 2020)).

The Basic vertebrate fauna field survey was completed over one day, 24th September 2020. The field team spent approximately 20 person hours on site undertaking the assessment. The maximum temperature experienced (29.6°C) was considerably higher than the LTA for the area (21.3°C). No rain fell over the course of the survey, providing ideal conditions to assess the likelihood of occurrence for fauna or determine the fauna habitats present. Rainfall in the six months leading up to the survey was slightly below average, particularly for the winter months (see above) (Figure 3.1) (Jandakot Aero (BoM, 2020)).

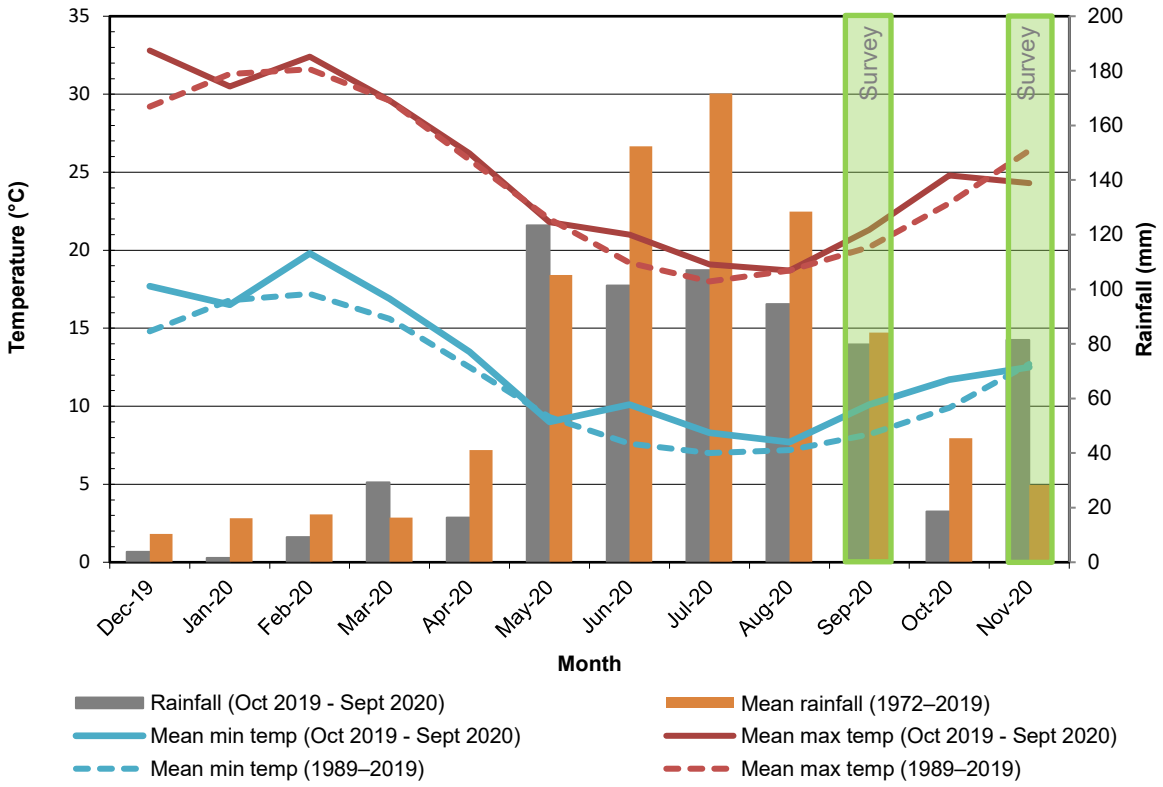

Figure 3.1: Monthly recorded and LTA climatic data for Jandakot Aero (BoM, 2020)

3.4 Survey Team and Licensing

The flora field surveys were completed by senior botanist Sam Coultas, who has over 6 years' experience in the bioregion. Sam was assisted in the field by botanists Heather Edwards and Kaylin Geelhoed. The collection of flora specimens were taken under flora collecting permits (FB2000017; FB2000281; FB2000238) pursuant to the BC Act (Regulation 61). Sam also holds a Permit to Take Declared Rare Flora for identification purposes (TFL 60-1819), issued under the BC Act, Section 40.

The fauna field survey was led by senior zoologist Andrew Hide, who has over 11 years' experience undertaking fauna surveys within the bioregion and assisted by zoologist Ashleigh Jenkins. The fauna sampling for this survey was conducted under a DBCA Regulation 27 "Fauna Taking (Biological Assessment) License" (BA27000300) issued to Chris Knuckey. In accordance with Section 40 of the BC Act, threatened species sampling was completed under a DBCA "Authorisation to Take or Disturb Threatened Species" (authorisation number TFA 2020-0109) issued to Chris Knuckey.

3.5 Detailed and Targeted Flora Field Survey

3.5.1 Detailed Flora Survey

Biologic was commissioned to conduct a single season two phase detailed flora and vegetation survey (sampling of the site over two phases within the one season, for example two site visits in Spring). The survey involved the establishment and sampling of ten quadrats (10 m × 10 m) and one relevé within representative vegetation units (Figure 3.2). The quadrats were established and sampled during phase one, while the quadrats were re-scored during phase two to identify any late flowering flora species,

with consideration to late flowering annuals, ephemerals and perennial natives. The sampling design and intensity was developed with consideration given to the following:

- landform and habitat – scale, heterogeneity, rarity;
- vegetation structure, diversity and seasonality;
- potential for significant ecological communities to occur, based on habitat analysis; and
- information from previous biological surveys conducted in the vicinity of the Study Area.

Due to the small size of the Study Area, the sampling of three quadrats per vegetation type as recommended by the EPA (2016a) was not achievable; however at least one quadrat per vegetation unit was sampled. Any opportunistic flora taxa seen were also recorded to supplement the survey work. The following information was recorded at each quadrat and relevé:

- unique quadrat number (or relevé number);
- date of survey;
- personnel;
- GPS coordinate of the north-west corner unless specified otherwise;
- site photograph;
- soil characteristics (texture and colour);
- vegetation condition (based on EPA (2016a) (Figure 4.9; Table 4.9); and
- disturbance (if present).

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GGS-07

GGS-06

GGS-05

GGS-02

GGS-01

Legend

- Study Area
- Development Envelope

Flora Sample Site

- Quadrat
- Relevé
- Traverse

0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 12/04/2022

N

biologic Environmental Survey

Scale: 1:2,500

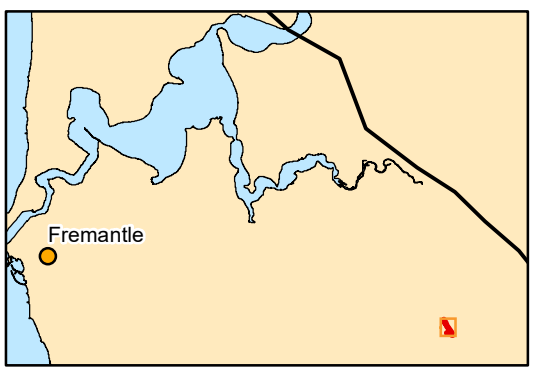

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Figure 3.2: Flora sampling and traverses

3.5.2 Targeted Searches for Taxa of Conservation Significance

Prior to the survey, a list of conservation significant flora known to, with the likelihood to, or potential to occur within the Study Area was compiled. Field personnel familiarised themselves with photographs, reference samples and descriptions of these taxa before conducting the survey. Once on the ground, personnel actively searched while traversing the Study Area and in known locations or preferred habitat encountered in the field.

Targeted searching was undertaken for flora of conservation significance, as identified during the desktop assessment. Taxa that were confirmed or considered highly likely, likely or possible to occur within the Study Area were targeted. The meandering targeted searches while traversing the Study Area focussed on habitat considered likely to support conservation significant flora.

If a conservation significant taxon was identified, a GPS coordinate of the individual was taken when occurring in isolation, or a central GPS coordinate was taken for a small population (central coordinate with an approximate 20 m radius). Information collected at each location comprised:

- Number of individuals, for a small population
- Condition and reproductive status of the plants in each population
- Photographs and description of vegetation habitat
- Broad information on vegetation type and condition
- Coordinates of either each plant (if few) or the extent of the population (if many) using a GPS. A differential GPS (Trimble Catalyst antenna) was used to record the locations of threatened and priority flora to ensure accurate coordinates are provided

Threatened and Priority Flora Report Forms will be provided to the Parks and Wildlife Division (Parks and Wildlife) of DBCA, as required under the flora collecting permits. Conservation significant flora specimens will be vouchered with the Western Australian Herbarium (WAH), where required and appropriate.

3.5.3 Introduced Taxa

While completing the detailed flora assessment and targeted searches any significant environmental weeds (weeds of national significance and Declared Plant Pests listed under Section 12 and Section 22 of the BAM Act) located in the Study Area had their locations noted and searches with a minimum 20 m radius from the given specimen were conducted to document the number of individual plants and map the spatial extent of the infestation.

3.5.4 Vegetation Mapping

Vegetation types were also mapped at a 1:5,000 to 1:1,000 scale to a minimum NVIS Level V (NVIS Technical Working Group, 2017) which is the current nationally adopted classification system for vegetation descriptions, site photographs were also taken to support the vegetation unit mapping. The floristic data collected from the quadrats was statistically analysed using R version 4.0.0 (R Core Team, 2018) and appropriate similarity analysis techniques. The proposed statistical methodology is sufficient to meet EPA expectations and is detailed further below.

3.5.5 Floristic Data Analysis

Data Transformation and Reconciliation

The observed taxa in the quadrats were recorded on a cover abundance basis, with an estimate of the foliage cover of each species made at each site. To allow for any disparity in cover and the potential for ambiguities in determining cover between observers, the cover values were reduced to cover codes, based on an adapted Braun-Blanquet method (1 = <1 %; 2 = 1–5 %; 3 = 6–25 %; 4 = 26–50 %; 5 = 51–75 %; and 6 = >75 %). The flora species list was reconciled to amalgamate selected taxa e.g. varieties of the same species. Tentative genus identifications (i.e., ?Genus species) were removed from the analysis if confirmed specimens of the same genus had already been recorded.

Species Accumulation Curve

Species accumulation curves were plotted using Sobs, Chao 1, Jacknife 1, Bootstrap and Michealis-Menton in Primer v7 to determine the adequacy of the survey. When a curve approaches an asymptote it suggests that sampling effort has been sufficient to adequately collect the species comprising the floral assemblage at the locations sampled (Thompson & Withers, 2003). The value at which the curve asymptotes can also be used as an approximate measure of the total size of the species complement at that location (Thompson *et al.*, 2003).

Hierarchical Clustering

Cluster analyses were carried out using R version 4.0.0 (R Core Team, 2018). Cover code and presence absence values for the flora in each quadrat were compiled in R and a resemblance matrix was created. In order to compare the floristic data collected from this survey and with data from regional surveys (Gibson *et al.*, 1994; Keighery *et al.*, 2012), presence absence dendrograms were created. Introduced flora taxa were removed for the analyses.

Similarity testing was undertaken using the Bray-Curtis coefficient. Quadrats were also analysed individually against past surveys from the region (Gibson *et al.*, 1994; Keighery *et al.*, 2012), to determine which floristic communities the quadrats most closely resembled.

3.5.6 Vegetation Condition

Vegetation condition was defined within the Study Area using the vegetation condition scale in EPA (2016a), which has been adapted from Keighery (1994) (Appendix B). The vegetation condition was determined based on the level of disturbance observed in an area. Condition was recorded at each quadrat and relevé, while additional notes were taken while traversing the Study Area to broadly map vegetation condition boundaries. The vegetation condition mapping was then digitised using GIS software.

3.5.7 Conservation Significant Ecological Communities

Data and observations from the field survey were used to identify and confirm the presence of conservation ecological communities within the Study Area and whether it met condition and patch size thresholds outlined by the approved conservation advice for these communities. The Quadrat data was analysed against state data for that community (NatureMap) where applicable, consistent with methods used in key regional surveys. Any TEC/PEC boundaries were then mapped within the Study Area at a scale of 1:5,000.

3.5.8 Specimen Identifications

Plant taxa that could not be identified during the field survey were collected, assigned a unique number for tracking purposes, and pressed for subsequent identification. Identifications were carried out by Biologics taxonomists Rachel Meissner and Sam Coultas, utilising the Western Australian Herbarium's (WAH) reference collection, taxonomic keys and reference material. Photographs of some plant taxa were taken and compared later to images available on FloraBase. All taxa were checked against Florabase© (version 2.9.31; WAH, 1998-) to ensure their currency and validity. Any additional flora taxa, including potential threatened and priority species, range extensions and potential new taxa have been verified and vouchered (if appropriate) at the WAH.

3.6 Basic Terrestrial Vertebrate Fauna Field Survey

3.6.1 Habitat Assessments and Mapping

Thorough fauna habitat assessments and mapping was undertaken throughout the Study Area (Figure 3.3). Habitat assessments were conducted using methodology and terminology modified from the *Australian Soil and Land Survey Field Handbook* (National Committee on Soil and Terrain, 2009). Fauna habitat mapping was undertaken across the entirety of the Study Area from the completed habitat assessments, high-resolution aerial imagery, and vegetation mapping from the concurrent flora and vegetation survey (Figure 5.3). A total of 14 fauna habitat assessments were conducted during the current survey. Habitats were delineated and mapped across the Study Area at a scale of approximately 1:10,000. Fauna habitats were assessed for the likelihood that they may support fauna of conservation significance. Any disturbances present (e.g. weeds, clearing, tracks, feral animals) were also documented.

3.6.2 Targeted and Opportunistic Vertebrate Fauna Records

Targeted searches were undertaken to identify the occurrence of fauna of conservation significance and their habitat and were completed in the most prospective habitats. During the targeted searches, and while traversing the Study Area, the team recorded a list of all opportunistic vertebrate fauna species encountered, either from primary (i.e. direct observation) or secondary (e.g. burrows, scratching's, diggings, scats, feathers and nests) evidence. The location of all records pertaining to species of conservation significance were also recorded.

The latest checklist of mammal, reptile and amphibian names published by the Western Australian Museum (WAM, 2020) was used as a guide to the current taxonomy and nomenclature of these groups. For birds, the current checklist of Australian birds maintained by Birdlife Australia (BirdLife Australia, 2020a) was used in conjunction with the WAM species list (WAM, 2020).

3.6.3 Motion-sensor Camera Deployments

Targeted sampling using motion cameras was conducted to verify the presence of conservation significant vertebrate species identified during the desktop assessment (i.e. chuditch *Dasyurus geoffroii*, quenda *Isoodon fusciventer*, and south-western brush-tailed phascogale *Phascogale tapoatafa wambenger*), as recommended for many medium-sized mammals such as these (DSEWPaC, 2011a; EPA, 2020). Camera traps were baited with a universal bait mix, a mixture of oats, sardines and peanut

butter. Five baited cameras were deployed opportunistically in suitable habitat throughout the Study Area over seven consecutive nights, from the 24th September to 1st October. This resulted in a total of 35 camera trap nights for the assessment. Each camera was set to record 5 continuous seconds of video footage when triggered during their deployment. An example of a motion camera deployment in shown below in Plate 3.1.

Plate 3.1: Motion-sensor camera deployment.

3.6.4 Taxonomy and Nomenclature

The latest checklist of mammal, reptile and amphibian names published by the WAM (WAM, 2020) was used as a guide to the current taxonomy and nomenclature of these groups, with the exception of taxonomic changes published subsequent to the checklist. For birds, the current checklist of Australian birds maintained by Birdlife Australia (based on Christidis & Boles, 2008) was used in conjunction with the WAM (2020b) species list. While compiling a list of fauna potentially occurring in the Study Area, all records were checked to ensure the latest taxonomy using recent publications and authorities.

3.7 Black Cockatoo Habitat Assessment

A black cockatoo habitat assessment was conducted via foot-traversed transects across the entire Study Area in line with the DSEWPaC (2012) *EPBC Act Referral Guidelines for Three Threatened Black Cockatoo Species* and DoEE (2017) *Revised draft referral guideline for three threatened black cockatoo species* for potential breeding, roosting and foraging habitat within the Study Area.

3.7.1 Potential Foraging Habitat

Foraging habitat quality was assessed throughout the Study Area using the habitat scoring tool provided by DoEE (2017) (refer to Table 3.5, Figure 5.3). In determining the quality of foraging habitat for each of the black cockatoo species, the scoring tool considers key attributes of foraging habitat for each species. An assessment was made within each habitat type present, which categorised the foraging quality within the Study Area between “very high quality” (score of >10) and “low quality” (score of 1) for each of the black cockatoo species. Scores that are below “low quality” (score <1) will not be mapped. This includes connectivity and proximity of the foraging habitat to other foraging habitat in the area, as well as other threats that can reduce the functionality of that habitat for respective species. DoEE (2017) defines ‘high quality’ foraging habitat as habitat scoring of 7 or above, which, particularly in proximity to roosting and/or breeding sites, is considered important for the long-term survival and recovery of black cockatoos.

Any tree and shrub species known to be staple food resources for black cockatoos (i.e. *Corymbia* and *Banksia* species) or any evidence of foraging (i.e. chewed nuts or *Banksia* cones and/or flowers) within the Study Area was also documented.

Table 3.4: Habitats used by black cockatoos for breeding, night roosting and foraging (DoEE, 2017)

	Baudin's cockatoo	Carnaby's cockatoo	Forest red-tailed black cockatoo
Description of foraging habitat	Primarily seeds of marri and jarrah in woodlands and forest, and seeds of native proteaceous plant species (for example, *Banksia* spp., *Hakea* spp. and *Dryandra* spp.). During the breeding season feed primarily on native vegetation, particularly marri (seeds, flowers, nectar and grubs). Also, insects and insect larvae; pith of kangaroo paw (*Anigozanthos flavidus*); juice of ripe persimmons; tips of *Pinus* spp.; and seeds of apples and pears.	Native shrubland, Kwongan heathland and woodland on seeds, flowers and nectar of native proteaceous plant species (*Banksia* spp., *Hakea* spp., *Dryandra* spp., and *Grevillea* spp.), as well as *Callistemon* spp. and marri. Also seeds of introduced species including *Pinus* spp., *Erodium* spp., wild radish, canola, almonds and pecan nuts; insects and insect larvae; occasionally flesh and juice of apples and persimmons.	Primarily seeds of jarrah and marri in woodlands and forest, and edges of karri forests, including wandoo and blackbutt. Forages on *Eucalyptus caesia, E. erythrocorys*, Allocasuarina cones, fruits of snotty gobble (*Persoonia longifolia*) and mountain marri (*Corymbia haematoxylon*). Also, some introduced eucalypts such as river red gum (*E. camaldulensis*) and flooded or rose gum (*E. grandis*). On the Swan Coastal Plain, often feeds on introduced Cape lilac (*Melia azedarach*).
Base habitat score			
10 (Very high quality)	Foraging habitat that is being managed for black cockatoos such as habitat that is the focus of, successful rehabilitation, and/or has some level of protection from clearing, and/or is quality habitat described below with attributes contributing to meet a sore of ≥10.	Foraging habitat that is being managed for black cockatoos such as habitat that is the focus of successful rehabilitation, and/or has some level of protection from clearing, and/or is quality habitat described below with attributes contributing to meet a sore of ≥10.	Foraging habitat that is being managed for black cockatoos such as habitat that is the focus of successful rehabilitation, and/or has some level of protection from clearing, and/or is quality habitat described below with attributes contributing to meet a score of ≥10.
7 (High quality)	Native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly marri, including along roadsides. Does not include orchards or areas under an RFA.	Native shrubland, Kwongan heathland and woodland dominated by proteaceous plant species such as *Banksia* spp. (including *Dryandra* spp.), *Hakea* spp. and *Grevillea* spp., as well as native eucalypt woodland and forest that contains foraging species, including along roadsides. Does not include orchards, canola, or areas under an RFA.	Jarrah and marri woodlands and forest, and edges of karri forests, including wandoo and blackbutt, within the range of the subspecies, including along roadsides. Does not include areas under a RFA.
5 (Quality)	Pine plantation or introduced eucalypts.	Pine plantation or introduced eucalypts.	Introduced eucalypts as well as the introduced Cape lilac (*Melia azedarach*).
1 (Low quality)	Individual foraging plants or small stand of foraging plants.	Individual foraging plants or small stand of foraging plants	Individual foraging plants or small stand of foraging plants
Additions	**Context adjustor - attributes improving functionality of foraging habitat**	**Context adjustor - attributes improving functionality of foraging habitat**	**Context adjustor - attributes improving functionality of foraging habitat**
+3	Is within the known foraging area	Is within the Swan Coastal Plain (important foraging area).	Jarrah and/or marri show good recruitment (i.e. evidence of young trees).
+3	Contains trees with suitable nest hollows.	Contains trees with suitable nest hollows.	Contains trees with suitable nest hollows.
+2	Primarily contains marri.	Primarily comprises marri.	Primarily contains marri and/or jarrah.
+2	Contains trees with potential to be used for breeding (DBH ≥ 500 mm or ≥ 300 mm DBH for salmon gum and wandoo).	Contains trees with potential to be used for breeding (DBH ≥ 500 mm or ≥ 300 mm DBH for salmon gum and wandoo).	Contains trees with potential to be used for breeding (DBH ≥ 500 mm or ≥ 300 mm DBH for salmon gum and wandoo).
+1	Is known to be a roosting site.	Is known to be a roosting site.	Is known to be a roosting site.
Subtractions	**Context adjustor - attributes reducing functionality of foraging habitat**	**Context adjustor - attributes reducing functionality of foraging habitat**	**Context adjustor - attributes reducing functionality of foraging habitat**
-2	No clear evidence of feeding debris.	No clear evidence of feeding debris.	No clear evidence of feeding debris.
-2	No other foraging habitat within 6 km.	No other foraging habitat within 6 km.	No other foraging habitat within 6 km.
-1	Is > 12 km from a known breeding location.	Is > 12 km from a known breeding location.	Is > 12 km from a known breeding location.
-1	Is > 12 km from a known roosting site.	Is > 12 km from a known roosting site.	Is > 12 km from a known roosting site.
-1	Is > 2 km from a watering point.	Is > 2 km from a watering point.	Is > 2 km from a watering point.
-1	Disease present (e.g. *Phytophthora cinnamomi* or marri canker).	Disease present (e.g. *Phytophthora cinnamomi* or marri canker).	Disease present (e.g. *Phytophthora cinnamomi* or marri canker).

Table 3.5: Habitat quality scoring totals for black cockatoo foraging habitat

Final habitat quality score	8 - 10	6 - 8	3 - 5	1 - 3
Habitat Quality Category	Very High Quality	High Quality	Quality	Low Quality

3.7.2 Potential Night Roosting Habitat

The potential for night roosting to occur within the Study Area was interpreted and extrapolated from the identification of potential breeding trees, mapping of potential breeding habitat, proximity to suitable watering spots, and knowledge of any known roosting sites within the vicinity of the Study Area. Additionally, a Birdlife Australia black cockatoo search was conducted within the 12 km of the Study Area to identify the presence of any known roosting locations (refer to section 3.2).

Any evidence of possible roosting events (i.e. clipped leaves and branches or droppings under suitable trees) recorded during the field survey was documented

3.7.3 Potential Breeding Habitat

Breeding habitat for black cockatoos is defined as "trees of species known to support breeding within the range of the species which either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow" (DoEE, 2017) (Table 3.6). For most tree species, suitable DBH is 500 mm, while for salmon gum (*Eucalyptus salmonophloia*) and wandoo (*Eucalyptus wandoo*), suitable DBH is 300 mm (DoEE, 2017; DSEWPaC, 2012). Breeding habitat for all three black cockatoo species generally consists of woodland or forest; however, breeding is also known to occur in former woodland or forest now comprising of isolated or small patches of trees (DoEE, 2017; DSEWPaC, 2012).

Table 3.6: Known breeding trees for black cockatoo species.

Species	DBH (mm)
Corymbia calophylla (marri) *Eucalyptus marginata* (jarrah) *Eucalyptus rudis* (flooded gum) *Eucalyptus camaldulensis* (river gum) *Eucalyptus diversicolor* (karri) *Eucalyptus gomphocephala* (tuart) *Eucalyptus patens* (Swan River blackbutt) *Eucalyptus megacarpa* (bullich) *Eucalyptus accedens* (powderbark wandoo) Introduced *Eucalyptus* species	500
Eucalyptus salmonophloia (salmon gum) *Eucalyptus wandoo* (wandoo)	300

List excludes species for which Study Area occurs outside the known distribution of the species, as provided in Florabase (WAH, 1998-)

The location and attributes of all potential black cockatoo habitat trees (as defined by DAWE) were recorded within the Study Area during the field survey. Attributes recorded included tree species (where discernible), approximate height, DBH, condition (i.e. living or dead), presence of hollows, and dimensions of hollows (where discernible).

Where suitably sized hollows were recorded, further inspections were undertaken with a camera mounted on a telescopic pole to identify the presence/absence of any known breeding signs, i.e. hollows showing evidence of wear and chew marks around the hollow entrance that may be attributed to black cockatoos. Where possible, hollow usage by fauna was also recorded, including use by introduced honeybees *Apis mellifera* or rainbow lorikeets *Trichoglossus moluccanus*. Potentially suitable nest

hollows were considered to be hollows that appeared to be deep enough with an opening large enough to be used by black cockatoos, of both natural and artificial origin, as determined by the criteria shown below in Table 3.7.

Table 3.7: Hollow suitability criteria for potential use by black cockatoo species

Overall hollow suitability	**Active** (Currently in use)	**Suitable** (No evidence of use)	**Possible** (Potential to support cockatoo but cannot confirm)	**Not suitable**	**Other factors to alter suitability?**
Hollow present?	Yes	Yes	Yes	Yes	• Orientation (vertical is preferred) • Diameter at base (>30 cm) • Evidence of bees • Common breeding tree species • Height above ground (> 2m)
Suitable diameter? (> 100 mm and unobstructed)	Yes	Yes	Yes	No	
Suitable depth? (> 250 mm)	Yes	Yes	Potential	No	
Evidence of chewing around hollow rim?	Yes	No	No	No	

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Legend

- Study Area
- Development Envelope

Fauna Sample Site

- Black Cockatoo
- Habitat Assessment
- Motion Camera
- Traverse

0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 12/04/2022

N

biologic Environmental Survey

Scale: 1:2,500

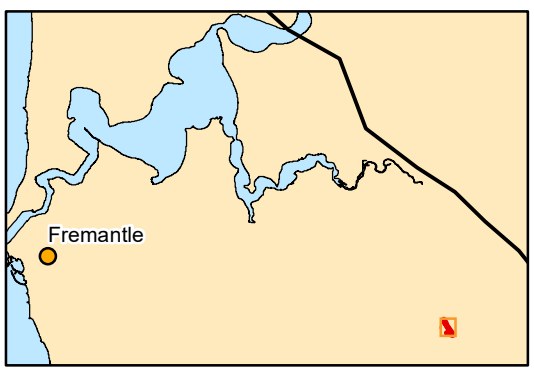

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Figure 3.3: Fauna sampling and traverses

3.8 Assessment of Occurrence

3.8.1 Flora

The conservation significant flora species identified from the database searches and literature review were assessed and ranked on their likelihood of occurring in the Study Area. The rankings were assigned using the following decision matrix (Table 3.8).

Table 3.8: Flora species likelihood of occurrence decision matrix

		Habitat categories (within the Study Area)			
		Core/ critical habitat present	**Suitable habitat present/ within known distribution**	**Marginal habitat present/ adjacent to known distribution**	**No suitable habitat present/ outside of known distribution**
Species Records / Occurrence Categories	**Recorded in the Study Area**	Confirmed	Confirmed	Confirmed	Confirmed
	Recorded within <2 km	Highly likely	Likely	Possible	Possible
	Recorded within 2-5 km	Likely	Possible	Possible	Unlikely
	Recorded within 5 -20 km	Possible	Possible	Unlikely	Unlikely
	Recorded >20 km	Possible	Unlikely	Unlikely	Highly unlikely
	Species considered locally/ regionally extinct	Unlikely	Unlikely	Highly unlikely	Highly unlikely

3.8.2 Fauna

The conservation significance fauna species identified by the desktop assessment were assessed for their likelihood of occurrence within the Study Area using a decision matrix which considers the suitability of habitat within the Study Area and the proximity of previous records (Table 3.9). Based on this decision matrix, each species was assigned to one of six categories of likelihood of occurrence: confirmed, highly, likely, possible, unlikely, or highly unlikely.

The decision matrix is intended to be an indicative guide only, and the way in which it is interpreted may vary between species, depending on a given species' habitat preferences and ability to disperse, as well as the reliability and availability of contextual information. For example, considering species which have been previously recorded close to the Study Area, a species with a limited dispersal capability will have a reduced likelihood of occurring in the Study Area compared with a species with greater dispersal capability. It is also recognised that a lack of records in the vicinity of the Study Area may indicate limited sampling effort rather than species' absence, and that previous records may include historic or presumed erroneous information which may misrepresent a species' current distribution. Where the determination of a species' likelihood of occurrence within the Study Area deviates from the decision matrix, detailed justification for any variation will be presented.

Table 3.9: Fauna species likelihood of occurrence decision matrix

		Habitat suitability of Study Area			
		Core habitat[2] present	**Foraging and dispersal habitat present**	**Marginally suitable habitat[3] present**	**No suitable habitat present**
Species Records[1]	**Recorded in Study Area**	Confirmed	Confirmed	Confirmed	Confirmed
	Recorded within 2 km of Study Area	Highly likely	Likely	Possible	Possible
	Recorded within 2-5 km of Study Area	Likely	Possible	Possible	Unlikely
	Recorded within 5-20 km of Study Area	Possible	Possible	Unlikely	Unlikely
	Recorded >20 km of Study Area	Possible	Unlikely	Unlikely	Highly unlikely
	Species considered locally/regionally extinct	Unlikely	Unlikely	Highly unlikely	Highly unlikely

[1]Only records within the previous 50 years are considered

[2]Marginally suitable habitat is habitat which is possibly used by a species for roosting or nesting, or during foraging and dispersal activities, but is unlikely to be depended upon; for example, it may be of low quality or only sporadically present.

3.9 Potential Limitations and Constraints

3.9.1 Flora

The EPA (2020) outlines several potential limitations and constraints which have the potential to affect results of flora and vegetation surveys. These aspects are assessed and discussed in Table 3.10. The sampling techniques used during the survey were not constrained by any significant limitations.

Table 3.10: Flora survey limitations and constraints

Potential limitation or constraint	Limitation	Applicability to this survey
Availability of data and information	No	A significant amount of flora and vegetation assessments have been undertaken in the local area and surrounding region.
Competency/experience of the survey team, including experience in the bioregion surveyed	No	The botanists who undertook the survey have extensive survey experience (>6 years) in the southwest of WA.

Potential limitation or constraint	Limitation	Applicability to this survey
Scope (floral groups sampled and whether any constraints affect this)	Yes (minor)	The survey was conducted over four days, two at the beginning of the spring season (September) and two at the end of the spring season (November). This enabled us to record (through detailed floristic sites and intensive targeted searching) both early and late flowering flora taxa, and in particular any annual, ephemeral and/or aquatic species which may only be present for a short period of time. The resulting flora species list was therefore as comprehensive and representative as possible given the timing of the survey. However, the months of winter received well below average rainfall collectively (149.5 mm less than the LTA of 451.7 mm for June to August). This may have affected the number of short-lived taxa present in the Study Area at the time of survey, and is therefore considered a minor limitation to the survey.
Timing, weather and season	Yes (Minor)	The field survey was conducted over two phases in Spring (early and late), which is the recommended optimal survey period for flora in south west Western Australia EPA (2016c). However, the months of winter (June to August) received well below average rainfall (149.5 mm less); 451.7 mm (LTA) compared to 303 mm (2020). Considering one of the conservation significant flora taxa previously confirmed from the Study Area is an ephemeral taxon, *Caladenia huegelii* (T), this is considered a minor limitation to the survey.
Disturbance that may have affected results, e.g. fire, flood	No	No on-ground disturbance affected the field survey in any way. Weeds, tracks/ firebreaks, fence lines, proximity to housing and development, rubbish and minor trampling were the main disturbances recorded within the Study Area. These disturbances are common in areas of bushland surrounded by urban development. Despite these disturbances, the majority of the vegetation was in very good or excellent condition and they are therefore not considered to be a constraint.
Proportion of flora recorded, or collected	No	There were three species identified to genus level and one species that was tentatively identified to species level. Overall, the majority of species were easily identifiable , and this is not considered to be a constraint on the proportion of flora recorded.
Adequacy of the survey intensity and proportion of survey achieved	No	A detailed flora and vegetation survey with targeted searching was undertaken across the Study Area with all vegetation types surveyed and all areas traversed extensively.
Access problems	No	The Study Area was easily accessible from adjoining roads and the entire area was traversed on foot.
Problems with data and analysis, including sampling biases	No	No issues with data or analysis were experienced.

3.9.2 Fauna

The EPA (2020) outlines several potential limitations to fauna surveys. These aspects are assessed and discussed in Table 3.11 below. The sampling techniques used during the survey was not constrained by any significant limitations.

Table 3.11: Fauna survey limitations and constraints

Potential limitation or constraint	Limitation	Applicability to this survey
Availability of data and information	No	Numerous fauna surveys have been completed within the City of Gosnells. These surveys were reviewed to assist in the development of the survey and the preparation of the report. A significant amount of black cockatoo survey work has been undertaken in the wider local area and the surrounding region, including annual black cockatoo monitoring for the past decade, and these survey results were available for review. The Birdlife, DBCA, and DAWE database searches provided additional sources of recent information.
Competency/experience of the survey team, including experience in the bioregion surveyed	No	The zoologists who undertook the survey have extensive survey experience within the region. DoEE (2017) advises that black cockatoo surveys should be done by a suitably qualified person with at least three years' experience in surveys of black cockatoo habitat. Andrew Hide has the required experience and has completed numerous black cockatoo habitat assessments on the SCP.
Scope (floral/ faunal groups sampled and whether any constraints affect this)	No	The survey was undertaken within one day reducing the ability to record a comprehensive list of species present. However the survey was completed in line with the scope of a basic terrestrial vertebrate fauna survey (EPA, 2020), and thus it was not necessary to record all species present. The assemblages present could be interpreted based on the habitats mapped. Targeted searching was undertaken by the field personnel for conservation significant fauna species, including the deployment of motion cameras (for a total of 35 camera nights). This survey technique is a preferred method for sampling medium sized mammals (chuditch, quenda, and south-western brush-tailed phascogale), and increase the likelihood of identifying such species if present.
Timing, weather and season	No	The field survey was conducted in early Spring which is the recommended optimal survey period for the main faunal groups sampled (birds, mammals, reptiles) (EPA, 2020). The survey timing fell within the recommended timing for forest red-tailed black cockatoo(year-round) (DoEE, 2017). Although the timing was outside of that recommended for Carnaby's cockatoo (January to July; DoEE, 2017); targeted searches were undertaken for secondary evidence of the species presence (i.e. foraging evidence) and to evaluate the potential suitability of the habitat. The temperatures and weather experienced were not considered a limitation to the survey and did not affect the ability to record fauna or habitats.

Potential limitation or constraint	Limitation	Applicability to this survey
Disturbance that may have affected results, e.g. fire, flood	No	No disturbances that may have affected the survey results were recorded. Weeds, clearing, and rubbish were the main disturbance recorded during the survey; however, as the Study Area occurs within a semi-urban environment, the disturbances were not considered to constrain the survey.
Proportion of fauna identified, recorded, or collected	No	All observed fauna was identified at the point of observation. All fauna captured on motion camera were identified post-survey with no limitations on identification to species level.
Adequacy of the survey intensity and proportion of survey achieved	No	A Basic vertebrate fauna survey and black cockatoo habitat assessment were undertaken across the Study Area. This level of survey is the required intensity given the size of the Study Area and the significance which a potential development may have. The entire Study Area was traversed on foot, with all tasks achieved within the allotted field time.
Access problems	No	The entire Study Area was traversed on foot; thus, remoteness or access was not considered a limitation.
Problems with data and analysis, including sampling biases	No	No issues with data or analysis were experienced.

4 FLORA AND VEGETATION RESULTS AND DISCUSSION

4.1 Desktop Assessment

4.1.1 Flora of Conservation Significance

The literature review identified four conservation significant flora taxa (those listed under the EPBC Act, BC Act, or DBCA's Priority List) (Appendix C), one of which was previously recorded from within the Study Area; *Jacksonia gracillima* (P3) (360 Environmental, 2014b; Natural Area, 2016b) (Table 4.1, Figure 4.1).

All conservation significant flora taxa identified in the literature review were also present in one or more of the databases searched.

A total of 50 conservation significant flora taxa were identified from the database searches (within 5 km of the Study Area) (Figure 4.1; Appendix D). Of the 50 taxa, 16 are Threatened (EPBC Act and BC Act), while the remaining 34 are Priority (three P1, five P2, 16 P3 and ten P4). Taxa were then assessed and ranked on the likelihood of occurring within the Study Area (Appendix E). Three taxa have been previously recorded in the Study Area, while four were considered likely and 14 were considered possible to occur within the Study Area pre-survey (Table 4.1). The remaining 29 taxa were considered unlikely to occur (Appendix E).

Table 4.1: Conservation significant flora desktop assessment results

Taxon	Description (WAH, 1998-)	Location[2]	Reference
Confirmed			
Caladenia huegelii (T)	Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green & cream & red, Sep to Oct. Grey or brown sand, clay loam.	Within (1 location (no frequency given))	(DBCA, 2020d)
Jacksonia gracillima (P3)	Prostrate, spreading or scrambling, spindly shrub, to 1.5 m high. Fl. pink/orange, Oct and Nov. Grey/brown sandy loam. Winter damp flats, gentle lower slopes of dunes.	Within (approximately 4 plants from 4 locations)	(360 Environmental, 2014b; Natural Area, 2016b)
Styphelia filifolia (P3)	Erect, well branched shrub, to 0.5 cm high. Fl. white. Brown/yellow sand. Midslopes, sandplains.	Within (1 location (no frequency given))	(DBCA, 2020d)
Likely			
Diuris purdiei (T)	Tuberous, perennial, herb, 0.15-0.35 m high. Fl. yellow, Sep to Oct. Grey-black sand, moist. Winter-wet swamps.	0.9 km WNW	(DBCA, 2020d)
Drakaea elastica (T)	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red & green & yellow, Oct to Nov. White or grey sand. Low-lying situations adjoining winter-wet swamps.	0.7 km WNW	
Stenanthemum sublineare (P2)	Erect shrub, to 0.1 m high. Fl. green, Oct to Dec. Littered white sand. Coastal plain.	0.2 km NNE	
Verticordia lindleyi subsp. *lindleyi* (P4)	Erect shrub, 0.2-0.75 m high. Fl. pink, May or Nov to Dec or Jan. Sand, sandy clay. Winter-wet depressions.	1.7 km SE	

[2] Distance from the Study Area boundary

Taxon	Description (WAH, 1998-)	Location[2]	Reference
Possible			
Austrostipa jacobsiana (T)	Clumping, perennial grass, to 0.6(flower spike to 1.1) m high. Fl. green. Grey sandy clay. Plains, damplands, winter wet flats.	2.9 km SSE	(DBCA, 2020d)
Drakaea micrantha (T)	Tuberous, perennial, herb, 0.15-0.3 m high. Fl. red & yellow, Sep to Oct. White-grey sand.	3.8 km WNW	
Eremophila glabra subsp. *chlorella* (T)	Prostrate & spreading or sprawling shrub, 0.2-1 m high. Fl. green-yellow, Jul to Nov. Sandy clay. Winter-wet depressions.	4.6 km WNW	
Acacia lasiocarpa var. bracteolata *long peduncle variant (G.J.* Keighery 5026) (P1)	Shrub, 0.4-1.5 m high. Fl. yellow, May or Aug. Grey or black sand over clay. Swampy areas, winter wet lowlands.	4.7 km ENE	
Thysanotus sp. Badgingarra (E.A. Griffin 2511) (P2)	Perennial, herb (with tuberous roots), ca 0.35 m high. Fl. blue, Dec. Grey sand with lateritic gravel.	4.9 km NNW	
Byblis gigantea (P3)	Small, branched perennial, herb (or sub-shrub), to 0.45 m high. Fl. pink-purple/white, Sep to Dec or Jan. Sandy-peat swamps. Seasonally wet areas.	3.4 km NW	
Schoenus benthamii (P3)	Tufted perennial, grass-like or herb (sedge), 0.15-0.45 m high. Fl. brown, Oct to Nov. White, grey sand, sandy clay. Winter-wet flats, swamps.	1.2 km WNW	
Schoenus capillifolius (P3)	Semi-aquatic tufted annual, grass-like or herb (sedge), 0.05 m high. Fl. green, Oct to Nov. Brown mud. Claypans.	2.1 km WSW	
Schoenus pennisetis (P3)	Tufted annual, grass-like or herb (sedge), 0.05-0.15 m high. Fl. purple-black, Aug to Sep. Grey or peaty sand, sandy clay. Swamps, winter-wet depressions.	5.3 km SSW	
Stylidium aceratum (P3)	Fibrous rooted annual, herb, 0.05-0.09 m high, leaves spathulate. Fl. pink/white, Oct to Nov. Sandy soils. Swamp heathland.	5.3 km SSW	
Stylidium paludicola (P3)	Reed-like perennial, herb, 0.35-1 m high, Leaves tufted, linear or subulate or narrowly oblanceolate, 0.5-4 cm long, 0.5-1.5 mm wide, apex acute, margin entire, glabrous. Scape mostly glabrous, inflorescence axis glandular. Inflorescence racemose. Fl. pink, Oct to Dec. Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.	2.8 km WSW	
Aponogeton hexatepalus (P4)	Rhizomatous or cormous, aquatic perennial, herb, leaves floating. Fl. green-white, Jul to Oct. Mud. Freshwater: ponds, rivers, claypans.	1.8 km SSE	
Thysanotus glaucus (P4)	Erect, tuberous, perennial herb, to 0.3 m high. Fl. purple. Grey sand. Plains, flats.	4.9 km SSE	
Tripterococcus sp. Brachylobus (A.S. George 14234) (43)	Erect, perennial, herb, to 0.8 m high. Fl. green. Grey sand or clay. Plains, winter damp flats.	2.3 km WNW	

Legend

T - CR

- *Austrostipa jacobsiana*
- *Caladenia huegelii*
- *Calytrix breviseta* subsp. *breviseta*
- *Drakaea elastica*
- *Grevillea thelemanniana*
- *Ptilotus pyramidatus*
- *Synaphea* sp. Fairbridge Farm (D. Papenfus 696)

T - EN

- *Austrostipa bronwenae*
- *Darwinia apiculata*
- *Diuris purdiei*
- *Drakaea micrantha*
- *Eremophila glabra* subsp. *chlorella*
- *Goodenia arthrotricha*
- *Lepidosperma rostratum*
- *Macarthuria keigheryi*
- *Thelymitra stellata*

T - VU

- *Andersonia gracilis*
- *Banksia mimica*
- *Conospermum undulatum*
- *Eleocharis keigheryi*

T

- *Anthocercis gracilis*
- *Diuris drummondii*
- *Tetraria australiensis*

P1

- *Acacia lasiocarpa* var. *bracteolata* long peduncle variant (G.J. Keighery 5026)
- *Amanita quenda*
- *Bolboschoenus fluviatilis*
- *Calandrinia uncinella*
- *Calytrix simplex* subsp. *simplex*
- *Eriochilus* sp. Roleystone (G. Brockman 1140)
- *Haloragis scoparia*
- *Levenhookia preissii*
- *Ptilotus sericostachyus* subsp. *roseus*
- *Schoenus* sp. Beaufort (G.J. Keighery 6291)
- *Thelymitra magnifica*

P2

- *Acacia benthamii*
- *Andersonia* sp. Blepharifolia (F. and J. Hort 1919)
- *Calectasia grandiflora*
- *Comesperma griffinii*
- *Diuris brevis*
- *Johnsonia pubescens* subsp. *cygnorum*
- *Lepyrodia curvescens*
- *Schoenus loliaceus*
- *Stenanthemum sublineare*
- *Thysanotus* sp. Badgingarra (E.A. Griffin 2511)

P3

- *Acacia horridula*
- *Allocasuarina grevilleoides*
- *Amanita wadjukiorum*
- *Angianthus micropodioides*
- *Asteridea gracilis*
- *Babingtonia urbana*
- *Banksia kippistiana* var. *paenepeccata*
- *Beaufortia purpurea*
- *Byblis gigantea*
- *Carex tereticaulis*
- *Chamaescilla gibsonii*
- *Comesperma rhadinocarpum*
- *Cyathochaeta teretifolia*
- *Eryngium pinnatifidum* subsp. Palustre (G.J. Keighery 13459)
- *Eryngium* sp. Subdecumbens (G.J. Keighery 5390)
- *Halgania corymbosa*
- *Isopogon autumnalis*
- *Isotropis cuneifolia* subsp. *glabra*
- *Jacksonia gracillima*
- *Lasiopetalum glutinosum* subsp. *glutinosum*
- *Meionectes tenuifolia*
- *Myriophyllum echinatum*
- *Schoenus benthamii*
- *Schoenus capillifolius*
- *Schoenus pennisetis*
- *Schoenus* sp. Waroona (G.J. Keighery 12235)
- *Stackhousia* sp. Red-blotched corolla (A. Markey 911)
- *Stylidium aceratum*
- *Stylidium paludicola*
- *Styphelia filifolia*
- *Thysanotus anceps*

P4

- *Acacia oncinophylla* subsp. *patulifolia*
- *Aponogeton hexatepalus*
- *Boronia tenuis*
- *Calothamnus accedens*
- *Calothamnus graniticus* subsp. *leptophyllus*
- *Dodonaea hackettiana*
- *Drosera occidentalis*
- *Hydrocotyle lemnoides*
- *Jacksonia sericea*
- *Ornduffia submersa*
- *Pimelea rara*
- *Schoenus natans*
- *Stylidium longitubum*
- *Thysanotus glaucus*
- *Tripterococcus* sp. Brachylobus (A.S. George 14234)
- *Verticordia lindleyi* subsp. *lindleyi*

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Stenanthemum sublineare

Styphelia filifolia

Caladenia huegelii

Caladenia huegelii

Legend

Study Area

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 22/03/2022

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Scale: 1:73,000

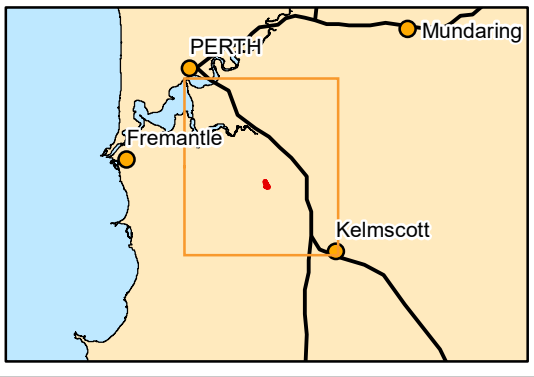

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Figure 4.1: Significant flora database search results

4.1.2 Vegetation of Conservation Significance

Searches of the DAWE database with regard to matters of national environmental significance as listed under the EPBC Act (DAWE, 2020) and the Threatened and Priority Ecological Communities database (DBCA, 2020a) revealed 12 ecological communities of conservation significance within the database search radius of 5 km (Figure 4.2; Table 4.2). Of these communities, two were determined as occurring within the Study Area (Banksia WL SCP and Claypans with shrubs over herbs), both of which are listed as Threatened under the EPBC act.

Woodman (2004) identified community "SCP21a Central *Banksia attenuata* – *Banksia menziesii* woodlands" as occurring within the Study Area. This community is not itself a conservation significant ecological community, but is encompassed within the (Banksia WL SCP (WA P3, EPBC T-EN) (TSSC, 2016).

The Study Area lies partially within Bush Forever site no. 125 and has been inferred to contain SCP23a 'Central *Banksia attenuata* – *Banksia menziesii* woodlands' (Government of Western Australia, 2000b), which is also encompassed within the Banksia WL SCP (WA P3, EPBC T-EN) (TSSC, 2016).

Table 4.2: Conservation significant ecological communities desktop assessment results

Ecological Community/Wetland	Status			Inferred nearest occurrence
	DBCA	BC Act	EPBC Act	
Banksia WL SCP Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	P3	-	EN	Within Study Area
Claypans with shrubs over herbs Claypans with mid dense shrublands of *Melaleuca lateritia* over herbs **(Component of Clay Pans SCP (EPBC T-CR)**	P1	-	CR	Within Study Area
SCP23b *Banksia attenuata* – *Banksia menziesii* woodlands of the Swan Coastal Plain (floristic community type 23b as originally described in in Gibson et al. (1994)) **(Component of Banksia WL SCP (WA P3, EPBC T-EN)**	P3	-	EN	Within Study Area
Muchea Limestone Shrublands and woodlands on Muchea Limestone of the Swan Coastal Plain	T	EN	EN	0.2 km S
SCP08 Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. (1994)) **(Component of Clay Pans SCP (EPBC T-CR)**	T	VU	CR	2.3 km SE
SCP21c Low lying *Banksia attenuata* woodlands or shrublands of the Swan Coastal Plain (floristic community type 21c as originally described in in Gibson et al. (1994)) **(Component of Banksia WL SCP (WA P3, EPBC T-EN)**	P3	-	EN	2.9 km E
SCP10a Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson et al. (1994)) **(Component of Clay Pans SCP (EPBC T-CR)**	T	EN	CR	4 km NNW

Ecological Community/Wetland	Status			Inferred nearest occurrence
	DBCA	BC Act	EPBC Act	
SCP3a *Corymbia calophylla - Kingia australis* woodlands on heavy soils of the Swan Coastal Plain (floristic community type 21c as originally described in in Gibson et al. (1994))	T	CR	EN	5.6 km NNE
SCP07 Herb rich saline shrublands in clay pans (floristic community type 7 as originally described in Gibson et al. (1994)) **(Component of Clay Pans SCP (EPBC T-CR)**	T	VU	CR	5.8 km NNE
SCP20b *Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson et al. (1994)) **(Component of Banksia WL SCP (WA P3, EPBC T-EN))**	T	EN	EN	6.1 km ENE
SCP3b *Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the Swan Coastal Plain (floristic community type 21c as originally described in in Gibson et al. (1994))	T	VU	-	6.4 km ENE
SCP20a *Banksia attenuata* woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994)) **(Component of Banksia WL SCP (WA P3, EPBC T-EN)**	T	EN	EN	7.3 km NE
SCP20c Shrublands and woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20c as originally described in in Gibson et al. (1994)) **(Component of Banksia WL SCP (WA P3, EPBC T-EN)**	T	CR	EN	7.3 km NE

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Legend

- Study Area

Community

- Banksia WL SCP
- Central Granite Shrublands (Com 5, Markey)
- Muchea Limestone
- SCP07
- SCP08
- SCP10a
- SCP20a
- SCP20b
- SCP20c
- SCP21c
- SCP3a
- SCP3b

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 22/03/2022

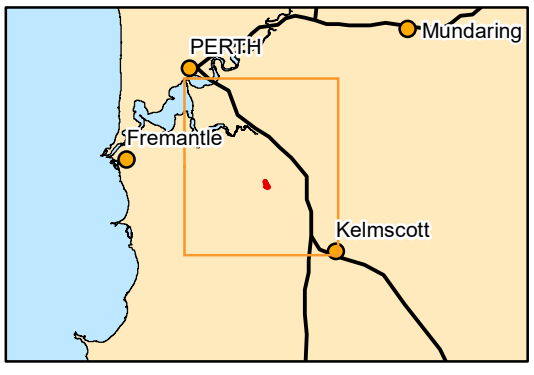

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Figure 4.2: Threatened and Priority Ecological Community database search results

4.1.3 Vegetation of Other Significance

The EPA (2016c) advises that vegetation may be of significance for reasons other than a listing as a TEC or a PEC. This may include, although is not limited to, scarcity, novel combination of species, role as a refuge, restricted distribution and vegetation extent being below a threshold level.

The Study Area partially overlaps a Sumpland (Unique Feature Identifier 15423; basin, seasonal inundation) (Figure 2.4), which is classified as a CCW (DBCA, 2019a; PGV, 2014), supporting high levels of attributes and functions. The Study Area also partially overlaps Bush Forever site 125 (Holmes Street Bushland) and Regional Ecological Linkage 48 (Figure 2.6).

4.1.4 Introduced Flora Taxa

The NatureMap (DBCA, 2020a), Protected Matters (DAWE, 2020), ALA (ALA, 2020) and The Western Australian Organism List (WAOL) (DPIRD, 2020) database searches identified a list of 188 introduced taxa that may potentially occur within the Study Area. The list of introduced taxa known to occur or potentially occur within the Study Area (Appendix F) was reviewed to identify Weeds of National Significance (WoNS) and Declared Plant Pests (DPP).

Weeds of National Significance and Declared Plant Pests

Of the list of introduced taxa identified during the desktop assessment as occurring in or near the Study Area, 33 are listed as WoNS (Appendix F). Twenty-one of the 33 WoNS were identified from the WAOL database search for the entire City of Gosnells and occur or may potentially occur within the City's boundaries. The remaining 12 WoNS were identified from the EPBC Protected Matters Search Tool and occur or may potentially occur within a 5 km buffer of the Study Area. The 33 taxa include numerous *Opuntia* and *Cylindropuntia* species that are grouped together in the WoNS listing. The desktop assessment identified 50 DPPs (including numerous cacti species that are all listed as DPPS), previously recorded or potentially located within the City of Gosnells.

4.2 Flora and Vegetation Field Survey Results

4.2.1 Flora Composition

A total of 186 vascular flora taxa from 48 families and 130 genera were recorded from the Study Area during the field survey (Appendix H). The total number of vascular flora taxa recorded comprised 153 native taxa and 33 introduced taxa.

The dominant families equate to 29.6 % of the total taxa recorded and comprised Myrtaceae (21) Fabaceae (19) and Orchidaceae (15). Of the 48 families recorded, 23 were represented by one taxon, which equates to 12.4 % of the total taxa recorded. The dominant genera make up 9.7 % of the total taxa recorded and comprised *Melaleuca* (seven), *Acacia* (six) and *Caladenia* (five), Of the 130 genera recorded, 101 were represented by only one taxon, which equates to 54.3 % of the total taxa recorded.

A small number of taxa (2.1 % or 4 taxa) observed and collected from the field were difficult to confidently identify to species or infraspecies level. This was mainly due to the specimens lacking suitable flowering and fruiting material for confident taxonomic identification. Of these taxa, one was tentatively identified to species level (*Lepidosperma ?squamatum*), while three have only been identified to genus level (*Caladenia* sp., *Conostylis* sp. and *Thysanotus* sp.). *Conostylis* sp. and *Thysanotus* sp.

are not considered to be analogous with conservation significant taxa. The individuals of *Caladenia* sp. (individuals with either leaves, old fruits or old flowers present) may potentially be analogous with the threatened taxon *Caladenia huegelii*. This is discussed further in Sections 4.2.3 and 4.2.4.

4.2.2 Survey Adequacy

During phase one, a total of 10 quadrats and one relevé were established during the current survey. The reconciled list of confirmed flora taxa comprised 186 different species (Appendix H), which includes opportunistic records. Using the observed taxa value (186), richness estimators indicated that the survey was approximately 71 % (Michaelis-Menten) to 86 % (Bootstrap) adequate (Table 4.3).

Table 4.3: Expected native species richness for the Study Area

Treatment	Results	Richness Estimates (based on Sobs)	Richness Estimates (based on 186)
Chao 1	162	75 %	87 %
Jacknife 1	162	75 %	87 %
Bootstrap	140	86 %	75 %
Michaelis-Menten	170	71 %	92 %
Sobs	121	-	-

NB: percentage values have been rounded to the nearest whole number.

The species accumulation curve for the Study Area shows that few new species were recorded after the first couple of sites, with the curve plateauing (Figure 4.3). Greater survey effort could have resulted in more taxa being recorded but given the small size of the Study Area, the sampling intensity is considered to be adequate.

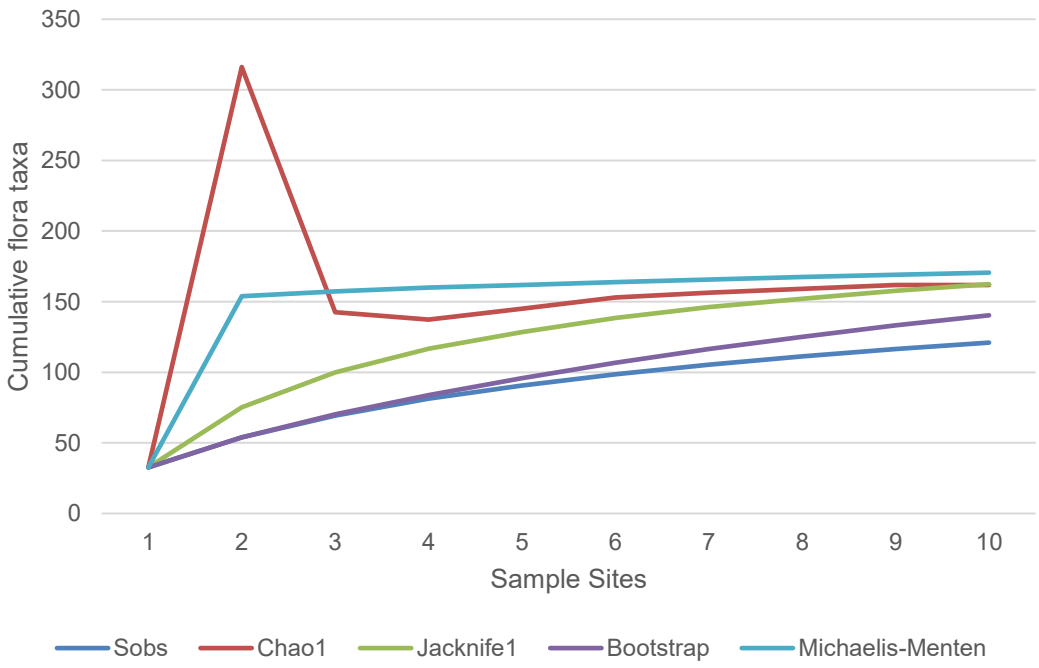

Figure 4.3: Species accumulation curve for the Study Area

4.2.3 Flora of Conservation Significance

Two conservation significant flora taxa were recorded in the Study Area by this survey (Figure 4.4; Appendix I):

- *Jacksonia gracillima* (P3) – 18 individuals from 16 point locations, with seven individuals from seven point locations of these occurring within the Development Envelope. Two additional individuals from two point locations were recorded outside of the Study Area by this survey
- *Styphelia filifolia* (P3) – Three individuals from three point locations, all of which also occur within the Development Envelope.

Previous point locations of these two taxa were visited, however no plants were observed directly (<5 m) at these locations (plants were observed in the surrounding area). Therefore, it can be considered that point locations and individual counts of these conservation significant flora taxa recorded in the Study Area by this survey are the most accurate records to date.

The threatened taxon *Caladenia huegelii* (Grand Spider Orchid), listed as Endangered under the EPBC and Critically Endangered under the BC Act, was first confirmed within the Study Area in 2004. However, recent surveys of the site (360 Environmental, 2014b; Natural Area, 2016b; PGV, 2016) did not record any individuals of the taxon. To support the survey timing, PGV (2016) visited a known location of *Caladenia* huegelii, located to the south of the Study Area, to better understand the flowering period in consideration of the local conditions (i.e., winter rainfall, daytime temperatures) during spring 2016.

The previous record, located at the southern end of the Study Area, was visited during both phases of this survey, however no individuals of this taxon were confirmed at this location. *Caladenia* leaves, stems and old flowers/fruit were observed (Plate 4.1) at this location during phase one, none of which were able to be identified during phase one of the survey. Its optimal flowering time is considered to occur between September and October (WAH, 1998-), although low winter rainfall has the potential for this tuberous perennial taxon to senesce more rapidly in response to dryer than normal conditions (DoE, 2014). Anecdotal evidence suggests that the flowering period for *Caladenia huegelii* was early for spring 2020, although this was not confirmed by Biologic. The *Caladenia* individuals observed in the Study Area that could not be confidently identified to species level could be a number of species recorded from the Study Area and from historical surveys (i.e., *Caladenia arenicola, C. flava* subsp. *flava, C. latifolia, C. longicauda*).

Furthermore, aerial imagery suggests that this point occurs on the edge of a cleared firebreak adjacent to parkland cleared vegetation to the south of the Study Area. Due to the age of this record, numerous prior surveys in the area and the location of this point in regards to nearby clearing, it is likely this location represents an locally extinct record for this taxon (see section 4.2.4 below for more information).

Plate 4.1: *Caladenia* leaves, stems and old flowers observed at the previous known location of *C. huegelii* (T) in the Study Area (Biologic photos)

Jacksonia gracillima (P3)

Jacksonia gracillima is a mostly prostrate, spreading or scrambling shrub (to 1 m) (Plate 4.2) restricted to coastal, sandy low-lying habitats of the Perth subregion within the South-west Botanical Province from Mindarie to Busselton (approximately 225 km) (WAH, 1998-). It has terete, spiny stems with reduced or absent leaves/phylloclades and stipules (Keybase, 2020). It flowers in October and November, producing typical glabrous yellow-red/pink *Jacksonia* flowers with mostly appressed straight calyx hairs. It closely resembles that of the unlisted taxon *Jacksonia furcellata*, differing only in lamina length and width and plant growth form (*J. furcellata* is a tall (to 6 m) erect or weeping shrub). There are currently 29 FloraBase and 38 NatureMap records for this taxon (DPaW, 2018; WAH, 1998-). Previous surveys have revealed additional individuals (approximately five point locations) occur outside of the Study Area in the surrounding bush (360 Environmental, 2014b; Natural Area, 2016b; PGV, 2016), while 20 individuals from 18 point locations were recorded by this survey. However, it is likely that additional individuals occur in this population surrounding the areas covered in this survey.

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6449426 6449176 6448926 6448676

Legend

Study Area

Development Envelope

Taxon - Status

Jacksonia gracillima - P3

Styphelia filifolia - P3

0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 12/04/2022

N

biologic Environmental Survey

Scale: 1:2,500

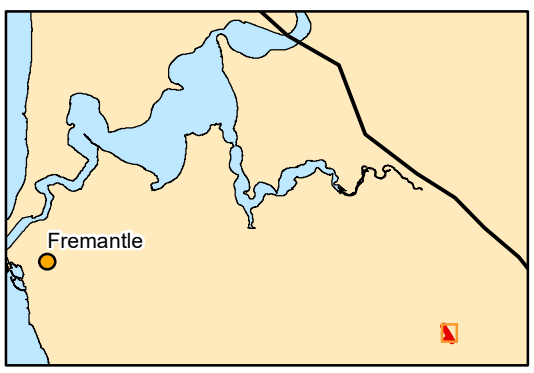

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Figure 4.4: Significant flora recorded in the Study Area

Plate 4.2 *Jacksonia gracillima* (P3) observed in the field (Biologic photos)

Styphelia filifolia (P3)

Styphelia filifolia is an erect Epacrid shrub (to 1 m) (Plate 4.3) occurring sporadically from north of Eneabba to Harvey (approximately 390 km) in the Geraldton Sandplains and SCP bioregions (Hislop & Puente-Lelièvre, 2017; WAH, 1998-). It grows on sandy soils of the coastal plain, usually in Banksia or Jarrah woodland and in low-lying situations. It is readily distinguished from all other Styphelia and Leucopogon by the combination of pendulous inflorescences, mostly linear leaves with a mucronate apex, and strongly zygomorphic fruit. It produces small, white flowers from March to May October. There are currently 36 FloraBase and 36 NatureMap records for this taxon (DPaW, 2018; WAH, 1998-), one

of which is known from the Study Area, with a total of three individuals from one population were recorded by this survey. However, it is likely that additional individuals occur in this population surrounding the areas covered in this survey.

Plate 4.3: *Styphelia filifolia* (P3) observed in the field (Biologic photos)

4.2.4 Review of Conservation Significant Flora Likelihood of Occurrence

Two taxa confirmed pre-survey were confirmed to occur within the Study Area (see Section 4.2.3 above).

The remaining confirmed taxon, *Caladenia huegelii* (T), previously known from the Study Area could not be verified during this survey (see Section 4.2.3 above). Although *Caladenia* leaves, stems and old flowers/fruit were observed (Plate 4.1) at this location which may be the result of early senescence of this taxon, these plant remnants could be a number of *Caladenia* species recorded from the Study Area (i.e., *Caladenia arenicola, C. flava* subsp. *flava, C. latifolia, C. longicauda*).

Furthermore, recent surveys of the site (360 Environmental, 2014b; Natural Area, 2016b; PGV, 2016) did not record any individuals, while the review of aerial imagery places this known location on the edge of a cleared firebreak and could potentially be a locally extinct record of this taxon. It is therefore considered unlikely that *C. huegelii* occurs within the Study Area post-survey. However, this downgrade in the likelihood of occurrence should still take in consideration the possibility that this orchid taxon does occur in the Study Area due to their capacity to persist underground for one or more years as tubers without producing above-ground parts (DoE, 2014). Although this is considered unlikely as this survey or the previous surveys (360 Environmental, 2014b; Natural Area, 2016b; PGV, 2016) would have recorded individuals.

All taxa considered likely and possible to occur within the Study Area are now considered unlikely. This is due to the small size of the Study Area, which is not supportive of the habitat and landform requirements for these taxa. Furthermore, the Study Area was relatively intensively traversed suggesting that if individuals were present, they would have been identified.

All remaining taxa considered unlikely or highly unlikely pre-survey were either downgraded or remained so post-survey due to distances from the Study Area and marginal or unsuitable habitat observed.

Table 4.4: Post-survey likelihood of occurrence for conservation significant flora

Taxon	Post-survey likelihood	Reason for change in likelihood
Pre-survey likelihood – Confirmed		
Caladenia huegelii (T)	Unlikely	Previously confirmed location not verified by this survey and four other surveys completed in the area (360 Environmental, 2014b; Natural Area, 2016b; PGV, 2016)
Jacksonia gracillima (P3)	Confirmed	No change. Confirmed within the Study Area
Styphelia filifolia (P3)	Confirmed	
Pre-survey likelihood – Likely		
Diuris purdiei (T)	Unlikely	Limited suitable habitat observed within Study Area, intensive searching within the Study Area
Drakaea elastica (T)	Unlikely	
Stenanthemum sublineare (P2)	Unlikely	
Verticordia lindleyi subsp. *lindleyi* (P4)	Unlikely	

Taxon	Post-survey likelihood	Reason for change in likelihood
Pre-survey likelihood – Possible		
Austrostipa jacobsiana (T)	Unlikely	Limited suitable habitat observed within Study Area, intensive searching within the Study Area
Drakaea micrantha (T)	Unlikely	
Eremophila glabra subsp. *chlorella* (T)	Unlikely	Limited suitable habitat observed within Study Area, intensive searching within the Study Area
Acacia lasiocarpa var. bracteolata long peduncle variant (G.J. Keighery 5026) (P1)	Unlikely	
Thysanotus sp. Badgingarra (E.A. Griffin 2511) (P2)	Unlikely	
Byblis gigantea (P3)	Unlikely	
Schoenus benthamii (P3)	Unlikely	
Schoenus capillifolius (P3)	Unlikely	
Schoenus pennisetis (P3)	Unlikely	
Stylidium aceratum (P3)	Unlikely	
Stylidium paludicola (P3)	Unlikely	
Aponogeton hexatepalus (P4)	Unlikely	
Thysanotus glaucus (P4)	Unlikely	
Tripterococcus sp. Brachylobus (A.S. George 14234) (P4)	Unlikely	

4.2.5 Flora of Other Significance

The EPA (2016c) advises that flora species, subspecies, varieties, hybrids and ecotypes may be considered significant for reasons other than listing as a Threatened or Priority Flora taxa. This may include, but is not limited to, range extensions, keystone species, relic status, local endemism and anomalous features. Based on these features, three taxa recorded from the Study Area during the current assessment were considered to be flora of "other" significance:

- *Gastrolobium acutum* - represents a slight range extension of approximately 4 km west, with very few records on the SCP (generally recorded from rocky hills) (DPaW, 2018; WAH, 1998-). A few individuals plants were recorded as a supplementary taxon to quadrat GGS-06 in low-lying habitat;
- *Goodenia pulchella* subsp. Coastal Plain B (L.W. Sage 2336 – represents a new location for this taxon, filling a slight locality hole as there are few records in the Perth area (DPaW, 2018; WAH, 1998-). One plant was recorded opportunistically in close proximity to the water feature; and

- *Lepidosperma* sp. Margaret River (B.J. Lepschi 1841) - represents a new location for this taxon, filling a slight locality hole as there are few records in the Perth area (DPaW, 2018; WAH, 1998-). A few individuals plants were recorded in quadrat GGS-10 in Banksia woodland.

None of these taxa are considered to be conservation significant.

4.2.6 Introduced Flora

A total of 33 introduced flora taxa were recorded from the Study Area by this survey (Figure 4.5 and Appendix H). The most frequently encountered introduced taxon with regard to floristic sites was **Hypochaeris glabra* which was recorded from all but one site, however numbers and cover were considerably low (<10 plants and <0.1% cover). The most dominant introduced taxon with regard to cover was **Ehrharta calycina* which was recorded from 11 point locations (six floristic sites, five opportunistic) with counts of up to 200 plants at each location (Plate 4.4). This taxon, along with other commonly encountered introduced taxa including **Avena barbata, *Briza maxima, *Briza minor*, **Eragrostis curvula*, **Trifolium angustifolium* var. *angustifolium* and **Watsonia meriana*, dominated the disturbed portions of the Study Area (track edges, fencelines, partially cleared areas and areas adjacent to urban infrastructure). Although these introduced species are not listed a WoNS or declared pests, they still have the potential to have negative effects on ecological processes and dominate/ alter vegetation structure and composition (DBCA, 2013).

Plate 4.4: *Ehrharta calycina, along with other common introduced flora taxa, dominating disturbed areas of the Study Area (Biologic Photos)

Asparagus asparagoides

One taxon **Asparagus asparagoides* is listed as a DPP under Section 22 of the BAM Act, is a WoNS and is considered to be a serious environmental weed that is rhizomatous and tuberous with the ability to climb and smother native vegetation (Plate 4.5). **A. asparagoides* has been rated by DBCA as having a high ecological impact and rapid invasiveness (DBCA, 2013). This taxon has the potential to cause acute disruption to ecological processes, dominate and/or significantly alter vegetation structure, composition and function of ecosystems. Twelve individuals from six point locations of this taxon were recorded by this survey, all of which were small individuals located at the southern end of the Study Area.

Plate 4.5: ****Asparagus asparagoides*, **a WoNS and declared pest, individuals located within the Study Area (Biologic Photos)**

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Taxon

- **Acacia longifolia* subsp. *longifolia*
- **Arctotheca calendula*
- **Asparagus asparagoides*
- **Avena barbata*
- **Briza maxima*
- **Briza minor*
- **Bromus diandrus*
- **Carpobrotus edulis*
- **Cynodon dactylon*
- **Disa bracteata*
- **Ehrharta calycina*
- **Eragrostis curvula*
- **Erigeron bonariensis*
- **Euphorbia terracina*
- **Freesia alba × leichtlinii*
- **Fumaria capreolata*
- **Gladiolus caryophyllaceus*
- **Hypochaeris glabra*
- **Juncus bufonius*
- **Lactuca serriola*
- **Lupinus luteus*
- **Lysimachia arvensis*
- **Oenothera stricta*
- **Oxalis pes-caprae*
- **Pelargonium capitatum*
- **Pentameris airoides*
- **Raphanus raphanistrum*
- **Solanum nigrum*
- **Sonchus oleraceus*
- **Trifolium angustifolium*
- **Ursinia anthemoides*
- **Watsonia meriana*

Legend

- Study Area
- Development Envelope
- Significant Weed

0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 12/04/2022

N

biologic Environmental Survey

Scale: 1:2,500

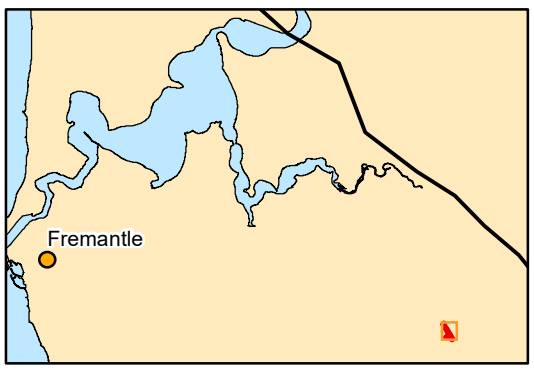

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Figure 4.5: Introduced flora in the Study Area

4.2.7 Vegetation Types

Five vegetation types, from three Broad Floristic Formations (BFFs), were recorded within the Study Area (Table 4.5; Figure 4.6).

The BFF covering the greatest proportion of the Study Area and the Development Envelope was *Banksia* low woodland (51% and 56% respectively). The dominant vegetation type in the Study Area was BaBmAlf Dea, covering 37% and 43% of the Study Area and Development Envelope, respectively.

Two mapping units, “Cleared” and “Parkland Cleared”, were mapped in addition to the five vegetation types (Table 4.5; Figure 4.6). These units were associated with cleared areas, fire breaks, tracks, track edges and along fence lines.

Vegetation type Adc Pc was noted as representing an ecotone between vegetation types BaBmAlf Dea and Mep Rc. The decision to sample the vegetation within Adc Pc (GGS-05) occurred with consideration to the large size of the ecotone (0.3 ha within the Study Area).

Table 4.5: Vegetation type descriptions

Code and Description	Broad Floristic Formation	Sample Sites	Study Area Extent (ha / %)	DE[3] Area Extent (ha / %)	Condition	Photo
BaBmAlf Dea (full code: BaBmAlf Adc HhStlAlh DeaBcDb) Low *Banksia attenuata*, *Banksia menziesii* and *Allocasuarina fraseriana* woodland over tall open *Adenanthos cygnorum* subsp. *cygnorum* shrubland over mid sparse *Stirlingia latifolia*, *Acacia pulchella* var. *pulchella* and *Melaleuca thymoides* shrubland over low *Desmocladus asper*, *Dasypogon bromeliifolius* and *Blancoa canescens* mixed rushland and shrubland on white/grey sand on a low sandy rise/sandplain	*Banksia* low woodland	GGS-01, GGS-02, GGS-13	1.76 / 36.76	1.14 / 43.16	Excellent (mostly), Very Good, Good, Degraded	
BaBmEt Pc (full code: BaBmEt Kg Xp PcDbDa) Low *Banksia attenuata, Banksia menziesii* and *Eucalyptus todtiana* woodland over tall sparse *Kunzea glabrescens* shrubland over mid scattered *Xanthorrhoea preissii* shrubs over low closed *Phlebocarya ciliata, Dasypogon bromeliifolius* and *Desmocladus asper* mixed sedgeland and shrubs on white/grey sand on sandplains		GGS-10, GGS-12	0.68 / 14.30	0.34 / 12.88	Excellent (mostly), Very Good, Good, Degraded	

[3] Development Envelope

Code and Description	Broad Floristic Formation	Sample Sites	Study Area Extent (ha / %)	DE[3] Area Extent (ha / %)	Condition	Photo
Mep Ls (full code: Mep MerHavPef LsLelLepg) Low sparse *Melaleuca preissiana* woodland over tall open *Melaleuca rhaphiophylla*, *Hakea varia* and *Pericalymma ellipticum* var. *floridum* shrubland over a tall closed *Leptocarpus scariosus, Lepidosperma longitudinal* and *Lepyrodia glauca* mixed rushland and sedgeland on black/grey sandy clay loam on a small wetland	*Melaleuca* low sparse woodland	GGS-07, GGS-08	0.35 / 7.20	0.17 / 6.56	Excellent (mostly), Very Good	
Mep Rc (full code: Mep AdcKgAdo RcAaPef Hya SceHye) Low sparse *Melaleuca preissiana* woodland over tall sparse *Adenanthos cygnorum* subsp. *cygnorum* and *Kunzea glabrescens* shrubland over mid closed *Regelia ciliata*, *Astartea affinis* and *Pericalymma ellipticum* var. *floridum* shrubland over low scattered *Hypocalymma angustifolium* shrubs over low open *Schoenus efoliatus* and *Hypolaena exsulca* sedgeland on grey loamy sand on wetlands and edges of wetland		GGS-06, GGS-11	0.63 / 13.25	0.28 / 10.59	Excellent, Very Good	

Code and Description	Broad Floristic Formation	Sample Sites	Study Area Extent (ha / %)	DE[3] Area Extent (ha / %)	Condition	Photo
Adc Pc (full code: Adc Epp PcDea) Tall scattered *Adenanthos cygnorum* subsp. *cygnorum* shrubs over mid open *Eremaea pauciflora* var. *pauciflora* over low closed *Phlebocarya ciliata* and *Desmocladus asper* mixed shrubland and sedgeland on grey sand on a lower slope of a low sandy rise/sandplain	*Phlebocarya* low closed shrubland	GGS-05	0.28 / 5.89	0.10 / 3.83	Excellent, Very Good, Good	
Parkland Cleared Cleared/disturbed areas with no intact native vegetation layers	-	-	0.35 / 7.27	0.28 / 10.59	Completely Degraded	

Code and Description	Broad Floristic Formation	Sample Sites	Study Area Extent (ha / %)	DE[3] Area Extent (ha / %)	Condition	Photo
Cleared Cleared areas with no vegetation (e.g., firebreaks)	-	-	0.73 / 15.33	0.34 / 12.39	Cleared	
TOTAL	-	-	**4.78 / 100**	**2.65 / 100**	-	-

401243 401493 401743

6449424 6449174 6448924 6448674

Legend

Study Area

Development Envelope

Vegetation Type

- Adc Epp PcDea
- BaBmAlf Adc HhStlAlh DeaBcDb
- BaBmEt Kg Xp PcDbDa
- Mep AdcKgAdo RcAaPef Hya SceHye
- Mep MerHavPef Hya LsLelLepg
- Parkland Cleared
- Cleared

0 50 100 Meters

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Projection: Transverse Mercator
Datum: GDA 1994 Created 23/03/2022

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biologic Environmental Survey

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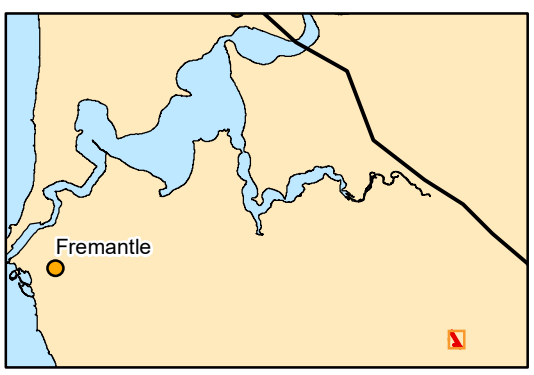

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Figure 4.6: Vegetation types in the Study Area

4.2.8 Floristic Community Type Analysis

The floristic data collected from the Study Area was statistically analysed against the regional floristic dataset for the SCP (Gibson *et al.*, 1994; Keighery *et al.*, 2012). The resultant hierarchical clustering output indicated that four vegetation types utilised in the analysis grouped with several different floristic community types (FCTs) as shown in Table 4.6. Vegetation type Adc Epp PcDea (GGS-05) represents that of an ecotone and was not considered in this determination.

Table 4.6: Determination of floristic community types

Veg Type	Quadrats	FCT	Super-group	Description	Regional sites	Significance (state)	Significance (EPBC)
BaBmAlf Dea	GGS-01, GGS-02, GGS-13	SCP21a or SCP23a	1	21a Central *Banksia attenuata - Eucalyptus marginata* woodlands of the Swan Coastal Plain Or 23a Central *Banksia attenuata - Banksia menziesii* woodlands of the Swan Coastal Plain	FL-4, gosn04, gosn13	Yes Encompassed within the Banksia WL SCP (P3)	Yes Encompassed within the Banksia WL SCP (T - EN)
BaBmEt Pc	GGS-10, GGS-12						
Mep Rc	GGS-06, GGS-11	SCP04 or SCP05	1	04 *Melaleuca preissiana* damplands of the Swan Coastal Plain Or 05 Mixed shrub damplands of the Swan Coastal Plain	Perth02, gosn01, gosn03, FL-1, FL-9	No	No
Mep Ls	GGS-07, GGS-08	SCP12	1	*Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands	FL-10	No	No
		S02 or S03	2	S02 Northern *Pericalymma ellipticum* dense low shrublands or S03 Wet sedgelands on sandy clays	hart02, hart03, gosn05	No	No

4.2.9 Vegetation of Conservation Significance

The desktop assessment (section 4.1.2) identified two conservation significant ecological communities occurring within the Study Area; Banksia woodlands of the Swan Coastal Plain (WA (P3), EPBC (T-EN)) and Claypans with shrubs over herbs (WA (P1, EPBC (T-CR)). Vegetation types mapped within the Study Area were assessed against criteria and thresholds in order to confirm the presence of these TECs/PECs.

Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region (WA (P3), EPBC (T-EN))

Floristic analysis determined that vegetation types BaBmAlf Dea and BaBmEt Pc mapped by this survey grouped closely with SCP21a and SCP23a, both of which are encompassed within Banksia WL SCP community (Table 4.6). Based on species composition and the absence of a co-dominant layer of *Eucalyptus marginata*, vegetation types BaBmAlf Dea and BaBmEt Pc more closely match that of SCP23a Central *Banksia attenuata - Banksia menziesii* woodlands of the Swan Coastal Plain (Gibson *et al.*, 1994).

Vegetation types BaBmAlf Dea and BaBmEt Pc were then assessed against criteria and thresholds under the relevant federal conservation advice (TSSC, 2016) in order to confirm presence or absence of this community within the Study Area. The results of this assessment are presented in Table 4.7.

Based on floristic analysis and diagnostic criteria assessments, vegetation types BaBmAlf Dea and BaBmEt Pc represent that of the Banksia WL SCP ecological community (WA (P3), EPBC (T-EN)). Typical vegetation representing this community is displayed in Plate 4.6.

Presence of the Banksia WL SCP are divided into three discrete patches in the Study Area; the northern patch (0.5 ha Study Area), the central patch (0.4 ha Study Area) and the southern patch (1.1 ha Study Area) (Figure 4.7). Patches consisted of vegetation in Good – Excellent condition, and covered a total area of 2.0 ha in the Study Area and 1.3 ha in the Development Envelope.

Although the central patch size doesn't strictly meet the minimum patch size requirements for vegetation of this community in Excellent condition (>0.5 ha) (Table 4.7), review of aerial imagery and on ground observations suggests that this vegetation forms a continuous patch extending outside of the Study Area boundary with the northern patch. Collectively this patch is well above the minimum patch requirement for this community.

Plate 4.6: Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region (WA (P3), EPBC (T-EN)) within the Study Area (Biologic Photos)

Table 4.7: Banksia woodland PEC/TEC assessment of vegetation types BaBmAlf Dea and BaBmEt Pc, adapted from (TSSC, 2016)

Key diagnostic characteristic/ threshold	Field results	Does it meet the criteria?
Location and physical environment	Study area is located in the Swan Coastal Plain IBRA bioregion	Yes
Soils and landform	Study area is located within the Bassendean sands. Vegetation types BaBmAlf Dea and BaBmEt Pc occurred on a well-drained sandplain/sandy low rise with white/grey coloured sand	Yes
Structure	Structure of vegetation types BaBmAlf Dea and BaBmEt Pc was a low open woodland with an upper sclerophyllous layer of low trees dominated by *Banksia attenuata* and *Banksia menziesii* with emergent *Allocasuarina fraseriana*. Occasional *Eucalyptus todtiana*, *Eucalyptus marginata, Nuytsia floribunda* and *Corymbia calophylla* were also noted in these vegetation types. Species rich understorey consisting of: - a layer of sclerophyllous shrubs of various heights - a herbaceous ground layer of rushes, sedges, and perennial and ephemeral herbs (including grasses)	Yes
Composition	The canopy of vegetation types BaBmAlf Dea and BaBmEt Pc was dominated by *Banksia attenuata* and *Banksia menziesii* with an emergent tree layer of *Allocasuarina fraseriana*. Occasional *Eucalyptus todtiana*, *Eucalyptus marginata, Nuytsia floribunda* and *Corymbia calophylla* were also noted in these vegetation types. The understorey had a high diversity of shrub and herb species - Total of 90 flora taxa, including 78 native and 12 introduced taxa from detailed floristic sites - Grouped with regional sites confirmed to be SCP23a Central *Banksia attenuata - Banksia menziesii* woodlands of the Swan Coastal Plain 26 species recorded are considered characteristic of the *Banksia* woodland TEC: - *Adenanthos cygnorum, Allocasuarina humilis, Bossiaea eriocarpa, Conostephium pendulum, Eremaea pauciflora, Gompholobium tomentosum, Hibbertia hypericoides, Jacksonia spp., Kunzea glabrescens, Petrophile linearis, Philotheca spicata, Stirlingia latifolia, Phlebocarya ciliata, Hypolaena exsulca, Xanthorrhoea preissii, Amphipogon turbinatus, Burchardia congesta, Caladenia spp., Dasypogon bromeliifolius, Drosera erythorhiza, Lyginia imberbis, Patersonia occidentalis, Podolepis spp., Stylidium brunonianum, Stylidium piliferum, Trachymene pilosa*	Yes
Contra-indicators	No contra-indicators found within vegetation types	Yes
Condition/ Patch size thresholds		
Indicative condition measures/thresholds	Vegetation types BaBmAlf Dea and BaBmEt Pc were mostly in excellent condition, except for a small areas on the edges considered very good, good and degraded due to presence of weeds and disturbances related to clearing o High native plant species diversity o All detailed floristic sites below 1% weed cover	Yes
Minimum patch size	Patch sizes are 0.56 ha (N), 0.40 ha (C) and 1.06 ha (S) within the Study Area, however the central and norther patches are part of a continuous patch which extends (>0.5 ha) outside of the Study Area. Patches inside the Study Area includes Excellent, Very Good and Good vegetation as the condition changes are part of a continuous patch	Yes

Key diagnostic characteristic/ threshold	Field results	Does it meet the criteria?
Further considerations		
Sampling protocols	All detailed floristic sites in the study area were 10 x 10 m (100 m^2), and were surveyed twice as part of a two-phase detailed survey (surveyed over two days in early Spring and two days in late Spring) Targeted searches for conservation significant taxa, as well as additional opportunistic taxa to the Study Area, were conducted in both phases of the survey; This resulted in thorough coverage of the *Banksia* woodland area. Landscape variables were recorded in phase 1 including: landform, aspect, slope, rock type, outcropping, soil type, soil colour, disturbances, and ground cover of rock, bare soil, leaf litter and perennial vegetation	Yes
Survey timing	Surveys were undertaken in spring with two sampling periods - Phase 1 – 18th and 21st September (early spring) - Phase 2 – 12th November (late spring) No recently disturbed areas e.g. fire	Yes
Patch definition	Due to the long linear shape of the Study Area, the *Banksia* woodland vegetation was broken up into three discrete patches. However, these patches form part of a large continuous patch occurring outside of the Study Area (Bush Forever site 151), particularly on the eastern side.	Yes
Buffer zone	The extension of this vegetation into areas outside of the Study Area (Bush Forever site 151) is providing a sufficient buffer zone to the vegetation within the Study Area	Yes
Floristic Community Types with relationships to the Banksia Woodlands ecological community	**Supergroup 3 – Uplands centred on Bassendean Dunes and Dandaragan Plateau** o 23a Central Banksia attenuata - Banksia menziesii woodlands	Yes

Claypans with Mid Dense Shrublands of Melaleuca lateritia over Herbs (WA (P1), EPBC (T-CR))

Floristic analysis determined that the wetland associated vegetation types Mep Rc and Mep Ls mapped by this survey grouped closely with SCP04 / SCP05 and SCP12 / S02 / S03 respectively, none of which are conservation significant ecological communities within the regional floristic dataset (Table 4.6). However, the desktop assessment identified the potential occurrence of Claypans with shrubs over herbs (WA (P1, EPBC (T-CR)) ecological community as occurring within the Study Area which is separate from the regional dataset.

Vegetation types Mep Rc and Mep Ls were then assessed against criteria and thresholds under the relevant federal conservation advice (TSSC, 2012a, 2012b) in order to confirm presence or absence of this community within the Study Area (Appendix J). The results of this assessment are presented in Table 4.8.

Based on floristic analysis and diagnostic criteria assessments (structure and composition), vegetation types Mep Rc and Mep Ls do not represent any vegetation of conservation significance, particularly that of Claypans with mid dense shrublands of *Melaleuca lateritia* over herbs.

Table 4.8: Claypans with mid dense shrublands of *Melaleuca lateritia* over herbs PEC/TEC assessment of vegetation types Mep Rc and Mep Ls, adapted from (TSSC, 2012a, 2012b)

Key diagnostic characteristic/ threshold	Field results	Does it meet the criteria?
Location and physical environment	Study Area is located in the Swan Coastal Plain IBRA bioregion	Yes
Soils and landform	Occurs low in the landscape with a sandy-clay base which becomes seasonally inundated within the Bassendean sands Vegetation types Mep Rc and Mep Ls occurred on a low-lying wetland with a white-grey sand clay base within the Bassendean sands	Yes
Structure	**Mep Ls** Mid sparse *Melelaeuca preissiana* woodland over tall open *Melaleuca rhaphiophylla*, *Hakea varia* and *Pericalymma ellipticum* var. *floridum* shrubland over a tall closed *Leptocarpus scariosus*, *Lepidosperma longitudinal* and *Lepyrodia glauca* mixed rushland. The Broad floristic formation was a *Leptocarpus* tall closed rushland. **Mep Rc** Low sparse *Melaleuca pressiana* woodland over tall sparse *Adenanthos cygnorum* subsp. *cygnorum* and *Kunzea glabrescens* shrubland over mid closed *Regelia ciliata*, *Astartea affinis* and *Pericalymma ellipticum* var. *floridum* shrubland over low scattered *Hypocalymma angustifolium* shrubs over low open *Schoenus efoliatus* and *Hypolaena exsulca* sedgeland o No shrubland layer consisting of *Melaleuca lateritia* o No species rich aquatic and amphibious layer	**No**
Composition	o No occurrences of *Melaleuca lateritia* in these vegetation types, or in the Study Area o Nine native aquatic and/or amphibious taxa of 89 taxa were recorded from both vegetation combined (low species richness): • *Centella asiatica* • *Chamaescilla corymbosa* var. *corymbose* • *Drosera stolonifera* • *Drosera menziesii* • *Goodenia pulchella* subsp. Coastal Plain B (L.W. Sage 2336) • *Hyalosperma cotula* • *Lachnagrostis filiformis* • *Microtis media* subsp. *media* • *Siloxerus humifusus*	**No**
Condition/ Patch size thresholds		
Indicative condition measures/thresholds	Vegetation types Mep Rc and Mep Ls were mostly in excellent condition, except for a small areas on the edges considered very good due to minor presence of weeds and disturbances related to clearing o Moderate native plant species diversity o All detailed floristic sites below 1% weed cover	Yes

Key diagnostic characteristic/ threshold	Field results	Does it meet the criteria?
Further considerations		
Sampling protocols	All detailed floristic sites in the Study Area were 10 x 10 m (100 m^2), and were surveyed twice as part of a two-phase detailed survey (surveyed over two days in early Spring and two days in late Spring) Targeted searches for conservation significant taxa, as well as additional opportunistic taxa to the Study Area, were conducted in both phases of the survey; This resulted in thorough coverage of the wetland area. Landscape variables were recorded in phase 1 including: landform, aspect, slope, rock type, outcropping, soil type, soil colour, disturbances, and ground cover of rock, bare soil, leaf litter and perennial vegetation	Yes
Survey timing	Surveys were undertaken in spring with two sampling periods - Phase 1 – 18th and 21st September (early spring) - Phase 2 – 12th November (late spring) No recently disturbed areas e.g. fire	Yes

401243 401493 401743

6449424 6449174 6448924 6448674

Legend

- Study Area
- Development Envelope
- Banksia Woodlands of the Swan Coastal Plain ecological community (P3 (WA); T- EN (EPBC))

0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 23/03/2022

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biologic Environmental Survey

Scale: 1:2,500

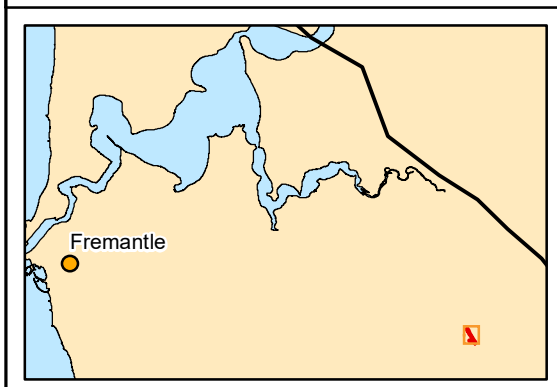

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Figure 4.7: Significant vegetation in the Study Area

4.2.10 Vegetation of Other Significance

Local and Regional Significance

Two vegetation types, BaBmAlf Dea and BaBmEt Pc, match and represent that of a state listed PEC and a federally listed TEC (Banksia WL SCP) of which is considered to be regionally significant.

Historically, the SCP bioregion has been heavily cleared (approximately 60%). Small remnant patch sizes make communities more vulnerable to disturbances such as invasion by weeds or feral animals, while separation between patches disrupt ecological processes that support the health of the community (DoEE, 2016). As the majority of the remnant vegetation within the Study Area and Development Envelope is intact native vegetation in excellent condition, this itself has the potential to be considered locally significant vegetation.

Wetlands

Floristic analysis determined that the vegetation types Mep Rc and Mep Ls mapped by this survey grouped closely with SCP04 / SCP05 and SCP12 / S02 / S03 respectively (Table 4.6), all of which were associated with, and represent vegetation associated with, wetland landforms. Vegetation mapped as "Wetlands" during this survey (Figure 4.8) closely matches that of the mapped Sumpland (Unique Feature Identifier 15423; basin, seasonal inundation) (Figure 2.4), which is classified as a 'Conservation Category Wetland' (CCW) (DBCA, 2019a; PGV, 2014). Vegetation type Mep Ls also supported a water feature (seasonal indundation present above the soil surface) (Figure 4.8; Plate 4.7).

Plate 4.7: Water feature within the Study Area (Biologic Photos)

401243 401493 401743

6449424 6449174 6448924 6448674

Legend

- Study Area
- Development Envelope
- Wetland
- Water Feature

0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 23/03/2022

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biologic Environmental Survey

Scale: 1:2,500

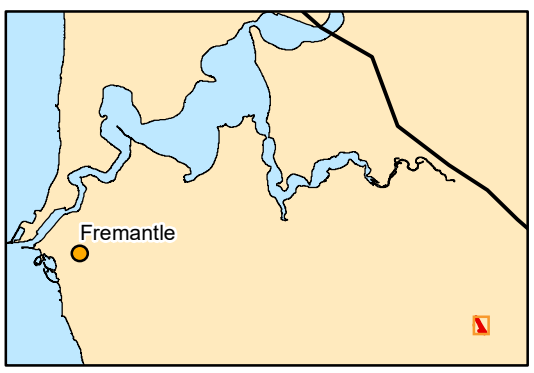

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Figure 4.8: Groundwater dependant vegetation in the Study Area

4.2.11 Vegetation Condition

The condition of the vegetation within the Study Area ranged from completely degraded to excellent (Table 4.9), with cleared areas with no vegetation (eg. tracks) mapped as “cleared”. The main disturbances observed in the Study Area were associated with surrounding urban development and included weeds, roads, tracks/ firebreaks, rubbish and minor trampling. These disturbances were mainly restricted to the northern and southern ends of the Study Area where edge effects from roads and housing were more evident. A small area within vegetation type Mep Ls (*Melaleuca preissiana* woodland) had some scattered chairs and debris; however, the understorey in this area was already sparse and not adversely affected by the debris. The majority (64%) of the vegetation was in very good or excellent condition.

Table 4.9: Vegetation condition extent in the Study Area

Condition	Study Area extent (ha / %)	Development Envelope extent (ha / %)	Comment
Excellent	2.07 / 43.39	1.13 / 42.77	Located within the larger areas of remnant bushland where vegetation has remained more or less intact. Low weed cover (<1%).
Very Good	10.93 / 19.45	0.57 / 21.40	Located closer to areas affected by urban development (northern and southern portions). More noticeable weed presence (1-5%).
Good	0.28 / 5.86	0.17 / 6.60	Located along edges of vegetation where edge effects were more evident. High weed diversity and cover (5-10%) but vegetation structure still intact.
Degraded	0.42 / 8.70	0.17 / 6.25	Located in small sections of vegetation type BaBmAlf Dea. Significant weed cover (10-50%) and diversity which has displaced the lower vegetation stratum and significantly reduced native mid shrub layer cover.
Completely Degraded	0.35 / 7.27	0.28 / 10.59	No intact vegetation structure present. Mostly just introduced grass and herb cover. Consisted of mapping unit ‘Parkland cleared’.
Cleared	0.73 / 15.33	0.33 / 12.39	Tracks and roads.
TOTAL	4.78 / 100	2.65 / 100	-

401243 401493 401743

6449424 6449174 6448924 6448674

Legend

- Study Area
- Development Envelope

Vegetation Condition

- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded
- Cleared

0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 23/03/2022

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biologic Environmental Survey

Scale: 1:2,500

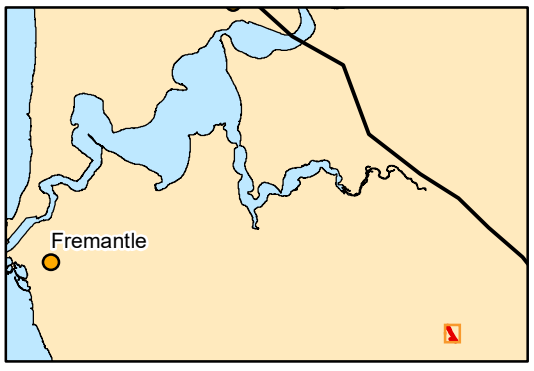

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Figure 4.9: Vegetation condition in the Study Area

5 VERTEBRATE FAUNA RESULTS AND DISCUSSION

5.1 Vertebrate Database Search Results

5.1.1 General Database Search Results

A total of 372 species of vertebrate fauna were identified from the database searches as having previously been recorded within the vicinity (10 km) of the Study Area and/or have a distribution that extends over the Study Area (Appendix M). This comprised of 35 mammals (11 introduced, 24 native), 249 birds (5 introduced, 244 native), 75 reptiles and thirteen amphibians.

5.1.2 Vertebrate Fauna of Conservation Significance Database Search Results

Based on the desktop assessment, a total of 49 vertebrate species of conservation significance have previously been recorded or have the potential to occur within 10 km of the Study Area, comprising seven mammals, 37 birds (including migratory species) and five reptiles (Table 5.1). Of these 49 species, ten are listed as Threatened, Conservation Dependent or Specially Protected under the EPBC Act and/or BC Act, 27 species are listed as Migratory under the EPBC Act and/or BC Act (and may also be classified under other categories under these acts), and 12 species are listed as Priority by the DBCA (Table 5.1). No records of such species were located within the Study Area.

Note, the database records included historic or presumed erroneous information which do not represent the species' current distribution e.g. numbat *Myrmecobius fasciatus* and western ringtail possum *Pseudocheirus occidentalis*. As such, these species have been removed from further consideration. Invertebrate fauna were not considered as part of this vertebrate fauna survey and were excluded from consideration.

Table 5.1: Fauna species of conservation significance potentially occurring within the vicinity of the Study Area

Scientific Name	Common Name	EPBC	BC	DBCA	IUCN	NatureMap (DBCA, 2020a)	Birdlife (BirdLife Australia, 2020b)	DBCA (DBCA, 2020a)	EPBC Protected Matters (DAWE, 2020)	ALA (ALA, 2020)	PGV (2016)	Natural Area (2016b)	Terrestrial Ecosystems (2014)	Terrestrial Ecosystems (2016)	ENV (2010)	CMPS&F (1993)	Golder Associates (2016)	Natural Area (2016a)	Current Survey
Mammals																			
Bettongia penicillata	Woylie	EN	CR						likely										
Dasyurus geoffroii	Chuditch	VU	VU			•			known	•									
Setonix brachyurus	Quokka	VU	VU						likely										
Phascogale tapoatafa wambenger	Wambenger brush-tailed phascogale		CD			•				•									
Notamacropus irma	Western brush wallaby			P4		•													
Hydromys chrysogaster	Water-rat			P4		•													
Isoodon fusciventer	Southern brown bandicoot			P4		•				•		•	•			•		•	•
Birds																			
Botaurus poiciloptilus	Australasian bittern	EN	EN			•			known	•									
Calyptorhynchus baudinii	Baudin's cockatoo	EN	EN			•	•		known	•							•		
Calyptorhynchus latirostris	Carnaby's cockatoo	EN	EN			•	•		known	•		•						•	•
Rostratula australis	Australian painted snipe	EN	EN		EN				likely										
Calidris canutus	Red knot	EN/MI	EN/MI		NT					•									
Charadrius leschenaultii	Greater sand plover	VU/MI	VU/MI			•				•									
Calyptorhynchus banksii naso	Forest red-tailed black cockatoo	VU	VU			•	•		known				•		•				•
Sterna nereis nereis	Fairy tern	VU	VU		VU				known	•									
Leipoa ocellata	Malleefowl	VU	VU						likely										
Calidris ferruginea	Curlew sandpiper	CR/MI	CR/MI		NT	•			known	•									
Calidris tenuirostris	Great knot	CR/MI	CR/MI		EN					•									
Pandion haliaetus	Osprey, eastern osprey	MI	MI			•			known	•									
Apus pacificus	Fork-tailed swift	MI	MI			•			likely	•									
Charadrius dubius	Little ringed plover	MI	MI						known	•									
Pluvialis fulva	Pacific golden plover	MI	MI			•				•									
Pluvialis squatarola	Grey plover	MI	MI			•				•									
Glareola maldivarum	Oriental pratincole	MI	MI							•									
Hydroprogne caspia	Caspian tern	MI	MI			•				•									
Sterna leucoptera	White-winged black tern	MI	MI							•									
Gelochelidon nilotica	Gull-billed tern	MI	MI			•				•									
Motacilla cinerea	Grey wagtail	MI	MI						may										
Calidris acuminata	Sharp-tailed sandpiper	MI	MI			•			known	•									
Calidris melanotos	Pectoral sandpiper	MI	MI			•			known	•									
Calidris ruficollis	Red-necked stint	MI	MI		NT	•			known	•									
Calidris subminuta	Long-toed stint	MI	MI			•			known	•									
Limosa lapponica	Bar-tailed godwit	MI	MI							•									
Limosa limosa	Black-tailed godwit	MI	MI		NT	•			known	•									
Philomachus pugnax	Ruff	MI	MI						known	•									
Tringa brevipes	Grey-tailed tattler	MI	MI	P4	NT					•									

Scientific Name	Common Name	EPBC	BC	DBCA	IUCN	NatureMap (DBCA, 2020a)	Birdlife (BirdLife Australia, 2020b)	DBCA (DBCA, 2020a)	EPBC Protected Matters (DAWE, 2020)	ALA (ALA, 2020)	PGV (2016)	Natural Area (2016b)	Terrestrial Ecosystems (2014)	Terrestrial Ecosystems (2016)	ENV (2010)	CMPS&F (1993)	Golder Associates (2016)	Natural Area (2016a)	Current Survey
Tringa glareola	Wood sandpiper	MI	MI			•			known	•									
Tringa hypoleucos	Common sandpiper	MI	MI			•			known	•									
Tringa nebularia	Common greenshank	MI	MI			•			known	•									
Tringa stagnatilis	Marsh sandpiper	MI	MI			•			known	•									
Plegadis falcinellus	Glossy ibis	MI	MI			•				•									
Elanus scriptus	Letter-winged kite			P4	NT					•									
Oxyura australis	Blue-billed duck			P4	NT	•				•									
Falco peregrinus	Peregrine falcon		OS			•				•									
REPTILES																			
Acanthophis antarcticus	Southern death adder			P3		•				•									
Neelaps calonotos	Black-striped snake			P3		•													
Ctenotus delli	Dell's skink			P4		•				•									
Ctenotus gemmula ssp. 'Swan Coastal Plain population'				P3		•				•									
Ctenotus ora	Coastal plains skink			P3	VU	•				•									
Lerista lineata	Lined skink			P3	EN	•				•									

396171 400171 404171

6450746 6450746

6446746 6446746

6442746 6442746

Legend

Study Area

Bird

- Australasian bittern
- Bar-tailed godwit
- Black-tailed godwit
- Blue-billed duck
- Crested tern
- Glossy ibis
- Great knot
- Grey plover
- Letter-winged kite
- Long-toed Stint
- Oriental pratincole
- Pacific golden plover
- Peregrine falcon
- Red knot
- Red-necked stint
- Ruff (reeve)
- Sharp-tailed sandpiper
- Wood sandpiper
- Curlew sandpiper
- Llittle ringed plover
- Pectoral sandpiper

Mammal

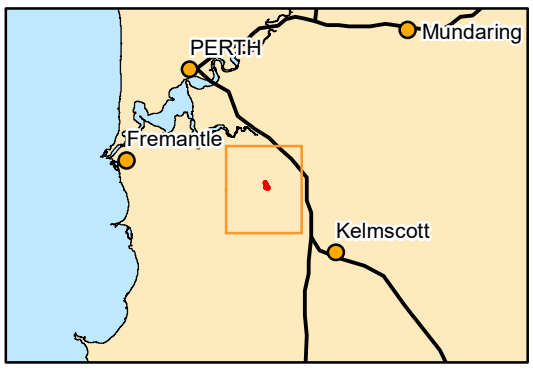
- Chuditch, western quoll
- Quenda (southwestern brown bandicoot)
- South-western brush-tailed phascogale
- Western brush wallaby

Reptile

- Coastal Plains skink
- Dell's skink
- Southern death adder

0 1 Km

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 22/03/2022



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Scale: 1:36,000

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Figure 5.1: Significant fauna database results (excluding black cockatoo)

5.1.3 Black Cockatoo Database Search Results

Black cockatoos rely upon the availability of foraging resources across their range, particularly to build condition in the post-breeding period (DoEE, 2017). Black cockatoos will forage up to 12 km from breeding hollows during the breeding season and rely on this proximity of foraging resources to breeding hollows to successfully raise chicks (DoEE, 2017). Previous survey reports that assessed for black cockatoos identified foraging habitat within their respective Study Area (occurs within current Study Area), with one recording foraging evidence of black cockatoos (Natural Area, 2016b).

Roosting habitat is defined as a suitable tree (generally the tallest) or group of tall trees, native or introduced, usually close to an important water source, and within an area of quality foraging habitat within the range of the black cockatoo species (DoEE, 2017). Significant roost sites exist for Carnaby's cockatoo in the Greater Perth-Peel region (Peck *et al.*, 2019), while forest red-tailed black cockatoos have been recorded breeding in the Perth region over recent years. Database searches did not record any roost sites within the Study Area boundary; however, there are seven confirmed white-tailed black cockatoo (Carnaby's and/ or Baudin's black cockatoo) roosts, 12 forest-red tailed black cockatoo roosts, and 17 joint roost sites within 12 km of the Study Area (total =36; BirdLife Australia, 2020b). The nearest roosts to the Study Area are forest red-tailed black cockatoo GOSGOSR004, located ~1.08 km (*n*=161, 2014-2019), joint roost GOSCNVR002 located 2 km west (white-tailed black cockatoo *n*=229, 2010-2019 and forest red-tailed black cockatoo *n*=4, 2014-2019), and GOSSOUR002 located 2.3 km south-east (white-tailed black cockatoo *n*=50, 2010-2019 and forest red-tailed black cockatoo *n*=259, 2014-2019).

Breeding habitat is defined in the referral guidelines as species of trees known to support breeding within the range of the species which either have a suitable nest hollow **or** are of a suitable diameter at breast height (DBH) to develop a nest hollow. For most species of trees, suitable DBH is 500 mm (DoEE, 2017; DSEWPaC, 2012). Modelled distributions show the Study Area lies within the breeding range for Carnaby's cockatoo and within forest red-tailed black cockatoo distribution (DoEE, 2017). The Study Area falls within a buffered (6 km) unconfirmed breeding area for Carnaby's cockatoo (DBCA, 2018a). There is anecdotal evidence of forest red-tailed black cockatoo breeding in Kenwick (*pers. comms.* Tony Kirkby via Birdlife), which is located less than 5 km from the Study Area. In addition, Bamford Consulting (2017) recorded two adult forest red-tailed black cockatoos with a dependent chick at the Gosnells Quarry, approximately 7 km north-east of the Study Area, which may have been bred within that local vicinity (Table 5.2).

Table 5.2: Summary of black cockatoo literature review from the surrounding area

Reference	Distance from Study Area (kms)	Foraging results	Night roosting results	Breeding results
PGV (2016)	Overlapping current Study Area	Not assessed.	Not assessed.	Not assessed.
Natural Area (2016b)	Overlapping current Study Area	Banksia Woodland, a preferred food source for Carnaby's cockatoos is present on site, occupying 1.5 ha. Signs of foraging of *Banksia* cones by Carnaby's cockatoos.	No roosting sites were recorded.	No breeding trees were recorded within the Study Area.
Terrestrial Ecosystems (2014)	Overlapping current Study Area	Banksia Woodland which provides potential foraging habitat was approximately 2.89 ha.	No roosting sites were recorded.	A single significant tree was recorded in the project area, however, this tree does not contain a hollow that would provide a suitable nesting site.
Terrestrial Ecosystems (2016)	Overlapping current Study Area	Not assessed.	Not assessed.	Not assessed.
ENV (2010)	Adjacent east	Not assessed.	Not assessed.	Not assessed.
CMPS&F (1993)	2.8 km SW	Not assessed.	Not assessed.	Not assessed.
Golder Associates (2016)	4.7 km SW	No foraging evidence observed in the Study Area. Limited number of foraging (*Marri*) trees identified with in the Study Area.	No roosting sites were recorded.	No known breeding trees were recorded in the Study Area. Minimal potential breeding trees were recorded.
Natural Area (2016a)	Overlapping current Study Area	Not assessed.	Not assessed.	Not assessed.
360 Environmental (2018b)	7.8 km AW	Banksia Woodland, a preferred food source for Carnaby's cockatoos is present on site, occupying 28.24 ha. Signs of foraging of *Banksia* cones.	No evidence of night roosting was recorded	Three potential breeding trees were recorded. Three hollows were recorded, however, they were either too small or were occupied by bees.

396616

402616

6448997

6442997

Legend

Study Area

Roost - Birdlife (2020)

Forest red-tailed black cockatoo

Joint (white-tailed black cockatoo and red-tailed black cockatoo)

Black Cockatoo Record (DBCA, 2020)

Carnaby's cockatoo

Forest red-tailed black cockatoo

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 23/03/2022

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biologic Environmental Survey

Scale: 1:36,500

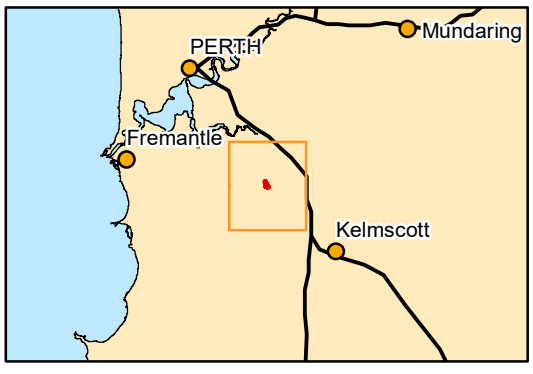

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Figure 5.2: Previous records of black cockatoos in the vicinity of the Study Area, including roost locations

5.2 Vertebrate Fauna Field Survey Results

5.2.1 Fauna Habitats

Following the current survey, fauna habitat mapping was completed across the Study Area from a combination of detailed fauna habitat assessments, the results of the concurrent flora and vegetation survey, and high-quality aerial imagery. Three broad fauna habitat types were identified, including areas considered 'Cleared' (Table 5.3,Figure 5.3), as follows:

- Banksia Woodland;
- Melaleuca thicket; and
- Cleared.

The habitat of greatest significance within the Study Area is the Banksia Woodland, occupying 2.72 ha (56.95 %) of the Study Area and within this, 1.59 ha (59.86 %) of the Development Envelope. However, the area contained evidence of disturbance such as rubbish, invasive weeds and areas of potential dieback. Banksia Woodlands are considered crucial for the ongoing viability of foraging resources for black cockatoo on the SCP, particularly Carnaby's cockatoo (DoEE, 2017), as supported by the observation of five foraging individuals during the survey. This habitat type also has the potential to support other conservation significant species such as quenda, likely as foraging or dispersal habitat, as well as reptile species such as *Lerista lineata*.

The *Melaleuca* thicket habitat within the Study Area occupies 0.98 ha (20.45 %) and within this 0.45 ha (17.15 %) of the Development Envelope. It is considered to be of value to vertebrate fauna, including the quenda, particularly following rainfall where the area would hold water. The quenda (southern brown bandicoot) prefers dense vegetation around wetland fringes and heathlands (Cooper, 1998; Woinarski *et al.*, 2014), similar to that located within the Study Area.

The remainder of the Study Area 1.08 ha (22.59 %) and within 0.61 ha (22.99 %) of the Development Envelope comprised of cleared and highly disturbed vegetation. Disturbance such as walk tracks, and areas of rubbish dumping has led to the introduction of invasive weeds. The vegetation present within these areas is unlikely to provide quality foraging potential for vertebrate fauna species of conservation significance and did not provide habitat to support black cockatoo foraging, night roosting, or breeding. Overall, these habitat types are in general considered having little to no value to the naturally occurring fauna present.

Table 5.3: Fauna habitat description

Fauna Habitat	Description	Area (ha); % of Study Area	Area (ha); % of Development Envelope	Value to Species of Conservation Significance	Representative photo
Banksia Woodland	Banksia Woodland (*B. menziesii* and *B. attenuata*), scattered *Eucalypt (Eucalyptus todtiana)* over *Casuarina* sp., *Xanthorrhoea preissii, Adenanthos sericeus* over sedges	2.72 ha 56.95 %	1.59 ha 59.86 %	This broad fauna habitat type has potential to support conservation significant species. • Carnaby's cockatoo are likely to utilise the habitat for foraging habitat due to the presence of Banksia species (*B. menziesii, B. attenuata, B. nivea*). • The habitat is described as core habitat for species such as quenda (due to a dense understorey including *Xanthorrhoea*). • May provide foraging habitat for small-medium sized mammals such as chuditch and phascogale if occurring.	

Fauna Habitat	Description	Area (ha); % of Study Area	Area (ha); % of Development Envelope	Value to Species of Conservation Significance	Representative photo
Melaleuca thicket	*Melaleuca* over sedge. Small wetland, non-permanent water feature.	0.98 ha 20.45 %	0.45 ha 17.15 %	This broad fauna habitat type has potential to support conservation significant species • The habitat is described as core habitat for species such as quenda (due to a dense understorey including *Xanthorrhoea*). • May provide foraging habitat for small-medium sized mammals such as chuditch and phascogale if occurring.	
Cleared	Areas cleared of vegetation or containing highly disturbed vegetation. Disturbances also include tracks and rubbish/litter.	1.08 ha 22.59 %	0.61 ha 22.99 %	This broad fauna habitat type is considered to be of low or limited value to vertebrate fauna.	
Total		**4.78 ha**	**2.65 ha**		

401243 401493 401743

6449425 6449175 6448925 6448675

Legend

- Study Area
- Development Envelope

Fauna Habitat

- Banksia Woodland
- Melaleuca Thicket
- Cleared

0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 12/04/2022

N

biologic Environmental Survey

Scale: 1:2,500

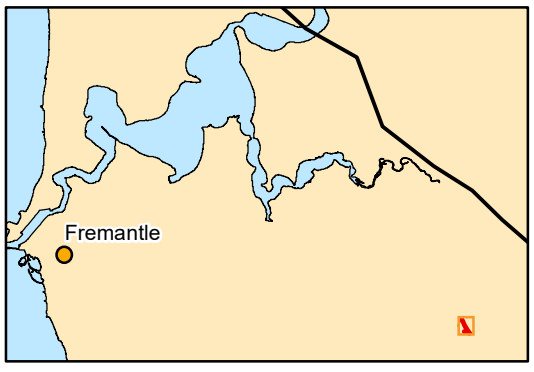

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Figure 5.3: Fauna habitats recorded in the Study Area

5.2.2 Fauna Recorded

During the field survey, targeted and opportunistic encounters with vertebrate fauna species were recorded. Motion camera footage was analysed post-survey. A total of 41 species were recorded during the field survey, comprising 32 avian bird species, six mammalian species (including four non-native species) and three reptilian species (Table 5.4). All species recorded were identified during the desktop. All species identified are commonly found in the mapped fauna habitats, suggesting that the fauna assemblages are typical of the habitats identified.

Three species recorded during the field survey were of conservation significance; the Carnaby's cockatoo, forest red-tailed black cockatoo, and quenda (see section 5.2.3). Forest red-tailed black cockatoo were observed perching within 25 metres of the Study Area and have been considered as confirmed within the Study Area.

Six introduced species were recorded during the current survey from both secondary evidence and motion camera footage (Plate 5.1, Plate 5.2). As known competitors and predators, the quantity of the feral species records, particularly the cat *Felis catus* (Plate 5.2), is likely to impact the species recorded and the likelihood of some species being present.

Plate 5.1 Rabbit captured on motion camera during the current survey

Plate 5.2: Cat captured on motion camera during the current survey

Table 5.4: Vertebrate species recorded during the current survey

Taxon Name	Common Name	EPBC Act listing	State listing	Observation method	Abundance
Mammals (*denotes introduced species)					
*Canis familiaris familiaris**	Domestic dog			Camera	7
				Opportunistic	1
*Felis catus**	Cat			Camera	2
Isoodon fusciventer	Quenda			Camera	21
				Diggings	11
Oryctolagus cuniculus	Rabbit			Camera	3
				Diggings, scats	12
Trichosurus vulpecula hypoleucus	Common Brushtail Possum, Koomal			Camera	3
*Vulpes vulpes**	Red Fox			Opportunistic - Den	1
Birds (*denotes introduced species)					
Acanthiza apicalis	Broad-tailed Thornbill (Inland Thornbill)			Opportunistic	1
Acanthiza chrysorrhoa	Yellow-rumped Thornbill			Opportunistic	4
Anthochaera carunculata	Red Wattlebird			Opportunistic	1
Artamus cinereus	Black-faced Woodswallow			Opportunistic	1
Cacatua roseicapilla	Galah			Opportunistic	2
Calyptorhynchus banksii	Red-tailed Black Cockatoo	VU	VU	Opportunistic	3
Calyptorhynchus latirostris	Carnaby's Cockatoo	EN	EN	Foraging evidence	12
				Individual (alive)	5
Colluricincla harmonica	Grey Shrikethrush			Opportunistic	4
Coracina novaehollandiae	Black-faced Cuckoo-shrike			Opportunistic	4
Corvus coronoides	Australian Raven			Camera	11
Cracticus tibicen	Australian Magpie			Opportunistic	2
Cracticus torquatus	Grey Butcherbird			Opportunistic	1
Falco cenchroides	Australian Kestrel (Nankeen Kestrel)			Opportunistic	1
Gavicalis virescens	Singing Honeyeater			Opportunistic	4
Gerygone fusca	Western Gerygone			Opportunistic	4
Grallina cyanoleuca	Magpie-lark			Opportunistic	2
Lalage tricolor	White-winged Triller			Opportunistic	1
Lichmera indistincta	Brown Honeyeater			Opportunistic	9
Malurus splendens	Splendid Fairywren			Opportunistic	2
Pachycephala rufiventris	Rufous Whistler			Opportunistic	1

Taxon Name	Common Name	EPBC Act listing	State listing	Observation method	Abundance
Pardalotus striatus	Striated Pardalote			Opportunistic	1
Petrochelidon nigricans	Tree Martin			Opportunistic	8
Phylidonyris novaehollandiae	New Holland Honeyeater			Opportunistic	15
Platycercus spurius	Red-capped Parrot			Opportunistic	1
Rhipidura leucophrys	Willie Wagtail			Opportunistic	6
Spilopelia chinensis	Spotted Turtle Dove			Opportunistic	2
*Spilopelia senegalensis**	Laughing Turtle Dove			Opportunistic	6
Threskiornis moluccus	Australian White Ibis			Opportunistic	2
Threskiornis spinicollis	Straw-necked Ibis			Opportunistic	5
*Trichoglossus moluccanus**	Rainbow Lorikeet			Opportunistic	3
Zosterops lateralis	Grey-breasted White-eye (Silvereye)			Opportunistic	1
Reptiles					
Cryptoblepharus buchananii				Opportunistic	3
Menetia greyii				Opportunistic	1
Tiliqua rugosa rugosa	Bobtail			Camera	4

5.2.3 Fauna of Conservation Significance

A total of 49 species of conservation significance have the potential to occur within the Study Area, based on the results of the desktop assessment (section 5.1.2, Table 5.1), comprising seven mammals, 37 birds (including migratory species) and five reptiles.

In total, based on distribution, previous records and the habitats present within the Study Area, three species of conservation significance are confirmed within the Study Area, three species were deemed possible to occur, and the remaining 43 species are unlikely or highly unlikely to occur (Appendix L). In addition to those confirmed during the current survey, the fork-tailed swift *Apus pacificus,* Perth slider *Lerista lineata* and black-striped snake *Neelans calonotos* were considered possible to occur. The justification for this likelihood of occurrence, and other species, is detailed in Appendix L.

Species confirmed within the Study Area

Carnaby's cockatoo

Carnaby's cockatoo *Calyptorhynchus latirostris* is classified as Endangered under the EPBC and BC Act. The species is considered common within the local vicinity, with 647 previous records of Carnaby's cockatoo within 10 km of the Study Area (DBCA, 2020b). Signs of foraging of *Banksia* cones by Carnaby's cockatoos were recorded by a previous survey Natural Area (2016b).

The species was recorded from the current survey from five individuals perched in the Banksia Woodland (within both the Study Area and the Development Envelope), as well as foraging evidence attributed to Carnaby's cockatoo recorded within the Banksia Woodland, with *Banksia* cones showing seed extraction characteristic of the species (DoEE, 2017; Johnstone *et al.*, 2011) (Figure 5.4). Of the 17 records of foraging activity, four records were outside the Development Envelope.

The quantitative classification of potential black cockatoo habitat within the Study Area is discussed in detail in section 5.2.4. A total of 2.72 ha (56.95%) of the Study Area and within this 1.59 ha (59.86 %) of the Development Envelope was classified as High to Very High Quality foraging habitat for the Carnaby's cockatoo as per the habitat quality scoring system recommended by DoEE (2017). Black cockatoos will forage up to 12 km from breeding hollows during the breeding season and rely on a proximity of foraging resources to breeding hollows (DoEE, 2017). Given the location of occupied roosts within this distance, the foraging habitat present is considered of very high significance for the species. Additionally, an individual tree which represents potential breeding and night roosting habitat was recorded (section 5.2.4). The habitat types supporting the species in the Study Area are also present in the immediate vicinity of the Study Area (360 Environmental, 2018a; Natural Area, 2016b; Terrestrial Ecosystems, 2014), providing additional habitat linked by Regional Ecological Linkages.

Forest red-tailed black cockatoo

The forest red-tailed black cockatoo *Calyptorhynchus banksia naso* is classified as Vulnerable under the EPBC and BC Act. There are 29 previous records of the species from within 10 km of the Study Area (DBCA, 2020b). The nearest record of the species exists approximately 0.57 km west of the Study Area from adjacent bushland in 2016 (DBCA, 2020b). Previous reports have identified potential foraging habitats within and nearby to the Study Area (Golder Associates, 2016; Natural Area, 2016b; Terrestrial Ecosystems, 2014). During the current survey, the species was recorded by a group of two individuals approximately 25 m outside of the Study Area boundary in Banksia Woodland (Figure 5.4). Black cockatoo flocks, especially forest red-tailed black cockatoo, show strong site fidelity to particular areas (DSEWPaC, 2012; EPA, 2019; Groom, 2015; Johnstone *et al.*, 2017). Evidence of the species in the surrounding area indicates supporting habitat is present within the vicinity of the Study Area (BirdLife Australia, 2020b; DBCA, 2020b).

The quantitative classification of potential black cockatoo habitat within the Study Area is discussed in detail in section 5.2.4. The Study Area contains low quality foraging habitat for the forest red-tailed black cockatoo as per the habitat quality scoring system recommended by DoEE (2017). Additionally, potential night roosting and breeding habitat is considered of low quality.

Quenda

The quenda (*Isoodon fusciventer*) is classified as Priority 4 by the DBCA. The species is distributed coastal margins in Western Australia ranging from Yanchep to Cape Le Grand and inland to Wyalcatchem and Hyden (Pentland, 1999). The habitat for the species is described as jarrah forest and swamp habitats, in dense vegetation around wetland fringes and heathland (Cooper, 1998; Woinarski *et al.*, 2014). The species prefers dense, low shrubland to forage underneath (Woinarski *et al.*, 2014), and low grass trees with leaves that touch the ground to provide protection from predators (Lohr *et al.*, 2018). The dense vegetation surrounding waterways also provides protection and foraging opportunities. Their presence is often identified by distinctively shaped foraging pits dug searching for invertebrates, tubers, and fungi, and can range in size from “nose-pokes” in leaf litter to well-excavated holes (Lohr *et al.*, 2018).

The species is considered common in the local vicinity and has been recorded 125 times from primary (direct observations during both day and night) and secondary evidence within 10 km of the Study Area (DBCA, 2020b). Quenda were recorded in four of the reviewed previous fauna survey reports. The closest record of quenda to the Study Area is approximately 300 metres north from 2017 (DBCA, 2020b). The City of Gosnells accounted for 3.3 % of the total quenda sightings made during the Perth quenda community survey in 2012 (Howard *et al.*, 2014).

The current survey recorded 32 sightings of the species via motion camera and secondary evidence. Evidence of quenda diggings were recorded throughout the Study Area (Plate 5.3, Figure 5.4 and Appendix N) primarily within the Banksia Woodland habitat where the understorey was dense and with preferred refugia such as *Xanthorrhoea.* Of the 32 records of quenda, 25 were outside the Development Envelope. Overall, the Banksia Woodland and *Melaleuca* Thicket (3.70 ha (77.40 %) of the Study Area and within this 2.04 ha (77.01 %) of the Development Envelope) is considered highly suitable habitat for the species. The habitat types supporting the species are also present within the surrounding bushland including the Bushland Forever site 125 providing additional core habitat linked by a Regional Ecological Linkage.

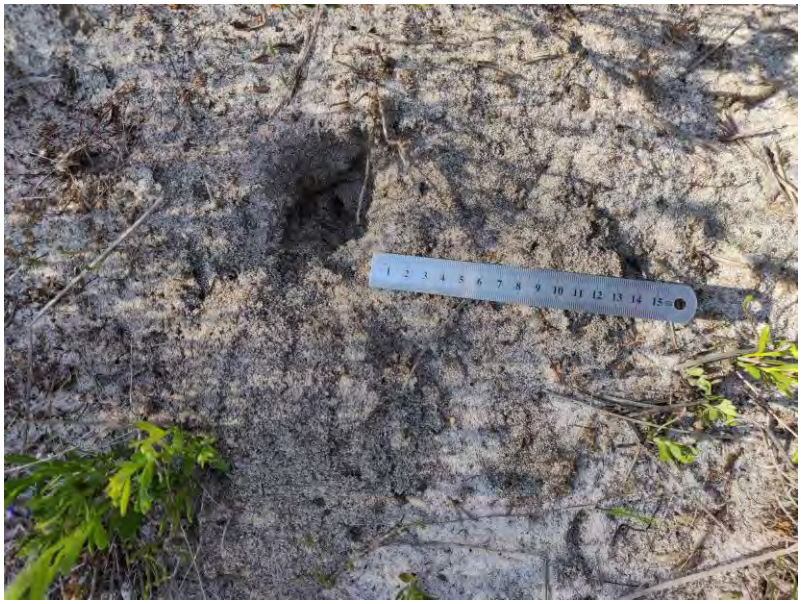

Plate 5.3: Example of quenda (diggings) recorded during the current survey

Plate 5.4 Example of quenda captured on motion camera during the current survey

Species Possibly occurring in the Study Area

Fork-tailed swift

The fork-tailed swift *Apus pacificus* is classified as Migratory under the EPBC and BC Act. It is a wide ranging but sparsely distributed species that occurs in a wide range of dry and/or open habitats (Johnstone & Storr, 1998). The species does not breed in Australia, migrating from breeding grounds in the northern Hemisphere. The species usually arrives in Australia in October, where it remains in various parts of the continent to as long as April. During its occurrence in Australia, the species is almost exclusively aerial, feeding and possibly also roosting aerially (DoE, 2018). The species is often observed during foraging or migration, with flocks ranging from 10 to 1,000 individuals (DoE, 2018).

The nearest observation of the species is approximately 11.23 km north-east of the Study Area from 1980 (DBCA, 2020b). Based on the presence of records within the vicinity of the Study Area, the species is considered possible to occasionally occur within the airspace above the Study Area and Development Envelope to forage; however, it is unlikely to land or nest within Study Area.

Perth slider

The Perth slider *Lerista lineata* (DBCA Priority 3) is a fossorial skink largely restricted to the SCP Plain (Maryan *et al.*, 2015). A recent re-assessment of the conservation status of Australian squamate fauna (Tingley *et al.*, 2019), suggests the species is listed as Endangered as it is recognised by the International Union for Conservation of Nature IUCN (Gaikhorst *et al.*, 2017). The species distribution follows a narrow strip located approximately 20–25 km inland from the coast, with the majority of *L. lineata* records from the southern suburbs of the Perth metropolitan area on the Bassendean and Spearwood Dune Systems. It is estimated that suitable habitat for the species has declined by 86 % since European settlement (Maryan *et al.*, 2015). This habitat includes the TEC Banksia WL SCP (TSSC, 2016), found across the Development Envelope.

There are four records within approximately 6 km of the Study Area (DBCA, 2020a) occurring in 2011. Based on the availability of suitable habitat (Banksia Woodland), the proximity and number of nearby records, and the distribution of the species, the Perth slider is considered possible to occur within the Study Area and Development Envelope.

Black-striped snake

The black-striped snake *Neelaps calonotos* (DBCA Priority 3) is restricted to coastal areas in the south west of Western Australia around Perth between Port Kennedy and the Dongara region (Gaikhorst *et al.*, 2018). The species inhabits sand dunes and sand plains vegetated with heaths, *Banksia* and Eucalypt woodlands (ALA, 2019). The species was recorded approximately 4.70 km west of the Study Area in 2011 (DBCA, 2020a).

Based on the presence of potentially suitable habitat present within the Study Area (Jarrah-Banksia Woodland), and contemporary records of the species in the near proximity, black-striped snake are considered possible to occur within the Study Area and Development Envelope.

401243 401493 401743

6449424 6449174 6448924 6448674

Legend

- Study Area
- Development Envelope

Fauna Habitat

- Banksia Woodland
- Melaleuca Thicket
- Cleared

- Carnaby's cockatoo - Foraging evidence
- Carnaby's cockatoo - Individual (alive)
- Forest red-tailed cockatoo - Individual (alive)
- Quenda - Digging
- Quenda - Individual (alive)

0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 24/03/2022

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Scale: 1:2,500

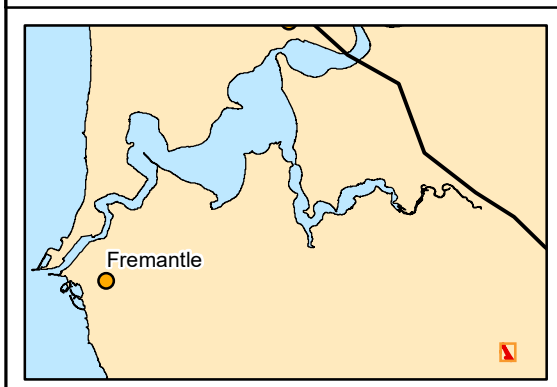

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Figure 5.4: Significant fauna recorded in the Study Area

5.2.4 Black Cockatoo Habitat Assessment

Potential Foraging Trees/ Habitat

DoEE (2017) defines 'high quality' foraging habitat as habitat scoring of 6 or above (Table 5.6), which, particularly in proximity to roosting and/ or breeding sites, is considered important for the long-term survival and recovery of black cockatoos (Table 5.6). Overall, the habitat of greatest foraging quality was the Banksia Woodland (overall score of 9 for Carnaby's cockatoo, foraging score of 0 for Baudin's and forest red-tailed black cockatoo). In total, the habitat represents 2.72 ha (56.95 %) of the Study Area and within this 1.59 ha (59.86 %) of the Development Envelope. The Banksia Woodland is considered of most significance for Carnaby's cockatoo due to its strong association with *Banksia* species for foraging in comparison to the other black cockatoo species (TSSC, 2016).

The Melaleuca Thicket was considered of "low Quality" (foraging score of 3 "low Quality" for Carnaby's cockatoo, foraging score of 0 for Baudin's cockatoo and not assessed for forest red-tailed black cockatoo) due to the general characteristic of containing no foraging plants or only individual or small stands of foraging plants. In total, the habitat represents 0.98 ha (20.45 %) of the Study Area and within this 0.45 ha (17.15 %) of the Development Envelope. The Cleared habitat was not assessed as no foraging plants were present. Overall, foraging habitat for black cockatoos consisted of 3.7 ha (77.40 %) of the Study Area and within this 2.04 ha (77.01 %).

The Study Area and Development Envelope contain foraging species considered primary food resources for black cockatoo, in particular jarrah and *Banksia* species (Table 5.5). Several *Banksia* species were present that are known common food resources, primarily for Carnaby's cockatoo (e.g. *Banksia attenuata, B. menziesii, B. ilicifolia, B. nivea*) (Groom, 2011). Some secondary food resources were present, including *Allocasuarina fraseriana* (sheoak), *Xanthorrhoea preissii* (grasstree), *Hakea varia* and *Lupinus* sp. (Groom, 2011) (Table 5.5). The *Banksia* plants present had evidence of feeding by black cockatoos, with cones showing seed extraction characteristic of Carnaby's cockatoo (Plate 5.5).

Black cockatoos rely upon the availability of foraging resources across their range, particularly to build condition in the post-breeding period (DoEE, 2017). Black cockatoos will forage up to 12 km from breeding hollows during the breeding season and rely on this proximity of foraging resources to breeding hollows to successfully raise chicks (DoEE, 2017). The Study Area is located within a semi-urbanised local environment; it is in the vicinity of Yangtzee Avenue reserve (< 1 km west) and Forrestdale Lake Nature Reserve. As such it is highly likely that the surrounding region contains additional foraging habitat for black cockatoos.

Plate 5.5: Evidence of Carnaby's cockatoo feeding in the Study Area

Table 5.5: Black cockatoo food resources present in the Study Area, and species utilising them

		Carnaby's cockatoo	Baudin's cockatoo	Forest red-tailed black cockatoo
Primary food resources				
Jarrah *Eucalyptus marginata*		●	●	●
Coastal Blackbutt or Prickley Bark *Eucalyptus todtiana*		●		
Slender Banksia *Banksia attenuata*		●		
Firewood Banksia *Banksia menziesii*		●		
Couch Honeypot *Banksia nivea*		●		
Holly Banksia *Banksia ilicifolia*		●	●	
Secondary food resources				
Grasstree *Xanthorrhoea preissii*		●	●	
Sheoak *Allocasuarina fraseriana*		●		●
Lupinus sp.		●		
Hakea varia		●	●	

Table 5.6: Summary of foraging habitat quality scores for the Study Area

Habitat type	Carnaby's cockatoo foraging score				Baudin's cockatoo foraging score				Forest red-tailed black cockatoo foraging score			
	Starting score	Additions	Subtractions	Total	Starting score	Additions	Subtractions	Total	Starting score	Additions	Subtractions	Total
Banksia Woodland Study Area: 2.72 ha Development Envelope: 1.59 ha	Native shrubland, kwongan heathland and woodland dominated by proteaceous plant species (7)	-Is within the Swan Coastal Plain (+3)	-Disease present (-1)	**9** **(Very High Quality)**	Individual foraging plants or small stand of foraging plants (1)	n/a	-No clear evidence of feeding debris (-2) -Is > 12 km from a known breeding location (-1) -Disease present (-1)	**0** **(<Low Quality)**	Individual foraging plants or small stand of foraging plants (1)	n/a	-No clear evidence of feeding debris (-2) -Disease present (-1)	**0** **(<Low Quality)**
Melaleuca Thicket Study Area: 0.98 ha Development Envelope: 0.45 ha	Individual foraging plants or small stand of foraging plants (1)	-Is within the Swan Coastal Plain (+3)	-Disease present (-1)	**3** **(Low Quality)**	Individual foraging plants or small stand of foraging plants (1)	n/a	-No clear evidence of feeding debris (-2) -Is > 12 km from a known breeding location (-1)	**0** **(<Low Quality)**	Not foraging habitat	n/a	n/a	n/a
Cleared Study Area: 1.08 ha Development Envelop: 0.61 ha	Not foraging habitat				Not foraging habitat				Not foraging habitat			

Potential Night Roosting Habitat

No evidence of black cockatoo roosting activity was recorded during the field survey (e.g. clipped leaves and branches or droppings under suitable trees). The survey timing fell outside that recommended for Carnaby's cockatoo, where it is likely that most birds have migrated to the Wheatbelt for breeding, and so recent evidence of roosting for this species is unlikely. Based on the habitat mapping conducted and the presence of only one recognised roosting species (i.e., one jarrah tree located within the Study Area but outside the Development Envelope) (DoEE, 2017; Johnstone *et al.*, 2011), potential night roosting habitat is unlikely within the Study Area. In addition to one jarrah tree, five *Eucalyptus todtiana* were identified in the Study Area; however, these are not typically used for night roosting.

Although the habitat is considered of low quality for night roosting, the presence of a large number of black cockatoo night roosts within 12 km of the Study Area (*n* = 36) suggests that the Study Area could provide night roosting habitat. The nearest roost to the Study Area (GOSGOSR004, approximately 0.4 km), is a confirmed forest red-tailed cockatoo roost with recent individual counts of 79 (in 2018) and 32 (in 2017) (Peck *et al.*, 2019). Night roosts can include tall trees within approximately 1 km of a central roost area of larger roost sites (>150 birds at any given time), with patches of trees usually 2-3 ha in area with smaller clumps used on any individual night for roosting (Glossop. B *et al.*, 2011). Carnaby's cockatoo are known to shift the roost location of a large Bentley roost within a 2 km x 2km area where a clump of trees used on any individual (Glossop. B *et al.*, 2011). Black cockatoos will favour night roost sites that are within 2 km to water sources (DoEE, 2017). Although there are no permanent water sources within the Study Area; numerous waterbodies within 5 km of the Study Area including Sutherlands Park (~0.30 km southeast), Park Lake (~1.5 km southwest), and Balannup Lake (~2.6 km southwest). As such, it cannot be eliminated that the Study Area may on occasion be used for night roosting by birds from larger nearby night roosts, though this is unlikely and would be on an irregular basis.

The remaining habitats (*Melaleuca* Thicket and Cleared) were not considered to be potential night roosting habitat.

Potential Breeding Tree Records

The Study Area and Development Envelope contains minimal suitable habitat and trees as potential nesting trees. One tree (jarrah) was identified within the Study Area boundary but outside the Development Envelope as of a suitable DBH and species to support black cockatoo breeding (Plate 5.6). Two hollows were observed on the jarrah tree identified, however, as both hollows were below 5 centimetres (cm) in diameter and of insufficient depth, neither were considered suitable for black cockatoo (Table 5.7). In general, jarrah trees provides only around ten percent of black cockatoo hollows (Johnstone *et al.*, 2010; Kirkby, 2018), as although jarrah produce more hollows, they are of significantly smaller size than in marri (Whitford, 2002). No hollows were recorded outside the Banksia Woodland habitat type. Five trees of *E. todtiana* (coastal blackbutt) of 500 - 940 mm DBH was recorded; however, this species is not a known breeding tree for any of the black cockatoo species (DoEE, 2017).

Although the hollows present in the Study Area were not currently suitable for black cockatoo for nesting, the importance of veteran and stag trees are recognized in their potential to develop hollows in the future, as it can take more than 200 years for a tree to develop suitable hollows (DoEE, 2017; Johnstone *et al.*, 2011). There is anecdotal evidence of the species breeding in Kenwick (*pers. comms.* Tony Kirkby via Birdlife); as such, with the region potentially supporting breeding, potential hollow-forming trees or hollows that may be suitable for black cockatoo within the Study Area may be of significance.

Table 5.7: Summary of potential breeding tree within the Study Area during the current survey

TGDN-01	
Location	-32.0930, 115.9586
Species	Jarrah *Eucalyptus marginata*
DBH	110 cm
Height	12 m
Status	Alive
Hollows	2 (both below 5 cm)
Activity	No black cockatoo activity recorded

Plate 5.6: Jarrah (*Eucalyptus marginata*) potential breeding tree recorded in the Study Area

401243 401493 401743

6449424 6449174 6448924 6448674

TGDN-01

Legend

- Study Area
- Development Envelope

Potential Foraging Habitat

- Very high quality for Carnaby's cockatoo (Study Area: 2.72 ha / Development Envelope: 1.59 ha)
- Low quality for Carnaby's cockatoo (Study Area: 0.98 ha / Development Envelope: 0.45 ha)

Potential Breeding Tree

- Jarrah (*Eucalyptus marginata*)

0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994 Created 24/03/2022

N

biologic Environmental Survey

Scale: 1:2,500

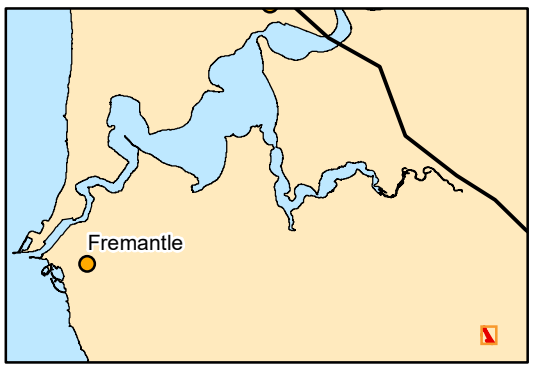

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Figure 5.5: Black cockatoo foraging habitat and potential breeding tree

6 CONCLUSION

A single season two-phase detailed flora and vegetation survey and single-phase basic vertebrate fauna survey, including black cockatoo habitat assessment, was undertaken at the Development Envelope for the proposed Garden Street extension, and included the whole 'Other Regional Roads' boundary. The field survey was completed on the 16 and 17 September and 10 and 11 November 2020 for the flora component, and on 24 September 2020 for the fauna component. All areas of the Study Area were traversed. The field surveys were undertaken in response to a request from the City of Gosnells to determine the overall flora and fauna values of the site and provide information for any potential future development of the Study Area. Prevailing seasonal conditions to phase one of the flora component are considered to be a minor constraint to the survey.

6.1 Flora and Vegetation

A total of 186 vascular flora taxa from 48 families and 130 genera were recorded from the Study Area by this survey, comprising 153 native taxa and 33 introduced taxa. One introduced taxon is listed as both a DP and a WoNS, **Asparagus asparagoides*.

Two flora taxa of conservation significance were located in the Study Area by this survey;

- *Jacksonia gracillima* (P3) – 18 individuals from 16 point locations, with seven individuals from seven point locations of these occurring within the Development Envelope. Two additional individuals from two point locations were recorded outside of the Study Area
- *Styphelia filifolia* (P3) – Three individuals from three point locations, all of which also occur within the Development Envelope.

Below average rainfall for the winter months prior to survey is considered to have constrained the survey, particularly with regard to the presence one ephemeral conservation significant flora taxon previously confirmed from the Study Area, *Caladenia huegelii* (T). Targeted searches for this taxon, including an intensive search at the original known location during this survey and during previous surveys, did not confirm the occurrence of this taxon in the Study Area. Furthermore, review of the aerial imagery suggests this record may represent a locally extinct record of this taxon. It is therefore considered unlikely that *C. huegelii* occurs within the Study Area post-survey.

Five vegetation types from three broad floristic formations were described and delineated from the Study Area;

- *Banksia* low woodland –BaBmAlf Dea and BaBmEt Pc
- *Melaleuca* low sparse woodland – Mep Ls and Mep Rc
- *Phlebocarya* low closed shrubland –Adc Pc

Two additional units, Parkland Cleared and Cleared, were also mapped within the Study Area. The majority of the vegetation within the Study Area was in excellent to very good condition.

Vegetation types BaBmAlf Dea and BaBmEt Pc are considered to represent that of SCP23a (Central *Banksia attenuata* - *Banksia menziesii* woodlands of the Swan Coastal Plain), which is a component of

the federally listed Banksia Woodlands of the Swan Coastal Plain IBRA Region (WA (P3), EPBC (T-EN)). The entirety of these mapped vegetation types is consistent with this TEC.

Vegetation types Mep Ls and Mep Rc are considered to represent that of the previously mapped Sumpland, which is classified as a 'Conservation Category Wetland', with Mep Ls also supporting a water feature.

6.2 Vertebrate Fauna

Three broad fauna habitats were recorded and mapped within the Study Area. These comprised, in decreasing order of extent *Banksia* Woodland (57 % of Study Area and within this 60 % of the Development Envelope), Melaleuca Thicket (20 % of Study Area and within this 17% of the development envelope) and Cleared (23% of Study Area and within this 23 % of the Development Envelope). Of the three fauna habitats identified, *Banksia* Woodland is considered of high significance for the Carnaby's cockatoo and quenda which were recorded during the survey. *Melaleuca* Thicket was considered of high significance for the quenda; and the remaining Cleared areas are considered to be of low significance. Fauna and habitats mapped were typical of those expected and recorded during the survey suggesting the Study Area contains a typical faunal assemblage for the area. Three species recorded during the field survey were of conservation significance: the Carnaby's cockatoo, forest red-tailed black cockatoo, and quenda.

Carnaby's cockatoo are likely to forage within the Study Area on a seasonal basis, given the foraging evidence identified and the location of known night roosting sites. Though isolated instances of night roosting of the species in the Study Area may occur, it is considered unlikely to used. No trees within the Study Area were recorded with evidence of breeding, however, one jarrah tree which is classified by DoEE (2017) as a potential breeding tree for both the Carnaby's cockatoo and forest red-tailed black cockatoo, was identified. Similarly, forest red-tailed black cockatoos may forage over the Study Area irregularly throughout the year given the location of known roosting sites in local area. Quenda was recorded in high numbers within the Study Area via motion cameras and secondary evidence. Thus, the area is likely to support a high-density population.

Three species, the fork-tailed swift, Perth slider and black-striped snake were assessed as possibly occurring within the Study Area and Development Envelope. Further investigation would be required to confirm the presence of the Perth slider and black-striped snake. The for-tailed swift is possible to occur as an irregular migrant. Future development of the Study Area should consider the impacts to these species, in particular, the further fragmentation of existing populations.

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8 APPENDICES

Appendix A – Conservation Codes

International Union for Conservation of Nature

Category	Definition
Extinct (EX)	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Extinct in the Wild (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically Endangered (CR)	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern (LTC)	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.
Not Evaluated (NE)	A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

Environment Protection and Biodiversity Conservation Act 1999

Category	Definition
Threatened Flora Species	
Extinct (EX)	A native species is eligible to be included in the Extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (EW)	A native species is eligible to be included in the Extinct in the Wild category at a particular time if, at that time: (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CR)	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (EN)	A native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (VU)	A native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Conservation Dependent (CD)	A native species is eligible to be included in the Conservation Dependent category at a particular time if, at that time: (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming Vulnerable, Endangered or Critically Endangered; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish; (ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

Category	Definition
Threatened Ecological Communities (TEC)	
Critically Endangered	An ecological community is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	An ecological community is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	An ecological community is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered nor endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Threatened Fauna Species	
Extinct (EX)	Taxa not definitely located in the wild during the past 50 years.
Extinct in the Wild (EW)	Taxa known to survive only in captivity.
Critically Endangered (CE)	Taxa facing an extremely high risk of extinction in the wild in the immediate future.
Endangered (EN)	Taxa facing a very high risk of extinction in the wild in the near future.
Vulnerable (VU)	Taxa facing a high risk of extinction in the wild in the medium-term future.
Migratory (MIG)	Consists of species listed under the following International Conventions: Japan-Australia Migratory Bird Agreement (JAMBA) China-Australia Migratory Bird Agreement (CAMBA) Convention on the Conservation of Migratory Species of Wild animals (Bonn Convention)

Biodiversity Conservation Act 2016

Category	Definition
Threatened Flora Species	
Critically Endangered (CR)	Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Published under schedule 1 of the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.
Endangered (EN)	Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Published under schedule 2 of the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.
Vulnerable (VU)	Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Published under schedule 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.
Extinct (EX)	Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.
Extinct in the Wild (EW)	Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened flora species listed as extinct in the wild.
Threatened Ecological Communities (TEC)	
Critically Endangered (CR)	An ecological community is eligible for listing in the category of critically endangered ecological community at a particular time if, at that time — (a) it is facing an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines; and (b) listing in that category is otherwise in accordance with the ministerial guidelines.
Endangered (EN)	An ecological community is eligible for listing in the category of endangered ecological community at a particular time if, at that time — (a) it is not a critically endangered ecological community; and (b) it is facing a very high risk of becoming eligible for listing as a collapsed ecological community in the near future, as determined in accordance with criteria set out in the ministerial guidelines; and (c) listing in that category is otherwise in accordance with the ministerial guidelines.

Category	Definition
Vulnerable (VU)	An ecological community is eligible for listing in the category of vulnerable ecological community at a particular time if, at that time — (a) it is not a critically endangered ecological community or an endangered ecological community; and (b) it is facing a high risk of becoming eligible for listing as a collapsed ecological community in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines; and (c) listing in that category is otherwise in accordance with the ministerial guidelines.
Collapsed	An ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time — (a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed; or (b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover — (i) its species composition or structure; or (ii) its species composition and structure.
Threatened Fauna Species	
Critically Endangered (Cr)	Rare or likely to become extinct, as *critically endangered* fauna.
Endangered (En)	Rare or likely to become extinct, as *endangered* fauna.
Vulnerable (Vu)	Rare or likely to become extinct, as *vulnerable* fauna.
Extinct (Ex)	Being fauna that is presumed to be extinct.
Migratory (Mi)	Birds that are subject to international agreements relating to the protection of migratory birds.
Conservation Dependent (CD)	Special conservation need being species dependent on ongoing conservation intervention. (Conservation Dependant)
Other Specially Protected Species (OS)	In need of special protection, otherwise than for the reasons pertaining to Schedule 1 through to Schedule 6 Fauna. (Other specially protected species

Department of Biodiversity, Conservation and Attractions Priority Definitions

Category	Definition
Priority Flora and Fauna Species	
Priority 1 (P1)	**Poorly-known Species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
Priority 2 (P2)	**Poorly-known Species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
Priority 3 (P3)	**Poorly-known Species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
Priority 4 (P4)	**Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Category	Definition
Priority Ecological Communities (PEC)	
Priority 1 (P1)	**Poorly-known ecological communities** Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤ 100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority 2 (P2)	**Poorly-known Ecological Communities** Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
Priority 3 (P3)	**Poorly-known Ecological Communities** (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or; (iii) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Category	Definition
Priority 4 (P4)	**Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.** (i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands. (ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category. (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.
Priority 5 (P5)	**Conservation Dependent Ecological Communities** Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Appendix B – Vegetation condition rating scale

Vegetation Condition	Definition
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. 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. 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 very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, 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. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, 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 comprising weed or crop species with isolated native trees and shrubs.

Appendix C – Flora literature review

Study Details	Methods	Results	Significant Findings	Limitations
PGV Environmental (2018) **Client:** City of Gosnells **Type:** Targeted TEC search **Location:** Garden St Road Reserve (overlaps study area) **Timing:** November & December 2017 and January 2018	• Five detailed floristic sites (quadrats)	• 57 flora taxa • Vegetation condition 'Excellent' in all quadrats • Six introduced flora species	• Core wetland vegetation in study area is not one of the Floristic Community Type that characterises the 'Claypans of the Swan Coastal Plain' TEC	• No substantial limitations
PGV Environmental (2016) **Client:** City of Gosnells **Type:** Targeted search **Location:** Garden St Road Reserve (overlaps study area) **Timing:** September 2016	• Targeted searching	• Eight Orchidaceae species identified	• No Threatened or Priority flora recorded	• No substantial limitations
Natural Areas Management (2016) **Client:** City of Gosnells **Type:** Detailed floristic survey **Location:** Garden St Road Reserve (overlaps study area) **Timing:** October 2015	• Six detailed floristic sites (quadrats) • Targeted searching	• 85 flora taxa • Seven vegetation types • Vegetation condition ranged from 'Excellent' to 'Degraded' • Nine introduced flora species	• One Priority flora species recorded: o *Jacksonia gracillima* (P3)	• No substantial limitations
360 Environmental (2014) **Client:** City of Gosnells **Type:** Targeted Flora Survey **Location:** Garden St Road Reserve (Encompasses study area) **Timing:** August and September 2014	• Targeted searching	• Five vegetation associations • Vegetation Condition 'Excellent', apart from localised disturbance	• No Threatened flora species recorded • One Priority flora species recorded: o *Jacksonia gracillima* (P3)	• No substantial limitations

Study Details	Methods	Results	Significant Findings	Limitations
Woodman (2004) **Client:** City of Gosnells **Type:** Detailed flora and vegetation survey **Location:** Garden St Road Reserve (Overlaps study area) **Timing:** October 2003	• Detailed floristic survey along road reserve • Targeted searching	• 114 flora taxa • Six vegetation units • Condition ranged from 'Excellent' to 'Good', with localised disturbance • Seven introduced weed species	• No Threatened or Priority flora species recorded o Swan Coastal Plain *Banksia attenuata – Banksia menziesii* woodlands (P3 – WA, and EN – EPBC)[4]	• Survey timing too late to identify *Caladenia huegelii*
ENV (2010) **Client:** City of Gosnells **Type:** Detailed flora and vegetation survey **Location:** Sutherlands Park Bushland (adjacent east) **Timing:** October 2009	• Seven detailed floristic sites (quadrats) • Targeted searching	• 97 flora taxa from 79 genera and 29 families • Seven vegetation units • Vegetation condition ranged from 'Excellent' to 'Completely Degraded' • 16 introduced weed species	• No Threatened or Priority flora recorded • One PEC/TEC recorded: o Low lying *Banksia attenuata* woodlands or shrublands (P3 – WA and EN – EPBC)	• Below average rainfall prior to survey
360 Environmental (2014) **Client:** City of Gosnells **Type:** Targeted Flora Survey **Location:** Southern River Road Duplication (2.2 km SW) **Timing:** July and September 2014	• Targeted searching	• Vegetation condition 'Excellent' with localised disturbance • Introduced weed species present	• No Threatened flora species recorded. • One Priority flora species recorded: o *Jacksonia gracillima* (P3) • One possible Priority 1 flora species: o *Eremaea asterocarpa* subsp. *?brachyclada* (P1)	• No substantial limitations

[4] More recently known as FCT23a Central *Banksia attenuata – Banksia menziesii* woodlands (which is not listed), of which forms part of the Banksia Woodlands of the Swan Coastal Plain (state listed PEC – P3, EPBC listed TEC – EN)

Study Details	Methods	Results	Significant Findings	Limitations
ENV (2006) **Client:** City of Gosnells **Type:** Detailed floristic survey **Location:** Precinct 3, Southern River (1 km SE) **Timing:** September and October 2006	• Over 50 detailed floristic sites (quadrats) • Targeted searching	• 227 taxa from 146 genera and 50 families • 32 vegetation units • Vegetation condition ranged from 'Excellent' to 'Completely Degraded' • 41 introduced flora species	• Two Priority flora species recorded: o *Aponogeton hexatepalus* (P4) o *Verticordia lindleyi* subsp. *lindleyi* (P4) • One range extension recorded: o *Evandra pauciflora* • Two Threatened Ecological Communities identified: o Shrublands and Woodlands on Muchea Limestone (EN – WA, EN – EPBC) o Corymbia calophylla – Kingia australis Woodlands on heavy soils (CR – WA, EN – EPBC) • Four flora species listed as Declared Pest plants (DPPs): o **Asparagus asparagoides* o **Echium plantagineum* o **Zantedeschia aethiopica* o **Moraea flaccida*	• No substantial limitations
Bennett (2013) **Client:** Coterra Environment **Type:** Detailed floristic survey **Location:** Lots 101 and 200 Anstey Road, Forrestdale (5.2 km SSW) **Timing:** May & October 2013	• Eight detailed floristic sites (quadrats) • Targeted searching	• 117 taxa from 93 genera and 42 families • Six vegetation units • Vegetation condition ranged from 'Excellent' to 'Degraded' • 37 introduced weed species	• One Priority flora species recorded: o *Jacksonia gracillima* (P3) • Three flora species listed as Declared Pest plants (DPPs): o **Gomphocarpus fruticosus* o **Zantedeschia aethiopica* o **Moraea flaccida*	• No substantial limitations

Study Details	Methods	Results	Significant Findings	Limitations
360 Environmental (2015) **Client:** Perron Developments **Type:** Detailed Flora and Vegetation Survey **Location:** Lot 131 Jandakot Road, Banjup (6.7 km SW) **Timing:** September and October 2014	• Desktop assessment • 10 detailed floristic sites (quadrats) • Three relevé sites • Targeted searching	• 98 taxa from 76 genera and 33 families • Six vegetation associations • Vegetation condition ranged from 'Excellent' to 'Completely Degraded' • 11 introduced weed species	• One Threatened flora species recorded: o *Caladenia huegelii* (T) • One flora species listed as a Declared Pest plant (DPP): o **Zantedeschia aethiopica*	• No substantial limitations
Morgan (2011) **Client:** RPS Environmental **Type:** Detailed Flora and Vegetation Survey **Location:** Lot 467 Warton Rd Banjup (6.1 km SW) **Timing:** October 2010	• Six detailed floristic sites (quadrats) • Two relevé sites • Three mapping notes • Targeted searching	• 155 native flora taxa • Six vegetation units • Vegetation condition ranged from 'Excellent' to 'Completely Degraded' • 38 introduced weed species	• No Threatened or Priority flora or ecological communities recorded • Two regionally significant flora taxa recorded: o *Hensmania turbinata* o *Pultenaea ochreata*	• No substantial limitations
Natural Areas (2019) **Client:** City of Armadale **Type:** Reconnaissance Flora and Vegetation Survey **Location:** Skeet Road, Harrisdale (2.7 km SSW) **Timing:** July 2019	• Desktop assessment • Relevé sites	• 79 flora taxa • Three vegetation types • Vegetation condition ranged from 'Very Good' to 'Completely Degraded'	• One Priority flora species recorded: o *Jacksonia gracillima* (P3)	• Survey completed mid-winter, which is not optimal timing
Focused Vision (2016) **Client:** City of Cockburn **Type:** Reconnaissance Flora and Vegetation Survey **Location:** Cockburn Central East Local Structure Plan (9.1 km WSW) **Timing:** September 2016	• Desktop assessment • Five detailed floristic sites (quadrats) • Relevé sites • Opportunistic observations	• 107 flora taxa from 90 genera and 44 families • Eight vegetation communities (five intact, three degraded) • Vegetation condition ranged from 'Very Good' to 'Completely Degraded' • 45 introduced weed species	• No Threatened or Priority flora or ecological communities recorded • Four flora species listed as Declared Pest plants (DPPs): o **Asparagus asparagoides* o **Echium plantagineum* o **Zantedeschia aethiopica* o **Gomphocarpus fruticosus*	• No substantial limitations

Study Details	Methods	Results	Significant Findings	Limitations
Focused Vision (2018) **Client:** City of Cockburn **Type:** Targeted Flora Survey **Location:** Cockburn Central East Local Structure Plan (9.1 km WSW) **Timing:** September 2017	• Targeted searching	• n/a	• No *Caladenia huegelli* plants were recorded	• No substantial limitations
Focused Vision (2020) **Client:** Coterra Environment **Type:** Reconnaissance Flora and Vegetation Survey **Location:** Lot 9103 Warton Road, Piara Waters (5.6 km SW) **Timing:** March 2020	• Desktop assessment • Five relevé sites • Targeted searching	• 57 flora taxa • Six vegetation units • Vegetation condition ranged from 'Good' to 'Completely Degraded' • Six introduced flora species	• No Threatened flora species recorded. • One possible Priority flora species: o *Jacksonia* ? *gracillima* (P3) • Two vegetation units represent Banksia woodland TEC	• Poor survey timing for targeted significant flora
ENV (2013) **Client:** Water Corporation **Type:** Detailed Flora and Vegetation Survey **Location:** Keane Rd Sewer Main, Forrestdale (4.7 km SSW) **Timing:** October 2012	• Six detailed floristic sites (quadrats) • Four relevé sites • Targeted searching	• 94 taxa from 76 genera and 30 families • Four vegetation units • Condition ranged from 'Excellent' to 'Completely Degraded' • 15 introduced weed species	• No Threatened flora species recorded. • One Priority flora species: o *Jacksonia gracillima* (P3) • One range extension: o *Petrophile rigida* • Two vegetation sites of conservation significance: o Low lying *Banksia attenuata* woodlands or shrublands (P3 – WA, EN – EPBC) o Either 'Herb-rich shrublands in claypans' (VU – WA, CR – EPBC) or 'Shrublands on dry clay flats' (EN – WA, CR – EPBC) • Two flora species listed as Declared Pest plants (DPPs): o **Zantedeschia aethiopica* o **Moraea flaccida*	• No substantial limitations

Study Details	Methods	Results	Significant Findings	Limitations
Ecoscape (2019) **Client:** City of Canning **Type:** Detailed Flora and Vegetation Survey **Location:** Clifton Park, Canning Vale (4.8 km W) **Timing:** September and November 2018	• Two detailed floristic sites (quadrats) • Opportunistic observations • Targeted searching	• 68 flora taxa • Vegetation condition 'Very Good' • 15 introduced weed species	• No Threatened or Priority flora or ecological communities recorded	• No substantial limitations

Appendix D – Flora identified from the desktop assessment

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
Aizoaceae	*Carpobrotus edulis*		●								Y
Alismataceae	*Sagittaria platyphylla*					●	●				Y
Amaranthaceae	*Amaranthus albus*	●	●								Y
	Ptilotus declinatus	●	●								
	Ptilotus drummondii	●	●								
	Ptilotus esquamatus	●	●								
	Ptilotus manglesii	●	●								
	Ptilotus sericostachyus		●								
	Ptilotus stirlingii		●								
	Ptilotus stirlingii subsp. *stirlingii*	●									
Amaryllidaceae	*Narcissus tazetta*		●								Y
	Narcissus tazetta subsp. *italicus*	●									Y
	Narcissus tazetta subsp. *tazetta*	●									Y
Anarthriaceae	*Lyginia barbata*	●	●								
	Lyginia imberbis		●								
Apiaceae	*Centella asiatica*	●	●								
	Homalosciadium homalocarpum		●								
	Platysace filiformis		●								
	Xanthosia candida	●	●								
	Xanthosia huegelii	●	●								
Apocynaceae	*Araujia sericifera*	●	●								Y
	Calotropis procera						●				Y
	Cryptostegia madagascariensis						●				Y
Aponogetonaceae	*Aponogeton hexatepalus*	●	●	●	●			P4			
Araceae	*Pistia stratiotes*						●				Y
	Zantedeschia aethiopica	●	●				●				Y
Araliaceae	*Hydrocotyle ranunculoides*						●				Y
	Trachymene pilosa	●	●								
Asparagaceae	*Asparagus aethiopicus*					●					Y
	Asparagus asparagoides					●	●				Y
	Asparagus plumosus					●					Y
	Chamaescilla corymbosa	●	●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Chamaescilla corymbosa var. *corymbosa*	●									
	Laxmannia ramosa		●								
	Laxmannia ramosa subsp. *ramosa*	●									
	Laxmannia sessiliflora		●								
	Laxmannia sessiliflora subsp. *australis*	●									
	Laxmannia squarrosa	●	●								
	Lomandra caespitosa	●	●								
	Lomandra hermaphrodita	●	●								
	Lomandra micrantha		●								
	Lomandra nigricans	●	●								
	Lomandra odora	●	●								
	Lomandra preissii	●	●								
	Lomandra purpurea		●								
	Lomandra sericea		●								
	Lomandra suaveolens		●								
	Sowerbaea laxiflora		●								
	Thysanotus arbuscula		●								
	Thysanotus dichotomus		●								
	Thysanotus glaucus	●	●	●				P4			
	Thysanotus manglesianus	●	●								
	Thysanotus multiflorus	●	●								
	Thysanotus patersonii		●								
	Thysanotus sp. Badgingarra (E.A. Griffin 2511)	●	●	●				P2			
	Thysanotus sp. Coastal plain (N.H. Brittan 66/63)	●	●								
	Thysanotus sparteus		●								
	Thysanotus tenellus	●	●								
	Thysanotus thyrsoideus		●								
	Thysanotus triandrus	●	●								
Asphodelaceae	*Asphodelus fistulosus*	●	●								Y
Asteraceae	*Asteridea gracilis*	●	●	●	●			P3			
	Asteridea pulverulenta		●								
	Brachyscome iberidifolia	●	●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Centaurea melitensis	●	●								Y
	Chondrilla juncea						●				Y
	Chrysanthemoides monilifera					●					Y
	Chrysanthemoides monilifera subsp. *monilifera*					●					Y
	Cotula coronopifolia	●	●								Y
	Crepis foetida		●								Y
	Crepis foetida subsp. *foetida*	●									Y
	Hyalosperma cotula	●	●								
	Hypochaeris glabra	●	●								Y
	Hypochaeris radicata	●	●								Y
	Leontodon saxatilis	●	●								Y
	Olearia paucidentata	●	●								
	Onopordum acaulon						●				Y
	Pithocarpa pulchella		●								
	Pithocarpa pulchella var. *pulchella*	●									
	Podolepis gracilis		●								
	Podolepis lessonii	●	●								
	Podolepis nutans	●	●								
	Podotheca chrysantha		●								
	Quinetia urvillei		●								
	Rhodanthe citrina		●								
	Rhodanthe manglesii		●								
	Rhodanthe pyrethrum	●	●								
	Senecio gilbertii		●					P1			
	Senecio multicaulis		●								
	Senecio multicaulis subsp. *multicaulis*	●									
	Siloxerus filifolius	●	●								
	Siloxerus humifusus	●	●								
	Siloxerus multiflorus		●								
	Silybum marianum						●				Y
	Solidago chilensis	●	●								Y
	Sonchus oleraceus	●	●								Y

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Symphyotrichum squamatum	●	●								Y
	Tagetes erecta	●	●								Y
	Trichocline spathulata	●	●								
	Urospermum picroides	●	●								Y
	Ursinia anthemoides		●								Y
	Xanthium spinosum						●				Y
	Xanthium strumarium						●				Y
Basellaceae	*Anredera cordifolia*					●					Y
Bignoniaceae	*Jacaranda mimosifolia*		●								Y
Boraginaceae	*Echium plantagineum*						●				Y
	Halgania corymbosa	●	●	●	●			P3			
Boryaceae	*Borya sphaerocephala*	●	●								
Brassicaceae	*Brassica tournefortii*		●								Y
	Raphanus raphanistrum	●	●								Y
Byblidaceae	*Byblis gigantea*	●	●	●	●			P3			
Cactaceae	*Austrocylindropuntia cylindrica*						●				Y
	Austrocylindropuntia subulata						●				Y
	Cylindropuntia fulgida						●				Y
	Cylindropuntia imbricata						●				Y
	Cylindropuntia kleiniae						●				Y
	Cylindropuntia pallida						●				Y
	Cylindropuntia tunicata						●				Y
	Opuntia elata						●				Y
	Opuntia elatior						●				Y
	Opuntia engelmannii						●				Y
	Opuntia ficus-indica						●				Y
	Opuntia microdasys						●				Y
	Opuntia monacantha						●				Y
	Opuntia polyacantha						●				Y
	Opuntia puberula						●				Y
	Opuntia stricta						●				Y
	Opuntia tomentosa						●				Y

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
Campanulaceae	*Grammatotheca bergiana*		●								Y
	Grammatotheca bergiana var. *bergiana*	●									Y
	Isotoma hypocrateriformis	●	●								
	Lobelia rhombifolia	●	●								
	Lobelia rhytidosperma	●	●								
	Lobelia tenuior	●	●								
	Monopsis debilis		●								Y
	Monopsis debilis var. *depressa*	●									Y
Caryophyllaceae	*Minuartia mediterranea*	●	●								Y
	Silene gallica		●								Y
	Spergula arvensis		●								Y
Casuarinaceae	*Allocasuarina fraseriana*	●	●								
	Allocasuarina humilis	●	●								
Celastraceae	*Stackhousia monogyna*		●								
	Stackhousia pubescens	●	●								
	Tripterococcus brunonis	●	●								
	Tripterococcus sp. Brachylobus (A.S. George 14234)			●	●			P4			
	Tripterococcus sp. Brachylobus (A.S.George 14234)	●									
Centrolepidaceae	*Aphelia cyperoides*		●								
	Centrolepis aristata	●	●								
	Centrolepis drummondiana		●								
	Centrolepis mutica	●	●								
Ceramiaceae	*Centroceras clavulatum*		●								
Chenopodiaceae	*Dysphania ambrosioides*	●	●								Y
Colchicaceae	*Burchardia congesta*	●	●								
	Burchardia multiflora	●	●								
	Burchardia rosea		●								
	Burchardia umbellata		●								
	Wurmbea dioica		●								
	Wurmbea dioica subsp. *alba*	●									
Compsopogonaceae	*Compsopogon caeruleus*		●								
Convolvulaceae	*Ipomoea muelleri*		●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
Crassulaceae	*Crassula colorata*		●								
Cupressaceae	*Athrotaxis cupressoides*		●								
	Callitris acuminata	●	●								
Cyperaceae	*Baumea arthrophylla*	●	●								
	Baumea vaginalis		●								
	Bolboschoenus fluviatilis			●				P1			
	Carex tereticaulis			●	●			P3			
	Chorizandra enodis	●	●								
	Cyathochaeta avenacea		●								
	Cyperus congestus	●	●								Y
	Cyperus eragrostis	●	●								Y
	Cyperus polystachyos	●	●								
	Cyperus tenellus	●									Y
	Cyperus tenuiflorus	●	●								Y
	Eleocharis acuta	●	●								
	Eleocharis keigheryi	●	●	●	●	●		T	VU	VU	
	Evandra pauciflora		●								
	Fimbristylis velata	●	●								
	Isolepis cyperoides		●								
	Isolepis levynsiana		●								Y
	Isolepis marginata	●	●								
	Isolepis oldfieldiana		●								
	Lepidosperma apricola	●	●								
	Lepidosperma effusum		●								
	Lepidosperma leptostachyum	●	●								
	Lepidosperma longitudinale	●	●								
	Lepidosperma scabrum		●								
	Lepidosperma sp.	●									
	Lepidosperma sp. Gosnells (A. Markey 1145)	●	●								
	Lepidosperma squamatum		●								
	Lepidosperma tetraquetrum	●	●								
	Mesomelaena tetragona	●	●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Schoenus asperocarpus	●	●								
	Schoenus benthamii	●	●	●	●			P3			
	Schoenus brevisetis		●								
	Schoenus capillifolius	●		●	●			P3			
	Schoenus cruentus	●	●								
	Schoenus curvifolius	●	●								
	Schoenus efoliatus		●								
	Schoenus odontocarpus		●								
	Schoenus pennisetis		●	●	●			P3			
	Schoenus plumosus	●	●								
	Schoenus rigens		●								
	Schoenus subbulbosus		●								
	Schoenus tenellus	●	●								
	Tetraria octandra	●	●								
Dasypogonaceae	*Calectasia cyanea*		●					T	CR	CR	
	Calectasia narragara		●								
	Dasypogon bromeliifolius	●	●								
	Kingia australis	●	●								
Dennstaedtiaceae	*Pteridium esculentum*		●								
Dilleniaceae	*Hibbertia acerosa*		●								
	Hibbertia aurea		●								
	Hibbertia commutata	●	●								
	Hibbertia diamesogenos	●	●								
	Hibbertia glomerata		●								
	Hibbertia glomerata subsp. *darlingensis*	●									
	Hibbertia gracilipes		●								
	Hibbertia huegelii	●	●								
	Hibbertia hypericoides		●								
	Hibbertia hypericoides subsp. *hypericoides*	●									
	Hibbertia montana		●								
	Hibbertia pilosa		●								
	Hibbertia racemosa		●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Hibbertia stellaris	●	●								
	Hibbertia striata		●								
	Hibbertia subvaginata	●	●								
	Hibbertia vaginata		●								
Dioscoreaceae	*Dioscorea hastifolia*	●	●								
Doryanthaceae	*Doryanthes excelsa*		●								
Droseraceae	*Drosera bulbigena*	●	●								
	Drosera drummondii	●	●								
	Drosera erythrorhiza	●	●								
	Drosera gigantea	●	●								
	Drosera glanduligera		●								
	Drosera heterophylla	●	●								
	Drosera hirsuta	●	●								
	Drosera leucoblasta	●	●								
	Drosera macrantha	●	●								
	Drosera menziesii	●	●								
	Drosera miniata	●	●								
	Drosera neesii	●	●								
	Drosera nitidula	●	●								
	Drosera paleacea		●								
	Drosera pallida		●								
	Drosera porrecta	●	●								
	Drosera stolonifera	●	●								
	Drosera zonaria	●	●								
Elaeocarpaceae	*Tetratheca hirsuta*		●								
	Tetratheca hirsuta subsp. *hirsuta*	●									
Ericaceae	*Andersonia lehmanniana*	●	●								
	Andersonia simplex		●								
	Andersonia sp. Blepharifolia (F. & J. Hort 1919)	●		●				P2			
	Andersonia sprengelioides		●								
	Astroloma ciliatum	●	●								
	Astroloma foliosum	●	●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Astroloma glaucescens	●	●								
	Astroloma microcalyx		●								
	Astroloma pallidum	●	●								
	Astroloma xerophyllum	●	●								
	Brachyloma preissii	●	●								
	Conostephium pendulum	●	●								
	Conostephium preissii	●	●								
	Croninia kingiana	●	●								
	Leucopogon capitellatus	●	●								
	Leucopogon conostephioides	●	●								
	Leucopogon gracillimus		●								
	Leucopogon oxycedrus	●	●								
	Leucopogon polymorphus	●	●								
	Leucopogon pulchellus	●	●								
	Leucopogon sprengelioides	●	●								
	Leucopogon squarrosus		●								
	Leucopogon squarrosus subsp. *squarrosus*	●									
	Leucopogon tenuis	●	●								
	Lysinema ciliatum		●								
	Lysinema pentapetalum	●	●								
	Styphelia filifolia	●	●	●				P3			
	Styphelia tenuiflora	●	●								
Euphorbiaceae	*Calycopeplus paucifolius*		●								
	Euphorbia terracina		●								Y
	Jatropha gossypiifolia						●				Y
	Monotaxis grandiflora		●								
	Monotaxis grandiflora var. *grandiflora*	●									
	Ricinocarpos graniticus		●								
	Ricinus communis		●								Y
Fabaceae	*Acacia alata*		●								
	Acacia alata var. *alata*	●									
	Acacia applanata	●	●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Acacia benthamii	●		●	●			P2			
	Acacia dentifera	●	●								
	Acacia drewiana		●								
	Acacia drewiana subsp. *drewiana*	●									
	Acacia horridula		●	●	●			P3			
	Acacia huegelii		●								
	Acacia incurva		●								
	Acacia lasiocarpa		●								
	Acacia lasiocarpa var. bracteolata long peduncle variant (G.J. Keighery 5026)	●		●	●			P1			
	Acacia lateriticola	●	●								
	Acacia longifolia		●								Y
	Acacia nervosa	●	●								
	Acacia oncinophylla		●								
	Acacia oncinophylla subsp. *patulifolia*	●		●	●			P4			
	Acacia pulchella		●								
	Acacia pulchella var. *pulchella*	●									
	Acacia saligna	●	●								
	Acacia sessilis	●	●								
	Acacia stenoptera		●								
	Acacia suaveolens		●								
	Acacia teretifolia	●	●								
	Acacia willdenowiana		●								
	Alhagi maurorum						●				Y
	Aotus gracillima	●	●								
	Aotus procumbens	●	●								
	Bossiaea angustifolia	●	●								
	Bossiaea eriocarpa	●	●								
	Bossiaea ornata	●	●								
	Chorizema cordatum		●								
	Chorizema dicksonii	●	●								
	Cristonia biloba		●								
	Cristonia biloba subsp. *biloba*	●									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Daviesia cordata		●								
	Daviesia decipiens		●								
	Daviesia decurrens		●								
	Daviesia decurrens subsp. *decurrens*	●									
	Daviesia horrida	●	●								
	Daviesia physodes	●	●								
	Daviesia rhombifolia	●	●								
	Daviesia triflora		●								
	Delonix regia		●								Y
	Dillwynia cinerascens		●								
	Euchilopsis linearis	●	●								
	Eutaxia virgata	●	●								
	Gastrolobium acutum	●	●								
	Gastrolobium capitatum	●	●								
	Gastrolobium dilatatum	●	●								
	Gastrolobium linearifolium	●	●								
	Gastrolobium spathulatum	●	●								
	Genista linifolia		●			●					Y
	Genista monspessulana					●					Y
	Genista sp. X *Genista monspessulana*					●					Y
	Gompholobium confertum	●	●								
	Gompholobium knightianum	●	●								
	Gompholobium marginatum	●	●								
	Gompholobium shuttleworthii	●	●								
	Gompholobium tomentosum	●	●								
	Hardenbergia comptoniana	●	●								
	Hovea chorizemifolia	●	●								
	Hovea pungens	●	●								
	Hovea trisperma	●	●								
	Indigofera australis		●								
	Isotropis cuneifolia		●								
	Jacksonia furcellata	●	●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Jacksonia gracillima	●		●				P3			
	Jacksonia lehmannii	●	●								
	Kennedia coccinea	●	●								
	Kennedia prostrata	●	●								
	Kennedia stirlingii	●	●								
	Labichea lanceolata		●								
	Labichea punctata		●								
	Lotus subbiflorus	●	●								Y
	Lupinus cosentinii	●	●								Y
	Lupinus luteus	●	●								Y
	Mirbelia microphylla		●								
	Mirbelia pungens		●								
	Mirbelia spinosa	●	●								
	Ornithopus compressus	●	●								Y
	Paraserianthes lophantha		●								
	Parkinsonia aculeata						●				Y
	Prosopis glandulosa x velutina						●				Y
	Pultenaea ericifolia	●	●								
	Pultenaea reticulata	●	●								
	Senna alata						●				Y
	Senna obtusifolia						●				Y
	Sphaerolobium linophyllum	●	●								
	Trifolium angustifolium		●								Y
	Trifolium angustifolium var. *angustifolium*	●									Y
	Trifolium glomeratum	●	●								Y
	Trifolium polymorphum		●								
	Ulex europaeus						●				Y
	Vicia sativa		●								Y
	Viminaria juncea	●	●								
Gentianaceae	*Centaurium erythraea*		●								Y
Geraniaceae	*Geranium molle*	●	●								Y
	Pelargonium capitatum	●	●								Y

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Pelargonium littorale		●								
Goodeniaceae	*Anthotium junciforme*	●	●								
	Dampiera alata	●	●								
	Dampiera lavandulacea	●	●								
	Dampiera linearis	●	●								
	Dampiera trigona		●								
	Goodenia coerulea	●	●								
	Goodenia fasciculata	●	●								
	Goodenia pulchella		●								
	Lechenaultia biloba		●								
	Lechenaultia expansa	●	●								
	Lechenaultia floribunda	●	●								
	Scaevola calliptera	●	●								
	Scaevola glandulifera	●	●								
	Scaevola pilosa	●	●								
	Scaevola repens		●								
	Velleia trinervis		●								
Haemodoraceae	*Anigozanthos bicolor*		●								
	Anigozanthos bicolor subsp. *bicolor*	●									
	Anigozanthos humilis		●								
	Anigozanthos humilis subsp. *humilis*	●									
	Anigozanthos manglesii	●	●								
	Anigozanthos viridis		●								
	Anigozanthos viridis subsp. *viridis*	●									
	Blancoa canescens	●	●								
	Conostylis aculeata		●								
	Conostylis aurea		●								
	Conostylis bracteata		●					P3			
	Conostylis festucacea		●								
	Conostylis juncea	●	●								
	Conostylis setigera		●								
	Conostylis setigera subsp. *setigera*	●									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Conostylis setosa	●	●								
	Haemodorum paniculatum	●	●								
	Haemodorum simplex	●	●								
	Haemodorum simulans	●	●								
	Haemodorum sparsiflorum		●								
	Haemodorum spicatum	●	●								
	Phlebocarya ciliata	●	●								
	Phlebocarya filifolia	●	●								
	Tribonanthes australis	●	●								
	Tribonanthes brachypetala	●	●								
Haloragaceae	*Gonocarpus pithyoides*	●	●								
	Meionectes brownii	●	●								
	Meionectes tenuifolia		●	●				P3			
	Myriophyllum crispatum		●								
Hemerocallidaceae	*Arnocrinum preissii*		●								
	Caesia micrantha		●								
	Caesia occidentalis	●	●								
	Corynotheca micrantha		●								
	Dianella caerulea		●								
	Dianella revoluta		●								
	Hensmania turbinata	●	●								
	Johnsonia pubescens		●								
	Johnsonia pubescens subsp. *cygnorum*			●				P2			
	Johnsonia pubescens subsp. *pubescens*	●									
	Stypandra glauca	●	●								
	Tricoryne elatior	●	●								
	Tricoryne tenella		●								
Hydrocharitaceae	*Limnobium laevigatum*		●								
	Ottelia ovalifolia		●								
	Ottelia ovalifolia subsp. *chrysobasis*	●									
Hypoxidaceae	*Pauridia occidentalis*		●								
	Pauridia occidentalis var. *quadriloba*	●									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Pauridia vaginata		●								
Iridaceae	*Babiana angustifolia*	●	●								Y
	Ferraria crispa	●	●								Y
	Freesia alba x leichtlinii	●									Y
	Gladiolus caryophyllaceus		●								Y
	Gladiolus undulatus	●	●								Y
	Hesperantha falcata	●	●								Y
	Iris unguicularis		●								Y
	Moraea flaccida						●				Y
	Moraea miniata						●				Y
	Moraea vegeta	●	●								Y
	Orthrosanthus laxus		●								
	Orthrosanthus laxus var. *laxus*	●									
	Patersonia occidentalis	●	●								
	Romulea flava		●								Y
	Romulea flava var. *minor*	●									Y
	Romulea rosea	●	●								Y
	Romulea rosea var. *australis*	●									Y
	Tritonia gladiolaris	●	●								Y
	Watsonia knysnana	●	●								Y
	Watsonia meriana		●								Y
	Watsonia meriana var. *bulbillifera*	●									Y
	Watsonia versfeldii	●	●								Y
Juncaceae	*Juncus acutus*		●								Y
	Juncus acutus subsp. *acutus*	●									Y
	Juncus amabilis	●	●								
	Juncus articulatus	●	●								Y
	Juncus bufonius	●	●								Y
	Juncus caespiticius	●	●								
	Juncus capitatus	●	●								Y
Juncaginaceae	*Cycnogeton lineare*	●	●								
Lamiaceae	*Hemiandra linearis*		●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Hemiandra pungens	●	●								
	Hemiandra sp. Jurien (B.J. Conn 3885 & M.E.Tozer)		●								
	Hemigenia incana	●	●								
	Hemigenia pritzelii	●	●								
	Hemigenia sericea		●								
	Lavandula stoechas	●	●								Y
	Mentha suaveolens		●								Y
	Microcorys longifolia	●	●								
Lauraceae	*Cassytha flava*		●								
	Cassytha glabella		●								
	Cassytha racemosa		●								
Lentibulariaceae	*Utricularia menziesii*		●								
	Utricularia multifida		●								
	Utricularia violacea	●	●								
Liceaceae	*Licea kleistobolus*	●									
Linaceae	*Linum trigynum*	●	●								Y
Loganiaceae	*Phyllangium paradoxum*		●								
Loranthaceae	*Nuytsia floribunda*		●								
Lythraceae	*Lythrum hyssopifolia*	●	●								Y
Macarthuriaceae	*Macarthuria apetala*	●	●								
Malvaceae	*Brachychiton acerifolius*		●								Y
	Commersonia corniculata	●	●								
	Lasiopetalum floribundum		●								
	Lasiopetalum glutinosum		●								
	Lasiopetalum glutinosum subsp. *glutinosum*	●		●				P3			
	Thomasia foliosa	●	●								
	Thomasia macrocarpa	●	●								
Meliaceae	*Melia azedarach*		●								
Menyanthaceae	*Ornduffia albiflora*		●								
	Ornduffia submersa	●		●	●			P4			
Myrtaceae	*Astartea affinis*	●	●								
	Astartea fascicularis		●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Astartea scoparia	●	●								
	Babingtonia camphorosmae	●	●								
	Beaufortia macrostemon		●								
	Beaufortia purpurea	●	●	●				P3			
	Beaufortia squarrosa	●	●								
	Calothamnus brevifolius		●					P4			
	Calothamnus graniticus		●								
	Calothamnus hirsutus	●	●								
	Calothamnus lateralis	●	●								
	Calothamnus oldfieldii		●								
	Calothamnus phellosus		●								
	Calothamnus quadrifidus		●								
	Calothamnus quadrifidus subsp. *quadrifidus*	●									
	Calothamnus rupestris	●	●								
	Calothamnus torulosus	●	●								
	Calytrix acutifolia	●	●								
	Calytrix angulata		●								
	Calytrix aurea	●	●								
	Calytrix breviseta		●								
	Calytrix breviseta subsp. *breviseta*	●		●	●	●		T	CR	EN	
	Calytrix flavescens		●								
	Calytrix fraseri	●	●								
	Calytrix glutinosa	●	●								
	Calytrix sapphirina		●								
	Calytrix variabilis		●								
	Chamelaucium uncinatum		●								
	Conothamnus trinervis	●	●								
	Corymbia calophylla	●	●								
	Darwinia citriodora	●	●								
	Eremaea asterocarpa		●								
	Eremaea asterocarpa subsp. *asterocarpa*	●									
	Eremaea asterocarpa subsp. *brachyclada*	●									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Eremaea pauciflora	●	●								
	Eucalyptus decipiens	●	●								
	Eucalyptus lane-poolei	●	●								
	Eucalyptus marginata		●								
	Eucalyptus rudis	●	●								
	Eucalyptus todtiana	●	●								
	Eucalyptus x balanites					●		T	CR	EN	
	Hypocalymma angustifolium	●	●								
	Hypocalymma angustifolium subsp. Swan Coastal Plain (G.J. Keighery 16777)	●									
	Kunzea ambigua		●								
	Kunzea glabrescens	●	●								
	Kunzea micrantha		●								
	Kunzea recurva		●								
	Leptospermum erubescens	●	●								
	Leptospermum laevigatum	●	●								Y
	Melaleuca brevifolia		●								
	Melaleuca incana		●								
	Melaleuca lateritia	●	●								
	Melaleuca parviceps	●	●								
	Melaleuca preissiana	●	●								
	Melaleuca radula	●	●								
	Melaleuca rhaphiophylla	●	●								
	Melaleuca scabra		●								
	Melaleuca seriata	●	●								
	Melaleuca teretifolia	●	●								
	Melaleuca thymoides	●	●								
	Melaleuca thyoides		●								
	Melaleuca viminea	●	●								
	Paragonis grandiflora	●	●								
	Pericalymma ellipticum	●	●								
	Pericalymma ellipticum var. *ellipticum*	●									
	Regelia ciliata	●	●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Regelia inops	●	●								
	Scholtzia involucrata	●	●								
	Verticordia acerosa		●								
	Verticordia acerosa var. *acerosa*	●									
	Verticordia densiflora		●								
	Verticordia densiflora var. *densiflora*	●									
	Verticordia drummondii	●	●								
	Verticordia huegelii		●								
	Verticordia huegelii var. *huegelii*	●									
	Verticordia insignis		●								
	Verticordia insignis subsp. *insignis*	●									
	Verticordia lindleyi		●								
	Verticordia lindleyi subsp. *lindleyi*	●		●	●			P4			
	Verticordia pennigera	●	●								
	Verticordia plumosa		●								
	Verticordia plumosa var. *plumosa*	●									
Oleaceae	*Olea europaea*					●					Y
Orchidaceae	*Acianthus reniformis*		●								
	Acianthus tenuissimus		●								
	Arachnorchis macrostylis		●								
	Arachnorchis paludosa		●								
	Caladenia arenicola	●	●								
	Caladenia brunonis		●								
	Caladenia deformis		●								
	Caladenia denticulata		●								
	Caladenia discoidea	●	●								
	Caladenia emarginata		●								
	Caladenia ferruginea		●								
	Caladenia flava		●								
	Caladenia gemmata		●								
	Caladenia georgei		●								
	Caladenia huegelii	●	●	●	●	●		T	CR	EN	

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Caladenia latifolia		●								
	Caladenia longicauda		●								
	Caladenia longicauda subsp. *calcigena*	●									
	Caladenia macrostylis		●								
	Caladenia marginata	●	●								
	Caladenia nobilis	●	●								
	Caladenia paludosa	●	●								
	Caladenia pectinata		●								
	Caladenia pendens		●								
	Caladenia reptans		●								
	Caladenia reptans subsp. *reptans*	●									
	Caladenia saccharata		●								
	Caladenia varians		●								
	Caladenia vulgata	●									
	Cyanicula sericea	●	●								
	Cyrtostylis tenuissima	●	●								
	Disa bracteata		●								Y
	Diuris brumalis	●	●								
	Diuris corymbosa	●	●								
	Diuris laxiflora		●								
	Diuris longifolia		●								
	Diuris magnifica	●	●								
	Diuris micrantha		●			●		T	VU	VU	
	Diuris purdiei	●		●	●	●		T	EN	EN	
	Drakaea elastica	●			●	●		T	CR	EN	
	Drakaea glyptodon		●								
	Drakaea micrantha	●		●	●	●		T	EN	VU	
	Elythranthera brunonis		●								
	Elythranthera emarginata	●	●								
	Ericksonella saccharata		●								
	Eriochilus dilatatus		●								
	Eriochilus dilatatus subsp. *multiflorus*	●									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Eriochilus helonomos	●	●								
	Eriochilus scaber		●								
	Eriochilus scaber subsp. *scaber*	●									
	Leporella fimbriata		●								
	Leptoceras menziesii	●	●								
	Lyperanthus nigricans		●								
	Lyperanthus serratus	●	●								
	Microtis alba	●	●								
	Microtis alboviridis	●	●								
	Microtis atrata		●								
	Microtis media		●								
	Microtis orbicularis		●								
	Microtis unifolia		●								
	Paracaleana nigrita		●								
	Pheladenia deformis	●	●								
	Prasophyllum cyphochilum		●								
	Prasophyllum drummondii		●								
	Prasophyllum elatum	●	●								
	Prasophyllum fimbria	●	●								
	Prasophyllum gibbosum	●	●								
	Prasophyllum giganteum	●	●								
	Prasophyllum gracile		●								
	Prasophyllum hians	●	●								
	Prasophyllum macrostachyum	●	●								
	Prasophyllum ovale		●								
	Prasophyllum parvifolium	●	●								
	Prasophyllum plumiforme	●	●								
	Prasophyllum regium	●	●								
	Pterostylis atrosanguinea		●								
	Pterostylis concava		●								
	Pterostylis crebriflora		●								
	Pterostylis nana		●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Pterostylis recurva		●								
	Pterostylis sanguinea	●	●								
	Pterostylis sp.	●									
	Pterostylis tasmanica		●								
	Pterostylis vittata	●	●								
	Pyrorchis nigricans	●	●								
	Ranorchis sargentii		●								
	Thelymitra antennifera		●								
	Thelymitra campanulata		●								
	Thelymitra carnea		●								
	Thelymitra crinita		●								
	Thelymitra flexuosa		●								
	Thelymitra fuscolutea		●								
	Thelymitra graminea		●								
	Thelymitra macrophylla		●								
	Thelymitra mucida		●								
	Thelymitra nuda		●								
	Thelymitra spiralis		●								
	Thelymitra stellata	●	●	●	●	●		T	EN	EN	
	Thelymitra villosa		●								
	Thelymitra vulgaris		●								
	Thelymitra xanthotricha		●								
	Urochilus sanguineus		●								
	Urochilus vittatus		●								
Orobanchaceae	*Bellardia viscosa*	●	●								Y
Oxalidaceae	*Oxalis corniculata*	●	●								Y
	Oxalis glabra	●	●								Y
	Oxalis pes-caprae	●	●								Y
	Oxalis purpurea		●								Y
Papaveraceae	*Fumaria muralis*		●								Y
	Fumaria muralis subsp. *muralis*	●									Y
Philydraceae	*Philydrella pygmaea*		●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Philydrella pygmaea subsp. *pygmaea*	●									
Phyllanthaceae	*Phyllanthus calycinus*	●	●								
	Phyllanthus scaber	●	●								
	Poranthera microphylla		●								
Picrodendraceae	*Stachystemon vermicularis*	●	●								
Pinaceae	*Pinus radiata*					●					Y
Pittosporaceae	*Cheiranthera preissiana*	●	●								
Plantaginaceae	*Gratiola pubescens*		●								
	Kickxia elatine		●								Y
	Kickxia elatine subsp. *crinita*	●									Y
	Kickxia spuria	●	●								Y
Poaceae	*Aira caryophyllea*		●								Y
	Aira praecox		●								Y
	Amphibromus nervosus	●	●								
	Amphipogon laguroides		●								
	Amphipogon strictus	●	●								
	Amphipogon turbinatus		●								
	Austrostipa campylachne		●								
	Austrostipa compressa	●	●								
	Austrostipa flavescens		●								
	Austrostipa jacobsiana	●	●	●	●	●		T	CR	CR	
	Briza maxima		●								Y
	Briza minor		●								Y
	Bromus hordeaceus	●	●								Y
	Cenchrus ciliaris					●					Y
	Cenchrus macrourus	●	●								Y
	Cenchrus setaceus		●								Y
	Cortaderia selloana		●								Y
	Cortaderia selloana subsp. *selloana*	●									Y
	Ehrharta calycina	●	●								Y
	Ehrharta longiflora		●								Y
	Eragrostis curvula	●	●								Y

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Hyparrhenia hirta	●	●								Y
	Lachnagrostis aemula	●	●								
	Lachnagrostis filiformis		●								
	Microlaena stipoides		●								
	Neurachne alopecuroidea	●	●								
	Panicum capillare	●	●								Y
	Paspalum dilatatum	●	●								Y
	Paspalum urvillei	●	●								Y
	Pentameris airoides		●								Y
	Pentameris airoides subsp. *airoides*	●									Y
	Phalaris angusta	●	●								Y
	Polypogon monspeliensis	●	●								Y
	Rytidosperma occidentale		●								
	Rytidosperma setaceum	●	●								
	Sorghum halepense	●	●								Y
	Themeda triandra	●	●								
	Tribolium uniolae	●	●								Y
	Urochloa mutica					●					Y
	Vulpia myuros		●								Y
	Vulpia myuros forma *myuros*	●									Y
Polygalaceae	*Comesperma virgatum*		●								
Polygonaceae	*Polygonum aviculare*	●	●								Y
	Rumex vesicarius	●	●								Y
Pontederiaceae	*Heteranthera reniformis*		●								Y
Potamogetonaceae	*Althenia australis*	●	●								
Primulaceae	*Lysimachia arvensis*		●								Y
Proteaceae	*Adenanthos cygnorum*		●								
	Adenanthos cygnorum subsp. *cygnorum*	●									
	Adenanthos obovatus	●	●								
	Banksia armata		●								
	Banksia armata var. *armata*	●									
	Banksia attenuata	●	●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Banksia dallanneyi	●	●								
	Banksia dallanneyi subsp. *dallanneyi* var. *mellicula*	●									
	Banksia ilicifolia		●								
	Banksia incana	●	●								
	Banksia kippistiana		●								
	Banksia littoralis	●	●								
	Banksia menziesii	●	●								
	Banksia mimica	●	●	●	●	●		T	VU	EN	
	Banksia polycephala		●								
	Banksia sessilis		●								
	Banksia sessilis var. *sessilis*	●									
	Banksia telmatiaea	●	●								
	Conospermum amoenum		●								
	Conospermum huegelii	●	●								
	Conospermum stoechadis		●								
	Conospermum stoechadis subsp. *stoechadis*	●									
	Conospermum triplinervium		●								
	Conospermum undulatum	●	●	●	●			T	VU	VU	
	Grevillea bipinnatifida		●								
	Grevillea curviloba					●		T	EN	EN	
	Grevillea diversifolia		●								
	Grevillea diversifolia subsp. *diversifolia*	●									
	Grevillea endlicheriana	●	●								
	Grevillea pilulifera	●	●								
	Grevillea speciosa		●								
	Grevillea synapheae		●								
	Hakea ceratophylla		●								
	Hakea erinacea	●	●								
	Hakea incrassata		●								
	Hakea lissocarpha	●	●								
	Hakea lorea		●								
	Hakea myrtoides	●	●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Hakea trifurcata	●	●								
	Hakea undulata	●	●								
	Hakea varia	●	●								
	Isopogon asper	●	●								
	Isopogon dubius		●								
	Isopogon sphaerocephalus	●	●								
	Lambertia multiflora	●	●								
	Lambertia multiflora var. *darlingensis*	●									
	Persoonia saccata		●								
	Petrophile biloba	●	●								
	Petrophile linearis	●	●								
	Petrophile longifolia		●								
	Petrophile seminuda	●	●								
	Petrophile striata	●	●								
	Stirlingia latifolia		●								
	Synaphea gracillima	●	●								
	Synaphea pinnata	●	●								
	Synaphea sp. Serpentine (G.R. Brand 103)					●		T	CR	CR	
	Synaphea spinulosa		●								
	Synaphea spinulosa subsp. *spinulosa*	●									
Pteridaceae	*Cheilanthes austrotenuifolia*	●	●								
	Cheilanthes tenuifolia		●								
Ranunculaceae	*Clematis pubescens*	●	●								
Restionaceae	*Chaetanthus aristatus*		●								
	Cytogonidium leptocarpoides	●	●								
	Desmocladus asper	●	●								
	Desmocladus diacolpicus		●								
	Desmocladus fasciculatus		●								
	Desmocladus flexuosus		●								
	Hypolaena exsulca		●								
	Hypolaena pubescens		●								
	Lepidobolus preissianus		●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Lepidobolus preissianus subsp. *preissianus*	●									
	Leptocarpus canus		●								
	Leptocarpus decipiens	●	●								
	Leptocarpus roycei		●								
	Lepyrodia macra		●								
	Loxocarya cinerea	●	●								
	Tremulina tremula		●								
Rhamnaceae	*Cryptandra arbutiflora*		●								
	Cryptandra arbutiflora var. *arbutiflora*	●									
	Cryptandra pungens	●	●								
	Stenanthemum sublineare	●	●	●				P2			
	Trymalium ledifolium		●								
	Trymalium ledifolium var. *rosmarinifolium*	●									
	Trymalium odoratissimum		●								
	Trymalium odoratissimum subsp. *odoratissimum*	●									
	Ziziphus mauritiana						●				Y
Rosaceae	*Eriobotrya japonica*	●	●								Y
	Rubus anglocandicans						●				Y
	Rubus fruticosus aggregate					●					Y
	Rubus laudatus						●				Y
	Rubus rugosus						●				Y
	Rubus ulmifolius						●				Y
Rubiaceae	*Galium aparine*						●				Y
	Galium murale		●								Y
	Galium spurium						●				Y
Rutaceae	*Boronia coerulescens*		●								
	Boronia crenulata		●								
	Boronia crenulata subsp. *viminea*	●									
	Boronia cymosa	●	●								
	Boronia dichotoma	●	●								
	Boronia ramosa		●								
	Boronia spathulata		●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Boronia tenuis	●	●	●				P4			
	Philotheca spicata		●								
Salicaceae	*Salix* sp.					●					Y
Salviniaceae	*Salvinia molesta*					●					Y
Santalaceae	*Leptomeria empetriformis*	●	●								
Sapindaceae	*Cardiospermum grandiflorum*		●								Y
	Diplopeltis huegelii		●								
	Diplopeltis huegelii subsp. *lehmannii*	●									
Scrophulariaceae	*Eremophila fraseri*		●								
	Eremophila glabra subsp. *chlorella*	●		●	●	●		T	EN	EN	
Selaginellaceae	*Selaginella gracillima*	●	●								
Solanaceae	*Lycium ferocissimum*					●					Y
	Nicotiana rotundifolia	●	●								
	Solanum elaeagnifolium						●				Y
	Solanum linnaeanum	●	●				●				Y
	Solanum nigrum	●	●								Y
Stylidiaceae	*Levenhookia pusilla*		●								
	Levenhookia stipitata		●								
	Stylidium aceratum			●				P3			
	Stylidium affine		●								
	Stylidium amoenum	●	●								
	Stylidium androsaceum		●								
	Stylidium araeophyllum	●	●								
	Stylidium brunonianum	●	●								
	Stylidium bulbiferum		●								
	Stylidium calcaratum		●								
	Stylidium carnosum		●								
	Stylidium dichotomum		●								
	Stylidium diuroides		●								
	Stylidium eriopodum	●	●								
	Stylidium guttatum		●								
	Stylidium hispidum	●	●								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Stylidium leptophyllum	●	●								
	Stylidium longitubum			●	●			P4			
	Stylidium paludicola			●				P3			
	Stylidium piliferum		●								
	Stylidium pycnostachyum	●	●								
	Stylidium recurvum	●	●								
	Stylidium repens	●	●								
	Stylidium schoenoides		●								
	Stylidium tenue		●								
	Stylidium tenue subsp. *majusculum*	●									
	Stylidium thesioides		●								
	Stylidium utricularioides	●	●								
	Stylidium xanthellum	●	●								
Tamaricaceae	*Tamarix aphylla*					●	●				Y
Thymelaeaceae	*Pimelea angustifolia*	●	●								
	Pimelea imbricata		●								
	Pimelea imbricata var. *piligera*	●									
	Pimelea lanata	●	●								
	Pimelea sylvestris	●	●								
Verbenaceae	*Lantana camara*					●	●				Y
Violaceae	*Hybanthus calycinus*	●	●								
	Hybanthus floribundus		●								
	Hybanthus floribundus subsp. *floribundus*	●									
Xanthorrhoeaceae	*Xanthorrhoea brunonis*		●								
	Xanthorrhoea preissii		●								
Zamiaceae	*Macrozamia fraseri*		●								
	Macrozamia riedlei	●	●								

Appendix E – Assessment of conservation significant flora likelihood

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood Pre-survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Caladenia huegelii	T	CR	EN	Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green & cream & red, Sep to Oct. Grey or brown sand, clay loam.	Yes	Yes	Within	Confirmed	Unlikely
Jacksonia gracillima	P3			Prostrate, spreading or scrambling, spindly shrub, to 1.5 m high. Fl. pink/orange, Oct and Nov. Grey/brown sandy loam. Winter damp flats, gentle lower slopes of dunes.	Yes	Yes	Within	Confirmed	Confirmed
Styphelia filifolia	P3			Erect, well branched shrub, to 0.5 cm high. Fl. white. Brown/yellow sand. Midslopes, sandplains.	Yes	Yes	Within	Confirmed	Confirmed
Diuris purdiei	T	EN	EN	Tuberous, perennial, herb, 0.15-0.35 m high. Fl. yellow, Sep to Oct. Grey-black sand, moist. Winter-wet swamps.	Yes	Yes	0.9 km WNW	Likely	Unlikely
Drakaea elastica	T	CR	EN	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red & green & yellow, Oct to Nov. White or grey sand. Low-lying situations adjoining winter-wet swamps.	Yes	Yes	0.7 km WNW	Likely	Unlikely
Stenanthemum sublineare	P2			Erect shrub, to 0.1 m high. Fl. green, Oct to Dec. Littered white sand. Coastal plain.	Yes	Yes	0.2 km NNE	Likely	Unlikely
Verticordia lindleyi subsp. *lindleyi*	P4			Erect shrub, 0.2-0.75 m high. Fl. pink, May or Nov to Dec or Jan. Sand, sandy clay. Winter-wet depressions.	Yes	Yes	1.7 km SE	Likely	Unlikely
Austrostipa jacobsiana	T	CR	CR	Clumping, perennial grass, to 0.6(flower spike to 1.1) m high. Fl. green. Grey sandy clay. Plains, damplands, winter wet flats.	Yes	Adjacent	2.9 km SSE	Possible	Unlikely
Drakaea micrantha	T	EN	VU	Tuberous, perennial, herb, 0.15-0.3 m high. Fl. red & yellow, Sep to Oct. White-grey sand.	Possible	Adjacent	3.8 km WNW	Possible	Unlikely
Eremophila glabra subsp. *chlorella*	T	EN	EN	Prostrate & spreading or sprawling shrub, 0.2-1 m high. Fl. green-yellow, Jul to Nov. Sandy clay. Winter-wet depressions.	Possible	Adjacent	4.6 km WNW	Possible	Unlikely
Acacia lasiocarpa var. bracteolata long peduncle variant (G.J. Keighery 5026)	P1			Shrub, 0.4-1.5 m high. Fl. yellow, May or Aug. Grey or black sand over clay. Swampy areas, winter wet lowlands.	Possible	Yes	4.7 km ENE	Possible	Unlikely
Thysanotus sp. Badgingarra (E.A. Griffin 2511)	P2			Perennial, herb (with tuberous roots), ca 0.35 m high. Fl. blue, Dec. Grey sand with lateritic gravel.	Possible	Yes	4.9 km NNW	Possible	Unlikely
Byblis gigantea	P3			Small, branched perennial, herb (or sub-shrub), to 0.45 m high. Fl. pink-purple/white, Sep to Dec or Jan. Sandy-peat swamps. Seasonally wet areas.	Yes	Yes	3.4 km NW	Possible	Unlikely

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood Pre-survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Schoenus benthamii	P3			Tufted perennial, grass-like or herb (sedge), 0.15-0.45 m high. Fl. brown, Oct to Nov. White, grey sand, sandy clay. Winter-wet flats, swamps.	Possible	Yes	1.2 km WNW	Possible	Unlikely
Schoenus capillifolius	P3			Semi-aquatic tufted annual, grass-like or herb (sedge), 0.05 m high. Fl. green, Oct to Nov. Brown mud. Claypans.	Yes	Yes	2.1 km WSW	Possible	Unlikely
Schoenus pennisetis	P3			Tufted annual, grass-like or herb (sedge), 0.05-0.15 m high. Fl. purple-black, Aug to Sep. Grey or peaty sand, sandy clay. Swamps, winter-wet depressions.	Yes	Yes	5.3 km SSW	Possible	Unlikely
Stylidium aceratum	P3			Fibrous rooted annual, herb, 0.05-0.09 m high, leaves spathulate. Fl. pink/white, Oct to Nov. Sandy soils. Swamp heathland.	Yes	Yes	5.3 km SSW	Possible	Unlikely
Stylidium paludicola	P3			Reed-like perennial, herb, 0.35-1 m high, Leaves tufted, linear or subulate or narrowly oblanceolate, 0.5-4 cm long, 0.5-1.5 mm wide, apex acute, margin entire, glabrous. Scape mostly glabrous, inflorescence axis glandular. Inflorescence racemose. Fl. pink, Oct to Dec. Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.	Possible	Adjacent	2.8 km WSW	Possible	Unlikely
Aponogeton hexatepalus	P4			Rhizomatous or cormous, aquatic perennial, herb, leaves floating. Fl. green-white, Jul to Oct. Mud. Freshwater: ponds, rivers, claypans.	No	No	1.8 km SSE	Possible	Unlikely
Thysanotus glaucus	P4			Erect, tuberous, perennial herb, to 0.3 m high. Fl. purple. Grey sand. Plains, flats.	Possible	Adjacent	4.9 km SSE	Possible	Unlikely
Tripterococcus sp. Brachylobus (A.S. George 14234)	P4			Erect, perennial, herb, to 0.8 m high. Fl. green. Grey sand or clay. Plains, winter damp flats.	Yes	Yes	2.3 km WNW	Possible	Unlikely
Banksia mimica	T	VU	EN	Prostrate, lignotuberous shrub, 0.15-0.4 m high. Fl. yellow-brown, Dec or Jan to Feb. White or grey sand over laterite, sandy loam.	No	No	4.9 km NE	Unlikely	Unlikely
Calectasia cyanea	T	CR	CR	Rhizomatous, clump forming, woody perennial, herb, 0.1-0.6 m high, to 0.3 m wide. Fl. blue/purple, Jun to Oct. White, grey or yellow sand, gravel.	No	No	6.7 km NNE	Unlikely	Unlikely
Calytrix breviseta subsp. *breviseta*	T	CR	EN	Shrub, 0.4-1 m high. Fl. purple-blue, Oct to Nov. Sandy clay. Swampy flats.	Possible	No	4.2 ENE	Unlikely	Unlikely
Conospermum undulatum	T	VU	VU	Erect, compact shrub, 0.6-2 m high. Fl. white-other, May to Oct. Grey or yellow-orange clayey sand.	No	No	4.2 km ENE	Unlikely	Unlikely

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood Pre-survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Diuris micrantha	T	VU	VU	Tuberous, perennial, herb, 0.3-0.6 m high. Fl. yellow & brown, Sep to Oct. Brown loamy clay. Winter-wet swamps, in shallow water.	No	No	4.4 km SE	Unlikely	Unlikely
Eleocharis keigheryi	T	VU	VU	Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 m high. Fl. green, Aug to Nov. Clay, sandy loam. Emergent in freshwater: creeks, claypans.	No	Adjacent	4.7 km ENE	Unlikely	Unlikely
Eucalyptus x *balanites*	T	CR	EN	(Mallee), to 5 m high, bark rough, flaky. Fl. white, Oct to Dec or Jan to Feb. Sandy soils with lateritic gravel.	No	No	10.9 km SSE	Unlikely	Unlikely
Grevillea curviloba	T	EN	EN	Prostrate to erect shrub, 0.1-2.5 m high. Fl. white-cream, Aug to Oct. Grey sand, sandy loam. Winter-wet heath.	Yes	No	17.2 km N	Unlikely	Unlikely
Synaphea sp. Serpentine (G.R. Brand 103)	T	CR	CR	Erect, compact shrub, 0.3-0.6 m high. Fl. yellow. Brown/grey loamy sand/clay. Coastal plain, winter wet areas,flats.	No	No	10.8 km SE	Unlikely	Unlikely
Thelymitra stellata	T	EN	EN	Tuberous, perennial, herb, 0.15-0.25 m high. Fl. yellow & brown, Oct to Nov. Sand, gravel, lateritic loam.	Possible	No	4.7 km ENE	Unlikely	Unlikely
Bolboschoenus fluviatilis	P1			Erect, rhizomatus perennial sedge, 0.6-2 m high. Fl. brown. Wet dark brown silt. Swan River, seeps, floodplain.	No	No	5.5 km N	Unlikely	Unlikely
Senecio gilbertii	P1			Erect, slender perennial, herb, to 1.5 m high. Fl. yellow, Sep to Nov. Peaty sand. Swamps, slopes.	No	No	4.4 km SSE	Unlikely	Unlikely
Acacia benthamii	P2			Shrub, ca 1 m high. Fl. yellow, Aug to Sep. Sand. Typically on limestone breakaways.	Yes	Yes	2.3 km WNW	Unlikely	Unlikely
Andersonia sp. Blepharifolia (F. & J. Hort 1919)	P2			Small, spreading to upright shrub, 0.15-0.5 m high. Fl. cream/white. Brown/red sandy clay. Slopes, hilltops.	Possible	No	4.7 km ENE	Unlikely	Unlikely
Johnsonia pubescens subsp. *cygnorum*	P2			Tufted perennial, herb, 0.15-0.25 m high. Fl. white-green, Sep. Grey-white-yellow sand. Flats, seasonally-wet sites.	Possible	Adjacent	5.2 km ESE	Unlikely	Unlikely
Acacia horridula	P3			Harsh, slender, single-stemmed shrub, 0.3-0.6(-1) m high. Fl. yellow, May to Aug. Gravelly soils over granite, sand. Rocky hillsides.	No	No	5.1 km NNE	Unlikely	Unlikely
Asteridea gracilis	P3			Annual, herb, 0.15-0.35 m high. Fl. white-pink, Sep to Dec. Sand, clay, gravelly soils.	Possible	No	4.2 km ENE	Unlikely	Unlikely
Beaufortia purpurea	P3			Erect or spreading shrub, 0.3-1.5 m high. Fl. red-purple, Oct to Dec or Jan to Feb. Lateritic or granitic soils. Rocky slopes.	No	No	4.9 km NE	Unlikely	Unlikely

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood Pre-survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Carex tereticaulis	P3			Monoecious, rhizomatous, tufted perennial, grass-like or herb (sedge), 0.7 m high. Fl. brown, Sep to Oct. Black peaty sand.	No	Adjacent	5.8 km N	Unlikely	Unlikely
Conostylis bracteata	P3			Rhizomatous, tufted or shortly proliferous perennial, grass-like or herb, 0.2-0.45 m high. Fl. yellow, Aug to Sep. Sand, limestone. Consolidated sand dunes.	No	No	4.4 km SE	Unlikely	Unlikely
Halgania corymbosa	P3			Erect shrub, 0.35-1 m high. Fl. blue-purple, Aug to Nov. Gravelly soils, soils over granite.	Possible	No	4.2 km ENE	Unlikely	Unlikely
Lasiopetalum glutinosum subsp. *glutinosum*	P3			Perennial, multi stemmed shrub, 0.5-1.5 m high. Fl. pink/purple. Brown silty clay/sandy loam. Outcrops, slopes, valleys.	Possible	Adjacent	4.2 km ENE	Unlikely	Unlikely
Meionectes tenuifolia	P3			Prostrate, annual semi aquatic herb, erect stems to 0.35 m high. Fl. orange. Red/green trifid and linear leaves. Grey/black loam over granite. Seasonally wet flats, swamps, granite flats.	No	Yes	5.1 km NNE	Unlikely	Unlikely
Acacia oncinophylla subsp. *patulifolia*	P4			Shrub, 0.5-2.5(-3) m high, 'minni-ritchi' bark, phyllodes 4-9 cm long, 3-6 mm wide. Fl. yellow, Aug to Nov or Nov to Dec. Granitic soils, occasionally on laterite.	Possible	Adjacent	3.6 km NE	Unlikely	Unlikely
Boronia tenuis	P4			Procumbent or erect & slender shrub, 0.1-0.5 m high. Fl. blue/pink-white, Aug to Nov. Laterite, stony soils, granite.	Possible	No	4.2 km ENE	Unlikely	Unlikely
Calothamnus brevifolius	P4			Erect, spreading shrub, 0.3-0.6(-0.8) m high. Fl. red, Jan to Feb or Apr. White/grey or yellow sand.	Possible	No	4.4 km SE	Unlikely	Unlikely
Jacksonia sericea	P4			Low spreading shrub, to 0.6 m high. Fl. orange, usually Dec or Jan to Feb. Calcareous & sandy soils.	Yes	Adjacent	5.6 km SSW	Unlikely	Unlikely
Ornduffia submersa	P4			Aquatic, floating herb. Fl. cream/white/yellow. Grey/brown clay. Ephemeral creeks, wetlands, open depressions.	No	Yes	5 km S	Unlikely	Unlikely
Stylidium longitubum	P4			Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. pink, Oct to Dec. Sandy clay, clay. Seasonal wetlands.	No	Yes	5.3 km SSW	Unlikely	Unlikely

Appendix F – Introduced flora desktop assessment

Family	Taxon	Source				Declared Plant Pest (DPP)	Weeds of National Significance (WoNS)	Ecological	Invasiveness
		NM	ALA	EPBC	WAOL				
Aizoaceae	*Carpobrotus edulis*		●			No	No	Unknown	Rapid
Alismataceae	*Sagittaria platyphylla*			●	●	Yes	Yes	Not assessed	Not assessed
Amaranthaceae	*Amaranthus albus*	●	●			No	No	Unknown	Unknown
Amaryllidaceae	*Narcissus tazetta*		●			No	No	Not assessed	Not assessed
	Narcissus tazetta subsp. *italicus*	●				No	No	Not assessed	Not assessed
	Narcissus tazetta subsp. *tazetta*	●				No	No	Not assessed	Not assessed
Apocynaceae	*Araujia sericifera*	●	●			No	No	Not assessed	Not assessed
	Calotropis procera				●	Yes	No	Not assessed	Not assessed
	Cryptostegia madagascariensis				●	Yes	No	Not assessed	Not assessed
Araceae	*Pistia stratiotes*				●	Yes	No	Not assessed	Not assessed
	Zantedeschia aethiopica	●	●		●	Yes	No	High	Moderate
Araliaceae	*Hydrocotyle ranunculoides*				●	Yes	No	Not assessed	Not assessed
Asparagaceae	*Asparagus aethiopicus*			●		No	Yes	High	Rapid
	Asparagus asparagoides			●	●	Yes	Yes	High	Rapid
	Asparagus plumosus			●		No	Yes	High	Unknown
Asphodelaceae	*Asphodelus fistulosus*	●	●			No	No	Low	Unknown
Asteraceae	*Centaurea melitensis*	●	●			No	No	Medium	Rapid
	Chondrilla juncea				●	Yes	No	Not assessed	Not assessed
	Chrysanthemoides monilifera			●		No	Yes	Not assessed	Not assessed
	Chrysanthemoides monilifera subsp. *monilifera*			●		No	Yes	Not assessed	Not assessed
	Cotula coronopifolia	●	●			No	No	Unknown	Rapid
	Crepis foetida		●			No	No	Not assessed	Not assessed
	Crepis foetida subsp. *foetida*	●				No	No	Not assessed	Not assessed
	Hypochaeris glabra	●	●			No	No	Medium	Rapid
	Hypochaeris radicata	●	●			No	No	Medium	Rapid
	Leontodon saxatilis	●	●			No	No	Medium	Rapid
	Onopordum acaulon				●	Yes	No	Not assessed	Not assessed
	Silybum marianum				●	Yes	No	Unknown	Moderate
	Solidago chilensis	●	●			No	No	Not assessed	Not assessed
	Sonchus oleraceus	●	●			No	No	Medium	Rapid
	Symphyotrichum squamatum	●	●			No	No	Unknown	Rapid
	Tagetes erecta	●	●			No	No	Not assessed	Not assessed
	Urospermum picroides	●	●			No	No	High	Rapid
	Ursinia anthemoides		●			No	No	Unknown	Rapid

Family	Taxon	Source				Declared Plant Pest (DPP)	Weeds of National Significance (WoNS)	Ecological	Invasiveness
		NM	ALA	EPBC	WAOL				
	Xanthium spinosum				●	Yes	No	Not assessed	Not assessed
	Xanthium strumarium				●	Yes	No	Not assessed	Not assessed
Basellaceae	*Anredera cordifolia*			●		No	Yes	High	Rapid
Bignoniaceae	*Jacaranda mimosifolia*		●			No	No	Not assessed	Not assessed
Boraginaceae	*Echium plantagineum*				●	Yes	No	Low	Moderate
Brassicaceae	*Brassica tournefortii*		●			No	No	Unknown	Rapid
	Raphanus raphanistrum	●	●			No	No	Unknown	Rapid
Cactaceae	*Austrocylindropuntia cylindrica*				●	Yes	Yes	Not assessed	Not assessed
	Austrocylindropuntia subulata				●	Yes	Yes	Not assessed	Not assessed
	Cylindropuntia fulgida				●	Yes	Yes	Not assessed	Not assessed
	Cylindropuntia imbricata				●	Yes	Yes	Not assessed	Not assessed
	Cylindropuntia kleiniae				●	Yes	Yes	Not assessed	Not assessed
	Cylindropuntia pallida				●	Yes	Yes	Not assessed	Not assessed
	Cylindropuntia tunicata				●	Yes	Yes	Not assessed	Not assessed
	Opuntia elata				●	Yes	Yes	Not assessed	Not assessed
	Opuntia elatior				●	Yes	Yes	Not assessed	Not assessed
	Opuntia engelmannii				●	Yes	Yes	Not assessed	Not assessed
	Opuntia ficus-indica				●	Yes	Yes	Not assessed	Not assessed
	Opuntia microdasys				●	Yes	Yes	Not assessed	Not assessed
	Opuntia monacantha				●	Yes	Yes	Low	Slow
	Opuntia polyacantha				●	Yes	Yes	Not assessed	Not assessed
	Opuntia puberula				●	Yes	Yes	Not assessed	Not assessed
	Opuntia stricta				●	Yes	Yes	Low	Slow
	Opuntia tomentosa				●	Yes	Yes	Not assessed	Not assessed
Campanulaceae	*Grammatotheca bergiana*		●			No	No	Not assessed	Not assessed
	Grammatotheca bergiana var. *bergiana*	●				No	No	Not assessed	Not assessed
	Monopsis debilis		●			No	No	Low	Rapid
	Monopsis debilis var. *depressa*	●				No	No	Not assessed	Not assessed
	Minuartia mediterranea	●	●			No	No	Unknown	Rapid
	Silene gallica		●			No	No	Unknown	Rapid
	Spergula arvensis		●			No	No	Unknown	Unknown
Chenopodiaceae	*Dysphania ambrosioides*	●	●			No	No	Not assessed	Not assessed
Cyperaceae	*Cyperus congestus*	●	●			No	No	Unknown	Moderate
	Cyperus eragrostis	●	●			No	No	Unknown	Moderate

Family	Taxon	Source				Declared Plant Pest (DPP)	Weeds of National Significance (WoNS)	Ecological	Invasiveness
		NM	ALA	EPBC	WAOL				
	Cyperus tenellus	●				No	No	Unknown	Rapid
	Cyperus tenuiflorus	●	●			No	No	Unknown	Unknown
	Isolepis levynsiana		●			No	No	Not assessed	Not assessed
Euphorbiaceae	*Euphorbia terracina*		●			No	No	High	Rapid
	Jatropha gossypiifolia				●	Yes	No	Not assessed	Not assessed
	Ricinus communis		●			No	No	Unknown	Unknown
Fabaceae	*Acacia longifolia*		●			No	No	Unknown	Moderate
	Alhagi maurorum				●	Yes	No	Not assessed	Not assessed
	Delonix regia		●			No	No	Not assessed	Not assessed
	Genista linifolia		●	●		No	Yes	Unknown	Rapid
	Genista monspessulana			●		No	Yes	Unknown	Rapid
	Genista sp. X *Genista monspessulana*			●		No	Yes	Not assessed	Not assessed
	Lotus subbiflorus	●	●			No	No	Unknown	Rapid
	Lupinus cosentinii	●	●			No	No	Medium	Moderate
	Lupinus luteus	●	●			No	No	Medium	Unknown
	Ornithopus compressus	●	●			No	No	Not assessed	Not assessed
	Parkinsonia aculeata				●	Yes	No	Not assessed	Not assessed
	Prosopis glandulosa x *velutina*				●	Yes	No	Not assessed	Not assessed
	Senna alata				●	Yes	No	Not assessed	Not assessed
	Senna obtusifolia				●	Yes	No	Not assessed	Not assessed
	Trifolium angustifolium		●			No	No	Not assessed	Not assessed
	Trifolium angustifolium var. *angustifolium*	●				No	No	Unknown	Unknown
	Trifolium glomeratum	●	●			No	No	Unknown	Unknown
	Ulex europaeus				●	Yes	No	High	Moderate
	Vicia sativa		●			No	No	Unknown	Slow
Gentianaceae	*Centaurium erythraea*		●			No	No	Unknown	Rapid
Geraniaceae	*Geranium molle*	●	●			No	No	Unknown	Unknown
	Pelargonium capitatum	●	●			No	No	High	Rapid
Iridaceae	*Babiana angustifolia*	●	●			No	No	High	Moderate
	Ferraria crispa	●	●			No	No	High	Slow
	Freesia alba x *leichtlinii*	●				No	No	High	Rapid
	Gladiolus caryophyllaceus		●			No	No	Not assessed	Not assessed
	Gladiolus undulatus	●	●			No	No	High	Moderate
	Hesperantha falcata	●	●			No	No	Not assessed	Not assessed

Family	Taxon	Source				Declared Plant Pest (DPP)	Weeds of National Significance (WoNS)	Ecological	Invasiveness
		NM	ALA	EPBC	WAOL				
	Iris unguicularis		●			No	No	Not assessed	Not assessed
	Moraea flaccida				●	Yes	No	High	Moderate
	Moraea miniata				●	Yes	No	Not assessed	Not assessed
	Moraea vegeta	●	●			No	No	Not assessed	Not assessed
	Romulea flava		●			No	No	Not assessed	Not assessed
	Romulea flava var. *minor*	●				No	No	High	Unknown
	Romulea rosea	●	●			No	No	Not assessed	Not assessed
	Romulea rosea var. *australis*	●				No	No	High	Unknown
	Tritonia gladiolaris	●	●			No	No	Not assessed	Not assessed
	Watsonia knysnana	●	●			No	No	High	Moderate
	Watsonia meriana		●			No	No	High	Moderate
	Watsonia meriana var. *bulbillifera*	●				No	No	Not assessed	Not assessed
	Watsonia versfeldii	●	●			No	No	High	Moderate
Juncaceae	*Juncus acutus*		●			No	No	Not assessed	Not assessed
	Juncus acutus subsp. *acutus*	●				No	No	High	Rapid
	Juncus articulatus	●	●			No	No	Unknown	Unknown
	Juncus bufonius	●	●			No	No	Low	Rapid
	Juncus capitatus	●	●			No	No	Low	Rapid
Lamiaceae	*Lavandula stoechas*	●	●			No	No	Low	Moderate
	Mentha suaveolens		●			No	No	Not assessed	Not assessed
Linaceae	*Linum trigynum*	●	●			No	No	Low	Unknown
Lythraceae	*Lythrum hyssopifolia*	●	●			No	No	Unknown	Rapid
Malvaceae	*Brachychiton acerifolius*		●			No	No	Not assessed	Not assessed
Myrtaceae	*Leptospermum laevigatum*	●	●			No	No	High	Moderate
Oleaceae	*Olea europaea*			●		No	No	Not assessed	Not assessed
Orchidaceae	*Disa bracteata*		●			No	No	Unknown	Rapid
Orobanchaceae	*Bellardia viscosa*	●	●			No	No	Not assessed	Not assessed
Oxalidaceae	*Oxalis corniculata*	●	●			No	No	Not assessed	Not assessed
	Oxalis glabra	●	●			No	No	Medium	Moderate
	Oxalis pes-caprae	●	●			No	No	High	Slow
	Oxalis purpurea		●			No	No	High	Slow
Papaveraceae	*Fumaria muralis*		●			No	No	Unknown	Unknown
	Fumaria muralis subsp. *muralis*	●				No	No	Not assessed	Not assessed
Pinaceae	*Pinus radiata*			●		No	No	High	Rapid

Family	Taxon	Source				Declared Plant Pest (DPP)	Weeds of National Significance (WoNS)	Ecological	Invasiveness
		NM	ALA	EPBC	WAOL				
Plantaginaceae	*Kickxia elatine*		●			No	No	Not assessed	Not assessed
	Kickxia elatine subsp. *crinita*	●				No	No	Low	Rapid
	Kickxia spuria	●	●			No	No	Low	Rapid
Poaceae	*Aira caryophyllea*		●			No	No	Unknown	Rapid
	Aira praecox		●			No	No	Unknown	Unknown
	Briza maxima		●			No	No	Unknown	Rapid
	Briza minor		●			No	No	Unknown	Rapid
	Bromus hordeaceus	●	●			No	No	High	Rapid
	Cenchrus ciliaris			●		No	No	Not assessed	Not assessed
	Cenchrus macrourus	●	●			No	No	High	Moderate
	Cenchrus setaceus		●			No	No	Not assessed	Not assessed
	Cortaderia selloana		●			No	No	High	Rapid
	Cortaderia selloana subsp. *selloana*	●				No	No	Not assessed	Not assessed
	Ehrharta calycina	●	●			No	No	Unknown	Moderate
	Ehrharta longiflora		●			No	No	Unknown	Rapid
	Eragrostis curvula	●	●			No	No	High	Rapid
	Hyparrhenia hirta	●	●			No	No	High	Rapid
	Panicum capillare	●	●			No	No	Not assessed	Not assessed
	Paspalum dilatatum	●	●			No	No	High	Rapid
	Paspalum urvillei	●	●			No	No	Unknown	Unknown
	Pentameris airoides		●			No	No	Unknown	Unknown
	Pentameris airoides subsp. *airoides*	●				No	No	Not assessed	Not assessed
	Phalaris angusta	●	●			No	No	Unknown	Unknown
	Polypogon monspeliensis	●	●			No	No	Medium	Unknown
	Sorghum halepense	●	●			No	No	Not assessed	Not assessed
	Tribolium uniolae	●	●			No	No	High	Moderate
	Urochloa mutica			●		No	No	Not assessed	Not assessed
	Vulpia myuros		●			No	No	Not assessed	Not assessed
	Vulpia myuros forma *myuros*	●				No	No	Not assessed	Not assessed
Polygonaceae	*Polygonum aviculare*	●	●			No	No	Unknown	Unknown
	Rumex vesicarius	●	●			No	No	Not assessed	Not assessed
Pontederiaceae	*Heteranthera reniformis*		●			No	No	Not assessed	Not assessed
Primulaceae	*Lysimachia arvensis*		●			No	No	Not assessed	Not assessed
Rhamnaceae	*Ziziphus mauritiana*				●	Yes	No	Not assessed	Not assessed

Family	Taxon	Source				Declared Plant Pest (DPP)	Weeds of National Significance (WoNS)	Ecological	Invasiveness
		NM	ALA	EPBC	WAOL				
Rosaceae	*Eriobotrya japonica*	●	●			No	No	Low	Slow
	Rubus anglocandicans				●	Yes	No	High	Moderate
	Rubus fruticosus aggregate			●		No	Yes	Not assessed	Not assessed
	Rubus laudatus				●	Yes	No	High	Moderate
	Rubus rugosus				●	Yes	No	Not assessed	Not assessed
	Rubus ulmifolius				●	Yes	No	High	Moderate
Rubiaceae	*Galium aparine*				●	Yes	No	Not assessed	Not assessed
	Galium murale		●			No	No	Low	Unknown
	Galium spurium				●	Yes	No	Not assessed	Not assessed
Salicaceae	*Salix* sp.			●		No	Yes	Not assessed	Not assessed
Salviniaceae	*Salvinia molesta*			●		No	Yes	Not assessed	Not assessed
Sapindaceae	*Cardiospermum grandiflorum*		●			No	No	Not assessed	Not assessed
Solanaceae	*Lycium ferocissimum*			●		No	Yes	High	Moderate
	Solanum elaeagnifolium				●	Yes	No	Not assessed	Not assessed
	Solanum linnaeanum	●	●		●	Yes	No	Medium	Moderate
	Solanum nigrum	●	●			No	No	Unknown	Moderate
Tamaricaceae	*Tamarix aphylla*			●	●	Yes	Yes	Not assessed	Not assessed
Verbenaceae	*Lantana camara*			●	●	Yes	Yes	Not assessed	Not assessed

Appendix G – Raw quadrat data

Garden Street Ecological Survey Site GGS-01

Date	17/09/2020	10/11/2020		
Described by	KG & SC	HE, KG & SC		
Type	Q	10m x 10m		
Location	MGA Zone	50		
	401699	mE;	6448784	mN
	115.9582	E	-32.092977	S
Veg Condition	Very Good			
Soil	Sandy Loam			
Rock Type	None			
Fire Age	>10 yrs			
Habitat	Hillslope			
Vegetation	Low *Banksia attenuata*, *Banksia menziesii* and *Allocasuarina fraseriana* woodland over tall open *Adenanthos cygnorum* shrubland over mid sparse *Stirlingia latifolia*, *Acacia pulchella* var. *pulchella* and *Melaleuca thymoides* shrubland over low *Desmocladus asper*, *Dasypogon bromeliifolius* and *Blancoa canescens* mixed sedgeland and shrubland.			

SPECIES LIST

Name	Cover	Height	Specimen	Notes
Acacia pulchella var. *pulchella*	2	1.2	GGS13-03	
Adenanthos cygnorum	4	5		
Allocasuarina fraseriana	2	9		
Amphipogon turbinatus	0.1	0.4	GGS13-06	
Anigozanthos manglesii	0.1	0.5		
Arnocrinum preissii	0.1	0.4	GGS13-09	Node plant
**Asparagus asparagoides*	0.1	0.1		
Austrostipa compressa	0.1	0.3	GGS01-10	Austro like
Banksia attenuata	6	7		
Banksia menziesii	3	6		
Blancoa canescens	15	0.4		
Bossiaea eriocarpa	0.1	0.3		
**Briza maxima*	0.1	0.2		
**Briza minor*	0.1	0.2		
Burchardia congesta	0.1	0.4		
Caladenia flava	0.1	0.1		
Calytrix variabilis	0.1	0.5	GGS01-06	Calytrix red stem
Chaetospora curvifolia	0.1	0.4	GGS01-09	Mesomelaena styg
Chamaescilla corymbosa var. *corymbosa*	0.1	0.1	GGS12-01	Triangular inflation
Conostephium pendulum	0.1	0.2	GGS01-03	Conostephium pend
Conostylis juncea	0.1	0.1		
Conostylis sp.	0.1	0.1		
Dampiera linearis	0.1	0.3	GGS12-03	
Dasypogon bromeliifolius	15	0.5		
Desmocladus asper	25	0.3	GGS13-02	
Drosera erythrorhiza	0.1	0.1		
Drosera menziesii	0.1	0.3		
**Ehrharta calycina*	0.1	0.3		
**Erigeron bonariensis*	0.1	0.3		
Gladiolus caryophyllaceus	0.1	1.1		
Gompholobium tomentosum	0.1	0.3		
Hibbertia subvaginata	0.5	0.6		
**Hypochaeris glabra*	0.1	0.1		
Lomandra preissii	0.1	0.3	GGS01-02	Lomandra strap
Lyginia imberbis	0.1	0.3		
Melaleuca thymoides	3	1.8	GGS01-01	Melaleuca fuzzy growth 2
Opercularia vaginata	0.1	0.3	GGS01-08	Green balls

Patersonia occidentalis	0.1	0.3		
**Pentameris airoides*	0.1	0.1		
Persoonia saccata	0.1	0.4	GGS01-05	? Conospermum skinny
Petrophile linearis	0.1	0.3		
Phlebocarya ciliata	0.1	0.3		
Poranthera microphylla	0.1	0.1	GGS01-07	Bract flower
Stirlingia latifolia	4	1.1		
Stylidium repens	0.1	0.1		
Styphelia conostephioides	0.1	0.5	GGS01-10	Leucopogon old
Styphelia xerophylla	0.1	0.3	GGS01-04	Conostephium mag
Thysanotus multiflorus	0.1	0.2		
Thysanotus sp.	0.1	0.1		
Trachymene pilosa	0.1	0.1		
**Ursinia anthemoides*	8.1	0.1		

Phase 1

Phase 2

Garden Street Ecological Survey Site GGS-02

Date	17/09/2020	10/11/2020		
Described by	KG & SC	HE, KG & SC		
Type	Q	10m x 10m		
Location	MGA Zone	50		
	401661	mE;	6448855	mN
	115.9578	E	-32.092326	S
Veg Condition	Excellent			
Soil	Sandy Loam			
Rock Type	None			
Fire Age	>10 yrs			
Habitat	Sand Plain			
Vegetation	Low *Banksia menziesii*, *Banksia attenuata* and *Allocasuarina fraseriana* woodland over tall open *Adenanthos cygnorum* shrubland over mid *Eremaea pauciflora*, *Hibbertia hypericoides* and *Allocasuarina humilis* shrubland over low *Desmocladus asper*, *Blancoa canescens* and *Lyginia imberbis* mixed sedgeland and shrubland.			

SPECIES LIST

Name	Cover	Height	Specimen	Notes
Acacia sessilis	0.1	0.3	GGS02-05	Ericaceae skinny
Adenanthos cygnorum	5	4.5		
Allocasuarina humilis	10	2	GGS02-01	
Amphipogon turbinatus	0.1	0.3	GGS13-06	
Anigozanthos humilis	0.1	0.3		
**Arctotheca calendula*	0.1	0.1		
Arnocrinum preissii	0.1	0.3	GGS13-09	Node plant
Banksia attenuata	6	7		
Banksia menziesii	10	6		
Blancoa canescens	5	0.4		
Bossiaea eriocarpa	0.1	0.3		
**Briza maxima*	0.1	0.2		
**Briza minor*	0.1	0.1		
Burchardia congesta	0.1	0.6		
Calytrix flavescens	0.1	0.4	GGS02-04	Calytrix skinny
Calytrix variabilis	0.1	0.4	GGS01-06	Calytrix red stem
Conostephium pendulum	0.1	0.2	GGS01-03	Conostephium pend
Conostylis setigera subsp. *setigera*	0.1	0.2	GGS02-02	Conostylis toothed
Dasypogon bromeliifolius	0.1	0.2		
Desmocladus asper	18	0.4	GGS13-02	
**Ehrharta calycina*	0.1	1		
Elythranthera brunonis	0.1	0.2		
Eremaea pauciflora	10	1.8	GGS13-01	
**Gladiolus caryophyllaceus*	0.1	1		
Gompholobium tomentosum	0.1	0.5		
Hibbertia hypericoides	6	1.5		
**Hypochaeris glabra*	0.1	0.1		
Lomandra preissii	0.1	0.3	GGS01-02	Lomandra strap
Lyginia imberbis	2	0.6		
Patersonia occidentalis	0.1	0.4		
Pelargonium capitatum	0.1	0.2		
Petrophile linearis	0.1	0.4	GGS02-03	Petrophile linearis
Phlebocarya ciliata	0.1	0.2		
Pterostylis vittata	0.1	0.3		
**Sonchus oleraceus*	0.1	0.4		
Stirlingia latifolia	1	1.2		
Stylidium repens	0.1	0.1		

Styphelia conostephioides	0.1	0.3	GGS01-10	Leucopogon old
Thysanotus multiflorus	0.1	0.3		
Thysanotus sp.	0.1	0.2		
Trachymene pilosa	0.1	0.1		

Phase 1

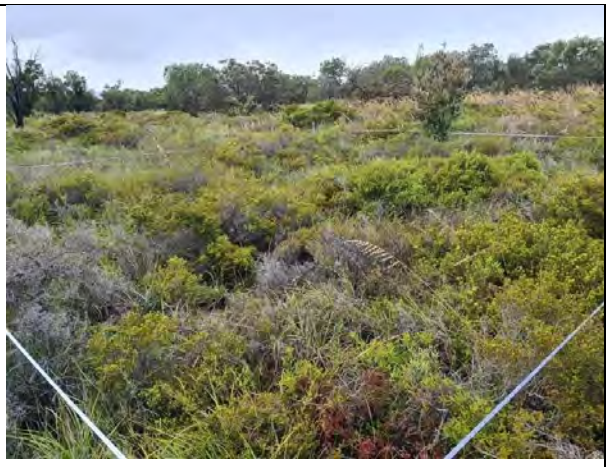
Phase 2

Garden Street Ecological Survey Site GGS-05

Date	17/09/2020		10/11/2020	
Described by	KG & SC		HE, KG & SC	
Type	Q	10m x 10m		
Location	MGA Zone	50		
	401634	mE;	6448916	mN
	115.9575	E	-32.091774	S
Veg Condition	Very Good			
Soil	Sandy Loam			
Rock Type	None			
Fire Age	>10 yrs			
Habitat	Footslope			
Vegetation	Tall scattered *Adenanthos cygnorum* shrubs over mid open *Eremaea pauciflora* over low closed *Phlebocarya ciliata* and *Desmocladus asper* sedgeland.			

SPECIES LIST

Name	Cover	Height	Specimen	Notes
Acacia pulchella var. *pulchella*	8.1	0.4	GGS13-03	
Adenanthos cygnorum	1	2		
Amphipogon turbinatus	0.1	0.3		
Anigozanthos manglesii	0.1	1		
**Arctotheca calendula*	0.1	0.1		
Arnocrinum preissii	0.1	0.4	GGS01-11	Node plant Round 2
**Avena barbata*	0.1	0.5		
Blancoa canescens	0.1	0.3		
Bossiaea eriocarpa	0.1	0.2		
**Briza maxima*	0.1	0.2		
Burchardia congesta	0.1	0.6		
Calytrix flavescens	0.1	0.2		
Chaetospora curvifolia	0.1	0.4		
Conostylis juncea	0.1	0.2		
Crassula exserta	0.1	0.1	GGS05-01	Red sausage
Dasypogon bromeliifolius	0.1	0.3		
Desmocladus asper	1	0.3	GGS13-02	
Drosera menziesii	0.1	0.2		
**Ehrharta calycina*	2	1.2		
Eremaea pauciflora	14	1.2	GGS13-01	
Gastrolobium capitatum	0.5	0.4	GGS05-02	Gastrolobium footslope
**Gladiolus caryophyllaceus*	0.1	1		
Gompholobium tomentosum	0.1	0.2		
Hibbertia subvaginata	0.1	0.3		
Hyalosperma cotula	0.1	0.2	GGS05-03	White daisy
**Hypochaeris glabra*	0.1	0.1		
Hypolaena exsulca	0.1	0.4	GGS05-11	Schoenus like
Laxmannia squarrosa	0.1	0.1	GGS10-07	Daisy rhyzome
Lepidosperma ?squamatum	0.1	0.5	GGS05-10	Lepidosperma tall flat
Lyginia barbata	0.1	0.3		
Lyginia imberbis	0.1	0.5		
Philotheca spicata	0.1	0.6	GGS13-05	Boronia purple
Phlebocarya ciliata	72	0.4		
Senecio multicaulis subsp. *multicaulis*	0.1	0.2	GGS05-04	Yellow daisy
Stylidium repens	0.1	0.1		
Styphelia conostephioides	0.1	0.3	GGS01-10	Leucopogon old
Trachymene pilosa	0.1	0.1		
Tricoryne elatior	0.1	0.5		
**Ursinia anthemoides*	0.1	0.3		

	
Phase 1	Phase 2

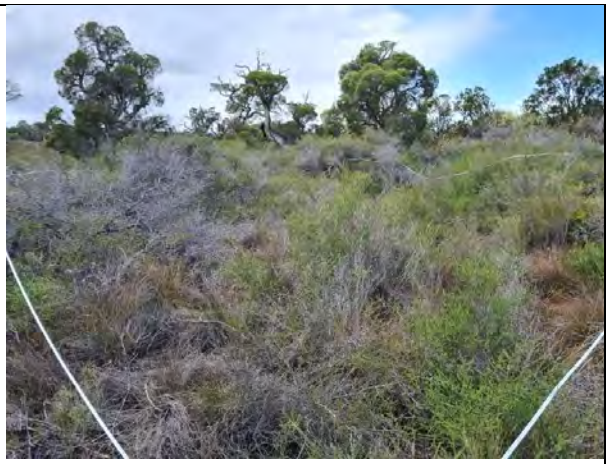
Garden Street Ecological Survey Site GGS-06

Date	17/09/2020		10/11/2020	
Described by	KG & SC		HE, KG & SC	
Type	Q	10m x 10m		
Location	MGA Zone	50		
	401615	mE;	6448959	mN
	115.9573	E	-32.091386	S
Veg Condition	Excellent			
Soil	Loamy Sand			
Rock Type	None			
Fire Age	>10 yrs			
Habitat	Drainage Area/ Floodplain			
Vegetation	Low sparse *Melaleuca preissiana* woodland over tall sparse *Adenanthos cygnorum* and *Kunzea glabrescens* shrubland over mid *Regelia ciliata*, *Astartea affinis* and *Pericalymma ellipticum* var. *floridum* shrubland over low scattered *Hypocalymma angustifolia* shrubs over low open *Schoenus efoliatus* and *Hypolaena exsulca* sedgeland.			

SPECIES LIST

Name	Cover	Height	Specimen	Notes
Acacia pulchella var. *pulchella*	0.1	0.5	GGS13-03	
Adenanthos cygnorum	0.5	3		
Adenanthos obovatus	0.1	0.5	KGSCOPP01	Lambertia orange
Astartea affinis	10	1.6	GGS08-04	Astartea scop
Calothamnus lateralis	0.1	0.8	GGS06-02	Calothamnus terete
Drosera stolonifera	0.1	0.2	GGS06-01	Drosera neat
Euchilopsis linearis	5	0.3	GGS11-02	
**Gladiolus caryophyllaceus*	0.1	0.4		
Hypocalymma angustifolium	1	0.8		
**Hypochaeris glabra*	0.1	0.1		
Hypolaena exsulca	2	0.4	GGS13-08	Hypolaena ex
Pericalymma ellipticum var. *floridum*	1	1.2	GGS11-03	
Phlebocarya ciliata	0.1	0.5		
Phyllangium paradoxum	0.1	0.1	GGS06-10	Tiny Herb
Regelia ciliata	40	1.9	GGS11-01	
Schoenus efoliatus	30	0.6	GGS08-06	Schoenus black base
Stylidium repens	0.1	0.1		
Thysanotus multiflorus	0.1	0.3		

Phase 1



Phase 2

Garden Street Ecological Survey Site GGS-07

Date	17/09/2020		10/11/2020	
Described by	KG & SC		HE, KG & SC	
Type	Q	10m x 10m		
Location	MGA Zone	50		
	401586	mE;	6449004	mN
	115.9570	E	-32.090975	S
Veg Condition	Excellent			
Soil	Sandy Clay Loam			
Rock Type	None			
Fire Age	>10 yrs			
Habitat	Drainage Area/ Floodplain			
Vegetation	Mid sparse *Melaleuca preissiana* woodland over tall open *Melaleuca rhaphiophylla*, *Hakea varia* and *Pericalymma ellipticum* var. *floridum* shrubland over a tall close *Leptocarpus scariosus* and *Lepidosperma longitudinale* rush land and sedgeland.			

SPECIES LIST

Name	Cover	Height	Specimen	Notes
**Acacia longifolia* subsp. *longifolia*	1	3	GGS07-01	Acacia cylinder
Astartea affinis	0.1	2	GGS08-04	Astartea scop
Calothamnus lateralis	0.1	1		
Cassytha racemosa forma *racemosa*	0.5			Cassytha sp.
Centella asiatica	0.1	0.1		Heart leaf
Dampiera linearis	0.1	0.2	GGS12-03	Dampiera lin swamp
Eutaxia virgata	0.1	1	GGS08-05	Flame pea
Hakea varia	4	3	GGS08-09	Hakea needle
**Hypochaeris glabra*	0.1	0.1		
Lepidosperma longitudinale	20	1.4	GGS08-10	Lepidosperma giant
Leptocarpus scariosus	50	1.3	GGS08-01	Leptocarpus female
Lobelia anceps	0.1	0.4	SCHEopp05	Purple Goodenia
Melaleuca preissiana	10	7		
Melaleuca rhaphiophylla	4	10	GGS08-08	Melaleuca whip
Melaleuca teretifolia	0.5	2.5	GGS07-02	Melaleuca long
Melaleuca thymoides	0.1	0.8	GGS12-04	Melaleuca fuzzy growth
Pericalymma ellipticum var. *floridum*	2	2.5	GGS11-03	

Phase 1

Phase 2

Garden Street Ecological Survey Site GGS-08

Date	16/09/2020	10/11/2020
Described by	KG & SC	HE, KG & SC
Type	Q	10m x 10m
Location	MGA Zone 50	
	401551 mE;	6449030 mN
	115.9567 E	-32.090740 S
Veg Condition	Very Good	
Soil	Sandy Clay Loam	
Rock Type	None	
Fire Age	>10 yrs	
Habitat	Drainage Area/ Floodplain	
Vegetation	Low open *Melaleuca preissiana* woodland over tall open *Melaleuca rhaphiophylla*, *Kunzea glabrescens* and *Astartea affinis* shrubs over tall *Leptocarpus scariosus* and *Lepyrodia glauca* rush land.	

SPECIES LIST

Name	Cover	Height	Specimen	Notes
Acacia pulchella var. *glaberrima*	0.1	1.1	HEopp01	Acacia lasiocarpa
Acacia pulchella var. *pulchella*	0.1	1.3	GGS13-03	
Astartea affinis	2	1.1	GGS08-04	Astartea scop
Cassytha racemosa forma *racemosa*	0.1			Cassytha sp.
Centella asiatica	0.1	0.1	GGS08-07	Heart leaf
Eutaxia virgata	0.1	0.3	GGS08-05	Flame pea
**Hypochaeris glabra*	0.1	0.1		
Kunzea glabrescens	2	3		
Lepidosperma longitudinale	2	1.2	GGS08-10	Lepidosperma giant
Leptocarpus scariosus	35	2.5	GGS08-01	Leptocarpus female
Lepyrodia glauca	5	0.6	GGS08-03	Lepyrodia
Lobelia anceps	0.1	0.3	SCHEopp05	Purple goodenia
Lyginia barbata	0.1	0.3		
Melaleuca preissiana	35	7		
Melaleuca rhaphiophylla	10	3.5	GGS08-08	Melaleuca whip
Pericalymma ellipticum var. *floridum*	1	2.5	GGS11-03	
Pimelea lanata	0.1	1.6	SCKGHEopp5	Phyllanthus lovely
Schoenus efoliatus	0.1	0.4	GGS08-06	Schoenus black base
Thysanotus multiflorus	0.1	0.3		

Phase 1

Phase 2

Garden Street Ecological Survey Site GGS-10

Date	16/09/2020	10/11/2020		
Described by	KG & SC	HE, KG & SC		
Type	Q	10m x 10m		
Location	MGA Zone	50		
	401519	mE;	6449103	mN
	115.9563	E	-32.090080	S
Veg Condition	Excellent			
Soil	Sandy Loam			
Rock Type	None			
Fire Age	>10 yrs			
Habitat	Sand Plain			
Vegetation	Low *Banksia attenuata*, *Banksia menziesii* and *Banksia ilicifolia* woodland over tall scattered *Kunzea glabrescens* shrubs over mid scattered *Xanthorrhoea preissii* shrubs over low closed *Phlebocarya ciliata*, *Dasypogon bromeliifolius* and *Patersonia occidentalis* mixed sedgeland and shrubs.			

SPECIES LIST

Name	Cover	Height	Specimen	Notes
Acacia pulchella var. *pulchella*	0.1	0.5	GGS13-03	
Adenanthos obovatus	0.1	0.2	KGSCOPP01	Lambertia orange
Anigozanthos manglesii	0.1	0.5		
Austrostipa compressa	0.1	0.4	GGS01-10	Austro like
Banksia attenuata	2	5		
Banksia ilicifolia	2	8		
Banksia menziesii	6	7		
Bossiaea eriocarpa	0.1	0.3		
**Briza maxima*	0.1	0.2		
Burchardia congesta	0.1	0.5		
Caladenia flava	0.1	0.2		
Calytrix flavescens	0.1	0.4		
Chaetospora curvifolia	0.1	0.3		
Conostylis juncea	0.1	0.2		
Dampiera linearis	0.1	0.3	GGS12-03	
Dasypogon bromeliifolius	10	0.6		
Drosera erythrorhiza	0.1			
**Ehrharta calycina*	0.1	1		
**Gladiolus caryophyllaceus*	0.1	1.5		
Gompholobium tomentosum	0.1	0.3		
Haemodorum spicatum	0.1	1.7	GGS10-10	Haemodorum giant
Hibbertia vaginata	0.1	0.2	GGS10-06	Hibberia hueg wide
Hovea trisperma	0.1	0.3	GGS10-08	Hovea tri
**Hypochaeris glabra*	0.1	0.1		
Hypolaena exsulca	0.1	0.3	GGS13-08	Hypolaena ex
Kunzea glabrescens	5	4		
Laxmannia squarrosa	0.1	0.1	GGS10-07	Daisy rhizome
Lepidosperma pubisquameum	0.1	0.5	GGS12-02	Lepidosperma tall
Lepidosperma sp. Margaret River (B.J. Lepschi 1841)	0.1	0.5	GGS10-05	Lepidosperma skinny flat
Lomandra preissii	0.1	0.2		
Lyginia imberbis	0.1	0.3		
Melaleuca thymoides	0.1	0.7	GGS12-04	Melaleuca fuzzy growth
Patersonia occidentalis	6	0.6		
Philotheca spicata	0.1	0.6	GGS13-05	Boronia purple
Phlebocarya ciliata	40	0.4		
Phyllangium divergens	0.1	0.1	GGS10-03	Tiny white

Pimelea ciliata	0.1	0.7	GGS10-01	Pimelea pink
Pterostylis vittata	0.1	0.3		
Regelia ciliata	1	1.6	GGS11-01	
Stylidium brunonianum	0.1	0.1		Stylidium pink
Stylidium piliferum	0.1	0.1		Stylidium white
Styphelia filifolia	0.1	0.3	GGS10-04	Styphelia ? filifolia
Thysanotus arbuscula	0.1	0.3	SCKGHEopp2	Thysanotus branching
Thysanotus multiflorus	0.1	0.3		
Trachymene pilosa	0.1	0.1		
Tricoryne tenella	0.1	0.3	GGS10-02	Tricoryne sticks
**Ursinia anthemoides*	0.1	0.1		
Xanthorrhoea preissii	2	1.5		

Phase 1

Phase 2

Garden Street Ecological Survey Site GGS-11

Date	16/09/2020	10/11/2020		
Described by	KG & SC	HE, KG & SC		
Type	Q	10m x 10m		
Location	MGA Zone	50		
	401487	mE;	6449180	mN
	115.9560	E	-32.089386	S
Veg Condition	Very Good			
Soil	Sandy Loam			
Rock Type	None			
Fire Age	>10 yrs			
Habitat	Drainage Area/ Floodplain			
Vegetation	Scattered low *Melaleuca preissiana* trees over scattered tall *Kunzea glabrescens* shrubs over mid closed *Regelia ciliata* and *Adenanthos obovatus* shrubland over scattered low sedges and rushes.			

SPECIES LIST

Name	Cover	Height	Specimen	Notes
Adenanthos obovatus	1	1.5	KGSCOPP01	Lambertia orange
Austrostipa compressa	0.1	0.4	GGS01-10	Austro like
Boronia dichotoma	0.1	0.5		
**Briza maxima*	0.1	0.2		
Dampiera linearis	0.1	0.4		
**Ehrharta calycina*	0.1	0.3		
Euchilopsis linearis	0.5	0.3	GGS11-02	
Gompholobium tomentosum	0.1	0.1		
Hypocalymma angustifolium	0.1	0.4		
**Hypochaeris glabra*	0.1	0.1		
Hypolaena exsulca	0.5	0.4	GGS13-08	Hypolaena ex
Lobelia tenuior	0.1	0.3	SCKGHEopp3	Lobelia common
Lyginia imberbis	0.1	0.3		
Melaleuca seriata	0.1	0.8	GGS11-04	Melaleuca swamp
Microtis media	0.1	0.3		
Neurachne alopecuroidea	0.1	0.1		
**Pentameris airoides*	0.1	0.1		
Pericalymma ellipticum var. *floridum*	0.1	1.1	GGS11-03	
Phlebocarya ciliata	1	0.5		
Regelia ciliata	75	1.8	GGS11-01	
Schoenus efoliatus	2	0.6		
Siloxerus humifusus	0.1	0.1	SCKGHEopp6	Siloxerus like
Stylidium brunonianum	0.1	0.1		Stylidium pink
Stylidium repens	0.1	0.1		
Trachymene pilosa	0.1	0.1		
**Ursinia anthemoides*	0.1	0.1		

	
Phase 1	Phase 2

Garden Street Ecological Survey Site GGS-12

Date	16/09/2020	10/11/2020		
Described by	KG & SC	HE, KG & SC		
Type	Q	10m x 10m		
Location	MGA Zone	50		
	401459	mE;	6449248	mN
	115.9557	E	-32.088764	S
Veg Condition	Excellent			
Soil	Sandy Loam			
Rock Type	None			
Fire Age	>10 yrs			
Habitat	Sand Plain			
Vegetation	Low *Banksia attenuata*, *Allocasuarina fraseriana* and *Eucalyptus todtiana* woodland over tall sparse *Kunzea glabrescens* shrubland over mid scattered *Xanthorrhoea preissii* shrubs over low closed *Dasypogon bromeliifolius*, *Desmocladus asper* and *Phlebocarya ciliata* mixed sedgeland and shrubland.			

SPECIES LIST

Name	Cover	Height	Specimen	Notes
Acacia pulchella var. *pulchella*	0.1	1.2	GGS13-03	
Allocasuarina fraseriana	1	11		
Banksia attenuata	5	5.5		
Banksia ilicifolia	0.5	9		
Bossiaea eriocarpa	0.1	0.2		
**Briza maxima*	0.1	0.3		
**Briza minor*	0.1	0.1		
Burchardia congesta	0.1	0.5		
Calytrix flavescens	0.1	0.2		
Chaetospora curvifolia	0.1	0.3		
Chamaescilla corymbosa var. *corymbosa*	0.1	0.2	GGS12-01	Triangular inflation
Conostylis juncea	0.1	0.1	GGS13-04	Conostylis prickly
Dampiera linearis	0.1	0.2	GGS12-03	
Dasypogon bromeliifolius	30	0.5		
Desmocladus asper	10	0.4	GGS13-02	
**Gladiolus caryophyllaceus*	0.1	1		
Gompholobium tomentosum	0.1	0.6		
**Hypochaeris glabra*	0.1	0.1		
Hypolaena exsulca	0.1	0.2	GGS13-08	Hypolaena ex
Kunzea glabrescens	20	6		
Lepidosperma pubisquameum	0.1	0.4	GGS12-02	Lepidosperma tall
Lomandra sonderi	0.1	0.4		
Lyginia imberbis	0.1	0.3		
Melaleuca thymoides	0.1	1	GGS12-04	Melaleuca fuzzy growth
Patersonia occidentalis	0.1	0.2		
Petrophile linearis	0.1	0.3		
Phlebocarya ciliata	40	0.3		
Regelia ciliata	0.1	0.3		
Stylidium repens	0.1	0.1		
Thysanotus arbuscula	0.1	0.2	SCKGHEopp2	Thysanotus branching
Tricoryne elatior	0.1	0.2		
**Ursinia anthemoides*	0.1	0.1		
Xanthorrhoea preissii	5	1.5		

	
Phase 1	Phase 2

Garden Street Ecological Survey Site GGS-13

Date	16/09/2020	10/11/2020		
Described by	KG & SC	HE, KG & SC		
Type	Q	10m x 10m		
Location	MGA Zone	50		
	401391	mE;	6449336	mN
	115.9550	E	-32.087968	S
Veg Condition	Very Good			
Soil	Sandy Loam			
Rock Type	None			
Fire Age	>10 yrs			
Habitat	Sand Plain			
Vegetation	Low *Banksia attenuata* and *Banksia menziesii* woodland over mid sparse *Eremaea pauciflora* and *Stirlingia latifolia* shrubland over low *Desmocladus asper* sedgeland and rush land.			

SPECIES LIST

Name	Cover	Height	Specimen	Notes
Acacia huegelii	0.1	0.3	GGS13-07	Daviesia recurved
Acacia pulchella var. *pulchella*	0.1	0.7	GGS13-03	
Amphipogon turbinatus	0.1	0.3	GGS13-06	
Arctotheca calendula	0.1	0.1		
Arnocrinum preissii	0.1	0.3	GGS13-09	Node plant
Banksia attenuata	7	20		
Banksia menziesii	5	7.5		
Blancoa canescens	0.1	0.1		
Bossiaea eriocarpa	0.1	0.3		
Briza maxima	0.1	0.3		
Briza minor	0.1	0.1		
Burchardia congesta	0.1	0.4		
Calytrix flavescens	0.1	0.2		
Conostephium pendulum	0.1	0.2		
Conostylis juncea	0.1	0.2	GGS13-04	Conostylis prickly
Dasypogon bromeliifolius	0.1	0.3		
Desmocladus asper	50	0.4	GGS13-02	
Drosera menziesii	0.1	0.1		
Ehrharta calycina	0.1	0.6		
Eremaea pauciflora	1	1.3	GGS13-01	
Gladiolus caryophyllaceus	0.1	1.2		
Gompholobium tomentosum	0.1	0.3		
Hensmania turbinata	0.3	0.1	GGS13-10	Johnsonia like
Hypochaeris glabra	0.1	0.1		
Hypolaena exsulca	0.1	0.3	GGS13-08	Hypolaena ex
Lomandra preissii	0.1	0.3		
Lyginia imberbis	0.1	0.4		
Macrozamia riedlei	2	3		
Melaleuca trichophylla	0.5	1	GGS13-10	Melaleuca fuzzy
Patersonia occidentalis	0.1	0.5		
Petrophile linearis	0.1	0.6		
Philotheca spicata	0.1	0.2	GGS13-05	Boronia purple
Phlebocarya ciliata	0.1	0.3		
Pterostylis vittata	0.1	0.3		
Pyrorchis nigricans	0.1	0.1		
Sonchus oleraceus	0.1	0.3		
Stirlingia latifolia	1	1.2		
Thysanotus arbuscula	0.1	0.2		Thysanotus branching
Thysanotus multiflorus	0.1	0.1		

Trachymene pilosa	0.1	0.1
Ursinia anthemoides	0.1	0.1

Phase 1

Phase 2

Garden Street Ecological Survey Site GGS-14

Date	16/09/2020
Described by	KG & SC
Type	R
Location	MGA Zone 50 401370 mE; 6449379 mN 115.9548 E -32.087575 S
Veg Condition	Degraded
Soil	Sandy Loam
Rock Type	None
Fire Age	>10 yrs
Habitat	Sand Plain
Vegetation	Low open *Banksia attenuata* and *Banksia menziesii* over scattered shrubs and grass weeds.

Phase 1

Phase 1

Garden Street Ecological Survey Site Opp

Date
Described by
Type
Location MGA Zone
mE; mN
E S
Veg Condition
Soil
Rock Type
Fire Age
Habitat
Vegetation
Notes

SPECIES LIST

Name	Specimen	Notes
**Acacia longifolia* subsp. *longifolia*		
Acacia pulchella var. *glaberrima*	HEOpp01	Acacia lassiocarpa
Acacia saligna		
Acacia sessilis		
Acacia stenoptera		
Acacia stenoptera	KGopp02	Acacia stenoptera weird
Adenanthos obovatus	KGSCOPP-01	Lambertia orange
Allocasuarina fraseriana		
Allocasuarina fraseriana		
Allocasuarina fraseriana		
**Arctotheca calendula*		
**Asparagus asparagoides*		
**Asparagus asparagoides*		
**Asparagus asparagoides*		
**Asparagus asparagoides*		
**Asparagus asparagoides*		
**Avena barbata*		
**Avena barbata*		
**Avena barbata*		
**Avena barbata*		
**Avena barbata*		
Banksia ilicifolia		
Banksia menziesii		
Banksia nivea		
Boronia dichotoma		
Boronia dichotoma	SCKGOPP02	Boronia giant
**Bromus diandrus*		
**Bromus diandrus*		
Caesia occidentalis	HEOpp03	Lomandra balls
Caladenia arenicola		Caladenia blush
Caladenia flava		
Caladenia latifolia		
Caladenia longicauda		
Caladenia sp.		
Caladenia sp.		
Calothamnus hirsutus	SCKGOPP03	Calothamnus quad
Calytrix angulata	KGopp01	Calytrix yellow
**Carpobrotus edulis*		
Cassytha racemosa forma *racemosa*	HEOpp02	Cassytha sp.
Chamaescilla corymbosa var. *corymbosa*		

Corymbia calophylla		
Corynotheca micrantha var. elongata	SCOPP20	Thysanotus wire
**Cynodon dactylon*		
**Disa bracteata*		
Diuris magnifica		
Diuris magnifica		
**Ehrharta calycina*		
**Ehrharta calycina*		
**Ehrharta calycina*		
**Ehrharta calycina*		
**Ehrharta calycina*		
Elythranthera brunonis		
**Eragrostis curvula*		
**Eragrostis curvula*		
Eucalyptus marginata		
Eucalyptus todtiana		
Eucalyptus todtiana		
Euphorbia terracina	KGOPP-01	Inflated bracts
Ficinia nodosa	HESCopp11	
Ficinia nodosa	HESCopp11	Ficinia nodosa
**Freesia alba x leichtlinii*		
**Fumaria capreolata*		
Gastrolobium acutum	GGS06-03	? Gastrolobium prickly
**Gladiolus caryophyllaceus*		
Gonocarpus pithyoides	SCOPP02	Stackhousia like
Goodenia pulchella subsp. Coastal Plain B (L.W. Sage 2336)	SCKGHEopp4	Gooden lamp southwest
Hakea varia	GGS08-09	Hakea needle
Hemiandra pungens		
Hibbertia huegelii		
Isolepis oldfieldiana	Scopp21	?isolepis
Isolepis stellata	SCOPP22	Cyperus pond
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima	SCKGHEopp9	
Jacksonia gracillima	SCKGHEopp7	
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia gracillima		
Jacksonia sternbergiana		
**Juncus bufonius*	SCOPP24	Schoenus sprawling
Kennedia prostrata		
Kunzea glabrescens		
Kunzea glabrescens		
Lachnagrostis filiformis	Scopp21	Austrostipa compact
**Lactuca serriola*		
Laxmannia squarrosa		
Lechenaultia expansa	SCKGHEopp8	Scaevola blue
Leporella fimbriata		
Lepyrodia glauca		
Levenhookia stipitata	SCOPP23	Stylidium branching tiny
Lobelia tenuior	SCKGHEopp3	Lobelia common

**Lolium rigidum*		
**Lupinus luteus*		
**Lysimachia arvensis*		
Lysinema pentapetalum		
Macarthuria australis		
Macarthuria australis		
Macrozamia riedlei		
Melaleuca lateritia	GGS07-03	Melaleuca flat
Melaleuca preissiana		
Melaleuca preissiana		
Microtis media		
Monotaxis occidentalis	Scopp 01	Prostrate job
Nuytsia floribunda		
Nuytsia floribunda		
Nuytsia floribunda		
**Oenothera stricta*		
**Oenothera stricta*		
**Oxalis pes-caprae*		
**Oxalis pes-caprae*		
**Pelargonium capitatum*		
**Pelargonium capitatum*		
Petrophile linearis	GGS02-03	
Pimelea lanata	SCKGHEopp5	Phyllanthus lovely
Podotheca gnaphalioides		
Prasophyllum parvifolium		
Pterostylis crispula		
Pterostylis recurva		
Pterostylis vittata		
Pyrorchis nigricans		
**Raphanus raphanistrum*		
Regelia ciliata	SCKGHEopp1	Beaufortia elegans
Senecio multicaulis subsp. multicaulis		
Siloxerus humifusus	SCKGHEopp6	Siloxerus white
**Solanum nigrum*		
Stylidium brunonianum		
Stylidium piliferum		
Stylidium schoenoides		
Styphelia filifolia		
Styphelia filifolia		
Thysanotus arbuscula	SCKGHEopp2	Thysanotus branching
**Trifolium angustifolium*		
Tripterococcus brunonis	Scopp03	Tripterococcus huge
**Watsonia meriana*		
Xanthorrhoea brunonis		

Appendix H – Flora taxa list for the Study Area (Flora composition)

42 Zamiaceae

Macrozamia riedlei

80 Lauraceae

Cassytha racemosa forma *racemosa*

109 Colchicaceae

Burchardia congesta

115 Orchidaceae

Caladenia arenicola
Caladenia flava subsp. *flava*
Caladenia latifolia
Caladenia longicauda
Caladenia sp. (leaves)
* *Disa bracteata*
Diuris magnifica
Elythranthera brunonis
Leporella fimbriata
Microtis media subsp. *media*
Prasophyllum parvifolium
Pterostylis crispula
Pterostylis recurva
Pterostylis vittata
Pyrorchis nigricans

124 Iridaceae

* *Freesia alba* x *leichtlinii*
* *Gladiolus caryophyllaceus*
Patersonia occidentalis var. *occidentalis*
* *Watsonia meriana*

126 Xanthorrhoeaceae

Xanthorrhoea brunonis
Xanthorrhoea preissii

128 Asparagaceae

* *Asparagus asparagoides*
Chamaescilla corymbosa var. *corymbosa*
Laxmannia squarrosa
Lomandra preissii
Lomandra sonderi
Thysanotus arbuscula
Thysanotus multiflorus
Thysanotus sp.

130 Hemerocallidaceae

Arnocrinum preissii
Caesia occidentalis
Corynotheca micrantha var. *elongata*
Hensmania turbinata
Tricoryne elatior
Tricoryne tenella

138 Haemodoraceae

Anigozanthos humilis subsp. *humilis*
Anigozanthos manglesii subsp. *manglesii*
Blancoa canescens
Conostylis juncea
Conostylis setigera subsp. *setigera*
Conostylis sp.
Haemodorum spicatum
Phlebocarya ciliata

147 Dasypogonaceae

Dasypogon bromeliifolius

155 Juncaceae

* *Juncus bufonius*

156 Cyperaceae

Chaetospora curvifolia
Ficinia nodosa
Isolepis oldfieldiana
Isolepis stellata
Lepidosperma ?squamatum
Lepidosperma longitudinale
Lepidosperma pubisquameum
Lepidosperma sp. Margaret River (B.J. Lepschi 1841)
Schoenus efoliatus

157 Anarthriaceae

Lyginia barbata
Lyginia imberbis

159 Restionaceae

Desmocladus asper
Hypolaena exsulca
Leptocarpus scariosus
Lepyrodia glauca

163 Poaceae

Amphipogon turbinatus
Austrostipa compressa
* *Avena barbata*
* *Briza maxima*
* *Briza minor*
* *Bromus diandrus*
* *Cynodon dactylon*
* *Ehrharta calycina*
* *Eragrostis curvula*
Lachnagrostis filiformis
* *Lolium rigidum*
Neurachne alopecuroidea
* *Pentameris airoides*

166 Papaveraceae

* *Fumaria capreolata*

175 Proteaceae

Adenanthos cygnorum subsp. *cygnorum*
Adenanthos obovatus
Banksia attenuata
Banksia ilicifolia
Banksia menziesii
Banksia nivea subsp. *nivea*
Hakea varia
Persoonia saccata
Petrophile linearis
Stirlingia latifolia

181 Dilleniaceae

Hibbertia huegelii
Hibbertia hypericoides
Hibbertia subvaginata
Hibbertia vaginata

192 Crassulaceae

Crassula exserta

196 Haloragaceae

Gonocarpus pithyoides

201 Fabaceae

Acacia huegelii
* *Acacia longifolia* subsp. *longifolia*
Acacia pulchella var. *glaberrima*
Acacia pulchella var. *pulchella*
Acacia saligna
Acacia sessilis
Acacia stenoptera
Bossiaea eriocarpa
Euchilopsis linearis
Eutaxia virgata
Gastrolobium acutum
Gastrolobium capitatum
Gompholobium tomentosum
Hovea trisperma
Jacksonia gracillima (P3)
Jacksonia sternbergiana
Kennedia prostrata
* *Lupinus luteus*
* *Trifolium angustifolium*

217 Casuarinaceae

Allocasuarina fraseriana
Allocasuarina humilis

229 Celastraceae

Tripterococcus brunonis

232 Oxalidaceae

* *Oxalis pes-caprae*

242 Euphorbiaceae

* *Euphorbia terracina*
Monotaxis occidentalis

247 Phyllanthaceae

Poranthera microphylla

274 Geraniaceae

* *Pelargonium capitatum*

279 Onagraceae

* *Oenothera stricta*

281 Myrtaceae

Astartea affinis
Calothamnus hirsutus
Calothamnus lateralis var. *lateralis*
Calytrix angulata
Calytrix flavescens
Calytrix variabilis
Corymbia calophylla
Eremaea pauciflora var. *pauciflora*
Eucalyptus marginata
Eucalyptus todtiana
Hypocalymma angustifolium
Kunzea glabrescens
Melaleuca lateritia
Melaleuca preissiana
Melaleuca rhaphiophylla
Melaleuca seriata
Melaleuca teretifolia
Melaleuca thymoides
Melaleuca trichophylla
Pericalymma ellipticum var. *floridum*
Regelia ciliata

300 Rutaceae

Boronia dichotoma
Philotheca spicata

311 Thymelaeaceae

Pimelea ciliata
Pimelea lanata

332 Brassicaceae

* *Raphanus raphanistrum*

339 Loranthaceae

Nuytsia floribunda

346 Droseraceae

Drosera erythrorhiza
Drosera menziesii
Drosera stolonifera

364 Aizoaceae

* *Carpobrotus edulis*

368 Molluginaceae

Macarthuria australis

392 Primulaceae

* *Lysimachia arvensis*

403 Ericaceae

Conostephium pendulum
Lysinema pentapetalum
Styphelia conostephioides
Styphelia filifolia (P3)
Styphelia xerophylla

409 Rubiaceae

Opercularia vaginata

411 Loganiaceae

Phyllangium divergens
Phyllangium paradoxum

417 Solanaceae

* *Solanum nigrum*

432 Lamiaceae

Hemiandra pungens

450 Campanulaceae

Lobelia anceps
Lobelia tenuior

452 Stylidiaceae

Levenhookia stipitata
Stylidium brunonianum
Stylidium piliferum
Stylidium repens
Stylidium schoenoides

458 Goodeniaceae

Dampiera linearis
Goodenia pulchella subsp. Coastal Plain B (L.W. Sage 2336)
Lechenaultia expansa

460 Asteraceae

* *Arctotheca calendula*
* *Erigeron bonariensis*
Hyalosperma cotula
* *Hypochaeris glabra*
* *Lactuca serriola*
Podotheca gnaphalioides
Senecio multicaulis subsp. *multicaulis*
Siloxerus humifusus
* *Sonchus oleraceus*
* *Ursinia anthemoides*

472 Araliaceae

Trachymene pilosa

474 Apiaceae

Centella asiatica

Appendix I – Conservation significant flora locations

Species	Latitude	Longitude	Site ID	Date	No. of Individuals
Jacksonia gracillima (P3)	-32.09029139	115.956602	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.09043938	115.9566442	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.0904717	115.9564283	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.09015107	115.9563069	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.09023088	115.9563354	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.09081262	115.9570834	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.09006331	115.9564216	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.0901203	115.9564092	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.0902076	115.9566254	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.0904899	115.9569935	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.08927042	115.9558806	Opp	11/11/2020	1
Jacksonia gracillima (P3)	-32.08996018	115.9565141	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.0904368	115.9566792	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.0898666	115.9567468	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.08907934	115.9556622	Opp	10/11/2020	1
Jacksonia gracillima (P3)	-32.08980765	115.9561018	Opp	10/11/2020	3
Jacksonia gracillima (P3)	-32.09040826	115.9564703	Opp	11/11/2020	1
Jacksonia gracillima (P3)	-32.0901863	115.9558383	Opp	11/11/2020	1
Styphelia filifolia (P3)	-32.0899832	115.9562425	Opp	10/11/2020	1
Styphelia filifolia (P3)	-32.09001728	115.9564481	Opp	10/11/2020	1
Styphelia filifolia (P3)	-32.0901054	115.9563925	GGS-10	16/09/2020	1

Appendix J – Key diagnostic characteristics, criteria, and thresholds for Claypans of the Swan Coastal Plain (encompassing Clay pans with shrubs over herbs), adapted from (TSSC, 2012a, 2012b)

Clay pans with shrubs over herbs (Community type 117) (encompassed within Claypans SCP) TEC	
Key diagnostic characteristics	
Location and physical environment	The Clay pans with shrubs over herbs ecological community primarily occurs in the Swan Coastal Plain IBRA bioregion. o This covers the coastal plain from around Jurien Bay south, through Perth, to around Dunsborough. o Six small clay pans lie within the Jarrah Forest IBRA bioregion to the immediate east and south of the Swan Coastal Plain
Soils and landform	o Typically occurs on low-lying ephemeral clay-based wetlands where deposits of clay form a dense, compact, fairly impermeable layer in the soil or subsoil. The clay pans are generally not considered to be connected to the local groundwater. They fill during the winter rains and dry completely over summer; o There are two geomorphic types of clay pans on the Swan Coastal Plain: low lying areas of seasonally inundated/waterlogged clay flats (the most common type) ranging in size from a few square metres to hundreds of square metres; and, small basin clay pans from 0.5 ha to 10 ha in size. Both types are referred to as clay pans. o Community occurs across the Bassendean dunes, the Pinjarra Plain (predominantly occurs here) and the Ridge Hill shelf.
Structure	The vegetation of the ecological community generally occurs as a shrubland (less commonly as a low, open woodland) over a ground layer of geophytes, herbs and sedges which are characteristic of the wetter parts of the sites. There are no dominant species which characterise the entire ecological community. **Clay pans with shrubs over herbs (Community Type 117)** o These clay pans are predominantly deeper basin clay pans usually dominated by a shrubland of *Melaleuca lateritia* with a thick understorey of herbs. o This vegetation community type occurs on the Swan Coastal Plain with disjunct occurrences in the Jarrah Forest bioregion (including the adjacent Darling plateau at Drummond Nature Reserve). o These clay pans are characterised by the presence of aquatic taxa and amphibious taxa. Species richness is still high but is lower than in SCP07 and SCP08.
Composition	o Few to many (mostly a dominant layer) individuals of *Melaleuca lateritia* o A high richness of aquatic and amphibious flora taxa including, but not limited to: • Aphelia drummondii • *Aponogeton hexatepalus* (P4) • *Bulbine semibarbata* • *Caesia* sp. Wongan • *Caesia micrantha* • *Calandrinia* sp. Kenwick (G.J. Keighery 10905) • *Myriocephalus occidentalis* • *Myriophyllum drummondii* • *Myriophyllum echinatum* (P3) • *Myriophyllum limnophilum* • *Ophioglossum lusitanicum* • *Ornduffia submersa* (P4) • *Pauridia glabella*

Clay pans with shrubs over herbs (Community type 117) (encompassed within Claypans SCP) TEC		
	• *Centrolepis alepyroides* • *Centrolepis aristata* • *Centrolepis glabra* • *Centrolepis polygyna* • *Chamaescilla corymbosa* • *Cicendia filiformis* • *Cycnogeton lineare* • *Diuris laxiflora* • *Drosera gigantea* • *Drosera glanduligera* • *Drosera menziesii* • *Drosera stolonifera* • *Eleocharis acuta* • *Eleocharis keigheryi* (T) • *Eryngium pinnatifidum* subsp. *palustre* (P3) • *Glossostigma diandrum* • *Goodenia micrantha* • *Goodenia pulchella* • *Gratiola pubescens* • *Homalosciadium homalocarpum* • *Hyalosperma cotula* • *Hydrocotyle alata* • *Hydrocotyle callicarpa* • *Hydrocotyle lemnoides* (P4) • *Isoetes drummondii* • *Isolepis cernua* • *Isolepis congrua* • *Isolepis stellata* • *Isotoma hypocrateriformis* • *Isotoma pusilla* • *Lachnagrostis filiformis*	• *Pauridia occidentalis* • *Philydrella drummondii* • *Philydrella pygmaea* • *Prasophyllum macrostachyum* • *Ranunculus sessiliflorus* • *Rhodanthe pyrethrum* • *Schoenus capillifolius* (P3) • *Schoenus elegans* • *Schoenus natans* (P4) • *Schoenus odontocarpus* • *Schoenus sculptus* • *Schoenus tenellus* • *Sebaea ovata* • *Siloxerus humifusus* • *Siloxerus multiflorus* • *Stylidium ecorne* • *Stylidium inundatum* • *Stylidium longitubum* (P3) • *Stylidium calcaratum* • *Stylidium obtusatum* • *Stylidium roseoalatum* • *Stylidium roseonanum* (P3) • *Thelymitra antennifera* • *Thelymitra vulgaris* • *Thysanotus patersonii* • *Thysanotus thyrsoideus* • *Tribonanthes longipetala* • *Tribonanthes violacea* • *Triglochin centrocarpa* • *Triglochin minutissima* • *Triglochin stowardii*

Clay pans with shrubs over herbs (Community type 117) (encompassed within Claypans SCP) TEC		
	• *Lachnagrostis plebeia* • *Leptocarpus canus* • *Leptocarpus coangustatus* • *Liparophyllum capitatum* • *Marsilea drummondii* • *Microtis media* • *Microtis orbicularis* • *Myriocephalus appendiculatus*	• *Trithuria bibracteata* • *Trithuria submersa* • *Utricularia inaequalis* • *Utricularia multifida* • *Utricularia violacea* • *Wurmbea dioica*
Condition/ Patch size thresholds		
To be considered as part of the EPBC Act ecological community, a patch should have a functioning hydrologic regime and meet at least the Good Condition 'Pristine' o Native plant species diversity fully retained or almost so o Zero or almost so weed cover/abundance o No minimum patch size applies 'Excellent' o High native plant species diversity o Less than 10% weed cover o 0.5 ha or 5,000 m2 (e.g. 50 m x 100 m) 'Very Good' o Moderate native plant species diversity o 5 – 20% weed cover o 1 ha or 10,000 m2 (e.g. 100 m x 100 m) 'Good' o Low native plant species diversity o 5 – 50% weed cover o 2 ha or 20,000 m2 (e.g. 200 m x 100 m) 'Degraded' o Very low native plant species diversity o 20 – 70% weed cover 'Completely Degraded'		

Clay pans with shrubs over herbs (Community type 117) (encompassed within Claypans SCP) TEC	
o Very low to no native species diversity o Greater than 70% weed cover	
Further considerations	
Sampling protocols	o Sampling to start in the area of maximum apparent native plant species diversity o Minimum of one hour per plot o Plot sizes of at least 100 m^2 o Larger and more variable areas require more samples/ plots o Recording of search effort i.e. person hours per plot and across the entire patch, surveyor's level of expertise o Recording of landscape variables
Survey timing	o Surveys should be undertaken in spring with two sampling periods, one in early-mid spring and a second in late spring o Timing of surveys in recently disturbed areas should allow for a reasonable interval after the disturbance (natural or human-induced) to allow for regeneration of species to become evident and be timed to enable component species to be identified
Patch definition	o A patch is a discrete and mostly continuous area of the ecological community. o A patch may include small-scale (<30 m) variations, gaps and disturbances, such as tracks, paths or breaks (including exposed soil, leaf litter, cryptogams and watercourses/drainage lines), or localised variations in vegetation that do not significantly alter the overall functionality of the ecological community. Such breaks are generally included in patch size calculations. o Where there is a break in native vegetation cover, from the edge of the tree canopy of 30 m or more (e.g. due to permanent artificial structures, wide roads or other barriers; or due to water bodies typically more than 30m wide) then the gap typically indicates that separate patches are present.
Buffer zone	o A buffer zone is a contiguous area immediately adjacent to a patch of the ecological community that is important for protecting its integrity o Recommended minimum buffer zone is 20 – 50 m from outer edge of a patch o A larger buffer zone should be applied, where practical, to protect patches that are of particularly high conservation value, or if patches are down slope of drainage lines or a source of nutrient enrichment, or groundwater drawdown
Other significance considerations	o Large size and or area to boundary ratio o Diversity of fauna habitat, or patches that contribute to movement corridors o High species richness (either flora or fauna) o Connectivity to other native vegetation remnants e.g. linear road reserves o Absence or limited symptoms of dieback o Occurrence of a patch is:

Clay pans with shrubs over herbs (Community type 117) (encompassed within Claypans SCP) TEC	
	- In an area where the ecological community has been most heavily cleared and degraded, so is locally or regionally at risk - Of a floristic community type that is recognised as a threatened or priority ecological community by the Western Australian government - At the edge of the range of the ecological community

Appendix K – Fauna habitat assessment undertaken during the current survey

Latitude	Longitude	Site	Habitat Description	Aspect	Slope	Soil Type	Soil Avail.	Outcrop	Rock Size	Veg Litter	Vegetation Types	Last Fire	Disturbances	Habitat condition	Rocky cracks/crevices	Burrowing suitability	Water Presence
-32.0875	115.9548	VGDN-01	Cleared	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Scarce	*Adenanthos sericeus*, mixed grasses	Old (6+ yr)		0.1	Nil	Very High	None
-32.0875	115.9548	VGDN-02	Banksia Woodland	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Evenly Spread	Banksia Woodland	Old (6+ yr)	Weed Invasion, Potential Dieback, Rubbish/ Litter	0.6	Nil	Very High	None
-32.0875	115.9548	VGDN-03	Banksia Woodland	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Evenly Spread	Scattered eucalypt, *Banksia* Woodland over open understorey of Xanthorrhoea and mixed grasses	Old (6+ yr)	Potential Dieback, Weed Invasion	0.6	Nil	Very High	None
-32.0875	115.9548	VGDN-04	Banksia Woodland	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Evenly Spread	*Banksia* Woodland over open understorey of Xanthorrhoea and mixed grasses	Old (6+ yr)	Weed Invasion	0.8	Nil	Very High	None
-32.0875	115.9548	VGDN-06	Melaleuca Thicket	Flat	Flat	Sandy Loam	Evenly Spread	Negligible	Negligible	Evenly Spread	Melaleuca over teatree over sedge	Old (6+ yr)		0.8	Nil	Very High	Prone to Pooling
-32.0875	115.9548	VGDN-05	Melaleuca Thicket	Flat	Flat	Sandy Loam	Evenly Spread	Negligible	Negligible	Evenly Spread	Melaleuca over mixed sedge	Old (6+ yr)		0.8	Nil	Very High	Prone to Pooling
-32.0875	115.9548	VGDN-07	Banksia Woodland	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Evenly Spread	Scattered eucalypt, *Banksia* Woodland over open understorey of Xanthorrhoea and mixed grasses	Old (6+ yr)	Rubbish/Litter, Weed Invasion	0.6	Nil	Very High	None
-32.0875	115.9548	VGDN-08	Cleared	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Few Small Patches	Mixed grasses	Old (6+ yr)	Weed Invasion	0.1	Nil	Very High	None
-32.0875	115.9548	VGDN-09	Banksia Woodland	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Evenly Spread	Scattered eucalypt, *Banksia* Woodland over open understorey of Xanthorrhoea and mixed grasses	Old (6+ yr)	Weed Invasion	0.8	Nil	Very High	None
-32.0875	115.9548	VGDN-10	Cleared	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Scarce	*Adenanthos sericeus*, mixed grasses	Old (6+ yr)		0.1	Nil	Very High	None
-32.0875	115.9548	VGDN-11	Banksia Woodland	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Evenly Spread	banksia x2, sheoak, woolly bush, grasses	Old (6+ yr)	Weed Invasion	0.8	Nil	Very High	None
-32.0875	115.9548	VGDN-12	Banksia Woodland	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Evenly Spread	Scattered eucalypt, *Banksia* Woodland over open understorey of Xanthorrhoea and mixed grasses	Old (6+ yr)	Weed Invasion	0.8	Nil	Very High	None
-32.0875	115.9548	VGDN-13	Banksia Woodland	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Evenly Spread	Scattered eucalypt, *Banksia* Woodland over open understorey of Xanthorrhoea and mixed grasses	Old (6+ yr)	Weed Invasion	0.8	Nil	Very High	None
-32.0875	115.9548	VGDN-14	Banksia Woodland	Flat	Flat	Sand	Evenly Spread	Negligible	Negligible	Many Small Patches	*Banksia* Woodland over open mixed lower story of Xanthorrhoea, *Zamia*, and mixed sedges	Old (6+ yr)	Potential dieback	0.4	Nil	Very High	None

Appendix L – Conservation significant fauna species likelihood assessment

Species	Conservation Status			Preferred Broad Habitats	Within Current Known Distribution	Distance to Nearest Record - Year	Potential Habitat Within Study Area	Recorded Within Study Area	Likelihood of Occurrence
	EPBC Act	BC Act	DBCA						
MAMMALS									
Brush-tailed bettong, woylie (*Bettongia penicillata ogilbyi*)	EN	EN		Woodlands and adjacent heaths with a dense understorey of shrubs particularly *Gastrolobium* sp. (Woinarski *et al.*, 2014). Species confined to two indigenous colonies in south-west and a small number of reintroduced areas (Start *et al.*, 1995).	No	~28.05 km N (2018) (DBCA, 2020a)	Yes	No	Highly unlikely – species restricted to known populations
Quokka (*Setonix brachyurus*)	VU	VU		Habitat varies but prefer *Acacia* and *Melaleuca* thickets. In Jarrah Forest associated with tea-tree, *Taxandria linearifolia* (de Tores, 2008).	No	~9.60 km E (2011) (DBCA, 2020a)	Yes	No	Highly unlikely – species restricted to known populations
Western quoll, chuditch (*Dasyurus geoffroii*)	VU	VU		In the Jarrah forest, Chuditch occur in moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest particularly in Riparian vegetation (Orell & Morris, 1994)	Yes	4.2 km E (1972) (DBCA, 2020b)	No	No	Unlikely
Wambenger brush-tailed phascogale (*Phascogale tapoatafa wambenger*)		CD		Dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover (Woinarski *et al.*, 2014).	Yes	4.20 km E (1999) (DBCA, 2020b)	Marginal	No	Unlikely
Quenda, southern brown bandicoot (*Isoodon fusciventer*)	-		P4	Jarrah Forest and swamp habitats, preferring dense vegetation around wetland fringes and heathland (Cooper, 1998; Woinarski *et al.*, 2014).	Yes	0.40 km NW (2017) (DBCA, 2020b)	Yes	Yes	Confirmed
Water rat, rakali (*Hydromys chrysogaster*)			P4	Permanent bodies of fresh or brackish water, subalpine streams to lakes and farm dams and on sheltered coastal beaches, mangroves and offshore islands (van Dyck & Strahan, 2008).	Yes	~1.70 km E (1975) (DBCA, 2020a)	No	No	Unlikely
Western brush wallaby (*Notamacropus irma*)	-		P4	The species inhabits a wide-range of habitats including low Banksia woodlands, Jarrah/Marri woodlands and moist *Melaleuca* lowlands, favours open, grassy areas (Wann & Bell, 1997; Woinarski *et al.*, 2014).	Yes	~3.60 km SW (1997) (DBCA, 2020a)	Marginal	No	Unlikely
BIRDS									
Australasian bittern (*Botaurus poiciloptilus*)	EN	EN		Beds of tall dense *Typha baumea* and sedges in freshwater swamps (Johnstone & Storr, 1998).	Yes	2 records ~3.70 km NW (1981) (DBCA, 2020b)	No	No	Highly Unlikely
Baudin's cockatoo (*Calyptorhynchus baudinii*)	EN	EN		Species forages primarily in Eucalypt forest, feeding on Marri nuts, flowers, nectar and seeds (Johnstone & Storr, 1998). Nesting trees are Karri, Marri, and Wandoo (Johnstone & Kirkby, 2008).	Yes	~2.30 km W (1981) (DBCA, 2020a)	No	No	Unlikely
Carnaby's cockatoo (*Calyptorhynchus latirostris*)	EN	EN		Proteaceous scrubs and heaths and adjacent eucalypt woodlands and forests (Johnstone & Storr, 1998).	Yes	~0.45 km N (2007) (DBCA, 2020b)	Yes	Yes	Confirmed
Australian painted snipe (*Rostratula australis)*	EN	EN		Generally, occupies shallow terrestrial freshwater wetlands (i.e. temporary and permanent lakes, swamps and claypans) with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire (Johnstone & Storr, 1998).	Yes	2 records ~12.55 km NW (2012) (DBCA, 2020a)	Yes	No	Highly Unlikely
Forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*)	VU	VU		Eucalypts forests. Attracted to seeding Marri, Jarrah, Blackbutt, Karri and Sheoak (Johnstone & Storr, 1998).	Yes	~0.55 km SE (2016) (DBCA, 2020b)	No	Yes	Confirmed – within ~25 m outside Study Area
Malleefowl (*Leipoa ocellata*)	VU	VU		Inhabits semi-arid shrublands and low woodlands dominated by mallee eucalypts and/or *Acacia*s with sandy loam soils (Benshemesh, 2007).	Yes	~16.90 km NW (1979) (DBCA, 2020a)	No	No	Highly Unlikely
Greater sand plover (Charadrius leschenaultia)	VU/ MI	VU/ MI		Inhabits sheltered sandy, shelly or muddy beaches, large intertidal mudflats, sandbanks, salt-marshes, estuaries, coral reefs, rocky islands, tidal lagoons and dunes near the coast (BirdLife International, 2020).	No	2 records ~3.75 km NW (1979) (DBCA, 2020b)	No	No	Highly Unlikely
Curlew sandpiper *(Calidris ferruginea)*	CR/ MI	CR/ MI		Inhabits intertidal mudflats in sheltered coastal areas (i.e. estuaries, bays, inlets and lagoons) (Geering *et al.*, 2007). This rare species generally roosts on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands (Geering *et al.*, 2007).	No	~3.70 km NW (1981) (DBCA, 2020b)	No	No	Highly Unlikely
Great knot *(Calidris tenuirostris)*	MI	MI		Breeds in the subarctic on montane tundra. Non-breeding birds migrate to harbours, bays, inlets, estuaries and lagoons with large intertidal sand and mud flats (Garnett *et al.*, 2011).	No	~3.75 km NE (1980) (DBCA, 2020b)	No	No	Highly Unlikely
Common sandpiper (*Actitis hypoleucos*)	MI	MI		Estuaries and deltas of streams, as well as banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans (Johnstone & Storr, 1998).	No	4 records ~2.85 km NW (1981) (DBCA, 2020a)	No	No	Highly Unlikely
Fork-tailed swift (*Apus pacificus*)	MI	MI		Aerial species, which forages high above the tree canopy and rarely lower (Johnstone & Storr, 1998).	Yes	~11.25 km W (2016)	Yes	No	Possible
Grey wagtail (*Motacilla cinerea*)	MI	MI		A rare vagrant to Western Australia where it has been recorded within various habitats with open waterbodies (Johnstone & Storr, 2004).	Yes	~308.45 km S (2013) (DBCA, 2020a)	Yes	No	Highly Unlikely

Species	Conservation Status			Preferred Broad Habitats	Within Current Known Distribution	Distance to Nearest Record - Year	Potential Habitat Within Study Area	Recorded Within Study Area	Likelihood of Occurrence
	EPBC Act	BC Act	DBCA						
Oriental pratincole (*Glareola maldivarum*)	MI	MI		Prefers open plains, floodplains or short grasslands, often with extensive bare areas. They often occur near terrestrial wetlands (such as billabongs, lakes or creeks), and artificial wetlands (such as reservoirs, saltworks and sewage farms) (Johnstone & Storr, 1998).	No	4 records ~2.55 km NW (1981) (DBCA, 2020a)	No	No	Highly Unlikely
Pectoral sandpiper (*Calidris melanotos*)	MI	MI		Coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (Johnstone & Storr, 2004; Johnstone *et al.*, 2013). It prefers wetlands with open fringing mudflats and low, emergent or fringing vegetation (Geering *et al.*, 2007).	Yes	3 records ~3.75 km NE (1979) (DBCA, 2020b)	No	No	Highly Unlikely
Sharp-tailed sandpiper (*Calidris acuminata)*	MI	MI		Coastal and inland areas saline and freshwater but prefers non-tidal fresh or brackish wetlands (Geering *et al.*, 2007)	No	2 records ~3.75 km NE (1981) (DBCA, 2020b)	No	No	Highly Unlikely
Osprey (*Pandion haliaetus)*	MI	MI		Occurs mainly in sheltered seas around islands, tidal creeks, estuaries and saltwork ponds, also large river pools (Johnstone *et al.*, 2013)	No	~3.60 km W (1981)	No	No	Unlikely
Common greenshank *(Tringa nebularia)*	MI	MI		Species occurs as a non-breeding summer Migrant which occurs throughout the region. Occurs mainly in Tidal mudflats, mangrove creeks, flooded samphire flats, beaches, river pools, and saltwork and sewage ponds (Johnstone *et al.*, 2013).	Yes	~2.75 km NE (1991) (DBCA, 2020b)	No	No	Highly Unlikely
Wood sandpiper (*Tringa glareola)*	MI	MI		Freshwater wetlands and occasional brackish intertidal mudflats (Geering *et al.*, 2007).	No	~3.780 km NW (1981) (DBCA, 2020b)	No	No	Highly Unlikely
Marsh sandpiper (*Tringa stagnatilis*)	MI	MI		Lives in permanent or ephemeral wetlands of varying salinity, and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. In Western Australia they prefer freshwater to marine environments. The species usually forages in shallow water at the edge of wetlands and roost or loaf on tidal mudflats, near low saltmarsh, and around inland swamps (Johnstone & Storr, 1998).	No	~3.75 km NE (1981) (DBCA, 2020b)	No	No	Highly Unlikely
Red-necked stint (Calidris ruficollis)	MI	MI		Lives in permanent or ephemeral wetlands of varying salinity, and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. In Western Australia they prefer freshwater to marine environments. The species usually forages in shallow water at the edge of wetlands and roost or loaf on tidal mudflats, near low saltmarsh, and around inland swamps (Johnstone & Storr, 1998).	No	3 records ~3.75 km NE (1981) (DBCA, 2020b)	No	No	Highly Unlikely
Long-toed stint (*Calidris subminuta*)	MI	MI		They prefer shallow freshwater or brackish wetlands but are also fond of muddy shorelines, growths of short grasses, weeds, sedges, low or floating aquatic vegetation, reeds, rushes and occasionally stunted samphire. The Long-toed Stint also frequents permanent wetlands and forages on wet mud or in shallow water, often among short grass, weeds and other vegetation on islets or around the edges of wetlands. They roost or loaf in sparse vegetation at the edges of wetlands and on damp mud near shallow water. It also roosts in small depressions in the mud (Johnstone & Storr, 1998).	No	2 records ~3.75 km NE (1981) (DBCA, 2020b)	No	No	Highly Unlikely
Gull-billed tern (*Gelochelidon macrotarsa*)	MI	MI		Shallow sheltered seas close to land, estuaries, tidal creeks; and inundated samphire flats, flooded salt lakes, claypans and watercourses in the interior (Johnstone & Storr, 1998).	No	~~11.15 km NW (2015) DBCA, 2020a)	No	No	Highly Unlikely
Caspian tern (*Hydroprogne caspia*)	MI	MI		Mainly sheltered seas, estuaries and tidal creeks; occasionally near-coastal salt lakes (including saltwork ponds) and brackish pools in lower courses of rivers; rarely fresh water (Johnstone & Storr, 1998).	No	~2.30 km W (1981) (DBCA, 2020a)	No	No	Highly Unlikely
White-winged black tern (*Chlidonias leucopterus*)	MI	MI		Mainly estuaries and sheltered seas in north, mainly freshwater swamps and lakes in the south; also samphire and short-grass flats, saltlakes, saltwork and sewage ponds (Johnstone & Storr, 1998).	Yes	~10.70 km W (2013) (DBCA, 2020a)	No	No	Highly Unlikely
Glossy ibis *(Plegadis falcinellus)*		MI		Freshwater wetlands, irrigated areas, margins of dams, floodplains, brackish and saline wetlands, tidal mudflats, pastures, lawns and public gardens (Johnstone *et al.*, 2013).	Yes	2 records ~3.75 km NE (1981) (DBCA, 2020b)	Yes	No	Highly Unlikely
Peregrine falcon *(Falco peregrinus)*		OS		The species occurs along coastal cliffs, rivers and ranges as well as wooded watercourses and lakes nesting on cliffs, granite outcrops, quarries and in the wheatbelt, old Raven and Whistling Kite nests (Johnstone & Storr, 1998).	Yes	4 records ~3.75 km NE (1981) (DBCA, 2020b)	Yes	No	Unlikely
Blue-billed duck (*Oxyura australis*)	-		P4	Mainly deep freshwater swamps and lakes; occasionally salt lakes and estuaries freshened by flood waters (Johnstone & Storr, 1998).	Yes	~3.75 km NE (1981) (DBCA, 2020b)	No	No	Highly Unlikely
Ruff *(Philomachus pugnax)*	MI	MI		Mainly fresh, brackish and saline wetlands with exposed mudflats. Found near lakes, swamps, pools, lagoons, tidal rivers and floodlands. Sometimes observed in sheltered coastal areas, including harbours and estuaries (DoEE, 2019).	No	~3.75 km NE (1980) (DBCA, 2020b)	No	No	Highly Unlikely
Little ringed plover *(Charadrius dubius)*	MI	MI		Bare or sparsely vegetated sandy and pebbly shores of shallow standing freshwater pools, lakes or slow-flowing rivers. Also found in artificial habitats including gravel pits, sewage works, industrial wastelands and rubbish tips (Geering *et al.*, 2007).	No	~3.75 km NE (1981) (DBCA, 2020b)	No	No	Highly Unlikely

Species	Conservation Status			Preferred Broad Habitats	Within Current Known Distribution	Distance to Nearest Record - Year	Potential Habitat Within Study Area	Recorded Within Study Area	Likelihood of Occurrence
	EPBC Act	BC Act	DBCA						
Bar-tailed godwit (*Limosa lapponica*)	MI	MI		Found mainly in coastal habitats like estuaries, tidal mudflats, shallow river margins, sewage ponds, brackish or saline inland lakes, airfields and flooded pastures (Pizzey & Knight, 2007).	No	2 records ~3.75 km NE (1981) (DBCA, 2020b)	No	No	Highly Unlikely
Grey plover (*Pluvialis squatarola*)	MI	MI		Inhabits intertidal mudflats, saltmarshes, sandflats and beaches, tidal reefs, estuaries and is rarely found inland. (Garnett *et al.*, 2011; Pizzey & Knight, 2007).	No	~3.75 km NE (1980) (DBCA, 2020b)	No	No	Highly Unlikely
Fairy tern (*Sterna nereis nereis)*	VU	VU		Found on sheltered coasts, and in fresh and saline wetlands. Nests on sandy beaches (Garnett *et al.*, 2011).	No	9.95 km NW (2000) (DBCA, 2020a)	No	No	Highly Unlikely
Red knot (*Calidris canutus*)	EN/ MI	EN/ MI		Found in mudflats and sandflats in estuaries, on sheltered coasts, near coastal saltlakes, and saltworks ponds (Johnstone & Storr, 1998)	No	~3.75 km NE (1980) (DBCA, 2020b)	No	No	Highly Unlikely
Pacific golden plover (*Pluvialis fulva*)	MI	MI		Found in estuaries, mudflats, saltmarshes, mangroves, rocky reefs and seaweed stranded on ocean shores (Pizzey & Knight, 2007).	No	~3.75 km NE (1981) (DBCA, 2020b)	No	No	Highly Unlikely
Black-tailed godwit (*Limosa limosa*)	MI	MI		Found mainly in coastal habitats like estuaries, tidal mudflats, sandspits, shallow river margins, sewage ponds. Inland habitats include large shallow fresh or brackish waters (Pizzey & Knight, 2007).	No	~3.75 km NE (1979) (DBCA, 2020b)	No	No	Highly Unlikely
Grey-tailed tattler (*Tringa brevipes*)	MI	MI	P4	Found mainly in tidal mudflats, estuaries; shores and reefs of islands and coastal swamps and commercial salt fields (Pizzey & Knight, 2007).	No	2.65 km NW (1981) (DBCA, 2020a)	No	No	Highly Unlikely
Letter-winged kite (*Elanus scriptus*)			P4	Habitats for this species include grasslands with trees and tree-lined watercourses (Pizzey & Knight, 2007).	No	~3.75 km W (1977) (DBCA, 2020a)	No	No	Highly Unlikely
REPTILES									
Dell's skink (*Ctenotus delli*)	-		P4	Dry sclerophyll forest on stony hills and ranges (Cogger, 2014), but otherwise undocumented.	No	~4.50 km N (1986) (DBCA, 2020a)	No	No	Unlikely
Perth slider *Lerista lineata*			P3	Found in loose soil or sand, particularly in coastal heaths and low shrublands (Cogger, 2014).	Yes	4 records ~6.20 km N (2018) (DBCA, 2020a)	No	No	Possible
Black-striped snake (*Neelaps calonotos*)	-		P3	Found in dunes and sand plains with heath and eucalypt/banksia woodlands, along the sandy coastal strip from Mandurah to Lancelin (Wilson & Swan, 2014)	Yes	~4.70 km W (2011) (DBCA, 2020a)	No	No	Possible
Ctenotus gemmula ssp. 'Swan Coastal Plain population'			P3	Inhabit pale sand plains supporting heaths in association with banksia or mallee woodlands (Wilson & Swan, 2014).	No	~8.30 km SW (1973) (DBCA, 2020a)	Marginal	No	Unlikely
Ctenotus ora			P3	Inhabit eucalypt over *Banksia* and low vegetation on sandy coastal plains and coastal dunes (Wilson & Swan, 2014).	Yes	~2.70 km E (no date), 6 records 15.41km N (1965) (DBCA, 2020a)	No	No	Unlikely

Appendix M – Summarised results of vertebrate fauna database searches

Scientific Name	Common Name	EPBC	BC	DBCA	IUCN	NatureMap (DBCA, 2020a)	Birdlife (BirdLife Australia, 2020b)	DBCA (DBCA, 2020a)	EPBC Protected Matters (DAWE, 2020)	ALA (ALA, 2020)	PGV (2016)	Natural Area (2016b)	Terrestrial Ecosystems (2014)	Terrestrial Ecosystems (2016)	ENV (2010)	CMPS&F (1993)	Golder Associates (2016)	Natural Area (2016a)	360 Environmental (2018b)	Current Survey
MAMMALS																				
BOVIDAE																				
Bos taurus	*European cattle					•			Likely	•										
Capra hircus	*Goat								Likely											
BURRAMYIDAE																				
Cercartetus concinnus	Western pygmy-possum					•				•										
CANIDAE																				
Canis familiaris	*Dog								Likely			•						•		•
Vulpes vulpes	*Red fox					•			Likely	•		•						•		
DASYURIDAE																				
Antechinus flavipes	Yellow-footed antechinus					•				•										
Dasyurus geoffroii	Chuditch	VU	VU			•			Known	•										
Phascogale tapoatafa wambenger	Wambenger brush-tailed phascogale		CD			•				•										
Sminthopsis fuliginosus	Grey-bellied dunnart									•										
Sminthopsis gilberti	Gilbert's dunnart					•				•										
Sminthopsis murina	Common dunnart									•										
FELIDAE																				
Felis catus	*Cat					•			Likely	•		•						•		•
LEPORIDAE																				
Oryctolagus cuniculus	*Rabbit					•			Likely	•		•	•		•			•		•
MACROPODIDAE																				
Macropus fuliginosus	Western grey kangaroo					•				•										
Notamacropus irma	Western brush wallaby			P4		•														
Setonix brachyurus	Quokka	VU	VU						Likely											
MOLOSSIDAE																				
Austronomus australis	White-striped freetail-bat					•														
MURIDAE																				
Hydromys chrysogaster	Water-rat			P4		•														
Mus musculus	*House mouse					•			Likely	•		•						•		
Rattus norvegicus	*Brown rat								Likely											
Rattus rattus	*Black rat					•			Likely	•										
MYRMECOBIIDAE																				
Myrmecobius fasciatus	Numbat	EN	EN			•														
PERAMELIDAE																				
Isoodon fusciventer	Southern brown bandicoot			P4		•				•		•	•			•		•		•
PHALANGERIDAE																				
Trichosurus vulpecula	Common brushtail possum					•										•				•
POTOROIDAE																				
Bettongia penicillata	Woylie	EN	CR						Likely											

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PSEUDOCHEIRIDAE																				
Pseudocheirus occidentalis	Western ringtail possum, ngwayir	CR	CR						May											
SCIURIDAE																				
Funambulus pennanti	*Indian palm squirrel					•			Likely	•										
SUIDAE																				
Sus scrofa	*Pig								Likely											
TACHYGLOSSIDAE																				
Tachyglossus aculeatus	Short-beaked echidna					•				•										
TARSIPEDIDAE																				
Tarsipes rostratus	Honey possum					•				•										
VESPERTILIONIDAE																				
Chalinolobus gouldii	Gould's wattled bat					•				•										
Chalinolobus morio	Chocolate wattled bat	LOCALLY SIG				•				•										
Nyctophilus geoffroyi	Lesser long-eared bat					•				•										
Nyctophilus major	Greater long-eared bat					•														
Vespadelus regulus	Southern forest bat					•				•										
BIRDS																				
ACANTHIZIDAE																				
Acanthiza apicalis	Inland thornbill					•				•										•
Acanthiza chrysorrhoa	Yellow-rumped thornbill					•				•		•						•		•
Acanthiza inornata	Western thornbill					•				•										
Calamanthus campestris	Rufous fieldwren									•										
Calamanthus cauta	Shy heathwren									•										
Gerygone fusca	Western gerygone					•				•										•
Sericornis frontalis	White-browed scrubwren					•				•										
Smicrornis brevirostris	Weebill					•				•										
ACCIPITRIDAE																				
Accipiter cirrocephalus	Collared sparrowhawk					•				•						•				
Accipiter fasciatus	Brown goshawk					•				•		•						•		
Aquila audax	Wedge-tailed eagle					•				•										
Circus approximans	Swamp harrier					•				•										
Circus assimilis	Spotted harrier					•				•										
Elanus axillaris	Black-shouldered kite					•				•										
Elanus scriptus	Letter-winged kite			P4	NT					•										
Haliaeetus leucogaster	White-bellied sea-eagle					•			Known	•										
Haliastur sphenurus	Whistling kite					•				•										
Hamirostra isura	Square-tailed kite					•				•										
Hieraaetus morphnoides	Little eagle					•				•										
Milvus migrans	Black kite					•				•										

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Pandion haliaetus	Osprey, eastern osprey	MI	MI			•			Known	•										
ACROCEPHALIDAE																				
Acrocephalus australis	Australian reed warbler					•				•										
AEGOTHELIDAE																				
Aegotheles cristatus	Australian owlet-nightjar					•				•										
ALCEDINIDAE																				
Dacelo novaeguineae	Laughing kookaburra					•				•						•				
Todiramphus sanctus	Sacred kingfisher					•				•										
ANATIDAE																				
Anas castanea	Chestnut teal					•				•										
Anas gracilis	Grey teal					•				•										
Anas platyrhynchos	*Mallard					•			Likely	•										
Anas rhynchotis	Australasian shoveler					•				•										
Anas superciliosa	Pacific black duck					•				•					•					
Aythya australis	Hardhead					•				•										
Biziura lobata	Musk duck					•				•										
Chenonetta jubata	Australian wood duck					•				•										
Cygnus atratus	Black swan					•				•										
Cygnus olor	*Mute swan					•				•										
Dendrocygna arcuata	Wandering whistling duck									•										
Malacorhynchus membranaceus	Pink-eared duck					•				•										
Oxyura australis	Blue-billed duck			P4	NT	•				•										
Stictonetta naevosa	Freckled duck					•				•										
Tadorna tadornoides	Australian shelduck					•				•		•						•		
ANHINGIDAE																				
Anhinga novaehollandiae	Australiasian darter					•				•										
APODIDAE																				
Apus pacificus	Fork-tailed swift	MI	MI			•			Likely	•										
ARDEIDAE																				
Ardea garzetta	Little egret					•				•										
Ardea ibis	Cattle egret					•			May	•										
Ardea intermedia	Intermediate egret					•				•										
Ardea modesta	Eastern great egret					•			Known	•										
Ardea novaehollandiae	White-faced heron					•				•										
Ardea pacifica	White-necked heron					•				•										
Ardea sacra	Eastern reef egret					•				•										
Botaurus poiciloptilus	Australasian bittern	EN	EN			•			Known	•										
Ixobrychus flavicollis	Black bittern									•										
Nycticorax caledonicus	Rufous night heron					•				•		•								

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Nycticorax nycticorax	Nankeen night heron																	•		•
ARTAMIDAE																				
Artamus cinereus	Black-faced woodswallow					•				•		•						•		•
Artamus cyanopterus	Dusky woodswallow					•				•										
Artamus personatus	Masked woodswallow					•				•										
Cracticus nigrogularis	Pied butcherbird					•				•										
Cracticus tibicen	Australian magpie					•				•		•			•	•		•		•
Cracticus torquatus	Grey butcherbird					•				•		•						•		•
BURHINIDAE																				
Burhinus grallarius	Bush stone-curlew					•				•										
CACATUIDAE																				
Cacatua leadbeateri	Major mitchell's cockatoo		EX							•										
Cacatua pastinator	Western long-billed corella					•				•										
Cacatua roseicapilla	Galah					•				•		•				•		•		•
Cacatua sanguinea	Little corella					•				•										
Calyptorhynchus banksii naso	Forest red-tailed black cockatoo	VU	VU			•	•		Known	•			•		•					•
Calyptorhynchus baudinii	Baudin's cockatoo	EN	EN			•	•		Known	•							•			
Calyptorhynchus latirostris	Carnaby's cockatoo	EN	EN			•	•		Known	•		•						•	•	•
CAMPEPHAGIDAE																				
Coracina novaehollandiae	Black-faced cuckoo-shrike					•				•		•			•			•		•
Lalage tricolor	White-winged triller					•				•										•
CAPRIMULGIDAE																				
Eurostopodus argus	Spotted nightjar					•				•										
DROMAIIDAE																				
Dromaius novaehollandiae	Emu					•				•										
CHARADRIIDAE																				
Charadrius dubius	Little ringed plover	MI	MI						Known	•										
Charadrius leschenaultii	Greater sand plover	VU/MI	VU/MI			•				•										
Charadrius melanops	Black-fronted dotterel					•				•										
Charadrius ruficapillus	Red-capped plover					•			Known	•										
Erythrogonys cinctus	Red-kneed dotterel					•				•										
Peltohyas australis	Inland dotterel									•										
Pluvialis fulva	Pacific golden plover	MI	MI			•				•										
Pluvialis squatarola	Grey plover	MI	MI			•				•										
Thinornis cucullatus	Hooded plover								Likely											
Vanellus miles	Masked lapwing					•				•										
Vanellus tricolor	Banded lapwing					•				•										
CLIMACTERIDAE																				
Climacteris rufa	Rufous treecreeper									•										

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COLUMBIDAE																				
Columba livia	*Domestic pigeon					•			Likely	•										
Geopelia striata	Peaceful dove									•										
Ocyphaps lophotes	Crested pigeon					•				•		•						•		
Phaps chalcoptera	Common bronzewing					•				•										
Phaps elegans	Brush bronzewing					•				•										
Streptopelia chinensis	*Spotted turtle-dove					•			Likely	•										•
Streptopelia senegalensis	*Laughing turtle-dove					•			Likely	•		•						•		•
CORVIDAE																				
Corvus bennetti	Little crow					•				•										
Corvus coronoides	Australian raven					•				•		•			•			•		•
CUCULIDAE																				
Cacomantis flabelliformis	Fan-tailed cuckoo					•				•										
Cacomantis pallidus	Pallid cuckoo					•				•										
Chrysococcyx basalis	Horsfield's bronze cuckoo					•				•										
Chrysococcyx lucidus	Shining bronze cuckoo					•				•										
Chrysococcyx osculans	Black-eared cuckoo									•										
Eudynamys orientalis	Pacific koel									•										
DICAEIDAE																				
Dicaeum hirundinaceum	Mistletoebird					•				•						•				
DIOMEDEIDAE																				
Diomedea epomophora	Southern royal albatross	VU/MI	VU/MI						Likely											
Diomedea exulans	Wandering albatross	VU/MI	VU/MI						Likely											
Diomedea exulans amsterdamensis	Amsterdam albatross	EN/MI	CR/MI						May											
Diomedea sanfordi	Northern royal albatross	EN/MI	EN/MI						Likely											
Thalassarche cauta	Shy albatross	VU/MI	VU/MI						Likely											
Thalassarche cauta steadi	White-capped albatross	VU/MI	VU/MI						Likely											
Thalassarche melanophris	Black-browed albatross	VU/MI	EN/MI						May											
Thalassarche melanophris impavida	Campbell island albatross	VU/MI	VU/MI						May											
Estrildidae																				
Lonchura castaneothorax	Chestnut-breasted mannikin					•				•										
Stagonopleura oculata	Red-eared firetail					•				•										
Taeniopygia guttata	Zebra finch									•										
FALCONIDAE																				
Falco berigora	Brown falcon					•				•										
Falco cenchroides	Australian kestrel					•				•										
Falco longipennis	Australian hobby					•				•										
Falco peregrinus	Peregrine falcon		OS			•				•										
GLAREOLIDAE																				

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Glareola maldivarum	Oriental pratincole	MI	MI							•										
HAEMATOPODIDAE																				
Haematopus longirostris	Pied oystercatcher					•				•										
HIRUNDINIDAE																				
Cheramoeca leucosternus	White-backed swallow					•				•										
Hirundo neoxena	Welcome swallow					•				•										
Petrochelidon ariel	Fairy martin					•				•										
Petrochelidon nigricans	Tree martin					•				•										•
LARIDAE																				
Anous tenuirostris melanops	Australian lesser noddy	VU	EN						May											
Larus novaehollandiae	Silver gull					•				•										
Thalasseus bergii	Crested tern	MI	MI			•				•										
Hydroprogne caspia	Caspian tern	MI	MI			•				•										
Sterna fuscata	Sooty tern					•				•										
Sterna hybrida	Whiskered tern									•										
Sterna leucoptera	White-winged black tern	MI	MI							•										
Sterna nereis nereis	Fairy tern	VU	VU		VU				Known	•										
Gelochelidon nilotica	Gull-billed tern	MI	MI			•				•										
Cladorhynchus leucocephalus	Banded stilt					•				•										
LOCUSTELLIDAE																				
Megalurus cruralis	Brown songlark									•										
Megalurus gramineus	Little grassbird					•				•										
Megalurus mathewsi	Rufous songlark									•										
MALURIDAE																				
Malurus elegans	Red-winged fairy-wren					•				•										
Malurus lamberti	Variegated fairy-wren					•				•										
Malurus splendens	Splendid fairy-wren					•				•		•						•		•
Stipiturus malachurus	Southern emu-wren									•										
MEGAPODIIDAE																				
Leipoa ocellata	Malleefowl	VU	VU						Likely											
MELIPHAGIDAE																				
Acanthagenys rufogularis	Spiny-cheeked honeyeater					•				•										
Acanthorhynchus superciliosus	Western spinebill					•				•										
Anthochaera carunculata	Red wattlebird					•				•		•				•		•		•
Anthochaera lunulata	Western little wattlebird					•				•										
Epthianura albifrons	White-fronted chat					•				•										
Gavicalis virescens	Singing honeyeater					•				•		•						•		•
Glyciphila melanops	Tawny-crowned honeyeater					•				•										
Lichmera indistincta	Brown honeyeater					•				•		•						•		•

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Manorina flavigula	Yellow-throated miner					•				•										
Melithreptus brevirostris	Brown-headed honeyeater					•				•										
Melithreptus chloropsis	Western white-naped honeyeater					•				•										
Phylidonyris nigra	White-cheeked honeyeater					•				•		•						•		
Phylidonyris novaehollandiae	New holland honeyeater					•				•		•						•		•
Ptilotula ornatus	Yellow-plumed honeyeater									•										
Purnella albifrons	White-fronted honeyeater									•										
Sugomel niger	Black honeyeater									•										
MEROPIDAE																				
Merops ornatus	Rainbow bee-eater					•			May	•		•						•		
MONARCHIDAE																				
Grallina cyanoleuca	Magpie-lark					•				•		•						•		•
Myiagra inquieta	Restless flycatcher					•				•										
MOTACILLIDAE																				
Anthus australis	Australian pipit									•										
Motacilla cinerea	Grey wagtail	MI	MI						May											
NEOSITTIDAE																				
Daphoenositta chrysoptera	Varied sittella					•				•										
PACHYCEPHALIDAE																				
Colluricincla harmonica	Grey shrike-thrush					•				•										
Colluricincla megarhyncha	Little shrike-thrush									•										
Pachycephala occidentalis	Western golden whistler									•										
Pachycephala pectoralis	Golden whistler									•										
Pachycephala rufiventris	Rufous whistler					•				•					•					•
PARDALOTIDAE																				
Pardalotus punctatus	Spotted pardalote					•				•										
Pardalotus striatus	Striated pardalote					•				•										•
PELECANIDAE																				
Pelecanus conspicillatus	Australian pelican					•				•										
PETROICIDAE																				
Eopsaltria australis	Yellow robin									•										
Eopsaltria australis griseogularis	Western yellow robin					•				•										
Eopsaltria georgiana	White-breasted robin					•				•										
Melanodryas cucullata	Hooded robin					•				•										
Microeca fascinans	Jacky winter					•				•										
Petroica boondang	Scarlet robin					•				•										
Petroica goodenovii	Red-capped robin					•				•										
PHAETHONTIDAE																				
Phalacrocorax carbo	Great cormorant					•				•										

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Phalacrocorax fuscescens	Black-faced cormorant									•										
Phalacrocorax melanoleucos	Little pied cormorant					•				•										
Phalacrocorax sulcirostris	Little black cormorant					•				•										
Phalacrocorax varius	Pied cormorant					•				•										
PHASIANIDAE																				
Coturnix pectoralis	Stubble quail					•				•										
Coturnix ypsilophora	Brown quail					•				•										
PODARGIDAE																				
Podargus strigoides	Tawny frogmouth					•				•										
PODICIPEDIDAE																				
Podiceps cristatus	Great crested grebe					•				•										
Poliocephalus poliocephalus	Hoary-headed grebe					•				•										
Tachybaptus novaehollandiae	Australasian grebe					•				•										
PROCELLARIIDAE																				
Macronectes giganteus	Southern giant petrel	EN/MI	MI						May											
Macronectes halli	Northern giant petrel	VU/MI	MI						May											
Pachyptila turtur	Fairy prion								Likely											
Pterodroma lessonii	White-headed petrel					•				•										
Pterodroma macroptera	Great-winged petrel					•				•										
Puffinus assimilis	Little shearwater					•				•										
PSITTACIDAE																				
Glossopsitta concinna	Musk lorikeet									•										
Melopsittacus undulatus	Budgerigar					•				•										
Neophema elegans	Elegant parrot					•				•										
Neophema petrophila	Rock parrot					•				•										
Parvipsitta porphyrocephala	Purple-crowned lorikeet									•										
Platycercus icterotis	Western rosella					•				•										
Platycercus spurius	Red-capped parrot					•				•		•						•		•
Platycercus zonarius	Australian ringneck					•				•		•				•		•		
Polytelis anthopeplus	Regent parrot					•				•										
Trichoglossus moluccanus	Rainbow lorikeet					•				•		•						•		•
RALLIDAE																				
Fulica atra	Eurasian coot					•				•										
Gallinula tenebrosa	Dusky moorhen					•				•										
Gallirallus philippensis	Buff-banded rail					•				•										
Porphyrio porphyrio	Purple swamphen					•				•										
Porzana fluminea	Australian spotted crake					•				•										
Porzana pusilla	Baillon's crake					•				•										
Porzana tabuensis	Spotless crake					•				•										

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Tribonyx ventralis	Black-tailed native-hen					•				•										
RECURVIROSTRIDAE																				
Himantopus himantopus	Black-winged stilt					•			Known	•										
Recurvirostra novaehollandiae	Red-necked avocet					•			Known	•										
RHIPIDURIDAE																				
Rhipidura albiscapa	Grey fantail					•				•						•				
Rhipidura leucophrys	Willie wagtail					•				•		•			•			•		•
ROSTRATULIDAE																				
Rostratula australis	Australian painted snipe	EN	EN		EN				Likely											
SCOLOPACIDAE																				
Calidris acuminata	Sharp-tailed sandpiper	MI	MI			•			Known	•										
Calidris canutus	Red knot	EN/MI	EN/MI		NT					•										
Calidris ferruginea	Curlew sandpiper	CR/MI	CR/MI		NT	•			Known	•										
Calidris melanotos	Pectoral sandpiper	MI	MI			•			Known	•										
Calidris ruficollis	Red-necked stint	MI	MI		NT	•			Known	•										
Calidris subminuta	Long-toed stint	MI	MI			•			Known	•										
Calidris tenuirostris	Great knot	CR/MI	CR/MI		EN					•										
Limosa lapponica	Bar-tailed godwit	MI	MI							•										
Limosa limosa	Black-tailed godwit	MI	MI		NT	•			Known	•										
Philomachus pugnax	Ruff	MI	MI						Known	•										
Tringa brevipes	Grey-tailed tattler	MI	MI	P4	NT					•										
Tringa glareola	Wood sandpiper	MI	MI			•			Known	•										
Tringa hypoleucos	Common sandpiper	MI	MI			•			Known	•										
Tringa nebularia	Common greenshank	MI	MI			•			Known	•										
Tringa stagnatilis	Marsh sandpiper	MI	MI			•			Known	•										
STRIGIDAE																				
Ninox boobook	Boobook owl									•										
THRESKIORNITHIDAE																				
Platalea flavipes	Yellow-billed spoonbill					•				•		•						•		
Platalea regia	Royal spoonbill					•				•										
Plegadis falcinellus	Glossy ibis	MI	MI			•				•										
Threskiornis molucca	Australian white ibis					•				•										•
Threskiornis spinicollis	Straw-necked ibis					•				•		•						•		•
TURNICIDAE																				
Turnix varia	Painted button-quail					•				•										
TYTONIDAE																				
Tyto alba	Barn owl					•				•										
ZOSTEROPIDAE																				
Zosterops lateralis	Silvereye					•				•						•				•

Scientific Name	Common Name	EPBC	BC	DBCA	IUCN	NatureMap (DBCA, 2020a)	Birdlife (BirdLife Australia, 2020b)	DBCA (DBCA, 2020a)	EPBC Protected Matters (DAWE, 2020)	ALA (ALA, 2020)	PGV (2016)	Natural Area (2016b)	Terrestrial Ecosystems (2014)	Terrestrial Ecosystems (2016)	ENV (2010)	CMPS&F (1993)	Golder Associates (2016)	Natural Area (2016a)	360 Environmental (2018b)	Current Survey
REPTILES																				
AGAMIDAE																				
Ctenophorus adelaidensis	Western heath dragon					•				•										
Ctenophorus ornatus	Ornate crevice dragon					•				•										
Pogona minor						•				•		•						•		
PYTHONIDAE																				
Antaresia stimsoni	Stimson's python					•				•										
Aspidites melanocephalus	Black-headed python																			
Morelia spilota	Carpet python					•				•										
CARPHODACTYLIDAE																				
Underwoodisaurus milii	Southern barking gecko					•				•										
CHELUIDAE																				
Chelodina colliei	Oblong turtle					•				•										
DIPLODACTYLIDAE																				
Crenadactylus ocellatus	South-western clawless gecko					•				•										
Diplodactylus granariensis						•				•										
Diplodactylus lateroides	Speckled stone gecko					•				•										
Diplodactylus polyophthalmus	Spotted sandplain gecko					•				•										
Diplodactylus pulcher						•				•										
Strophurus spinigerus						•				•										
Christinus marmoratus	Marbled gecko					•				•					•					
ELAPIDAE																				
Acanthophis antarcticus	Southern death adder			P3		•				•										
Brachyurophis semifasciatus						•				•										
Demansia psammophis	Yellow-faced whipsnake					•				•										
Echiopsis curta	Bardick					•				•										
Elapognathus coronatus	Crowned snake					•				•										
Neelaps bimaculatus	Black-naped snake					•				•										
Neelaps calonotos	Black-striped snake			P3		•														
Notechis scutatus	Tiger snake					•				•						•				
Parasuta gouldii						•				•										
Parasuta nigriceps						•				•										
Pseudechis australis	Mulga snake					•				•										
Pseudonaja affinis	Dugite					•				•						•				
Pseudonaja mengdeni	Western brown snake					•				•										
Pseudonaja modesta	Ringed brown snake									•										
GEKKONIDAE																				
Gehyra australis										•										
Gehyra variegata						•				•										

Scientific Name	Common Name	EPBC	BC	DBCA	IUCN	NatureMap (DBCA, 2020a)	Birdlife (BirdLife Australia, 2020b)	DBCA (DBCA, 2020a)	EPBC Protected Matters (DAWE, 2020)	ALA (ALA, 2020)	PGV (2016)	Natural Area (2016b)	Terrestrial Ecosystems (2014)	Terrestrial Ecosystems (2016)	ENV (2010)	CMPS&F (1993)	Golder Associates (2016)	Natural Area (2016a)	360 Environmental (2018b)	Current Survey
Hemidactylus frenatus	*Asian house gecko								Likely	•										
Heteronotia binoei	Bynoe's gecko																			
PYGOPODIDAE																				
Aprasia inaurita										•										
Aprasia pulchella						•				•										
Aprasia repens						•				•										
Delma fraseri						•				•		•						•		
Delma grayii						•				•										
Lialis burtonis						•				•										
Pletholax gracilis	Keeled legless lizard					•				•										
Pygopus lepidopodus	Common scaly foot					•				•										
SCINCIDAE																				
Acritoscincus trilineatus						•				•		•				•		•		
Cryptoblepharus buchananii						•				•										•
Cryptoblepharus metallicus										•										
Cryptoblepharus plagiocephalus						•				•		•						•		
Cryptoblepharus ruber										•										
Ctenotus australis						•				•		•						•		
Ctenotus delli	Dell's skink			P4		•				•										
Ctenotus fallens						•						•						•		
Ctenotus gemmula ssp. 'Swan Coastal Plain population'				P3		•				•										
Ctenotus impar						•				•										
Ctenotus inornatus										•										
Ctenotus labillardieri						•				•										
Ctenotus ora	Coastal plains skink			P3	VU	•				•										
Egernia kingii	King's skink					•				•										
Egernia napoleonis						•				•										
Hemiergis initialis						•				•										
Hemiergis quadrilineata						•				•										
Lerista distinguenda						•				•										
Lerista elegans						•				•		•						•		
Lerista eupoda				P1																
Lerista lineata	Lined skink			P3	EN	•				•										
Lerista macropisthopus										•										
Lissolepis luctuosa	Western swamp skink									•										
Menetia greyii						•				•		•				•		•		
Morethia lineoocellata						•				•										
Morethia obscura						•				•		•						•		
Tiliqua occipitalis	Western bluetongue					•				•										

Scientific Name	Common Name	EPBC	BC	DBCA	IUCN	NatureMap (DBCA, 2020a)	Birdlife (BirdLife Australia, 2020b)	DBCA (DBCA, 2020a)	EPBC Protected Matters (DAWE, 2020)	ALA (ALA, 2020)	PGV (2016)	Natural Area (2016b)	Terrestrial Ecosystems (2014)	Terrestrial Ecosystems (2016)	ENV (2010)	CMPS&F (1993)	Golder Associates (2016)	Natural Area (2016a)	360 Environmental (2018b)	Current Survey
Tiliqua rugosa						•				•		•						•		•
TYPHLOPIDAE																				
Anilios australis						•				•										
Anilios pinguis										•										
Anilios waitii										•										
VARANIDAE																				
Varanus gouldii	Sand monitor					•				•										
Varanus rosenbergi	Heath monitor					•				•										
Varanus tristis	Racehorse monitor					•				•										
AMPHIBIANS																				
PELODRYADIDAE																				
Litoria adelaidensis	Slender tree frog					•				•										
Litoria moorei	Motorbike frog					•				•										
LIMNODYNASTIDAE																				
Heleioporus barycragus	Hooting frog					•				•										
Heleioporus eyrei	Moaning frog					•				•		•						•		
Heleioporus psammophilus	Sand frog					•				•										
Limnodynastes dorsalis	Western banjo frog					•				•		•						•		
MYOBATRACHIDAE																				
Crinia georgiana	Quacking frog					•				•										
Crinia glauerti	Clicking frog					•				•										
Crinia insignifera	Squelching froglet					•				•										
Crinia pseudinsignifera	Bleating froglet					•				•										
Geocrinia leai	Ticking frog					•				•										
Myobatrachus gouldii	Turtle frog					•				•										
Pseudophryne guentheri	Crawling toadlet					•				•										

Appendix N – Conservation significant fauna locations

Species	Latitude	Longitude	Species record
Carnaby's Cockatoo	-32.087872	115.95513	Foraging evidence
Carnaby's Cockatoo	-32.089929	115.956163	Foraging evidence
Carnaby's Cockatoo	-32.092773	115.957312	Foraging evidence
Carnaby's Cockatoo	-32.092827	115.957028	Foraging evidence
Carnaby's Cockatoo	-32.092834	115.956981	Foraging evidence
Carnaby's Cockatoo	-32.092914	115.958663	Foraging evidence
Carnaby's Cockatoo	-32.093179	115.958863	Foraging evidence
Carnaby's Cockatoo	-32.089942	115.95659	Foraging evidence
Carnaby's Cockatoo	-32.088569	115.955608	Foraging evidence
Carnaby's Cockatoo	-32.088523	115.955506	Foraging evidence
Carnaby's Cockatoo	-32.088211	115.955281	Foraging evidence
Carnaby's Cockatoo	-32.087837	115.955033	Foraging evidence
Carnaby's Cockatoo	-32.08827	115.955127	Foraging evidence
Carnaby's Cockatoo	-32.09313	115.958263	Foraging evidence
Carnaby's Cockatoo	-32.092415	115.957779	Foraging evidence
Carnaby's Cockatoo	-32.087934	115.95514	Foraging evidence
Carnaby's Cockatoo	-32.087938	115.95515	Individual (alive)
Quenda	-32.089097	115.956037	Digging
Quenda	-32.08924	115.956088	Digging
Quenda	-32.088054	115.955252	Digging
Quenda	-32.089976	115.95631	Digging
Quenda	-32.090801	115.957241	Digging
Quenda	-32.09	115.95658	Digging
Quenda	-32.088116	115.955231	Digging
Quenda	-32.087726	115.954991	Digging
Quenda	-32.087543	115.954788	Digging
Quenda	-32.09196	115.957837	Digging
Quenda	-32.08871	115.955695	Digging
Quenda	-32.088267	115.955286	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)

Species	Latitude	Longitude	Species record
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.089976	115.956613	Individual (alive)
Quenda	-32.090934	115.956867	Individual (alive)
Red-tailed Black Cockatoo	-32.090135	115.955915	4 individuals perching ~25 m outside Study Area

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