Ghooli Pump Station

Biological Report

Water Corporation

21 November 2022

→ **The Power of Commitment**

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Executive Summary

In 2017 GHD Pty Ltd (GHD) conducted a survey for the Water Corporation for works to remediate contaminated sites at Dedari and Ghooli. Since this survey, Water Corporation submitted a clearing permit application to the Department of Water and Environmental Regulation (DWER) for the Ghooli site. A Request for Information (RFI) was raised by DWER for the proposed clearing envelope, which includes the area previously surveyed by GHD (2017) and Lot 1355 on Plan 161170 and part of Lot 1356 on Plan 161171. GHD was engaged by the Water Corporation to undertake a Targeted flora search within the survey area and a Detailed flora and vegetation assessment, Basic fauna survey and Black Cockatoo habitat assessment within the proposed clearing envelope that was not previously surveyed (referred to 'biological survey area' within this report). The survey area, which incorporates the biological survey area, is located at the decommissioned Ghooli Pump Station, approximately 12 kilometres east of Southern Cross. The entire survey area is 46 hectares (ha), the biological survey area comprises 23 ha of the survey area. The field survey was undertaken from 19 to 20 September 2022. The outcome of the survey and information supplied in this biological survey report will be used to inform the environmental assessment and approvals process.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.6 and the assumptions and qualifications contained throughout the report.

Key findings

A review of GHD (2017) was conducted to determine if there were any updates to the environmental and biological values of the study area. The majority of the desktop information within GHD (2017) is up to date and relevant to this report. The aspects that have changed since 2017 and were updated within this document included the climatic data, vegetation statistics, flora and fauna desktop species including significant species. The GHD (2017) likelihood of occurrence assessment was also updated for this report.

Flora and vegetation

Two vegetation types and cleared areas were mapped within the biological survey area. The dominant vegetation type was Es Woodland (*Eucalyptus salmonophloia* tall woodland) with 22.13 ha (97%) of the biological survey area. One Threatened Ecological Community (TEC) was identified in the desktop search *Eucalypt Woodlands of the Western Australian Wheatbelt*. No TECs as listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or *Biodiversity Conservation Act 2016* (BC Act) or Priority Ecological Communities (PEC) listed by Department of Biodiversity Conservation and Attractions (DBCA) were identified as occurring within the biological survey area. The vegetation in the biological survey area ranged from Very Good to Degraded condition with 14.26 ha (62%) mapped as Very Good condition.

Sixty-six flora taxa (including subspecies and varieties) representing 26 families and 48 genera were recorded from the survey area during the field survey. This total comprised of 59 native taxa and seven introduced flora taxa. One introduced species, **Opuntia stricta*, is listed as a Declared Pest under the *Biosecurity and Management Act* 2007 (BAM Act) and as a Weed of National Significance (WoNS).

No EPBC Act, BC Act or DBCA listed flora were recorded within the survey area. The updated likelihood of occurrence assessment identified 16 significant species. Post field survey 14 species were considered unlikely to occur, and two species were considered highly unlikely to occur. This assessment took into account survey efficacy, optimal flowering times, previous records and habitat requirements through desktop assessment and vegetation observed in the field.

Fauna

Two broad fauna habitat types were identified within the survey area, consisting of Salmon Gum (*Eucalyptus salmonophloia*) woodland and *Allocasuarina* shrubland. The fauna habitats within the survey area are generally in Very Good condition but have been impacted by a number of anthropogenic disturbances including historical clearing and infrastructure, grazing, weeds and introduced fauna.

Thirty-six fauna species, including 29 birds, four reptiles and three mammals were recorded during the survey. Of these, two species are introduced: Red Fox (*Vulpes vulpes*) and Rabbit (*Oryctolagus cuniculus*).

One individual Carnaby's Cockatoo (*Zanda latirostris*), listed as Endangered under the EPBC Act and BC Act, was observed flying over the biological survey area during the survey. A likelihood of occurrence assessment for significant fauna concluded two species are considered likely to utilise the habitat present in the survey area, these being the Peregrine Falcon (*Falco peregrinus*) and Western Spiny-tailed Skink (*Egernia stokesii badia*).

Black Cockatoo habitat assessment

One individual Carnaby's Cockatoo was observed flying over during the survey, however no evidence of breeding, foraging or roosting was observed within the biological survey area.

Suitable foraging species present within the survey area for Carnaby's Cockatoo consist primarily of *Eucalyptus salmonophloia*) and *E. salubris* (Gimlet) which occur within the Salmon Gum woodland habitat type. There is 22.13 ha of Salmon Gum woodland within the survey area, which is considered to be low to moderate quality foraging habitat.

A total of 242 potential habitat trees were recorded within the biological survey area, of which 240 are Salmon Gum (DBH >300 mm) and two are Gimlet (DBH >500 mm). Five of the trees recorded contained one or more hollows ranging from small (<9 cm) to medium sized (10-20 cm). One tree contained hollows that were of a suitable size to currently provide nesting opportunities for Carnaby's Cockatoo (hollows with an entrance diameter greater than 20 cm). Observations from ground level indicated this hollow is not currently being utilised.

Contents

Table index

Appendices

1. Introduction

1.1 Background

In 2017 GHD Pty Ltd (GHD) conducted a biological survey for the Water Corporation for works to remediate contaminated sites at Dedari and Ghooli. Since this survey Water Corporation submitted a clearing permit application to the Department of Water and Environmental Regulation (DWER) for the Ghooli site. A Request for Information (RFI) was raised by DWER for the proposed clearing envelope which includes the area previously surveyed by GHD (2017) and Lot 1355 on Plan 161170 and part of Lot 1356 on Plan 161171.

GHD was engaged by the Water Corporation to undertake a:

– Targeted flora survey of GHD (2017) survey area plus Lot 1355 on Plan 161170 and part of Lot 1356 on Plan 161171 (referred to from herein as the survey area)
– Detailed flora and vegetation assessment, Targeted flora survey, Basic fauna survey, Black Cockatoo habitat assessment on Lot 1355 on Plan 161170 and part of Lot 1356 on Plan 161171 (referred to from herein as the biological survey area).

1.2 Purpose of this report

The purpose of the survey was to assess the flora, vegetation and fauna values within the biological survey area and to search for potential significant flora within the survey area, to inform planning for the remediation works. The outcome of the survey and information supplied in this biological survey report will be used to inform the environmental assessment and approvals process.

1.3 Survey area

The survey area is located at the old Ghooli Pump Station, approximately 12 kilometres (km) east of Southern Cross. The survey area is 46 hectares (ha) and is comprised of the GHD (2017) survey area (23 ha, southern side of Great Eastern Hwy) and the Biological survey area (23 ha, northern side of the Great Eastern highway of the survey area (Figure 1, Appendix A).

1.3.1 Study area

A study area was defined for the desktop based searches for the assessment and includes a 20 kilometre (km) buffer around the survey area.

1.4 Scope of works

The scope of works was to undertake an assessment of the flora, vegetation and fauna values of the survey area. The following actions were completed to fulfil the scope:

– Review the GHD (2017) desktop assessment to determine any updates to the environmental values and conservation significant flora, fauna, habitat vegetation or other environmental features (such as riparian areas, wetlands) relating to Lot 1355 and part of Lot 1356 within the survey area
– Undertake a Targeted flora survey within the survey area for significant flora species highlighted by the DWER RFI and for significant species listed post GHD (2017) and identified within the current desktop search
– Conduct a Detailed flora and vegetation survey, Targeted flora, Basic fauna and Black Cockatoo habitat assessment of the biological survey area
– Provide a consolidated technical report (this document) that outlines the methods and results of the field survey
– Provide a field data package as per IBSA data standards that includes data collected during the field survey.

1.5 Relevant legislation, conservation codes and background information

In Western Australia (WA) some ecological communities and flora are protected under both Federal and State Government legislation. In addition, regulatory authorities also provide a range of guidance and information on expected standards and protocols for environmental surveys.

An overview of key legislation and guidelines, conservation codes and background information relevant to this flora and vegetation survey and fauna survey are provided in Appendix B

1.6 Limitations

This report has been prepared by GHD for Water Corporation and may only be used and relied on by Water Corporation for the purpose agreed between GHD and Water Corporation as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Water Corporation arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Water Corporation and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Site conditions may change after the date of this report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

This report has assessed desktop environmental aspects and biological factors in the field for the survey area. Should these areas change or be refined, further assessment may be required

2. Methodology

2.1 Desktop assessment

Prior to the commencement of the field survey, a review of GHD (2017) was conducted to determine if there were any updates to the environmental and biological values of the study area. The majority of the desktop information within GHD (2017) is up to date and relevant to this report. The aspects that have changed since 2017 and updated within this report are listed in Table 1.

Table 1 Desktop information Sources

Aspect	Information source
Climate	Bureau of Meteorology (BoM) Climate Data Online (2022)
Vegetation	State-wide Vegetation Statistics (GoWA 2019)

The desktop assessment also included a review and update of flora and fauna species, including significant species based on:

– The Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) to identify communities and species listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) potentially occurring within the desktop study area (DCCEEW 2022a) (Appendix C)
– The Department of Biodiversity, Conservation and Attractions (DBCA) NatureMap database for flora and fauna species previously recorded within the study area (DBCA 2007–). This dataset has been formatted by GHD to allow for easier reading (Appendix C).

2.2 Field survey

2.2.1 Field survey timing and personnel

The field survey was undertaken from 19 to 20 September 2022 by GHD Senior Botanist Angela Benkovic and Senior Ecologist Erin Lynch. The GHD survey team have extensive experience in undertaking biological surveys across WA including the Coolgardie Bioregion (Table 3).

2.2.2 Guiding documents and data collection

The survey methodology and data collection GHD employed was consistent with relevant aspects of:

– Environmental Protection Authority (EPA) Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016)
– EPA Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020)
– Department of Agriculture, Water and the Environment (DAWE) 2022, Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black- cockatoo (DAWE 2022).

Field data collection for the field survey was undertaken using Global Positioning System (GPS) enabled Samsung tablets using electronic forms in Collector and tailored to IBSA spatial data requirements. Data was synced to the cloud at the conclusion of each field day. GPS devices were used to capture survey effort (track logs) (Figure 2, Appendix A). Field photographs were stored and where applicable have been provided as part of the deliverables.

2.2.3 Survey area

Targeted flora survey

Based on the significant flora identified in the desktop searches, GHD employed a sampling method involving walking traverses spaced approximately 30-60 metres (m) apart depending on suitable habitat and vegetation condition. The survey methodology employed by GHD was undertaken with reference to the EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016). Survey effort for the Targeted flora survey is shown in Figure 2, Appendix A.

2.2.4 Biological survey area – flora and vegetation

Detailed flora and vegetation survey

The Detailed flora and vegetation survey was undertaken concurrently with the Targeted flora survey. The assessment was undertaken to identify and describe the broad dominant vegetation types, assess vegetation condition, and complete high intensity sampling of vascular flora taxa present at the time of survey. Searches for significant ecological communities and flora species were also undertaken during the field survey.

Field survey methods involved a combination of quadrat sampling and traversing the survey area by foot. Quadrats measuring 20 m x 20 m were conducted within the biological survey area to describe the broad-scale vegetation and physical features. Four quadrats were established throughout the biological survey area, the locations of each quadrat are presented in (Figure 3, Appendix A). Three quadrats were located within the dominant vegetation type, however due to the limited size of Ac Shrubland only one quadrat was able to be created.

Field data at each quadrat site was recorded on a pro-forma data sheet and included the parameters detailed in ***Table 2***. Survey and quadrat data are provided in Appendix D.

Table 2 Data collected during the field survey

Aspect	Measurement
Collection attributes	Site code, personnel/recorder, date, photograph of the site.
Physical features	Landform, slope, aspect, soil attributes, ground surface cover
Location	Coordinates recorded in Geocentric Datum of Australia (GDA) 20 datum using a GPS enabled tablet with approximately 2-5 m accuracy.
Vegetation condition	Broad-scale vegetation condition using the condition rating scale adapted by EPA (2016) for the South West and Interzone Botanical Province.
Disturbance	Level and nature of disturbances (e.g. weed presence, fire and time since last fire, impacts from grazing, infrastructure development activities).
Flora	List of dominant flora from each structural layer, list of all species at each quadrat including stratum, average height and cover using National Vegetation Information System (NVIS) (NVIS Technical Working Group 2017).

Vegetation types

Vegetation types were identified and boundaries delineated using a combination of aerial photography, topographical features and field data/observations.

Vegetation types were described based on structure, dominant taxa and cover characteristics as defined by quadrat data, relevés and field observations. Vegetation type descriptions follow the NVIS and are consistent with NVIS Level V (Association) and are grouped within NVIS Level III (Broad Floristic Formation). At Level V up to three taxa per stratum are used to describe the association (NVIS 2017).

Vegetation condition

The vegetation condition was assessed and mapped in accordance with the vegetation condition rating scale for the South West and Interzone Botanical Provinces devised by Keighery (1994) and adapted by EPA (2016). The

scale recognises the intactness of vegetation and consists of six rating levels. The vegetation condition rating scale is outlined in Appendix B. Areas devoid of vegetation were mapped as cleared (e.g. dirt roads/ tracks).

Flora inventory, identification and nomenclature

A flora inventory was compiled from taxa listed in described quadrats and from opportunistic floristic records throughout the survey area.

Species well known to the survey botanist and ecologist were identified in the field; all other species were collected and assigned a unique collection number to facilitate tracking. All specimens collected during the field assessment were dried and processed in accordance with the requirements of the WA Herbarium. Species were identified by the use of taxonomic literature, electronic keys and online electronic databases with reference to specimens at the WA Herbarium. Relevant taxonomic experts were also consulted where required.

The conservation status of all recorded flora was compared against the current lists available on *FloraBase* (WA Herbarium 1998–) and the EPBC Act Threatened species database provided by DCCEEW (2022b). Nomenclature used in this report follows that used by the WA Herbarium as reported on *FloraBase* (WA Herbarium 1998–).

2.2.5 Biological survey area - fauna

The Basic fauna survey was performed within the biological survey area to identify and describe the dominant fauna habitat types present and their condition, assess habitat connectivity, and identify and record fauna species within the survey area. An assessment of the likelihood of significant fauna and their habitats occurring within the survey area was also undertaken.

Habitat assessment

Habitats were visually assessed to document the type, value and extent of habitats within the biological survey area. The following observations/features were recorded at each habitat assessment site:

– Habitat structure (e.g. vegetation type, presence/absence of structural layers such as ground cover and mid storey, dominant flora present and covers)
– Soil type and landform characteristics
– Presence/absence of refuge including density of ground covers, fallen timber (coarse woody debris), hollow bearing trees and stags and rocks/boulder piles, and the type and extent of each refuge
– Presence/absence of waterways including type, extent and habitat quality within waterway
– Location of the habitat within the survey area in comparison to the habitat within the surrounding landscape
– Habitat connectivity and identification of wildlife corridors within and immediately adjacent to the survey area
– Current land use and disturbance history (e.g. fire history, evidence of threats such as feral species)
– Evaluation of key habitat features and types identified during the desktop assessment relevant to fauna of conservation significance
– Evaluation of the likelihood of occurrence of conservation significant fauna within the habitat (based on presence of suitable habitat)
– A representative photograph of each habitat type.

The fauna habitat observations collected, along with vegetation type mapping, aerial photography and topographical features were used to describe and map fauna habitats across the biological survey area.

Opportunistic fauna searches

Opportunistic fauna searches were also conducted across the biological survey area. Opportunistic searches involved:

– Searching the survey area for tracks, scats, bones, diggings and feeding areas for both native and feral species
– Searching through microhabitats including turning over logs or rocks, turning over leaf litter and examining tree hollows and hollow logs

– Visual and aural surveys, which accounted for many bird species potentially utilising the survey area Recording GPS locations of any significant fauna species.

A fauna inventory was compiled from species recorded during habitat observations and from opportunistic fauna searches.

Targeted Black Cockatoo assessment

The Black Cockatoo habitat assessment included:

– The identification and recording (via GPS) of the locations of potential and actual breeding habitat within the survey area (relevant tree species with a diameter at breast height (DBH) of >500 mm for Jarrah (*Eucalyptus marginata*), Marri (*Corymbia calophylla*) and Tuart (*E. gomphocephala*), and >300 mm for Salmon gum and Wandoo (*E. wandoo*))
– Identifying, describing, and recording the size of existing tree hollows and any evidence of use by Black Cockatoos within the survey area
– Identifying, recording and describing the locations of potential night roosting habitat
– Identifying, recording and describing the locations of potential foraging habitat.

Breeding habitat

Where present, the assessment methodology differentiated between actual and potential breeding habitat as per the following:

– Actual nest trees: Evidenced as currently being used or have been used in the past (visible chews of hollow entrances)
– Potential breeding habitat: Trees with available hollows that do not show evidence of use now or in the past, trees with hollows that do not show evidence of use now or in the past where the hollow is not available (e.g. hollows are occupied by bees or galahs); and those trees without hollows but which have the potential to develop hollows in the future, and which have DBH >500 mm or 300 mm for different species.

This was a ground-based assessment using binoculars to identify potential and/or actual breeding hollows, with tree DBH measured in the field with a measuring tape.

Roosting habitat

Based on the referral guidelines, night roosts for Carnaby's cockatoo typically occur in the tallest trees of an area, and usually close to an important water source and quality foraging habitat. The survey area was visually surveyed for trees or stands of trees that matched these descriptions, and for any evidence of recent use as a roost site (feathers and droppings).

Foraging habitat

To determine if the vegetation within the survey area constitutes foraging habitat for Black Cockatoos as specified under the referral guidelines, the flora were identified and compared with a list of known foraging species (Valentine and Stock 2008). In addition, the ground was searched for any evidence of Black Cockatoo foraging.

Taxonomy and Nomenclature

Identification of fauna species was made in the field using available field guides and electronic guides. In accordance with the EPA technical guidance, nomenclature for herpetofauna and mammals follows that of the Western Australian Museum Checklist of the Vertebrates of Western Australia (Western Australia Museum 2021) and birds follows the Australian Faunal Directory (DCCEEW 2022c).

2.3 Limitations

2.3.1 Desktop limitations

The EPBC Act PMST is based on bioclimatic modelling for the potential presence of species. As such, this does not represent actual records of the species within the survey area. The records from the DBCA searches of Threatened flora and fauna provide more accurate information for the general area. However, some records of

collections, sightings or trappings cannot be dated and often misrepresent the current range of Threatened species.

2.3.2 Field survey limitations

The EPA (2016; 2020) Technical Guidance states that flora and fauna survey reports for environmental impact assessment in WA should contain a section describing the limitations of the survey methods used. The limitations and constraints associated with this field survey are discussed in Table 3. Based on this assessment, the survey effort has not been subject to any constraints, which affect the thoroughness of the assessment and the conclusions that formed.

Table 3 Field Survey Limitations

Aspect	Constraint	Comment
Sources of information and availability of contextual information.	Nil	Adequate information is available for the survey area, this includes: – Broadscale (1:250,000) mapping by Beard (1972) and digitised by Shepherd et al. (2002) – *NatureMap* (DBCA, 2007-) – Previous survey (GHD 2017).
Scope (what life forms were sampled etc.)	Nil	Vascular flora and terrestrial vertebrate fauna were sampled during the survey. Non-vascular flora, invertebrate and aquatic fauna were not surveyed.
Proportion of flora and fauna collected and identified (based on sampling, timing and intensity)	Nil	The single season Detailed and Targeted flora and vegetation survey and Basic fauna survey and Black Cockatoo habitat assessment were undertaken on 19-20 September 2022, this is recommended timing for flora surveys in the South West Interzone Botanical Province (EPA 2016). The survey timing was considered appropriate for the purpose of the assessment. The flora recorded is detailed in section 4.1.4 and a full flora species list is provided in Appendix D. The portion of flora collected and identified was considered representative for the survey area based on the species accumulation curve (Plate 2). The basic fauna survey was undertaken to identify habitat types and terrestrial vertebrate fauna utilising the survey area. The fauna assessment sampled those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings, etc. Many cryptic species would not have been identified during a basic survey and seasonal variation within species often requires targeted surveys at a particular time of the year. Of the fauna species recorded during the survey, all were identified to species level.
Flora determination	Nil	Flora determination was undertaken by the survey botanist and ecologist in the field. Species that could not be identified in the field were collected and identified at the WA Herbarium by Senior Botanist Angela Benkovic All collected specimens were able to be identified to species level. The taxonomy and conservation status of the WA flora is dynamic. This report was prepared with reliance on taxonomy and conservation status current at the time report development, but it should be noted this may change in response to ongoing research and review of International Union for Conservation Nature criteria.
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	Nil	The survey area was accessed by vehicle and on foot. The survey area was adequately surveyed during the field survey in line with the scope. An adequate number of floristic sampling sites were done for a detailed flora and vegetation survey. Three quadrats were established per vegetation type where possible. Ac Shrubland was represented by one quadrat due to the size of the vegetation type within the biological survey area. Additional opportunistic sampling was undertaken to develop a comprehensive species inventory. Habitats considered suitable for significant flora and fauna were traversed by foot.
Mapping reliability	Nil	The vegetation and fauna habitats were mapped using high-resolution aerial imagery obtained from Landgate, topographical features, previous broad scale mapping (Beard 1972) and field data. Data was recorded in the field using hand-held GPS tools. Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The Garmin GPS units and

Aspect	Constraint	Comment
		GPS enabled tablets used for this survey are accurate to within 2-5 metres on average.
Timing/weather/ season/cycle	Nil	The field survey was conducted on 19-20 September 2022. In the four months prior to the survey (May - August), the Southern Cross Airfield (BoM 2022) recorded a total of 167.8 mm of rainfall. This is 27% above the recorded average for the same period (121.8 mm) (BoM 2022). The weather conditions recorded during the survey were generally overcast with light rain. A summary of the climatic conditions are provided: – Daily maximum temperature 17.9 °C – Daily minimum temperature 6.7 °C – Daily rainfall 3 mm. The weather conditions recorded during the survey were considered unlikely to have impacted upon the results of the flora and vegetation and fauna survey.
Disturbances (e.g. fire, flood, accidental human intervention)	Nil	Some of the survey area has been subjected to historical disturbance events (e.g. clearing, anthropogenic activities associated with the pump station); however, these disturbances did not affect the results of the survey.
Intensity (in retrospect, was the intensity adequate)	Nil	The vascular flora of the survey area was sampled in accordance with EPA (2016) and terrestrial fauna sampled in accordance with EPA (2020). The survey area was sufficiently covered by the field botanist and ecologist during the survey.
Resources	Nil	Adequate resources were employed during the field survey. Four person days were spent undertaking the survey using one botanist and one ecologist.
Access restrictions	Nil	The survey area was accessible by vehicle and on foot. There were no access restrictions.
Experience levels	Nil	The botanist and ecologists who executed the survey are practitioners suitably qualified and experienced in their respective fields: – Senior Botanist, Angela Benkovic (flora licence no. FB62000080-2), was the field team lead with more than 17 years' experience leading and conducting vegetation and flora surveys – Senior Ecologist, Erin Lynch (FB62000081-2) has over 15 years' experience undertaking flora and vegetation surveys and fauna surveys.

3. Desktop assessment

3.1 Climate

The Coolgardie region is arid to semi-arid, with hot summers and mild winters. The closest BoM weather station with sufficient historical data to the survey area was Southern Cross Airfield (012320) located approximately 10 km west of the survey area. Climate data from this station shows the mean maximum temperature ranges from 34.8ºC in January to 16.8ºC in July. The mean minimum temperature ranges from 17.9ºC in January to 3.7ºC in July. The mean annual rainfall is 301.3 mm (BoM 2022) (Plate 1).

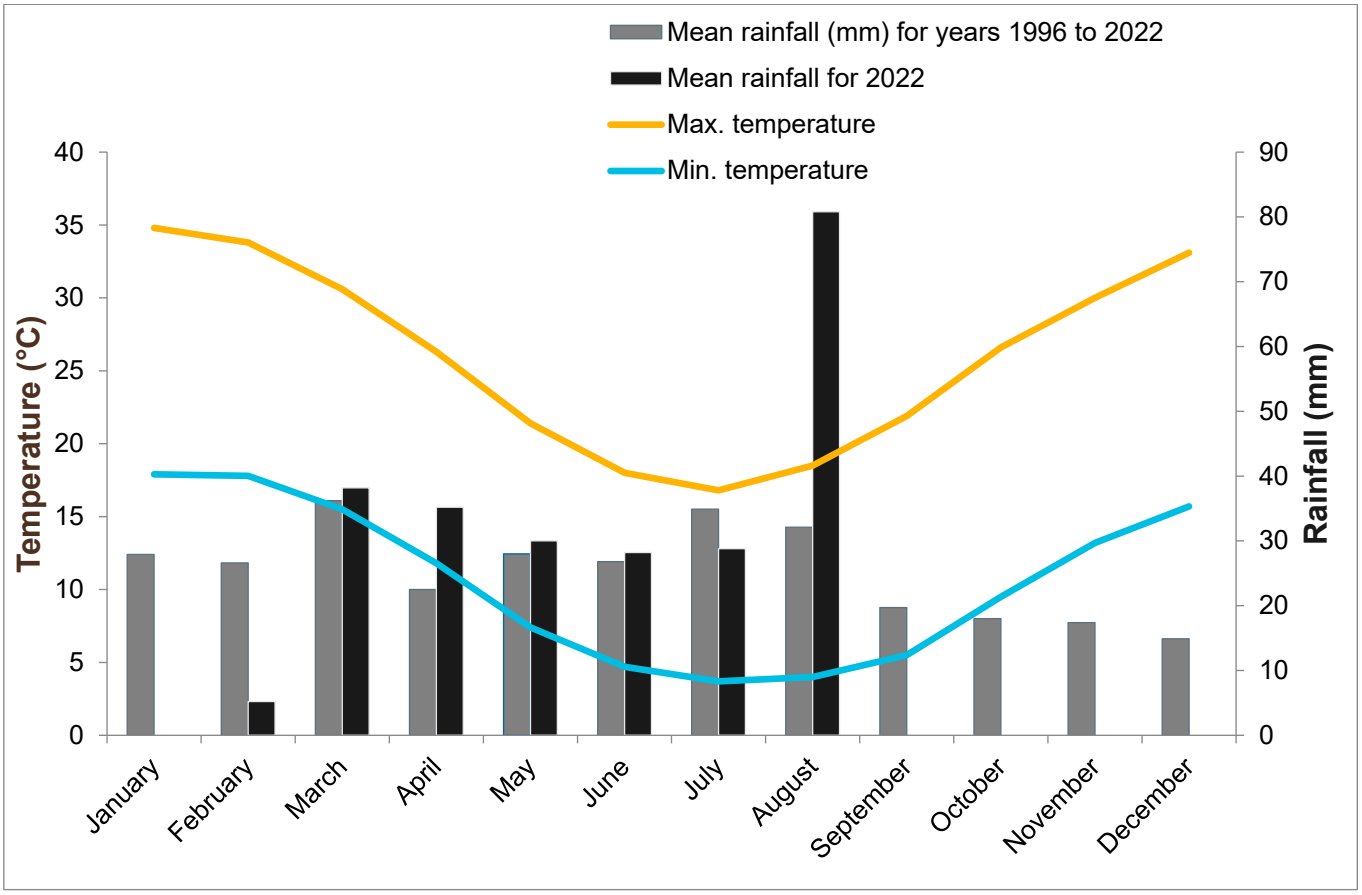

Plate 1 ***Climate data fo***r Southern Cross Airfield (012320) ***– long term average (BoM 2022)***

3.2 Broad vegetation associations and extents

Broad scale (1:250,000) pre-European vegetation mapping of the area was completed by Beard (1972) at an association level. The mapping indicates one vegetation association present within the survey area, shrublands; Acacia, Casuarina and Melaleuca thicket (association 1413).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by DBCA (latest update March 2019 – GoWA 2019). As shown in Table 4, the current extent remaining of vegetation associations 1413 is greater than 73% of the calculated pre-European extents at all levels (eg. State, IBRA bioregion, IBRA subregion and Local government Area (LGA)).

Table 4 Extent of pre-European vegetation associations mapped in the survey area (Beard 1972, GoWA 2019)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	% Current extent in all DBCA managed land (proportion of current extent)
1413	State: Western Australia	1,679,916	1,286,855	76.60	17.25
	IBRA bioregion: Coolgardie	1,061,212	1,042,553	98.24	18.50
	IBRA subregion: Southern Cross	953,237	934,825	98.07	19.76
	LGA: Shire of Yilgarn	538,791	395,458	73.40	26.24

3.2.1 Significant ecological communities

Searches of the EPBC Act PMST identified one Federally listed Threatened Ecological Community (TEC) within the study area, Eucalypt Woodlands of the Western Australian Wheatbelt. Details of this community are listed in Table 5.

Table 5 Threatened Ecological Community within the study area

Community name	Status		Description
	EPBC Act	BC Act/ DBCA	
Eucalypt Woodlands of the Western Australian Wheatbelt	Critically Endangered	Priority 3	Composed of Eucalypt woodlands that formerly were the most common type of vegetation across the wheatbelt landscape of south-western Western Australia (WA), i.e. inland between the Darling Range and western edge of the goldfields. The woodlands are dominated by a complex mosaic of Eucalypt species with a tree or mallet form over an understorey that is highly variable in structure and composition. Woodlands dominated by mallee forms or vegetation with a very sparse eucalypt tree canopy are not part of the ecological community (DoE 2015).

3.3 Flora

3.3.1 Flora diversity

The *NatureMap* database identified 630 plant species, recorded within 20 km of the study area (DBCA 2007-). A modified table of the NatureMap excel output provided by DBCA is reproduced in Appendix C.

3.3.2 Significant flora

The EPBC Act PMST (DCCEEW 2022a), *NatureMap* (DBCA 2007-) and historic DBCA TPFL and WAHERB databases from 2017 identified the presence/potential of 35 significant flora species within the study area. The desktop searches recorded:

– Twelve Threatened taxa
– Six Priority 1 (P1) taxa
– Three Priority 2 (P2) taxa
– Fourteen Priority 3 (P3) taxa.

The locations of significant flora registered on the DBCA database searches are provided in GHD (2017).

3.4 Fauna

3.4.1 Fauna diversity

The *NatureMap* database (DBCA 2007-) identified 148 terrestrial vertebrate fauna species previously recorded within the study area, including 105 bird, 31 reptile, six mammal and six amphibian species.

A modified table of the NatureMap excel output provided by DBCA is reproduced in Appendix C.

3.4.2 Significant fauna

The EPBC Act PMST (DCCEEW 2022a) and *NatureMap* (DBCA 2007) identified the presence/potential presence of 12 significant fauna within the study area (excluding Migratory marine and wetland species). The species list included:

– Seven species listed as Threatened under the EPBC Act and/or *Biodiversity Conservation Act 2016* (BC Act)
– Three bird species listed as Migratory (terrestrial) only under the EPBC Act and/or BC Act
– One species listed as Specially Protected under the BC Act
– One species listed as P4 by DBCA.

4. Field results

4.1 Flora and vegetation

4.1.1 Vegetation types

Two vegetation types and cleared areas were mapped within the biological survey area. The dominant vegetation type was *Eucalyptus salmonophloia* tall woodland (Es Woodland) with 22.13 ha and 96.2 % of the biological survey area. A small patch of *Allocasuarina corniculata* tall shrubland (Ac Shrubland) was mapped in the northern extent of the biological survey area (0.59 ha 2.6 %). Descriptions and representative photographs for vegetation types are presented in Table 6. Vegetation type mapping is provided in Figure 3, Appendix A and quadrat data is presented in Appendix D.

4.1.2 Significant ecological communities

No TECs listed under the EPBC Act or BC Act or Priority Ecological Communities (PECs) listed by DBCA were identified within the biological survey area during the field survey.

4.1.3 Vegetation condition

The vegetation in the biological survey area ranged from Very Good to Degraded condition (Table 6 and Figure 4, Appendix A). The majority of the survey area was mapped as Very Good. Basic vegetation structure in these areas had been impacted in parts by waste disposal relating to the operation of the pump station and some weed invasion. Vegetation rated as Good in condition had less coverage in the mid to lower strata due to grazing and more weed coverage. Degraded areas consisted of Eucalyptus over isolated native shrubs with weedy grasses and herbs. The south-eastern most extent of the survey area has recently been burnt (<1 year). This area was also rated as Degraded at the time of the survey.

4.1.4 Flora diversity

Sixty-six flora taxa (including subspecies and varieties) representing 26 families and 48 genera were recorded from the survey area during the field survey. This total comprised of 59 native taxa and seven introduced flora taxa.

Dominant families recorded from the survey area included:

– Chenopodiaceae (9 taxa)
– Asteraceae (9 taxa)
– Fabaceae (7 taxa).

To assess the adequacy of sampling effort within the survey area a species accumulation curve was generated using PRIMER (Plate 2). The species accumulation curve for the survey area, based on flora recorded within quadrats, is approaching an asymptote, which indicates survey effort was sufficient. The bootstrap, MM and UGE estimates of species richness generated from this data indicates that 51 (bootstrap) and 44 (MM and UGE) species could be expected from the survey area based on the diversity recorded within quadrats. The total species recorded within the quadrats was 44 however the total for the survey area including opportunistic species was 66 flora taxa.

Table 6 *Vegetation types mapped within the biological survey area*

Vegetation type	Vegetation Type Description	Landform and Substrate	Extent (ha) and proportion of survey area (%)	Survey Site	Photograph
Es Woodland	*Eucalyptus salmonophloia* tall woodland with patches of *E. salubris* and *Melaleuca sheathiana* over a *Eremophila scoparia, E. ionantha* and *Atriplex nummularia* subsp. *spathulata* open shrubland over *Sclerolaena patenticuspis, S. diacantha* and *Maireana trichoptera*	orange compacted clayey sand on flats	22.13 ha (96.2%)	Q01, Q02 & Q03	
Ac Shrubland	*Allocasuarina corniculata* tall shrubland over *Acacia resinimarginea, Melaleuca atroviridis* and *Eremophila clarkei* mid open shrubland over *Monachather paradoxus* grassland	orange clay hardpan	0.59 ha (2.6%)	Q04	
Cleared	Dirt tracks		0.28 ha (1.2%)		

Table 7 Vegetation Condition

Vegetation condition	Extent (ha)	Proportion of survey area (%)
Very Good	14.26	62.00%
Good	3.92	17.04%
Degraded	4.54	19.74%
Cleared	0.28	1.22%
Total	23.00	100.00%

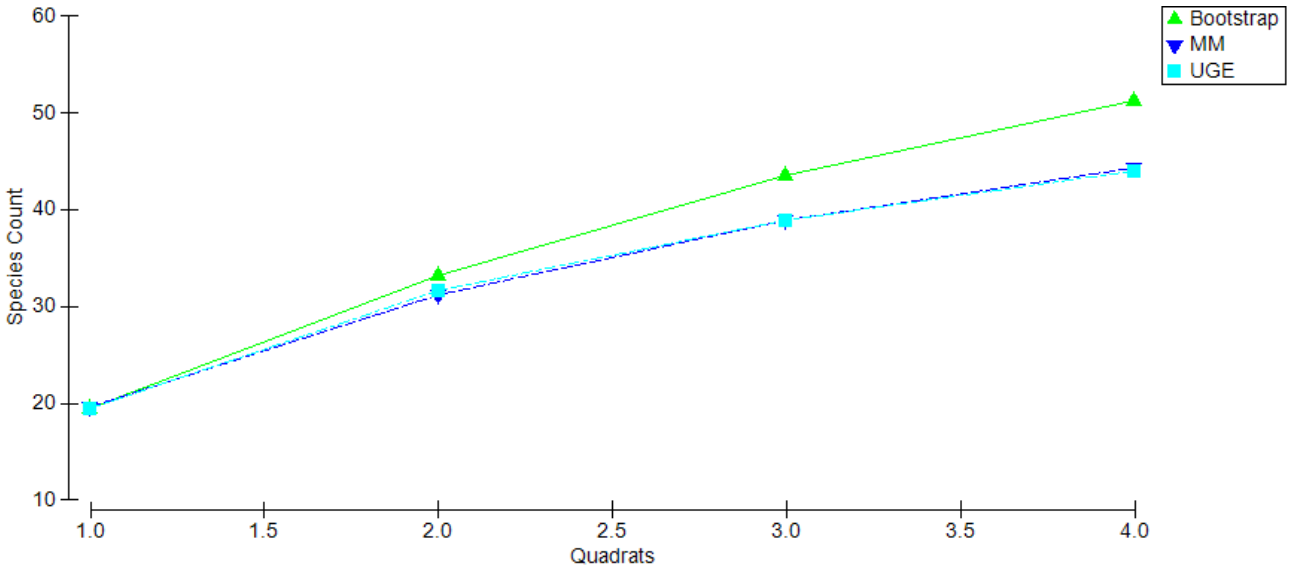

Plate 2 Flora species accumulation curve

4.1.5 Introduced flora

Seven introduced flora taxa were recorded in the survey area. One species, **Opuntia stricta*, is listed as a Declared Pest under the *Biosecurity and Management Act* 2007(BAM Act) and as a Weed of National Significance (WoNS). Four individuals were recorded from the small area north of Ghooli North Road (Figure 4, Appendix A). The remaining six introduced flora have been recorded in the study area before.

4.1.6 Significant flora

No EPBC Act, BC Act or DBCA listed flora were recorded within the survey area.

Likelihood of occurrence assessment

A likelihood of occurrence assessment was conducted for significant flora species in GHD (2017). Results from GHD (2017) are shown below:

> "The likelihood of occurrence assessment concluded five taxa may possibly occur and the remaining 26 taxa are unlikely or highly unlikely to occur within the survey area. The taxa that may possibly occur include *Goodenia heatheriana* (P1), *Millotia newbeyi* (P1), *Rinzia fimbriolata* (P1), *Teucrium diabolicum* (P3) (formerly *Teucrium* sp. dwarf (R. Davis 8813) (P1)) and *Stylidium choreanthum* (P3). There is habitat present within the Ghooli survey area for all of these species, they can be cryptic and the field survey was undertaken outside of the reported flowering period for all species."

An updated likelihood of occurrence assessment has been performed for the survey area, giving consideration to this survey observations. The updated likelihood of occurrence assessment has omitted taxa that were considered

highly unlikely and unlikely in GHD (2017). It includes the five above mentioned possible taxa and 11 additional flora taxa that have been listed as significant flora in the study area post GHD (2017).

In total 16 significant species were identified by the desktop assessment. The likelihood of occurrence assessment concluded that 14 species were considered unlikely and two species were considered highly unlikely to occur within the survey area (Appendix D). This assessment took into account survey efficacy, optimal flowering times, previous records and habitat requirements through desktop assessment and vegetation observed in the field.

4.2 Fauna

4.2.1 Fauna habitat types

Two broad fauna habitat types (not including cleared) were identified within the biological survey area based on the predominant landforms, soil and vegetation structure in the area. The habitat types identified closely correspond to the vegetation types outlined in section 4.1.1 and include: Salmon Gum Woodland and *Allocasuarina* Shrubland. Areas devoid of vegetation, including vehicle tracks have been mapped as cleared.

The habitat types within the biological survey area provide food resources, breeding habitat, shelter and habitat linkage for largely birds, reptiles and mammal species. Fallen logs and branches, leaf litter and tree hollows provide a variety of micro habitats for fauna species. The fauna habitats are generally in very good condition but have been impacted by a number of anthropogenic disturbances including historical clearing and infrastructure (buildings, tracks, fencing), waste, grazing, weed invasion and introduced fauna. The biological survey area is considered to provide areas of high habitat value for fauna in the region given the highly modified landscape of the surrounding area (largely cleared for agriculture).

The broad habitat types identified within the survey area are described in further detail in Table 8 and mapped in Figure 5 (Appendix A).

4.2.2 Fauna value and connectivity

The vegetation within the biological survey area forms part of a habitat corridor, essentially along the Great Eastern Highway, which links to surrounding remnant patches of vegetation and conservation reserves through a series of narrow vegetated corridors to the north, south, east and west through areas largely cleared for agriculture.

Historical disturbances such as grazing, clearing, weed invasion and introduced fauna has impacted on the natural state and condition of the remnant vegetation however much of it remains in very good condition. The survey area and the surrounding remnant vegetation of which it is a part of, provide an important refuge for native fauna in a region that is largely cleared and fragmented.

4.2.3 Fauna diversity

The field survey recorded 36 fauna species, consisting of 29 birds, four reptiles and three mammals were recorded from the biological survey area. Of these, two species are introduced: Red fox (*Vulpes vulpes*) and Rabbit (*Oryctolagus cuniculus*). The species recorded during the survey are typical for the habitats they were found in and are generally well represented in the region.

A full list of fauna recorded during the survey is provided in Appendix E.

Table 8 Fauna habitat types identified within the survey area

Fauna habitat type	Habitat Type Description	Extent (ha) and proportion of survey area (%)	Photograph
Salmon Gum Woodland	A tall woodland dominated by Salmon Gum *(Eucalyptus salmonophloia)* with scattered Gimlet (*E. salubris)* and *Melaleuca sheathiana* over an open low shrubland of *Eremophila* and halophytic shrubs on a clayey/sandy plain. This habitat type is well represented in the Ghooli survey area as well as in the local and broader areas (in surrounding nature reserves). <u>Significant fauna</u> The Peregrine Falcon may utilise this habitat for foraging and breeding (large trees with hollows). Salmon gum and gimlet trees provide suitable foraging habitat and potential breeding habitat (large trees with hollows) for Carnaby's Cockatoo.	22.13 ha (96.2%)	
Allocasuarina Shrubland	Tall shrubland of *Allocasuarina corniculata* over an open shrubland of *Acacia, Melaleuca* and *Eremophila* species over a grassland of *Monachather paradoxus* on clay hardpan. The shrubland provides high value habitat for birds, with foraging opportunities and refuge areas. Only a small patch of this habitat type occurs within the survey area, however it is considered to be well represented in the broader region (in nearby conservation reserves). <u>Significant fauna</u> The Peregrine Falcon may utilise this habitat type for foraging.	0.59 ha (2.6%)	
Cleared	Dirt tracks	0.28 ha (1.2%)	

4.2.4 Significant fauna

During the field survey, one fauna species of significance was recorded. One individual Carnaby's Cockatoo (*Zanda latirostris*) was observed flying over the biological survey area. No evidence of any other significant fauna was observed during the survey. More detail on Carnaby's Cockatoo's and an assessment of suitable habitat present within the survey area is provided in section 4.2.5.

Likelihood of occurrence assessment

An assessment on the likelihood of significant fauna identified in the desktop assessment, occurring in the biological survey area, was undertaken post survey. This assessment is based on species' biology, habitat requirements, the quality and availability of suitable habitat as determined during the field survey, and records of the species in the survey area and locality. Species specific searches of the DBCA *NatureMap* database were also conducted in order to gather information about the broader regional occurrence of species to further inform the likelihood of occurrence assessment. The complete assessment is provided in Appendix E.

Of the 12 significant fauna identified in the desktop searches, two species are considered likely to occur within the biological survey area. A summary of these species is provided in Table 9.

Table 9 Significant fauna identified as likely to occur within the survey area

Species	Status		Likelihood of occurrence
	BC Act/ DBCA	EPBC Act	
Peregrine Falcon (*Falco peregrinus*)	OS		Likely – the survey area provides suitable foraging and nesting habitat for this species. The closest known record is less than 10 km from the survey area.
Western Spiny-tailed Skink *(Egernia stokesii badia)*	EN	EN	Likely Suitable habitat is present within the survey area. This species is known to persist in small woodland remnants and disturbed areas.

A survey previously undertaken by GHD in 2017 (GHD 2017) recorded the presence of Red-tailed Black Cockatoo (*Calyptorhynchus banksii samueli*) and Major Mitchell Cockatoo (*Lephochroa leadbeateri*) within the Ghooli survey area. Although these species are not listed under the state or federal law, they are considered to be regionally significant. No evidence of their presence were recorded during the current survey.

4.2.5 Black Cockatoo habitat assessment

The Ghooli survey area is located just outside of the eastern extent of the modelled distribution for Carnaby's Cockatoo (*Zanda latirostris*). Although this species was not identified in the recent desktop assessment, it has been identified previously as likely to occur in the area and suitable habitat is present (GHD 2017). Carnaby's Cockatoo is listed as Endangered under the EPBC Act and the BC Act.

In the south-west of Western Australia, this species mostly occurs in the Wheatbelt, where the species breeds between July/August to January/February. The Carnaby's Cockatoo is highly mobile and displays a seasonal migratory pattern that is linked to breeding, with the majority of birds moving to the higher rainfall coastal areas to forage during the non-breeding season (DCCEEW 2022c). All areas of breeding habitat are critical to black cockatoos, as are the associated foraging areas that support breeding. Vegetation in the Wheatbelt region is highly fragmented and represented poorly in conservation reserves (DAWE 2022).

The field survey was carried out during the breeding season of Carnaby's Black Cockatoo. Only the one individual was observed flying over the survey area. No evidence of breeding, foraging or roosting was observed within the biological survey area. The species does not typically occur in high numbers east of Merredin. The closest known breeding area for Carnaby's Cockatoo is more than 150 km south/south-west of the survey area (GoWA 2022). It is considered Carnaby's Cockatoo are likely to utilise the survey area opportunistically.

Foraging habitat

No evidence of foraging was observed during the survey. While the habitat types within the biological survey area contain suitable foraging species, none are considered to provide high quality foraging habitat for Carnaby's Cockatoo (i.e.do not contain a high density of foraging species). Suitable foraging species present within the survey area consist of primarily *Eucalyptus salmonophloia* (Salmon Gum) and *E. salubris* (Gimlet). These species are restricted to the Salmon Gum woodland habitat type. There is 22.13 ha of Salmon Gum woodland habitat within the survey area.

The Salmon Gum woodland habitat within the survey area is considered to be low to moderate quality foraging habitat for Carnaby's Cockatoo due to the foraging species present, lack of feeding debris and is located more than 100 km from known breeding and roosting areas. Both Salmon Gum and Gimlet have relatively small fruits and are regarded as being of low to moderate foraging value given the amount of effort that would be required by black cockatoos to extract seeds when compared to more favourable species. The absence of any other flora species known to be utilised by black cockatoos as a food source (in particular diverse shrublands/kwongan heath/banksia) reduces the overall foraging value of the habitat types present within the biological survey area Additionally, the survey area is situated outside of the modelled distribution for this species (DAWE 2022).

Breeding habitat

A total of 242 potential habitat trees were recorded within the biological survey area, of which 240 are Salmon Gum (DBH >300 mm) and two trees are Gimlet (DBH >500 mm). Five of the trees recorded contained one or more hollows ranging from small (<9 cm) to medium sized (10-20 cm). One of the trees contained hollows that were of a suitable size to currently provide nesting opportunities for Carnaby's Cockatoo (hollows with an entrance diameter greater than 20 cm). Observations from ground level indicated this hollow is not currently being utilised.

No breeding events were recorded within the survey area.

The location of the potential habitat trees (with and without any hollows) are mapped in Figure 5, Appendix A.

Roosting habitat

Carnaby's Cockatoo roost in tall, large trees over 8 m in height, typically within close proximity to a water source and quality foraging resources (Glossop et al. 2011; Le Roux 2017). Generally any tall trees are suitable roosting, but particularly Flat-topped Yate (*Eucalyptus. occidentalis*), Salmon Gum, Wandoo (*E. wandoo*), Marri (*Corymbia calophylla*), Karri (*E. diversicolor*), Blackbutt (*E. patens*), Tuart (*E. gomphocephala*), introduced eucalypts and introduced pines (*Pinus radiata* and *P. pinaster)* (DAWE 2022).

No evidence of roosting activity, such as branch clippings, droppings and moulted feathers were observed during the survey. Additionally, no Carnaby's Cockatoo roosting was observed during the early morning or late in the afternoon. There is a lack of natural water sources in the area, however there are a number of small dams on farmland scattered in the surrounding landscape. The Salmon Gum Woodland is considered suitable for potential roosting by Carnaby's Cockatoo based on the presence of suitable tall trees and presence of some suitable foraging habitat. The closest known Carnaby's Cockatoo roosting site is more than 100 km west of the survey area, near Merriden (GoWA 2022).

5. Discussion

A review of GHD (2017) was conducted to determine if there were any updates to the environmental and biological values of the study area. Most of the desktop information within GHD (2017) is up to date and relevant to this report. The aspects that had changed since 2017 and were updated within this document included the climatic data, vegetation statistics, flora and fauna desktop species including significant species.

5.1 Vegetation

The vegetation types mapped within the biological survey area do not represent any EPBC Act or BC Act listed TECs or DBCA listed PECs. They are not restricted to the biological survey area or considered significant vegetation. Even though the vegetation type Es woodland has affinities to the Eucalypt Woodlands of the Western Australian Wheatbelt TEC, it is not considered representative of this community due to its location. The TEC boundary limit occurs just west of Southern Cross. Woodland communities past this point are referred to as the Great Western Woodlands and are not considered significant vegetation (DoE 2016). All the mapped vegetation types have high representation in both the local and regional area.

The vegetation condition in the biological survey area ranged from Very Good to Degraded condition, 62% of the biological survey area was mapped as Very Good. The disturbances within the biological survey area were associated with the old pump station. These disturbances included tracks and waste from the old settlement. This waste was generally localised in patches and not spread throughout the remnant vegetation. The south-eastern most extent of the survey area had recently been burnt (<1 year). This area was rated as Degraded at the time of the survey. The fire did not appear to be hot and the upper and mid storey species were recovering, the area has the ability to regenerate and improve in condition over time.

5.2 Flora

Sixty-six flora taxa (including subspecies and varieties) representing 26 families and 48 genera were recorded from the biological survey area during the field survey. A species accumulation curve showed survey effort was considered sufficient and representative of the floristic diversity.

No EPBC Act, BC Act or DBCA listed flora were recorded within the survey areas.

An updated likelihood of occurrence assessment has been conducted for this report for the survey area. The updated likelihood of occurrence assessment has omitted taxa that were considered highly unlikely and unlikely in GHD (2017). It includes *Goodenia heatheriana* (P1), *Millotia newbey*i (P1), *Rinzia fimbriolata* (P1), *Teucrium diabolicum* (P3) (previously *Teucrium* sp. dwarf (R. Davis 8813) (P1)) and *Stylidium choreanthum* (P3), which were listed as possible in GHD (2017) due to the survey being conducted outside the optimal flowering time for these species. An additional 11 flora taxa that have been listed as significant flora in the study area post GHD (2017) had also been included.

Of the 16 significant species identified in the desktop assessment 14 species were considered Unlikely and two species were considered Highly Unlikely to occur within the survey area. The survey area did have some suitable habitat for nine of these significant species, however due to the survey being conducted at the optimal flowering time for these species and due to the survey effort employed by GHD no significant flora species are considered to have occurred within the survey area during the field survey.

One introduced flora taxon recorded in the survey area **Opuntia stricta* is listed as a Declared Pest under the BAM Act and as a WoNS. This species spreads both by seed and vegetatively from cladodes, fallen flowers or immature fruit; these propagules easily root within a few months of contact with the soil (Sheehan and Potter 2017). Care should be taken with any remediation works to ensure this species doesn't spread.

5.3 Fauna

Two broad fauna habitat types (not including cleared areas) were identified within the survey area, consisting of Salmon Gum woodland and *Allocasuarina* shrubland. The fauna habitats within the survey area are generally in Very Good condition but have been impacted by a number of anthropogenic disturbances including historical

clearing and infrastructure, grazing, weeds and introduced fauna. The habitat types within the survey area provide a variety of micro-habitats and niches such fallen logs and branches, leaf litter, and tree hollows. The survey area provides areas of high habitat value given the highly modified landscape of the surrounding area. Remnant patches of vegetation serve as ecological refugia for flora and fauna, and their connection throughout the landscape, particularly for birds. However due to the small, fragmentated nature of the bushland remnant, only smaller mammal and reptile species with small home ranges are likely to persist in it.

Thirty-six fauna species, including 29 birds, four reptiles and three mammals were recorded during the survey. Of these, two species are introduced: red fox and rabbit. One individual Carnaby's Cockatoo (*Zanda latirostris*), listed as Endangered under the EPBC Act and BC Act, was observed flying over the biological survey area. No evidence of any other significant fauna was observed during the survey. A likelihood of occurrence assessment for significant fauna concluded two species are considered likely to utilise the habitat present in the survey area, these being the Peregrine Falcon (*Falco peregrinus*) and Western Spiny-tailed Skink (*Egernia stokesii badia*). The Peregrine Falcon is a widespread species that is found everywhere from woodlands to open grasslands, coastal cliffs and less frequently desert regions and is unlikely to solely rely on habitats present within the survey area. The salmon gum woodland provides suitable habitat for the Western Spiny-tailed Skink which is known to persist in small woodland remnants and disturbed areas.

5.3.1 Black Cockatoo habitat

The survey area is located just outside of the eastern extent of the modelled breeding distribution for the Carnaby's Cockatoo. This species does not typically occur in high numbers east of Merredin. The closest known breeding area for Carnaby's Cockatoo is more than 150 km south/south-west of the survey area. No evidence of breeding, foraging or roosting was observed within the biological survey area. The salmon gum woodland provides low to moderate quality foraging habitat and potential breeding habitat for Carnaby's Cockatoo with a total of 242 potential habitat trees (salmon gum and gimlet) recorded within the biological survey area. Of these, five trees have hollows of various sizes, of which only one contained hollows currently suitable for breeding by Carnaby's Cockatoo.

Although one individual Carnaby's Cockatoo was observed flying over during the survey, this species is likely to occur as an irregular visitor, utilising the habitat within the survey area opportunistically.

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Appendices

Appendix A

Figures

Paper Size ISO A3
at Scale: 1:15,000

0 50 100 200 300 400

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Water Corporation
Targeted Flora Survey 2022
Ghooli Site Remediation

Project Location

Project No. **12589099**
Revision No. **0**
Date **18/11/2022**

FIGURE 1

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Print date: 18 Nov 2022 - 15:26

Data source: Landgate_Subscription_Imagery\WANow:
OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri
World Topographic Map: Esri, HERE, Garmin, USGS, METI/NASA. Created by: dmontoya

Legend
Main Roads
Minor Roads
GPS Tracklogs
Survey Area

Ghooli North Rd
Great Eastern Hwy
Ghooli South Rd

Paper Size ISO A3
at Scale: 1:5,000

0 15 30 60 90 120
Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Water Corporation
Targeted Flora Survey 2022
Ghooli Site Remediation

Survey Effort

Project No. **12589099**
Revision No. **0**
Date **18/11/2022**

FIGURE 2

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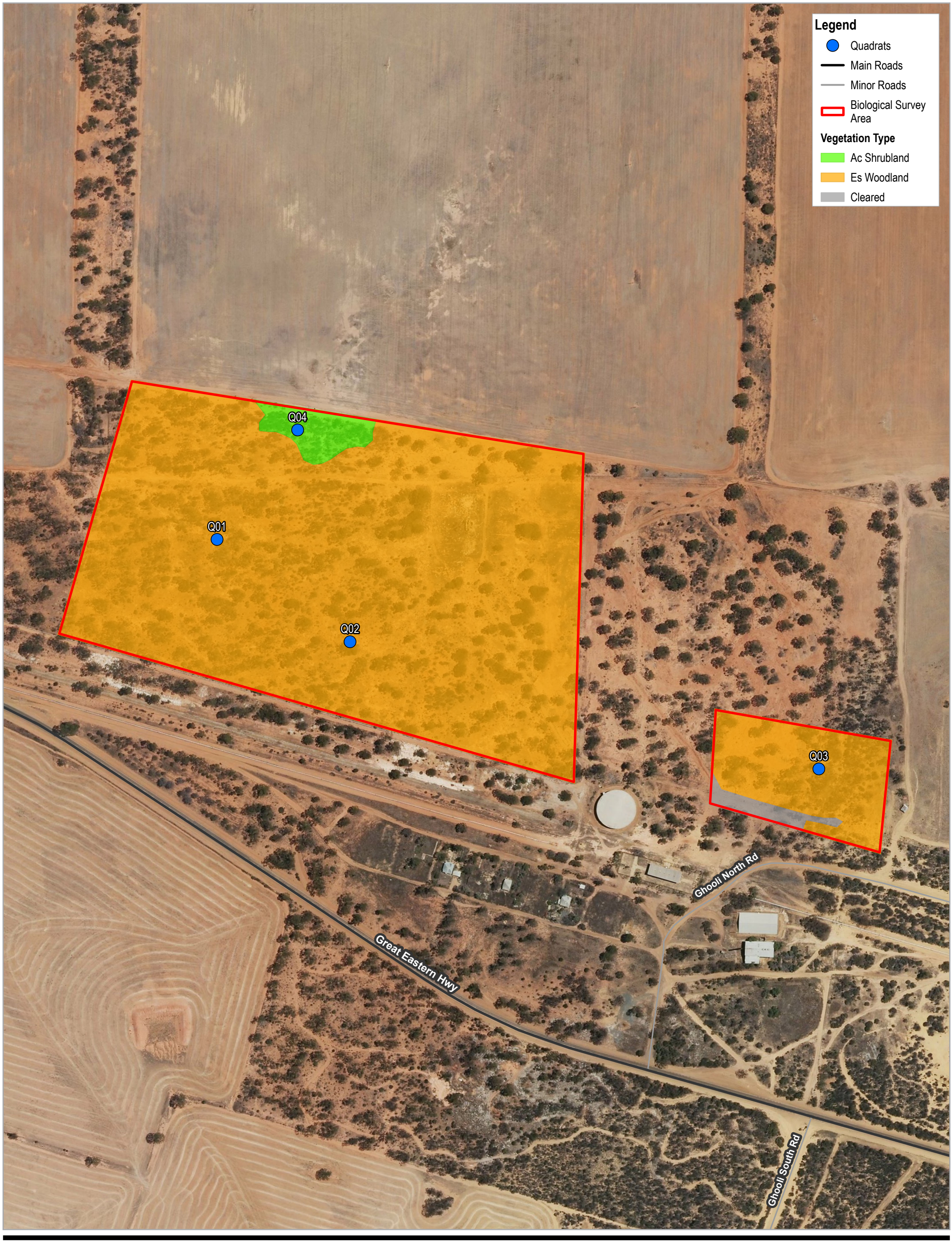


Paper Size ISO A3
at Scale: 1:4,000

0 12.5 25 50 75 100

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Water Corporation
Targeted Flora Survey 2022
Ghooli Site Remediation

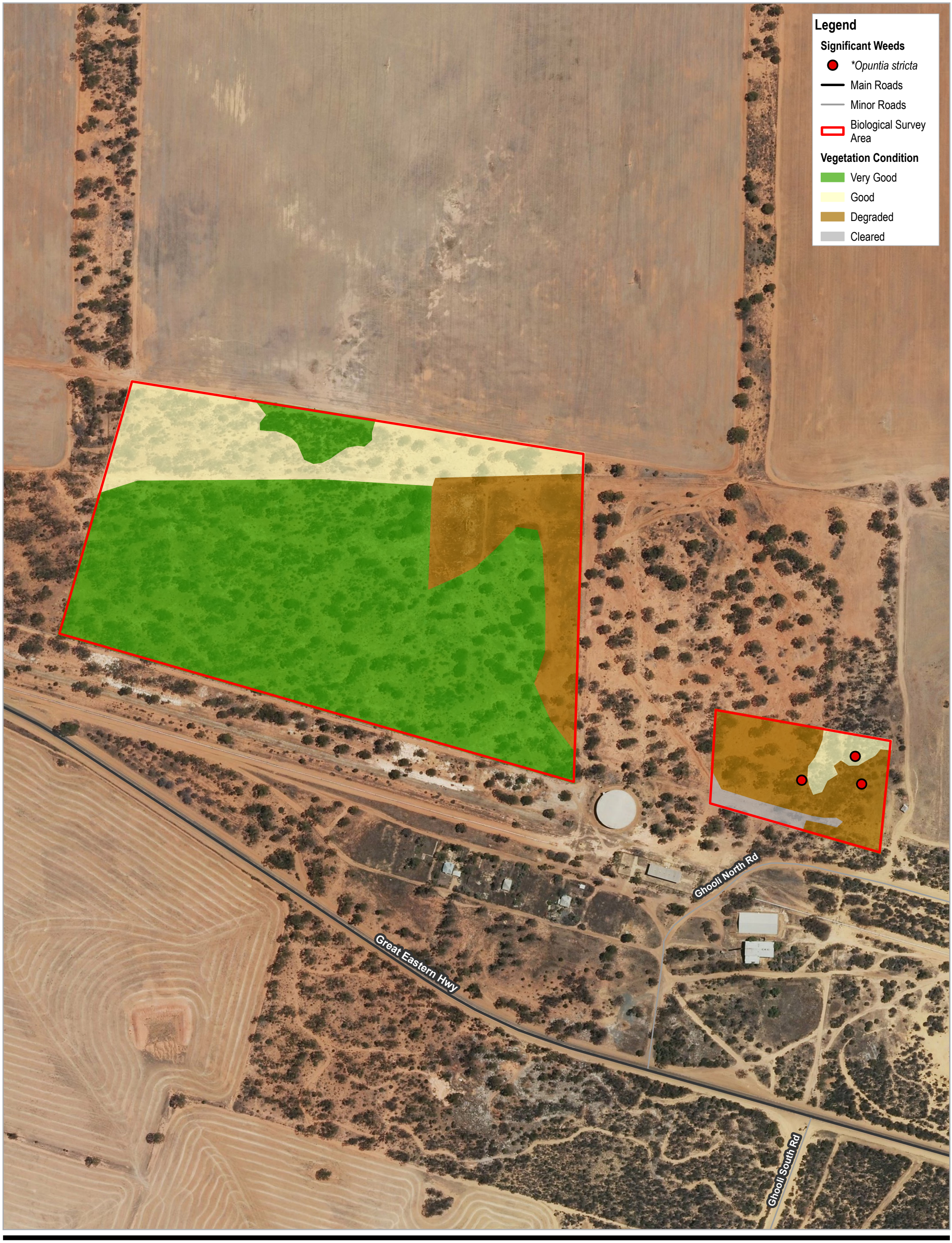
Project No. **12589099**
Revision No. **0**
Date **18/11/2022**

Vegetation Type and Sample Sites

FIGURE 3

\\ghdnet\ghd\AU\Perth\Projects\61\12589099\GIS\Maps\Working\12589099\12589099.aprx\12589099_03_VegetationTypeAndSampleSite_Rev0
Print date: 18 Nov 2022 - 15:30

Data source: Landgate_Subscription_Imagery\WANow:
OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri
World Topographic Map: Esri, HERE, Garmin, USGS. Created by: dmontoya



Paper Size ISO A3
at Scale: 1:4,000

0 12.5 25 50 75 100

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Water Corporation
Targeted Flora Survey 2022
Ghooli Site Remediation

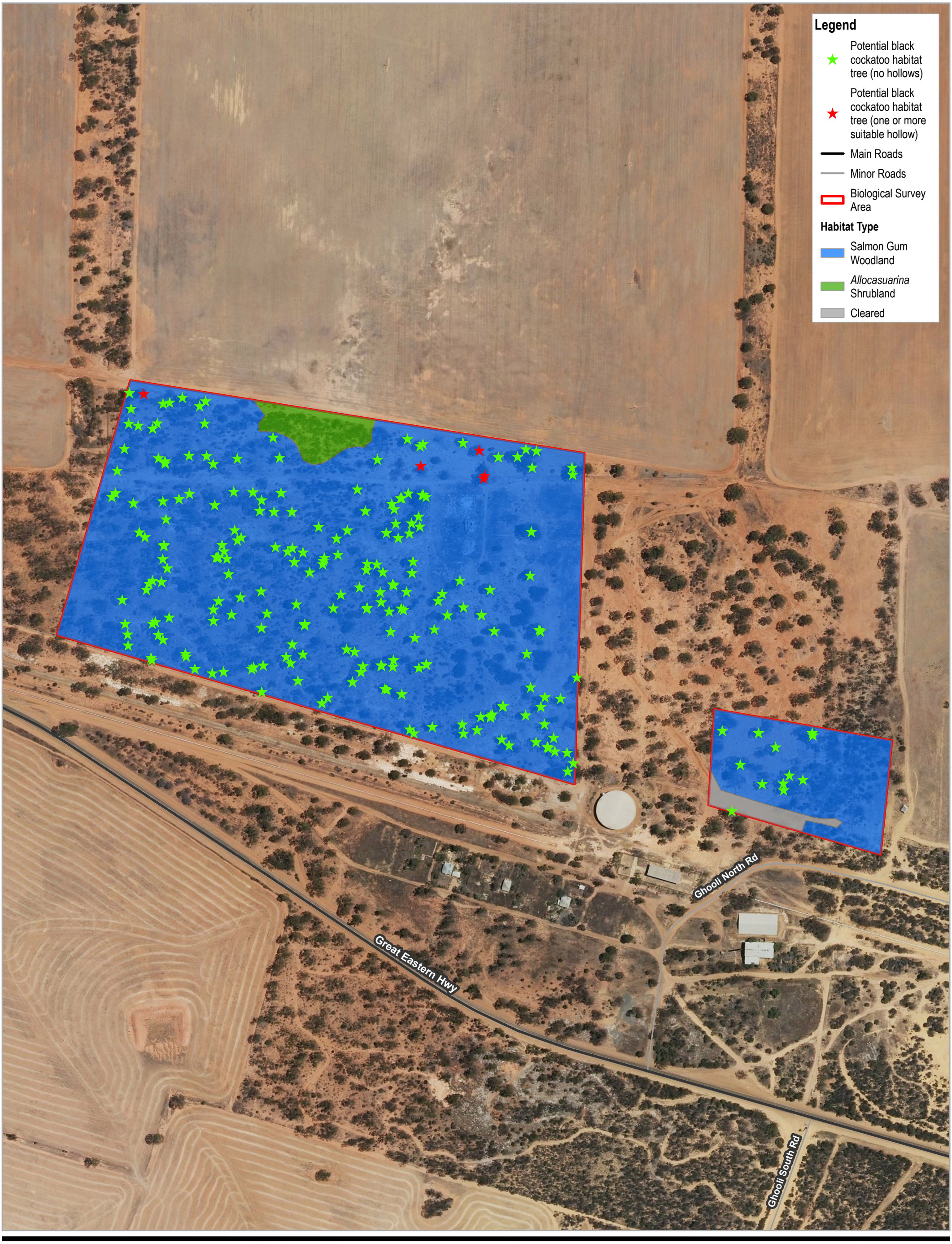
Vegetation Condition and Significant Weeds

Project No. **12589099**
Revision No. **0**
Date **18/11/2022**

FIGURE 4

\\ghdnet\ghd\AU\Perth\Projects\61\12589099\GIS\Maps\Working\12589099\12589099.aprx\12589099_04_VegetationConditionAndSignificantWeeds_Rev0
Print date: 18 Nov 2022 - 15:30

Data source: Landgate_Subscription_Imagery\WANow: OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri World Topographic Map: Esri, HERE, Garmin, USGS. Created by: dmontoya



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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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Water Corporation
Targeted Flora Survey 2022
Ghooli Site Remediation

Fauna Habitat and Potential Black Cockatoo Trees

Project No. **12589099**
Revision No. **0**
Date **18/11/2022**

FIGURE 5

\\ghdnet\ghd\AU\Perth\Projects\61\12589099\GIS\Maps\Working\12589099\12589099.aprx\12589099_05_FaunaHabitatandPotentialBCTrees_Rev0
Print date: 18 Nov 2022 - 15:33

Data source: Landgate_Subscription_Imagery\WANow:
OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri
World Topographic Map: Esri, HERE, Garmin, USGS, METI/NASA. Created by: dmontoya

Appendix B

Relevant legislation, background information and conservation codes

Relevant legislation

Federal *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Federal Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

The biological aspects listed as MNES include:

– Nationally threatened flora and fauna species and ecological communities
– Migratory species

A person must not undertake an action that has, will have, or is likely to have a significant impact (direct or indirect) on MNES, without approval from the Federal Minister for the Environment.

The EPBC Act is administered by the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

State *Environmental Protection Act 1986*

The *Environmental Protection Act 1986* (EP Act) is the primary legislative Act dealing with the protection of the environment in Western Australia. The Act allows the Environmental Protection Authority (EPA), to prevent, control and abate pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing. Part IV of the EP Act is administered by the EPA and makes provisions for the EPA to undertake environmental impact assessment of significant proposals, strategic proposals and land use planning schemes.

The Department of Water and Environment Regulation (DWER) is responsible for administering the clearing provisions of the EP Act (Part V). Clearing of native vegetation in Western Australia requires a permit from the DWER, unless exemptions apply. Applications for clearing permits are assessed by the Department and decisions are made to grant or refuse the application in accordance with the Act. When making a decision the assessment considers clearing against the ten clearing principles as specified in Schedule 5 of the EP Act:

1. Native vegetation should not be cleared if it comprises a high level of biodiversity.
2. Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significance habitat for fauna indigenous to Western Australia.
3. Native vegetation should not be cleared if it includes, or is necessary, for the continued existence of rare flora.
4. Native vegetation should not be cleared if it comprises the whole or part of native vegetation in an area that has been extensively cleared.
5. Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.
6. Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
7. Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.
8. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.
9. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

10. Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

Exemptions for clearing include clearing that is a requirement of a written law or authorised under certain statutory processes (listed in Schedule 6 of the EP Act) and exemptions for prescribed low impact day-to-day activities (prescribed in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004); these exemptions do not apply in environmentally sensitive areas (ESAs).

State *Biodiversity and Conservation Act 2016*

The *Biodiversity Conservation Act 2016* (BC Act) provides for the conservation and protection of biodiversity and biodiversity components, as well as the promotion of the ecologically sustainable use of biodiversity components in Western Australia. The BC Act replaces both the repealed *Wildlife Conservation Act 1950* (WC Act) and the *Sandalwood Act 1929* (Sandalwood Act), as well as their associated regulations. To attain the objectives of the BC Act, principles of ecological sustainable development have been established:

– Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations
– If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
– The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
– The conservation of biodiversity and ecological integrity should be a fundamental consideration indecision-making
– Improved valuation, pricing and incentive mechanisms should be promoted.

The BC Act is administered by the Department of Biodiversity Conservation and Attractions (DBCA).

State *Biosecurity and Agriculture Management Act 2007*

The *Biosecurity and Agriculture Management Act 2007* (BAM Act) and associated regulations are administered by the Department of Primary Industries and Regional Development (DPIRD) and replace the repealed *Agriculture and Related Resources Protection Act 1976.* The main purposes of the BAM Act and its regulations are to:

– Prevent new animal and plant pests (vermin and weeds) and diseases from entering WA
– Manage the impact and spread of those pests already present in the state
– Safely manage the use of agricultural and veterinary chemicals
– Increased control over the sale of agricultural products that contain violative chemical residues.

The Western Australian Organism List (WAOL) provides the status of organisms which have been categorised under the BAM Act. A Declared Pest is a prohibited organism or an organism for which a declaration under Section 22(2) of the Act is in force. Declared Pests may be assigned a control category including: C1 (exclusion), C2 (eradication) and C3 (management). The category may apply to the whole of the State, LGAs, districts, individual properties or even paddocks, and all landholders are obliged to comply with the specific category of control. Categories of control are defined below.

DPIRD Categories for Declared Pests under the BAM Act

Control class code	Description
C1 (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 (Management)	Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

Background information

Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared by the Minister for Environment under Section 51B of the EP Act. The Table below outlines the aspects of areas declared as ESA in the Environmental Protection (Environmentally Sensitive Areas) Notice 2005.

Aspects of ESAs

Aspects of Environmentally Sensitive Areas
A declared World Heritage property as defined in Section 13 of the EPBC Act.
An area that is included on the Register of the National Estate (RNE), because of its natural values, under the *Australian Heritage Commission Act 1975* of the Commonwealth (the RNE was closed in 2007 and is no longer a statutory list – all references to the RNE were removed from the EPBC Act on 19 February 2012).
A defined wetland and the area within 50 m of the wetland. Defined wetlands include Ramsar wetlands, conservation category wetlands and nationally important wetlands.
The area covered by vegetation within 50 m of rare flora, to the extent to which the vegetation is continuous with the vegetation in which the rare flora is located.
The area covered by a Threatened Ecological Community.
A Bush Forever Site listed in "Bush Forever" Volumes 1 and 2 (2000), published by the Western Australia Planning Commission, except to the extent to which the site is approved to be developed by the Western Australia Planning Commission.
The areas covered by the *Environmental Protection (Gnangara Mound Crown Land) Policy 1992*.
The areas covered by the *Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002.*
The areas covered by the lakes to which the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (EPP Lakes) applies.
Protected wetlands as defined in the *Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998*.

Reserves and conservation areas

Department of Biodiversity, Conservation and Attractions managed lands and waters

DBCA manages lands and waters throughout Western Australia to conserve ecosystems and species, and to provide for recreation and appreciation of the natural environment. DBCA managed lands and waters include national parks, conservation parks and reserves, marine parks and reserves, regional parks, nature reserves, State forest and timber reserves. Access to, or through, some areas of DBCA managed lands may require a permit or could be restricted due to management activities. Proposed land use changes and development proposals that abut DBCA managed lands will generally be referred to DBCA throughout the assessment process.

Wetlands

Ramsar Wetlands (Wetlands of International Importance)

The Convention of Wetlands of International Importance was signed in 1971 at the Iranian town of Ramsar. The Convention has since been referred to as the Ramsar Convention. Ramsar Listed wetlands are "sites containing representative, rare or unique wetlands, or wetlands that are important for conserving biological diversity … because of their ecological, botanical, zoological, limnological or hydrological importance" (DAWE 2020b). Once a Ramsar Listed Wetland is designated, the country agrees to manage its conservation and ensure its wise use.

Under the Convention, wise use is broadly defined as “maintaining the ecological character of a wetland” (DAWE 2020b).

Nationally important wetlands

Wetlands of national significance are listed under the Directory of Important Wetlands in Australia. Nationally important wetlands are wetlands which meet at least one of the following criteria (DAWE 2020a):

– It is a good example of a wetland type occurring within a biogeographic region in Australia
– It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex
– It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail
– The wetland supports one percent or more of the national populations of any native plant or animal taxa
– The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level
– The wetland is of outstanding historical or cultural significance.

Vegetation extent and status

The National Objectives and Targets for Biodiversity Conservation 2001–2005 (Commonwealth of Australia 2001) recognise that the retention of 30 percent or more of the pre-clearing extent of each ecological community is necessary if Australia’s biological diversity is to be protected. This is the threshold level below which species loss appears to accelerate exponentially and loss below this level should not be permitted. This level of recognition is in keeping with the targets recommended in the review of the National Strategy for the Conservation of Australia’s Biological Diversity (ANZECC 2000).

The extent of remnant native vegetation in WA has been assessed by Shepherd et al. (2002) and the GoWA (2019), based on broadscale vegetation association mapping by Beard (various publications). The GoWA produces Statewide Vegetation Statistics Reports that are used for a number of purposes including conservation planning, land use planning and when assessing development applications. The reports are updated every 2-3 years.

Vegetation condition

The vegetation condition can be assessed in accordance with the vegetation condition rating scale for the South West and Interzone Botanical Provinces (EPA 2016a). The scale recognises the intactness of vegetation and consists of six rating levels as outlined below.

Vegetation condition rating and scale for the South West and Interzone Botanical Provinces

Condition	South West and Interzone Botanical Provinces description
Pristine	Pristine or nearly so, no obvious signs of 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.

Condition	South West and Interzone Botanical Provinces description
Completely Degraded	The structure of 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 or shrubs.

Conservation codes

Species of significant flora, fauna and communities are protected under both Federal and State Acts. The Federal EPBC Act provides a legal framework to protect and manage nationally important flora and communities. The State BC Act is the primary wildlife conservation legislation in Western Australia. Information on the conservation codes is summarised in the following sections.

Ecological communities

Significant communities

Ecological communities are defined as naturally occurring biological assemblages that occur in a particular type of habitat (English and Blyth 1997). Federally listed Threatened Ecological Communities (TECs) are protected under the EPBC Act. The BC Act provides for the Minister to list an ecological community as a TEC (section 27), or as a collapsed ecological community (section 31) statutory listing of State TECs by the Minister. The legislation also describes statutory processes for preparing recovery plans for TECs, the registration of their critical habitat, and penalties for unauthorised modification of TECs.

Possible TECs that do not meet survey criteria are added to the DBCA Priority Ecological Community (PEC) List under Priorities 1, 2 and 3. These are ecological communities that are adequately known; are rare but not threatened, or meet criteria for Near Threatened. PECs that have been recently removed from the threatened list are placed in Priority 4. These ecological communities require regular monitoring. Conservation dependent ecological communities are placed in Priority 5. PECs are not listed under any formal Federal or State legislation, however, may be listed as TECs under the EPBC Act.

Codes and definitions for TECs listed under the EPBC Act and/or BC Act

Categories	Definition
Federal Government Conservation Categories (EPBC Act)	
Critically Endangered (CR)	An ecological community if, at that time, is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).
Endangered (EN)	An ecological community if, at that time: – is not critically endangered; and – is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).
Vulnerable (VU)	An ecological community if, at that time: – is not critically endangered or endangered; and – is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).
Western Australia Conservation Categories (BC Act)	
Threatened Ecological Communities	
Critically Endangered (CR)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.
Endangered (EN)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

Categories	Definition
Vulnerable (VU)	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.
Collapsed ecological communities	
An ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time – – there is no reasonable doubt that the last occurrence of the ecological community has collapsed); or – the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover – • its species composition or structure; or • its species composition and structure. Section 33 of the BC Act provides for a collapsed ecological community to be regarded as a threatened ecological community if it is discovered in a state that no longer makes it eligible for listing as a collapsed ecological community.	

Categories and definitions for PECs as listed by the DBCA

Category	
Priority 1	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 ≤100 ha). 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	Poorly known ecological communities. Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200 ha). At least some occurrences are not believed to be under immediate threat 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	Poorly known ecological communities. – 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: – 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, or; – 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, and inappropriate fire regimes. 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.
Priority 4	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. – 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.

Category	
	– 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 Vulnerable. – Ecological communities that have been removed from the list of threatened communities during the past five years.
Priority 5	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.

Other significant vegetation

Vegetation may be significant for a range of reasons other than a statutory listing. The EPA (2016a, b) states that significant vegetation may include vegetation that includes the following:

- Restricted distribution
- Degree of historical impact from threatening processes
- A role as a refuge
- Providing an important function required to maintain ecological integrity of a significant ecosystem
- Local endemism in restricted habitats
- Novel combinations of taxa
- A role as a key habitat for Threatened species or large population representing a significant proportion of the local to regional total population of a species
- Being representative of a vegetation unit in 'pristine' condition in a highly cleared landscape, recently discovered range extensions, or isolated outliers of the main range.

This may apply at a number of levels, so the unit may be significant when considered at the fine-scale (intra-locality), intermediate-scale (locality or inter-locality) or broad-scale (local to region).

Flora and fauna

Significant flora and fauna

Species of significant flora are protected under both Federal and State legislation. Any activities that are deemed to have a significant impact on species that are recognised by the EPBC Act, and/or the BC Act can warrant referral to the DCCEEW and/or the EPA.

The Federal conservation level of flora and fauna species and their significance status is assessed under the EPBC Act. The significance levels for flora and fauna used in the EPBC Act align with the International Union for Conservation of Nature (IUCN) Red List criteria, which are internationally recognised as providing best practice for assigning the conservation status of species. The EPBC Act also protects land and migratory species that are listed under International Agreements. The list of migratory species established under section 209 of the EPBC Act comprises:

- Migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II)
- Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China–Australia Migratory Bird Agreement (CAMBA)
- Native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the republic of Korea–Australia Migratory Bird Agreement (ROKAMBA)

The State conservation level of flora and fauna species and their significance status also follows the IUCN Red List criteria. Under the BC Act flora and fauna can be listed as Threatened, Extinct and as Specially Protected species.

Threatened species are those are species which have been adequately searched for and are deemed to be, in the wild, either rare, under identifiable threat of extinction, or otherwise in need of special protection, and have been gazetted as such. The assessment of the conservation status of Threatened species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria. Specially protected species meet one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as Threatened or Extinct species under the BC Act cannot also be listed as Specially Protected species.

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

For the purposes of this assessment, all species listed under the EPBC Act, BC Act and DBCA Priority species are considered significant.

Categories and definitions for EPBC Act and BC Act listed flora and fauna species

Conservation category	Definition
Threatened 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". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.
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". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines.
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". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines.
Extinct species	
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).
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).
Specially protected species	
Migratory (MI)	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.
Species of special conservation interest (conservation dependent fauna) (CD)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Other specially protected fauna (OS)	Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Codes for DBCA listed Priority flora and fauna

Priority category	Definition
Priority 1	Poorly-known taxa 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

Priority category	Definition
	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	Poorly-known taxa 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	Poorly-known taxa 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	Rare, Near Threatened and other taxa in need of monitoring – Rare: Taxa 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 taxa are usually represented on conservation lands. – Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. – Taxa that have been removed from the list of threatened taxa during the past five years for reasons other than taxonomy.

Other significant flora

Flora species, subspecies, varieties, hybrids and ecotypes may be significant for a range of reasons, other than a statutory listing. The EPA (2016a, b) states that significant flora may include taxa that have/are:

– A keystone role in a particular habitat for Threatened or Priority flora or fauna species, or large populations representing a considerable proportion of the local or regional total population of a species
– Relictual status, being representation of taxonomic or physiognomic groups that no longer occur widely in the broader landscape
– New species or anomalous features that indicate a potential new species
– Being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
– Unusual species, including restricted subspecies, varieties, or naturally occurring hybrids
– Local endemism (a restricted distribution) or association with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems).

Other significant fauna

Fauna species may be significant for a range of reasons other than those protected by international agreement or treaty, Specially Protected or Priority Fauna. Significant fauna may include short-range endemic species, species that have declining populations or declining distributions, species at the extremes of their range, or isolated outlying populations, or species which may be undescribed (EPA 2010).

Introduced plants (weeds)

Declared Pests

Information on species considered to be Declared Pests is provided under *State Biosecurity and Agriculture Management Act 2007.*

Weeds of National Significance

The spread of weeds across a range of land uses or ecosystems is important in the context of socio-economic and environmental values. The assessment of Weeds of National Significance (WoNS) is based on four major criteria:

– Invasiveness
– Impacts
– Potential for spread
– Socio-economic and environmental values.

Australian state and territory governments have identified thirty-two Weeds of National Significance (WoNS); a list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012.

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Appendix C

Desktop searches

EPBC PMST search

Nature Map searches

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 26-Oct-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	16
Listed Migratory Species:	6

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	4
Commonwealth Heritage Places:	None
Listed Marine Species:	10
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	4
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Goldfields Water Supply Scheme, Western Australia	WA	Listed place	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Eucalypt Woodlands of the Western Australian Wheatbelt	Critically Endangered	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area	In feature area
PLANT			
Banksia sphaerocarpa var. dolichostyla Ironcaps Banksia, Ironcap Banksia [10518]	Vulnerable	Species or species habitat may occur within area	In feature area
Dasymalla axillaris Native Foxglove [38829]	Critically Endangered	Species or species habitat may occur within area	In feature area
Daviesia microcarpa Norseman Pea [56766]	Endangered	Species or species habitat known to occur within area	In feature area
Eremophila resinosa Resinous Eremophila [11735]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Eremophila viscida Varnish Bush [2394]	Endangered	Species or species habitat likely to occur within area	In feature area
Frankenia parvula Short-leaved Frankenia [20872]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Gastrolobium graniticum Granite Poison [14872]	Endangered	Species or species habitat may occur within area	In buffer area only
Isopogon robustus Robust Coneflower [82646]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Ricinocarpos brevis [82879]	Endangered	Species or species habitat may occur within area	In buffer area only
Roycea pycnophylloides Saltmat [21161]	Endangered	Species or species habitat may occur within area	In buffer area only
REPTILE			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Egernia stokesii badia			
Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat may occur within area	In buffer area only

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51405]	WA	In buffer area only
Commonwealth Land - [51729]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [52179]	WA	In buffer area only
Commonwealth Land - [51057]	WA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Condarnin Rock	Nature Reserve	WA	In buffer area only
Duladgin	Nature Reserve	WA	In buffer area only
Unnamed WA25801	Nature Reserve	WA	In buffer area only
Yellowdine	Nature Reserve	WA	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Goldfields Water Supply Scheme Project	2019/8547	Controlled Action	Post-Approval	In feature area
Nava-1 Cable System	2001/510	Controlled Action	Completed	In feature area
Parker Range Mt Caudan Iron Ore Haul Road Proposal	2021/8955	Controlled Action	Assessment Approach	In buffer area only
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Nature Map search Flora

Class	*Taxa*	Status
DICOT	*Acacia acuminata*	
DICOT	*Acacia ancistrophylla var. perarcuata*	P3
DICOT	*Acacia anfractuosa*	
DICOT	*Acacia assimilis subsp. assimilis*	
DICOT	*Acacia beauverdiana*	
DICOT	*Acacia colletioides*	
DICOT	*Acacia consanguinea*	
DICOT	*Acacia coolgardiensis*	
DICOT	*Acacia cylindrica*	P3
DICOT	*Acacia deficiens*	
DICOT	*Acacia desertorum var. nudipes*	P3
DICOT	*Acacia dissona var. dissona*	
DICOT	*Acacia enervia subsp. enervia*	
DICOT	*Acacia enervia subsp. explicata*	
DICOT	*Acacia erinacea*	
DICOT	*Acacia filifolia*	P3
DICOT	*Acacia formidabilis*	P3
DICOT	*Acacia gibbosa*	
DICOT	*Acacia hemiteles*	
DICOT	*Acacia heteroneura var. jutsonii*	
DICOT	*Acacia inaequiloba*	
DICOT	*Acacia intricata*	
DICOT	*Acacia intricata (long phyllode form)*	
DICOT	*Acacia jennerae*	
DICOT	*Acacia kalgoorliensis*	
DICOT	*Acacia longispinea*	
DICOT	*Acacia merrallii*	
DICOT	*Acacia multispicata*	
DICOT	*Acacia murrayana*	
DICOT	*Acacia neurophylla subsp. erugata*	
DICOT	*Acacia nigripilosa subsp. nigripilosa*	
DICOT	*Acacia nyssophylla*	
DICOT	*Acacia Plurinerves-Microneurae Phyllodes >8-nerved, terete(aff.consanguinea)*	
DICOT	*Acacia prainii*	
DICOT	*Acacia resinimarginea*	
DICOT	*Acacia resinistipulea*	
DICOT	*Acacia rossei*	
DICOT	*Acacia sphacelata subsp. sphacelata*	
DICOT	*Acacia steedmanii*	

Class	*Taxa*	Status
DICOT	*Acacia steedmanii subsp. steedmanii*	
DICOT	*Acacia stereophylla var. stereophylla*	
DICOT	*Acacia tetragonophylla*	
DICOT	*Acacia verriculum*	
DICOT	*Acacia yorkrakinensis subsp. acrita*	
DICOT	*Actinobole uliginosum*	
DICOT	*Actinotus superbus*	
DICOT	*Adenanthos argyreus*	
DICOT	*Aizoon pubescens*	
DICOT	*Allocasuarina acutivalvis*	
DICOT	*Allocasuarina corniculata*	
DICOT	*Allocasuarina spinosissima*	
DICOT	*Alyxia buxifolia*	
DICOT	*Androcalva aphrix*	
DICOT	*Angianthus tomentosus*	
DICOT	*Aotus sp. Tortile (G.J. Keighery 3767)*	
DICOT	*Aotus tietkensii*	
DICOT	*Asteridea athrixioides*	
DICOT	*Astroloma serratifolium*	
DICOT	*Astus subroseus*	
DICOT	*Atriplex acutibractea subsp. acutibractea*	
DICOT	*Atriplex acutibractea subsp. karoniensis*	
DICOT	*Atriplex codonocarpa*	
DICOT	*Atriplex eardleyae*	
DICOT	*Atriplex fasciculiflora x stipitata*	
DICOT	*Atriplex holocarpa*	
DICOT	*Atriplex hymenotheca*	
DICOT	*Atriplex lindleyi subsp. inflata*	
DICOT	*Atriplex nummularia subsp. spathulata*	
DICOT	*Atriplex paludosa subsp. baudinii*	
DICOT	*Atriplex pumilio*	
DICOT	*Atriplex quadrivalvata*	
DICOT	*Atriplex quadrivalvata var. quadrivalvata*	
DICOT	*Atriplex semilunaris*	
DICOT	*Atriplex sp.*	
DICOT	*Atriplex stipitata*	
DICOT	*Atriplex suberecta*	
DICOT	*Atriplex vesicaria*	
DICOT	*Baeckea elderiana*	
DICOT	*Baeckea grandibracteata*	
DICOT	*Balaustion pulcherrimum*	

Class	*Taxa*	Status
DICOT	*Banksia audax*	
DICOT	*Banksia elderiana*	
DICOT	*Beaufortia puberula*	
DICOT	*Bellida graminea*	
DICOT	*Beyeria minor*	
DICOT	*Beyeria sulcata var. brevipes*	
DICOT	*Beyeria sulcata var. sulcata*	
DICOT	*Blennospora drummondii*	
DICOT	*Blennospora phlegmatocarpa*	
DICOT	*Boronia coerulescens*	
DICOT	*Boronia coerulescens subsp. spicata*	
DICOT	*Boronia ternata var. ternata*	
DICOT	*Bossiaea barbarae*	
DICOT	*Bossiaea walkeri*	
DICOT	*Brachychiton gregorii*	
DICOT	*Brachychiton populneus*	
DICOT	*Brachyscome ciliaris*	
DICOT	*Brachyscome iberidifolia*	
DICOT	*Brachyscome pusilla*	
DICOT	*Brachysola coerulea*	
DICOT	*Brassica tournefortii*	
DICOT	*Calandrinia eremaea*	
DICOT	*Calandrinia granulifera*	
DICOT	*Calothamnus gilesii*	
DICOT	*Calotis hispidula*	
DICOT	*Calytrix leschenaultii*	
DICOT	*Calytrix merrelliana*	
DICOT	*Calytrix sapphirina*	
DICOT	*Carthamus lanatus*	
DICOT	*Cassytha glabella forma dispar*	
DICOT	*Cassytha nodiflora*	
DICOT	*Casuarina obesa*	
DICOT	*Cephalipterum drummondii*	
DICOT	*Ceratogyne obionoides*	
DICOT	*Chamelaucium pauciflorum subsp. Perenjori (B.J. Conn 2181)*	
DICOT	*Chamelaucium sp. Bendering (T.J. Alford 110)*	
DICOT	*Cheiranthera filifolia*	
DICOT	*Chenopodium giganteum*	
DICOT	*Chlaenosciadium gardneri*	
DICOT	*Chthonocephalus pseudevax*	
DICOT	*Cleretum papulosum*	

Class	*Taxa*	Status
DICOT	*Codonocarpus cotinifolius*	
DICOT	*Comesperma drummondii*	
DICOT	*Comesperma scoparium*	
DICOT	*Comesperma spinosum*	
DICOT	*Comesperma volubile*	
DICOT	*Commersonia craurophylla*	
DICOT	*Conospermum brownii*	
DICOT	*Conospermum distichum*	
DICOT	*Conospermum stoechadis*	
DICOT	*Coopernookia strophiolata*	
DICOT	*Cotula sp.*	
DICOT	*Cryptandra crispula*	P3
DICOT	*Cryptandra myriantha*	
DICOT	*Cyanostegia angustifolia*	
DICOT	*Cyanostegia microphylla*	
DICOT	*Dampiera juncea*	
DICOT	*Dampiera linearis*	
DICOT	*Dampiera luteiflora*	
DICOT	*Dampiera sp.*	
DICOT	*Dampiera spicigera*	
DICOT	*Dampiera stenostachya*	
DICOT	*Dampiera tenuicaulis var. curvula*	
DICOT	*Dampiera tomentosa*	
DICOT	*Darwinia halophila*	
DICOT	*Darwinia sp. Karonie (K. Newbey 8503)*	
DICOT	*Dasymalla teckiana*	
DICOT	*Dasymalla terminalis*	
DICOT	*Daviesia aphylla*	
DICOT	*Daviesia argillacea*	
DICOT	*Daviesia croniniana*	
DICOT	*Daviesia grahamii*	
DICOT	*Daviesia intricata subsp. xiphophylla*	
DICOT	*Daviesia microcarpa*	CR
DICOT	*Daviesia rubiginosa*	
DICOT	*Didymanthus roei*	
DICOT	*Disphyma crassifolium subsp. clavellatum*	
DICOT	*Dissocarpus paradoxus*	
DICOT	*Dithyrostegia amplexicaulis*	
DICOT	*Dodonaea amblyophylla*	
DICOT	*Dodonaea bursariifolia*	
DICOT	*Dodonaea divaricata*	

Class	*Taxa*	Status
DICOT	*Dodonaea microzyga var. acrolobata*	
DICOT	*Dodonaea pinifolia*	
DICOT	*Dodonaea viscosa*	
DICOT	*Dodonaea viscosa subsp. angustissima*	
DICOT	*Drosera andersoniana*	
DICOT	*Drosera glanduligera*	
DICOT	*Drosera sp. Branched styles (S.C. Coffey 193)*	
DICOT	*Drummondita hassellii*	
DICOT	*Duboisia hopwoodii*	
DICOT	*Enchylaena tomentosa*	
DICOT	*Enchylaena tomentosa var. tomentosa*	
DICOT	*Eremophila caperata*	
DICOT	*Eremophila clarkei*	
DICOT	*Eremophila decipiens subsp. decipiens*	
DICOT	*Eremophila drummondii*	
DICOT	*Eremophila glabra subsp. albicans*	
DICOT	*Eremophila granitica*	
DICOT	*Eremophila interstans subsp. interstans*	
DICOT	*Eremophila interstans subsp. virgata*	
DICOT	*Eremophila ionantha*	
DICOT	*Eremophila miniata*	
DICOT	*Eremophila oppositifolia subsp. angustifolia*	
DICOT	*Eremophila scoparia*	
DICOT	*Erichsenia uncinata*	
DICOT	*Eriochiton sclerolaenoides*	
DICOT	*Erodium cygnorum*	
DICOT	*Erymophyllum ramosum subsp. ramosum*	
DICOT	*Erymophyllum sp.*	
DICOT	*Eucalyptus aequioperta*	
DICOT	*Eucalyptus calycogona subsp. calycogona*	
DICOT	*Eucalyptus celastroides subsp. celastroides*	
DICOT	*Eucalyptus celastroides subsp. virella*	
DICOT	*Eucalyptus clelandiorum*	
DICOT	*Eucalyptus corrugata*	
DICOT	*Eucalyptus crucis subsp. crucis*	EN
DICOT	*Eucalyptus distuberosa subsp. distuberosa*	
DICOT	*Eucalyptus extensa*	
DICOT	*Eucalyptus foecunda*	
DICOT	*Eucalyptus gracilis / yilgarnensis*	
DICOT	*Eucalyptus horistes*	
DICOT	*Eucalyptus kochii subsp. plenissima*	

Class	*Taxa*	Status
DICOT	*Eucalyptus kochii subsp. yellowdinensis*	
DICOT	*Eucalyptus leptophylla*	
DICOT	*Eucalyptus leptopoda subsp. leptopoda*	
DICOT	*Eucalyptus leptopoda subsp. subluta*	
DICOT	*Eucalyptus lesouefii*	
DICOT	*Eucalyptus longicornis*	
DICOT	*Eucalyptus longissima*	
DICOT	*Eucalyptus loxophleba subsp. lissophloia*	
DICOT	*Eucalyptus melanoxylon*	
DICOT	*Eucalyptus moderata*	
DICOT	*Eucalyptus myriadena*	
DICOT	*Eucalyptus myriadena subsp. myriadena*	
DICOT	*Eucalyptus myriadena subsp. parviflora*	
DICOT	*Eucalyptus oleosa*	
DICOT	*Eucalyptus olivina*	
DICOT	*Eucalyptus petraea*	
DICOT	*Eucalyptus pileata*	
DICOT	*Eucalyptus platycorys*	
DICOT	*Eucalyptus polita*	
DICOT	*Eucalyptus prolixa*	
DICOT	*Eucalyptus rigidula*	
DICOT	*Eucalyptus salicola*	
DICOT	*Eucalyptus salmonophloia*	
DICOT	*Eucalyptus salubris*	
DICOT	*Eucalyptus sheathiana*	
DICOT	*Eucalyptus sp.*	
DICOT	*Eucalyptus sp. Southern smooth-bark (D. Nicolle & M. French DN 6916)*	
DICOT	*Eucalyptus tenera*	
DICOT	*Eucalyptus vittata*	
DICOT	*Eucalyptus yilgarnensis*	
DICOT	*Euryomyrtus leptospermoides*	
DICOT	*Euryomyrtus maidenii*	
DICOT	*Eutaxia lasiophylla*	
DICOT	*Eutaxia rubricarina*	P3
DICOT	*Eutaxia sp.*	
DICOT	*Exocarpos aphyllus*	
DICOT	*Frankenia cinerea*	
DICOT	*Frankenia irregularis*	
DICOT	*Frankenia pauciflora*	
DICOT	*Frankenia setosa*	
DICOT	*Gastrolobium floribundum*	

Class	*Taxa*	Status
DICOT	*Glischrocaryon flavescens*	
DICOT	*Gnephosis tenuissima*	
DICOT	*Gnephosis tridens*	
DICOT	*Gompholobium gompholobioides*	
DICOT	*Gompholobium viscidulum*	
DICOT	*Goodenia berardiana*	
DICOT	*Goodenia dyeri*	
DICOT	*Goodenia elderi*	
DICOT	*Goodenia heatheriana*	P1
DICOT	*Goodenia helmsii*	
DICOT	*Goodenia incana*	
DICOT	*Goodenia mimuloides*	
DICOT	*Goodenia xanthosperma*	
DICOT	*Grevillea acacioides*	
DICOT	*Grevillea acuaria*	
DICOT	*Grevillea cagiana*	
DICOT	*Grevillea ceratocarpa*	
DICOT	*Grevillea didymobotrya subsp. didymobotrya*	
DICOT	*Grevillea eryngioides*	
DICOT	*Grevillea excelsior*	
DICOT	*Grevillea hookeriana subsp. apiciloba*	
DICOT	*Grevillea incrassata*	
DICOT	*Grevillea nematophylla*	
DICOT	*Grevillea oncogyne*	
DICOT	*Grevillea paradoxa*	
DICOT	*Grevillea pterosperma*	
DICOT	*Grevillea shuttleworthiana subsp. obovata*	
DICOT	*Grevillea teretifolia*	
DICOT	*Grevillea tetrapleura*	
DICOT	*Gunniopsis intermedia*	
DICOT	*Gunniopsis septifraga*	
DICOT	*Gyrostemon racemiger*	
DICOT	*Hakea erecta*	
DICOT	*Hakea francisiana*	
DICOT	*Hakea meisneriana*	
DICOT	*Hakea minyma*	
DICOT	*Hakea multilineata*	
DICOT	*Hakea pendens*	P3
DICOT	*Hakea platysperma*	
DICOT	*Hakea recurva subsp. arida*	
DICOT	*Halgania andromedifolia*	

Class	*Taxa*	Status
DICOT	*Halgania integerrima*	
DICOT	*Haloragis trigonocarpa*	
DICOT	*Halosarcia aff. pergranulata*	
DICOT	*Halosarcia lylei*	
DICOT	*Hemigenia brachyphylla*	
DICOT	*Hemigenia sp. Newdegate (E. Bishop 75)*	P1
DICOT	*Hemiphora elderi*	
DICOT	*Hibbertia ancistrophylla*	
DICOT	*Hibbertia conspicua*	
DICOT	*Hibbertia eatoniae*	
DICOT	*Hibbertia glomerosa var. glomerosa*	
DICOT	*Hibbertia rostellata*	
DICOT	*Hibbertia stowardii*	
DICOT	*Homalocalyx pulcherrimus*	
DICOT	*Homalocalyx thryptomenoides*	
DICOT	*Hyalochlamys globifera*	
DICOT	*Hyalosperma demissum*	
DICOT	*Hyalosperma glutinosum subsp. glutinosum*	
DICOT	*Hyalosperma zacchaeus*	
DICOT	*Hybanthus floribundus subsp. floribundus*	
DICOT	*Hydrocotyle corynophora*	P1
DICOT	*Hypochaeris glabra*	
DICOT	*Hysterobaeckea ochropetala subsp. reliqua*	
DICOT	*Isopogon scabriusculus subsp. pubifloris*	
DICOT	*Isopogon scabriusculus subsp. stenophyllus*	
DICOT	*Jacksonia arida*	
DICOT	*Jacksonia nematoclada*	
DICOT	*Jacksonia ramulosa*	
DICOT	*Kennedia prorepens*	
DICOT	*Kunzea pulchella*	
DICOT	*Lactuca serriola forma serriola*	
DICOT	*Lawrencella rosea*	
DICOT	*Lawrencia repens*	
DICOT	*Lechenaultia brevifolia*	
DICOT	*Leontodon rhagadioloides*	
DICOT	*Lepidium africanum*	
DICOT	*Lepidium rotundum*	
DICOT	*Leptomeria preissiana*	
DICOT	*Leptospermum nitens*	
DICOT	*Leptospermum roei*	
DICOT	*Leucochrysum fitzgibbonii*	

Class	*Taxa*	Status
DICOT	*Leucopogon hamulosus*	
DICOT	*Leucopogon sp. Boorabbin (K.R. Newbey 8374)*	
DICOT	*Leucopogon sp. Yellowdine (M. Hislop & F. Hort MH 3194)*	P2
DICOT	*Levenhookia leptantha*	
DICOT	*Levenhookia stipitata*	
DICOT	*Limonium lobatum*	
DICOT	*Limonium sinuatum*	
DICOT	*Lissanthe scabra*	P2
DICOT	*Lotus cruentus*	
DICOT	*Lycium australe*	
DICOT	*Lysiana casuarinae*	
DICOT	*Lysimachia arvensis*	
DICOT	*Lysinema pentapetalum*	
DICOT	*Lythrum hyssopifolia*	
DICOT	*Maireana amoena*	
DICOT	*Maireana brevifolia*	
DICOT	*Maireana carnosa*	
DICOT	*Maireana georgei*	
DICOT	*Maireana trichoptera*	
DICOT	*Malephora crocea*	
DICOT	*Malleostemon peltiger*	
DICOT	*Malleostemon roseus*	
DICOT	*Malleostemon tuberculatus*	
DICOT	*Malva parviflora*	
DICOT	*Marianthus bicolor*	
DICOT	*Medicago minima*	
DICOT	*Medicago orbicularis*	
DICOT	*Melaleuca acuminata subsp. acuminata*	
DICOT	*Melaleuca atroviridis*	
DICOT	*Melaleuca calyptroides*	
DICOT	*Melaleuca cordata*	
DICOT	*Melaleuca hamata*	
DICOT	*Melaleuca hamata x vinnula*	
DICOT	*Melaleuca hamata x zeteticorum*	
DICOT	*Melaleuca hamulosa*	
DICOT	*Melaleuca lateriflora*	
DICOT	*Melaleuca laxiflora*	
DICOT	*Melaleuca leiocarpa*	
DICOT	*Melaleuca pauperiflora subsp. fastigiata*	
DICOT	*Melaleuca sp. Wongan Hills (R. Davis 1959)*	
DICOT	*Melaleuca vinnula*	

Class	*Taxa*	Status
DICOT	*Melaleuca vinnula x sp.*	
DICOT	*Melaleuca vinnula x zeteticorum*	
DICOT	*Melaleuca zeteticorum*	
DICOT	*Melaleuca zeteticorum x*	
DICOT	*Mesembryanthemum crystallinum*	
DICOT	*Mesembryanthemum nodiflorum*	
DICOT	*Microcorys ericifolia*	
DICOT	*Microcorys sp.*	
DICOT	*Microcorys sp. stellate (A. Strid 21885)*	
DICOT	*Micromyrtus erichsenii*	
DICOT	*Millotia newbeyi*	P1
DICOT	*Millotia tenuifolia*	
DICOT	*Millotia tenuifolia var. tenuifolia*	
DICOT	*Mirbelia seorsifolia*	
DICOT	*Mirbelia trichocalyx*	
DICOT	*Monoculus monstrosus*	
DICOT	*Monotaxis grandiflora var. obtusifolia*	
DICOT	*Nicotiana glauca*	
DICOT	*Notisia intonsa*	P3
DICOT	*Olearia dampieri subsp. eremicola*	
DICOT	*Olearia exiguifolia*	
DICOT	*Olearia homolepis*	
DICOT	*Olearia incana*	
DICOT	*Olearia magniflora*	
DICOT	*Olearia muelleri*	
DICOT	*Olearia muricata*	
DICOT	*Olearia pimeleoides*	
DICOT	*Opercularia vaginata*	
DICOT	*Opuntia monacantha*	
DICOT	*Opuntia schickendantzii*	
DICOT	*Opuntia stricta*	
DICOT	*Opuntia tomentosa*	
DICOT	*Orianthera tortuosa*	
DICOT	*Ozothamnus occidentalis*	
DICOT	*Persoonia coriacea*	
DICOT	*Persoonia inconspicua*	
DICOT	*Persoonia saundersiana*	
DICOT	*Petalostylis cassioides*	
DICOT	*Petrophile arcuata*	
DICOT	*Petrophile merrallii*	
DICOT	*Petrophile seminuda*	

Class	*Taxa*	Status
DICOT	*Phebalium canaliculatum (hybrid)*	
DICOT	*Phebalium filifolium*	
DICOT	*Phebalium lepidotum*	
DICOT	*Phebalium megaphyllum*	
DICOT	*Phebalium megaphyllum x tuberculosum subsp.*	
DICOT	*Phebalium sp.*	
DICOT	*Phebalium tuberculosum*	
DICOT	*Philotheca brucei*	
DICOT	*Philotheca brucei subsp. brucei*	
DICOT	*Philotheca coccinea*	
DICOT	*Philotheca deserti subsp. deserti*	
DICOT	*Philotheca falcata*	EN
DICOT	*Philotheca tomentella*	
DICOT	*Phlegmatospermum eremaeum*	P3
DICOT	*Phyllangium sulcatum*	
DICOT	*Pimelea aeruginosa*	
DICOT	*Pimelea angustifolia*	
DICOT	*Pimelea brevifolia subsp. modesta*	
DICOT	*Pimelea imbricata var. piligera*	
DICOT	*Pimelea microcephala subsp. microcephala*	
DICOT	*Pimelea spiculigera var. thesioides*	
DICOT	*Pimelea suaveolens subsp. flava*	
DICOT	*Pimelea sulphurea*	
DICOT	*Pittosporum angustifolium*	
DICOT	*Pityrodia lepidota*	
DICOT	*Pityrodia terminalis*	
DICOT	*Plantago aff. hispidula (NG & ML 1732)*	
DICOT	*Platysace juncea*	
DICOT	*Platysace trachymenioides*	
DICOT	*Podolepis canescens*	
DICOT	*Podolepis capillaris*	
DICOT	*Podolepis gracilis*	
DICOT	*Podolepis lessonii*	
DICOT	*Podotheca angustifolia*	
DICOT	*Podotheca gnaphalioides*	
DICOT	*Pogonolepis muelleriana*	
DICOT	*Pogonolepis stricta*	
DICOT	*Prostanthera campbellii*	
DICOT	*Prostanthera grylloana*	
DICOT	*Prostanthera nanophylla*	P3
DICOT	*Prostanthera semiteres*	

Class	*Taxa*	Status
DICOT	*Prostanthera semiteres subsp. semiteres*	
DICOT	*Psammomoya choretroides*	
DICOT	*Ptilotus carlsonii*	
DICOT	*Ptilotus exaltatus*	
DICOT	*Ptilotus gaudichaudii*	
DICOT	*Ptilotus gaudichaudii var. parviflorus*	
DICOT	*Ptilotus grandiflorus*	
DICOT	*Ptilotus holosericeus*	
DICOT	*Ptilotus obovatus*	
DICOT	*Ptilotus spathulatus*	
DICOT	*Ptilotus spathulatus forma spathulatus*	
DICOT	*Radyera farragei*	
DICOT	*Rhagodia drummondii*	
DICOT	*Rhodanthe chlorocephala subsp. rosea*	
DICOT	*Rhodanthe citrina*	
DICOT	*Rhodanthe laevis*	
DICOT	*Rhodanthe oppositifolia subsp. oppositifolia*	
DICOT	*Rhodanthe pygmaea*	
DICOT	*Rhodanthe rubella*	
DICOT	*Rinzia fimbriolata*	P1
DICOT	*Roycea divaricata*	
DICOT	*Salsola australis*	
DICOT	*Santalum acuminatum*	
DICOT	*Scaevola restiacea*	
DICOT	*Scaevola restiacea subsp. restiacea*	
DICOT	*Scaevola spinescens*	
DICOT	*Schoenia cassiniana*	
DICOT	*Sclerolaena diacantha*	
DICOT	*Sclerolaena drummondii x parviflora*	
DICOT	*Sclerolaena fusiformis*	
DICOT	*Sclerolaena parviflora*	
DICOT	*Sclerolaena sp.*	
DICOT	*Senecio glossanthus*	
DICOT	*Senna artemisioides*	
DICOT	*Senna artemisioides subsp. filifolia*	
DICOT	*Senna sp.*	
DICOT	*Seringia velutina*	
DICOT	*Sisymbrium orientale*	
DICOT	*Sisymbrium runcinatum*	
DICOT	*Solanum nigrum*	
DICOT	*Sonchus oleraceus*	

Class	*Taxa*	Status
DICOT	*Stackhousia muricata*	
DICOT	*Stackhousia scoparia*	
DICOT	*Stenopetalum filifolium*	
DICOT	*Stenopetalum salicola*	
DICOT	*Stylidium arenicola*	
DICOT	*Stylidium choreanthum*	P3
DICOT	*Stylidium dielsianum*	
DICOT	*Stylidium limbatum*	
DICOT	*Stylidium piliferum*	
DICOT	*Stylidium sp.*	
DICOT	*Stylidium yilgarnense*	
DICOT	*Surreya diandra*	
DICOT	*Synaphea spinulosa subsp. major*	
DICOT	*Tecticornia disarticulata*	
DICOT	*Tecticornia halocnemoides*	
DICOT	*Tecticornia indica subsp. bidens*	
DICOT	*Tecticornia lylei*	
DICOT	*Tecticornia moniliformis*	
DICOT	*Tecticornia peltata*	
DICOT	*Tecticornia pergranulata subsp. pergranulata*	
DICOT	*Tecticornia pruinosa*	
DICOT	*Tecticornia pterygosperma subsp. pterygosperma*	
DICOT	*Tecticornia sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)*	
DICOT	*Tecticornia tenuis*	
DICOT	*Tecticornia undulata*	
DICOT	*Templetonia aculeata*	
DICOT	*Templetonia ceracea*	
DICOT	*Templetonia smithiana*	
DICOT	*Tetrapora tenuiramea*	
DICOT	*Tetratheca efoliata*	
DICOT	*Teucrium sp. dwarf (R. Davis 8813)*	
DICOT	*Teucrium sp. Norseman (T.E.H. Aplin 1851)*	
DICOT	*Thiseltonia gracillima*	
DICOT	*Thryptomene costata*	
DICOT	*Thryptomene kochii*	
DICOT	*Trachymene cyanopetala*	
DICOT	*Trifolium tomentosum var. tomentosum*	
DICOT	*Tripterococcus brunonis*	
DICOT	*Urodon dasyphyllus*	
DICOT	*Velleia cycnopotamica*	
DICOT	*Velleia discophora*	

Class	*Taxa*	Status
DICOT	*Verreauxia dyeri*	
DICOT	*Verticordia brachypoda*	
DICOT	*Verticordia chrysantha*	
DICOT	*Verticordia dasystylis subsp. dasystylis*	P2
DICOT	*Verticordia eriocephala*	
DICOT	*Verticordia helmsii*	
DICOT	*Verticordia inclusa*	
DICOT	*Verticordia mitchelliana subsp. implexior*	
DICOT	*Verticordia mitodes*	P3
DICOT	*Verticordia picta*	
DICOT	*Verticordia pritzelii*	
DICOT	*Verticordia roei subsp. roei*	
DICOT	*Verticordia sp. Koolyanobbing (B.H. Smith 1457)*	
DICOT	*Verticordia stenopetala*	P3
DICOT	*Vittadinia gracilis*	
DICOT	*Vittadinia humerata*	
DICOT	*Waitzia acuminata var. acuminata*	
DICOT	*Waitzia fitzgibbonii*	
DICOT	*Westringia cephalantha*	
DICOT	*Westringia cephalantha var. caterva*	
DICOT	*Westringia rigida*	
DICOT	*Zygophyllum aurantiacum*	
DICOT	*Zygophyllum eremaeum*	
DICOT	*Zygophyllum glaucum*	
FERN	*Cheilanthes lasiophylla*	
GYMNOSPERM	*Callitris canescens*	
GYMNOSPERM	*Callitris preissii*	
MONOCOT	*Amphipogon caricinus - strictus complex*	
MONOCOT	*Amphipogon caricinus var. caricinus*	
MONOCOT	*Aristida contorta*	
MONOCOT	*Asparagus asparagoides*	
MONOCOT	*Asphodelus fistulosus*	
MONOCOT	*Austrostipa elegantissima*	
MONOCOT	*Austrostipa nitida*	
MONOCOT	*Austrostipa pycnostachya*	
MONOCOT	*Austrostipa tenuifolia*	
MONOCOT	*Borya constricta*	
MONOCOT	*Caladenia mesocera*	
MONOCOT	*Caladenia pachychila*	
MONOCOT	*Caladenia roei*	
MONOCOT	*Caladenia sp. Muddarning Hill (S.D. Hopper 4013)*	

Class	*Taxa*	Status
MONOCOT	*Cenchrus ciliaris*	
MONOCOT	*Centrolepis eremica*	
MONOCOT	*Centrolepis humillima*	
MONOCOT	*Centrolepis polygyna*	
MONOCOT	*Chamaexeros fimbriata*	
MONOCOT	*Conostylis bealiana*	
MONOCOT	*Cyanicula amplexans*	
MONOCOT	*Dichanthium sericeum subsp. sericeum*	
MONOCOT	*Diuris picta*	
MONOCOT	*Ecdeiocolea monostachya*	
MONOCOT	*Eragrostis dielsii*	
MONOCOT	*Eriachne ovata*	
MONOCOT	*Ericksonella saccharata*	
MONOCOT	*Haemodorum discolor*	
MONOCOT	*Hordeum glaucum*	
MONOCOT	*Juncus aridicola*	
MONOCOT	*Juncus bufonius*	
MONOCOT	*Laxmannia arida*	
MONOCOT	*Laxmannia paleacea*	
MONOCOT	*Lepidosperma sanguinolentum*	
MONOCOT	*Lepidosperma sp.*	
MONOCOT	*Lomandra collina*	
MONOCOT	*Lomandra effusa*	
MONOCOT	*Monachather paradoxus*	
MONOCOT	*Moraea setifolia*	
MONOCOT	*Oligochaetochilus spathulatus*	
MONOCOT	*Patersonia drummondii subsp. drummondii*	
MONOCOT	*Pentameris airoides subsp. airoides*	
MONOCOT	*Pentaschistis airoides*	
MONOCOT	*Poa annua*	
MONOCOT	*Prasophyllum gracile*	
MONOCOT	*Pterostylis macrosceles*	
MONOCOT	*Pterostylis mutica*	
MONOCOT	*Pterostylis picta*	
MONOCOT	*Pterostylis recurva*	
MONOCOT	*Pterostylis sargentii*	
MONOCOT	*Pterostylis sp. inland (A.C. Beauglehole 11880)*	
MONOCOT	*Pterostylis spathulata*	
MONOCOT	*Pterostylis tryphera*	
MONOCOT	*Rostraria pumila*	
MONOCOT	*Rytidosperma caespitosum*	

Class	*Taxa*	Status
MONOCOT	*Rytidosperma setaceum*	
MONOCOT	*Schoenus hexandrus*	
MONOCOT	*Schoenus subaphyllus*	
MONOCOT	*Spiculaea ciliata*	
MONOCOT	*Thelymitra petrophila*	
MONOCOT	*Thelymitra sargentii*	
MONOCOT	*Thysanotus manglesianus*	
MONOCOT	*Tragus australianus*	
MONOCOT	*Tricoryne tenella*	
MONOCOT	*Triglochin minutissima ssp. elongatum*	
MONOCOT	*Triodia desertorum*	
MONOCOT	*Triodia rigidissima*	
MONOCOT	*Triodia sp.*	
MONOCOT	*Triodia tomentosa*	
MONOCOT	*Typha domingensis*	
MONOCOT	*Vulpia sp.*	
MONOCOT	*Xerolirion divaricata*	

Nature Map Search Fauna

Class	*Taxa*	Status
AMPHIBIAN	*Heleioporus albopunctatus*	
AMPHIBIAN	*Neobatrachus albipes*	
AMPHIBIAN	*Neobatrachus kunapalari*	
AMPHIBIAN	*Neobatrachus pelobatoides*	
AMPHIBIAN	*Pseudophryne guentheri*	
AMPHIBIAN	*Pseudophryne occidentalis*	
BIRD	*Acanthagenys rufogularis*	
BIRD	*Acanthiza apicalis*	
BIRD	*Acanthiza chrysorrhoa*	
BIRD	*Acanthiza uropygialis*	
BIRD	*Accipiter fasciatus*	
BIRD	*Accipiter fasciatus subsp. fasciatus*	
BIRD	*Aegotheles cristatus*	
BIRD	*Anas gracilis*	
BIRD	*Anas superciliosa*	
BIRD	*Anthochaera carunculata*	
BIRD	*Aphelocephala leucopsis*	
BIRD	*Aphelocephala leucopsis subsp. castaneiventris*	
BIRD	*Aquila audax*	
BIRD	*Artamus cinereus*	

Class	*Taxa*	Status
BIRD	*Artamus cyanopterus*	
BIRD	*Aythya australis*	
BIRD	*Barnardius zonarius*	
BIRD	*Cacatua sanguinea*	
BIRD	*Cacomantis pallidus*	
BIRD	*Calyptorhynchus banksii*	
BIRD	*Certhionyx variegatus*	
BIRD	*Chenonetta jubata*	
BIRD	*Cheramoeca leucosterna*	
BIRD	*Chroicocephalus novaehollandiae*	
BIRD	*Cincloramphus mathewsi*	
BIRD	*Circus assimilis*	
BIRD	*Cladorhynchus leucocephalus*	
BIRD	*Climacteris rufa*	
BIRD	*Colluricincla harmonica*	
BIRD	*Colluricincla harmonica subsp. rufiventris*	
BIRD	*Coracina novaehollandiae*	
BIRD	*Corvus bennetti*	
BIRD	*Corvus coronoides*	
BIRD	*Cracticus nigrogularis*	
BIRD	*Cracticus tibicen*	
BIRD	*Cracticus torquatus*	
BIRD	*Daphoenositta chrysoptera*	
BIRD	*Dromaius novaehollandiae*	
BIRD	*Drymodes brunneopygia*	
BIRD	*Egretta novaehollandiae*	
BIRD	*Elanus axillaris*	
BIRD	*Elanus caeruleus subsp. axillaris*	
BIRD	*Eolophus roseicapillus*	
BIRD	*Epthianura albifrons*	
BIRD	*Falco berigora*	
BIRD	*Falco cenchroides*	
BIRD	*Falco longipennis*	
BIRD	*Falco peregrinus*	OS
BIRD	*Fulica atra*	
BIRD	*Glossopsitta porphyrocephala*	
BIRD	*Glyciphila melanops*	
BIRD	*Grallina cyanoleuca*	
BIRD	*Haliastur sphenurus*	
BIRD	*Hamirostra melanosternon*	
BIRD	*Hieraaetus morphnoides*	

Class	*Taxa*	Status
BIRD	*Himantopus himantopus*	
BIRD	*Hirundo neoxena*	
BIRD	*Leipoa ocellata*	VU
BIRD	*Lichenostomus leucotis*	
BIRD	*Lichenostomus ornatus*	
BIRD	*Lichenostomus virescens*	
BIRD	*Lichmera indistincta*	
BIRD	*Lophochroa leadbeateri*	
BIRD	*Malacorhynchus membranaceus*	
BIRD	*Malurus leucopterus*	
BIRD	*Malurus pulcherrimus*	
BIRD	*Malurus splendens*	
BIRD	*Manorina flavigula*	
BIRD	*Melithreptus brevirostris*	
BIRD	*Merops ornatus*	
BIRD	*Microeca fascinans*	
BIRD	*Microeca fascinans subsp. assimilis*	
BIRD	*Nycticorax caledonicus subsp. hilli*	
BIRD	*Nymphicus hollandicus*	
BIRD	*Ocyphaps lophotes*	
BIRD	*Oreoica gutturalis*	
BIRD	*Pachycephala inornata*	
BIRD	*Pachycephala pectoralis*	
BIRD	*Pachycephala rufiventris*	
BIRD	*Pardalotus striatus*	
BIRD	*Pardalotus striatus subsp. westraliensis*	
BIRD	*Petrochelidon nigricans*	
BIRD	*Petroica goodenovii*	
BIRD	*Phaps chalcoptera*	
BIRD	*Platycercus zonarius subsp. zonarius*	
BIRD	*Podargus strigoides*	
BIRD	*Poliocephalus poliocephalus*	
BIRD	*Polytelis anthopeplus*	
BIRD	*Pomatostomus superciliosus*	
BIRD	*Pomatostomus superciliosus subsp. ashbyi*	
BIRD	*Purnella albifrons*	
BIRD	*Pyrrholaemus brunneus*	
BIRD	*Recurvirostra novaehollandiae*	
BIRD	*Rhipidura albiscapa*	
BIRD	*Rhipidura leucophrys*	
BIRD	*Smicrornis brevirostris*	

Class	*Taxa*	Status
BIRD	*Strepera versicolor*	
BIRD	*Streptopelia senegalensis*	
BIRD	*Sugomel niger*	
BIRD	*Tachybaptus novaehollandiae*	
BIRD	*Tadorna tadornoides*	
BIRD	*Taeniopygia guttata*	
BIRD	*Tribonyx ventralis*	
BIRD	*Tringa nebularia*	MI
BIRD	*Zosterops lateralis*	
INVERTEBRATE	*Aganippe castellum*	P4
INVERTEBRATE	*Aname mainae*	
INVERTEBRATE	*Aname mellosa*	
INVERTEBRATE	*Aname tepperi*	
INVERTEBRATE	*Antichiropus sp.*	
INVERTEBRATE	*Atelomastix bamfordi*	
INVERTEBRATE	*Backobourkia heroine*	
INVERTEBRATE	*Cercophonius michaelseni*	
INVERTEBRATE	*Cormocephalus turneri*	
INVERTEBRATE	*Ethmostigmus rubripes*	
INVERTEBRATE	*Hoggicosa forresti*	
INVERTEBRATE	*Hoggicosa storri*	
INVERTEBRATE	*Isometroides vescus*	
INVERTEBRATE	*Leioproctus pappus*	
INVERTEBRATE	*Leioproctus sp.*	
INVERTEBRATE	*Lychas annulatus*	
INVERTEBRATE	*Lychas jonesae*	
INVERTEBRATE	*Lychas splendens*	
INVERTEBRATE	*Lycosa godeffroyi*	
INVERTEBRATE	*Masasteron piankai*	
INVERTEBRATE	*Muscidae sp. H (SAP)*	
INVERTEBRATE	*Nicodamus mainae*	
INVERTEBRATE	*Oecobius navus*	
INVERTEBRATE	*Supunna funerea*	
INVERTEBRATE	*Synsphyronus dorothyae*	
INVERTEBRATE	*Tasmanicosa leuckartii*	
INVERTEBRATE	*Urodacus armatus*	
INVERTEBRATE	*Urodacus hoplurus*	
MAMMAL	*Chalinolobus gouldii*	
MAMMAL	*Dasyurus geoffroii*	VU
MAMMAL	*Myrmecobius fasciatus*	EN
MAMMAL	*Nyctophilus timoriensis subsp. timoriensis*	

Class	*Taxa*	Status
MAMMAL	*Pseudomys bolami*	
MAMMAL	*Vespadelus regulus*	
REPTILE	*Aspidites ramsayi*	
REPTILE	*Brachyurophis semifasciatus*	
REPTILE	*Crenadactylus ocellatus subsp. ocellatus*	
REPTILE	*Cryptoblepharus buchananii*	
REPTILE	*Ctenophorus cristatus*	
REPTILE	*Ctenophorus isolepis subsp. citrinus*	
REPTILE	*Ctenophorus ornatus*	
REPTILE	*Ctenophorus reticulatus*	
REPTILE	*Ctenophorus scutulatus*	
REPTILE	*Ctenotus atlas*	
REPTILE	*Ctenotus schomburgkii*	
REPTILE	*Delma butleri*	
REPTILE	*Diplodactylus granariensis subsp. granariensis*	
REPTILE	*Gehyra variegata*	
REPTILE	*Hesperoedura reticulata*	
REPTILE	*Heteronotia binoei*	
REPTILE	*Lerista gerrardii*	
REPTILE	*Liopholis inornata*	
REPTILE	*Lucasium maini*	
REPTILE	*Menetia greyii*	
REPTILE	*Moloch horridus*	
REPTILE	*Morelia spilota subsp. imbricata*	
REPTILE	*Pogona minor subsp. minor*	
REPTILE	*Pseudonaja mengdeni*	
REPTILE	*Pseudonaja modesta*	
REPTILE	*Pygopus lepidopodus*	
REPTILE	*Ramphotyphlops australis*	
REPTILE	*Simoselaps bertholdi*	
REPTILE	*Suta fasciata*	
REPTILE	*Tiliqua occipitalis*	
REPTILE	*Underwoodisaurus milii*	

Appendix D

Flora data

Flora species list

Raw site data

Quadrat data

Flora likelihood of occurrence assessment

Flora species list

Row Labels	Status	*Species*
Aizoaceae		*Carpobrotus modestus*
Aizoaceae		*Tetragonia moorei*
Amaranthaceae		*Ptilotus exaltatus*
Apocynaceae		*Alyxia buxifolia*
Asteraceae	*	*Arctotheca calendula*
Asteraceae		*Asteridea athrixioides*
Asteraceae		*Calotis hispidula*
Asteraceae		*Hyalosperma glutinosum* subsp. *glutinosum*
Asteraceae		*Olearia muelleri*
Asteraceae		*Podotheca gnaphalioides*
Asteraceae		*Senecio pinnatifolius*
Asteraceae		*Waitzia acuminata* var. *acuminata*
Asteraceae		*Waitzia fitzgibbonii*
Brassicaceae	*	*Brassica tournefortii*
Brassicaceae	*	*Carrichtera annua*
Brassicaceae	*	*Raphanus raphanistrum*
Cactaceae	*DP & WoNS	*Opuntia stricta*
Casuarinaceae		*Allocasuarina corniculata*
Chenopodiaceae		*Atriplex nummularia* subsp. *spathulata*
Chenopodiaceae		*Enchylaena tomentosa* var. *tomentosa*
Chenopodiaceae		*Maireana georgei*
Chenopodiaceae		*Maireana trichoptera*
Chenopodiaceae		*Rhagodia drummondii*
Chenopodiaceae		*Rhagodia preissii* subsp. *preissii*
Chenopodiaceae		*Sclerolaena diacantha*
Chenopodiaceae		*Sclerolaena drummondii*
Chenopodiaceae		*Sclerolaena patenticuspis*
Crassulaceae		*Crassula colorata*
Fabaceae		*Acacia ancistrophylla* var. *ancistrophylla*
Fabaceae		*Acacia deficiens*
Fabaceae		*Acacia erinacea*
Fabaceae		*Acacia merrallii*
Fabaceae		*Acacia resinimarginea*
Fabaceae		*Daviesia scoparia*
Fabaceae		*Senna artemisioides* subsp. *filifolia*
Goodeniaceae		*Goodenia mimuloides*
Goodeniaceae		*Scaevola spinescens*
Hemerocallidaceae		*Dianella revoluta* var. *divaricata*
Iridaceae	*	*Moraea miniata*

Row Labels	Status	*Species*
Iridaceae	*	*Moraea setifolia*
Lamiaceae		*Prostanthera laricoides*
Malvaceae		*Lawrencia diffusa*
Malvaceae		*Seringia velutina*
Montiaceae		*Calandrinia eremaea*
Myrtaceae		*Chamelaucium ciliatum*
Myrtaceae		*Eucalyptus salmonophloia*
Myrtaceae		*Eucalyptus salubris*
Myrtaceae		*Melaleuca atroviridis*
Myrtaceae		*Melaleuca sheathiana*
Poaceae		*Austrostipa elegantissima*
Poaceae		*Monachather paradoxus*
Poaceae		*Rytidosperma occidentale*
Polygalaceae		*Comesperma integerrimum*
Proteaceae		*Grevillea paradoxa*
Rutaceae		*Phebalium filifolium*
Rutaceae		*Phebalium tuberculosum*
Santalaceae		*Exocarpos aphyllus*
Santalaceae		*Santalum acuminatum*
Scrophulariaceae		*Eremophila clarkei*
Scrophulariaceae		*Eremophila decipiens* subsp. *decipiens*
Scrophulariaceae		*Eremophila granitica*
Scrophulariaceae		*Eremophila ionantha*
Scrophulariaceae		*Eremophila oppositifolia* subsp. *angustifolia*
Scrophulariaceae		*Eremophila scoparia*
Solanaceae		*Lycium australe*
Zygophyllaceae		*Roepera eremaea*

Site data

Site	Status	*Taxa*	% Cover	Height (m)
Q01		*Acacia merrallii*	10	0.5
Q01		*Atriplex nummularia* subsp. *spathulata*	40	1
Q01		*Austrostipa elegantissima*	2	0.5
Q01	*	*Carrichtera annua*	1	0.1
Q01		*Crassula colorata*	1	0.1
Q01		*Enchylaena tomentosa* var. *tomentosa*	2	0.5
Q01		*Eremophila ionantha*	5	1.75
Q01		*Eremophila scoparia*	10	1.75
Q01		*Eucalyptus salmonophloia*	30	30
Q01		*Exocarpos aphyllus*	3	1.5
Q01		*Maireana georgei*	5	0.25
Q01		*Maireana trichoptera*	10	0.25
Q01		*Olearia muelleri*	1	0.5
Q01		*Ptilotus exaltatus*	1	0.1
Q01		*Rhagodia drummondii*	5	0.5
Q01		*Rhagodia preissii* subsp. *preissii*	1	1
Q01		*Roepera eremaea*	1	0.25
Q01		*Santalum acuminatum*	1	2
Q01		*Sclerolaena diacantha*	10	0.25
Q01		*Sclerolaena patenticuspis*	10	0.25
Q01		*Tetragonia moorei*	1	0.1
Q02		*Acacia erinacea*	1	0.5
Q02		*Acacia merrallii*	10	0.5
Q02		*Asteridea athrixioides*	1	0.25
Q02		*Atriplex nummularia* subsp. *spathulata*	10	0.5
Q02		*Austrostipa elegantissima*	2	0.5
Q02		*Calotis hispidula*	1	0.25
Q02	*	*Carrichtera annua*	5	0.1
Q02		*Enchylaena tomentosa* var. *tomentosa*	15	0.5
Q02		*Eremophila oppositifolia* subsp. *angustifolia*	1	1.75
Q02		*Eremophila scoparia*	10	1.5
Q02		*Eucalyptus salmonophloia*	30	30
Q02		*Exocarpos aphyllus*	10	1.5
Q02		*Lawrencia diffusa*	1	0.25
Q02		*Maireana georgei*	10	0.25
Q02		*Maireana trichoptera*	10	0.25
Q02		*Maireana trichoptera*	5	0.25
Q02		*Melaleuca sheathiana*	5	3
Q02	*	*Moraea setifolia*	1	0.1

Site	Status	*Taxa*	% Cover	Height (m)
Q02		*Olearia muelleri*	2	0.5
Q02		*Podotheca gnaphalioides*	1	0.25
Q02		*Ptilotus exaltatus*	1	0.1
Q02		*Rhagodia drummondii*	3	1
Q02		*Rhagodia preissii* subsp. *preissii*	5	1
Q02		*Roepera eremaea*	1	0.5
Q02		*Scaevola spinescens*	1	0.5
Q02		*Sclerolaena diacantha*	1	0.25
Q02		*Sclerolaena patenticuspis*	10	0.25
Q02		*Senecio pinnatifolius*	1	0.25
Q02		*Tetragonia moorei*	1	0.1
Q03		*Acacia ancistrophylla var. ancistrophylla*	10	2
Q03		*Acacia deficiens*	1	0.5
Q03		*Acacia erinacea*	10	0.5
Q03		*Acacia merrallii*	2	0.5
Q03		*Austrostipa elegantissima*	1	0.5
Q03		*Calandrinia eremaea*	3	0.1
Q03		*Crassula colorata*	5	0.1
Q03		*Eremophila clarkei*	1	1.5
Q03		*Eremophila oppositifolia* subsp. *angustifolia*	5	1.5
Q03		*Eremophila scoparia*	1	1.5
Q03		*Eucalyptus salubris*	10	10
Q03		*Exocarpos aphyllus*	5	2
Q03		*Maireana trichoptera*	2	0.25
Q03		*Ptilotus exaltatus*	1	0.1
Q03		*Rhagodia drummondii*	10	1
Q03		*Scaevola spinescens*	1	1
Q03		*Sclerolaena diacantha*	5	0.25
Q03		*Tetragonia moorei*	1	0.1
Q04		*Acacia resinimarginea*	15	3
Q04		*Allocasuarina corniculata*	40	5
Q04		*Eremophila clarkei*	10	1.75
Q04		*Eucalyptus salubris*	2	5
Q04		*Grevillea paradoxa*	1	1.75
Q04		*Melaleuca atroviridis*	5	2
Q04		*Monachather paradoxus*	35	0.25
Q04		*Phebalium filifolium*	5	1.5
Q04		*Prostanthera laricoides*	5	1
Q04		*Sclerolaena drummondii*	5	0.25
Q04		*Sclerolaena patenticuspis*	5	0.1

* Denotes an introduced species

Quadrat data

Site ID:	Q01	Es Woodland
Type:	Quadrat	Size: 20 x 20 m
Date:	19/09/2022	Described by: Angela Benkovic
Co-ordinates (50J)	733294	6540091
Drainage:	Good	
Aspect:	Flat	
Soil colour:	Orange	
Soil type:	Clay	
Fire age and intensity:	Old	
Vegetation condition:	Very Good	

Site ID:	Q02	Es Woodland
Type:	Quadrat	Size: 20 x 20 m
Date:	19/09/2022	Described by: Angela Benkovic
Co-ordinates (50J)	733451	6539971
Drainage:	Good	
Aspect:	Flat	
Soil colour:	Orange	
Soil type:	Clay	
Fire age and intensity:	Old	
Vegetation condition:	Very Good	

Site ID:	Q03	Es Woodland
Type:	Quadrat	Size: 20 x 20 m
Date:	19/09/2022	Described by: Angela Benkovic
Co-ordinates (50J)	734005	6539820
Drainage:	Good	
Aspect:	Flat	
Soil colour:	Orange	
Soil type:	Clay	
Fire age and intensity:	Recent (<1yr)	
Vegetation condition:	Good	

Site ID:	Q04	Ac Shrubland
Type:	Quadrat	Size: 20 x 20 m
Date:	19/09/2022	Described by: Angela Benkovic
Co-ordinates (50J)	733389	6540220
Drainage:	Good	
Aspect:	Flat	
Soil colour:	Orange	
Soil type:	Sand	
Fire age and intensity:	Old	
Vegetation condition:	Very Good	

Flora Likelihood of Occurrence assessment guidelines

Likelihood of occurrence	Guideline
Likely	Species previously recorded within the study area and large areas of suitable habitat occur in the survey area.
Possible	Species previously recorded within the study area and areas of suitable habitat occur/may occur in the survey area.
Unlikely	Species previously recorded within the study area, but suitable habitat does not occur in the survey area or suitable search did not record the species.
Highly unlikely	Species not previously recorded within the study area, suitable habitat does not occur in the project area and/or the project area is outside the natural distribution of the species.
Other considerations	Intensity of survey, availability of access, growth form type, recorded flowering times, cryptic nature of species

Source information - desktop searches

PMST – DCCEEW Protected Matters Search Tool (PMST) to identify flora listed under the EPBC Act potentially occurring within the study area

DBCA -TPFL and WAHERB records of threatened and priority flora from database searches within the study area from 2016 (GHD, 2017)

NM – DBCA *NatureMap* (accessed October 2022)

Flora Likelihood of Occurrence assessment of significant flora identified in the desktop assessment as potentially occurring within the study area

Family	Taxon	Status		Description (if available) (WA Herbarium 1998–, DEE 2018)	Likelihood of occurrence (post survey)	Source
		EPBC Act	BC Act /DBCA			
Asteraceae	*Millotia newbeyi*		P1	Slender, upright annual, herb, 0.05-0.1 m high. Fl. cream-yellow, Sep. Red/brown loam, red clay. Undulating plains.	**Unlikely** – The survey was conducted during the optimal flowering period and survey efficacy would have recorded the species if it was present.	NM
Asteraceae	*Notisia intonsa*		P3	Prostrate clumping annual. Dull brown-green-white flowers in September. Red-brown shallow loam – clay soils	**Unlikely** – The survey was conducted during the optimal flowering period and survey efficacy would have recorded the species if it was present	NM
Brassicaceae	*Phlegmatospermum eremaeum*		P3	Prostrate to spreading annual, herb, 0.02-0.1(-0.2) m high. Fl. white-cream, Jun or Aug to Oct. Stony loam	**Unlikely** – The survey was conducted during the optimal flowering period and survey efficacy would have recorded the species if it was present.	NM

Family	Taxon	Status		Description (if available) (WA Herbarium 1998–, DEE 2018)	Likelihood of occurrence (post survey)	Source
		EPBC Act	BC Act /DBCA			
Fabaceae	*Acacia desertorum* var. *nudipes*		P3	Dense or open shrub or tree (rarely), 0.6-2 m high, phyllodes 16-nerved. Fl. yellow, Aug to Oct. Yellow sand, lateritic gravel. Sandplains, flats.	**Unlikely** – The historic location in the biological survey area was searched by GHD however no record was located. The survey was conducted during the optimal flowering period and survey efficacy would have recorded the species if it was present.	NM, DBCA
Fabaceae	*Gompholobium cinereum*		P3	Shrub, to 0.3 m high. Fl mauve, Sep-Nov. Yellow sand, clayey sand, brown loam, sandy gravel, laterite. Well-drained open sites, slopes, plains, roadsides	**Unlikely** – The survey was conducted during the optimal flowering period and survey efficacy would have recorded the species if it was present.	NM, DBCA
Frankeniaceae	*Frankenia parvula*	EN	EN	Compact shrub 10 cm high x 40 cm wide. Pink flowers fading to white. Oct-Nov. Salt lake margins	**Unlikely** – the species has been recorded within 20 km of the survey area. However, suitable habitat does not occur.	EPBC
Goodeniaceae	*Goodenia heatheriana*		P1	Annual, herb, to 0.15 m high. Fl. yellow, Sep to Oct. Red crumbly clay, greenstone gravel and cobbles. Lower slopes, moderately exposed gently undulating plain, roadsides.	**Unlikely** – The survey was conducted during the optimal flowering period and survey efficacy would have recorded the species if it was present.	DBCA, NM,

Family	Taxon	Status		Description (if available) (WA Herbarium 1998–, DEE 2018)	Likelihood of occurrence (post survey)	Source
		EPBC Act	BC Act /DBCA			
Lamiaceae	*Teucrium diabolicum* (formerly *Teucrium* sp. dwarf (R. Davis 8813))		P3	Herb to 0.1 m tall x 0.05 m wide, cracking clay soils. Flowering in Mar-May and Oct-Nov	**Unlikely** – The survey was not conducted during flowering however this species can be distinguished from other *Teucrium* spp. using vegetative characters. Suitable survey efficacy did not record this species.	NM,
Myrtaceae	*Balaustion grandibracteatum* subsp. *grandibracteatum*		P3	Spreading shrub, 40 cm high x 60 cm wide. Flowers pale pink.Fl, Sept – Dec. deep yellow sand over lateritic gravel	**Unlikely** – the species has been recorded within 20 km of the survey area. However, suitable habitat does not occur	NM
Myrtaceae	*Eucalyptus polita*		P3	Tree or (rarely mallee), 3-10 m high, bark smooth. Loam, sand. Around salt lakes, flats.	**Unlikely** – the species has been recorded within 20 km of the survey area. However, suitable habitat does not occur	NM
Myrtaceae	*Rinzia fimbriolata*		P1	Shrub 0.9 m high x 1.8 m wide. Flowers white with a pink tinge, Sept. Brownish sandy loam soil	**Unlikely** – The survey was conducted during the optimal flowering period and survey efficacy would have recorded the species if it was present.	NM,
Myrtaceae	*Verticordia elizabethiae*		P1	Low, domed to spreading, multi-stemmed shrub, 15-35 cm high x 20-60 cm wide. Flowers mauve-pink. Salt lake. White sand	**Unlikely** – the species has been recorded within 20 km of the survey area. However, suitable habitat does not occur	NM

Family	Taxon	Status		Description (if available) (WA Herbarium 1998–, DEE 2018)	Likelihood of occurrence (post survey)	Source
		EPBC Act	BC Act /DBCA			
Proteaceae	*Banksia sphaerocarpa* var. *dolichostyla*	VU	VU	Lignotuberous shrub, 1-3 m high. Fl. yellow-orange, Mar to May. Lateritic gravel, grey sand	**Highly Unlikely** – the species has not been recorded within 20 km of the survey area and suitable habitat does not occur.	EPBC
Proteaceae	*Isopogon robustus*	CR	CR	Shrub, to 1.5 m high. Fl. pink, Oct. Skeletal grey sandy loam, laterite. Ridges	**Highly Unlikely** – the species has not been recorded within 20 km of the survey area and suitable habitat does not occur.	EPBC
Rhamnaceae	*Cryptandra crispula*		P3	Non-spinescent shrub, 0.25-0.9 m high. Brown sandy clay, yellow loamy sand, red soil, pebbles. Dune ridges, hills, near salt lakes.	**Unlikely** – the species has been recorded within 20 km of the survey area. However, suitable habitat does not occur	NM
Stylidiaceae	*Stylidium choreanthum*		P3	Creeping perennial, herb, 0.01-0.03 m high, to 0.3 m wide. Fl. pink/white, Sep to Nov. White/yellow or red sand. Plains.	**Unlikely** – The survey was conducted during the optimal flowering period and survey efficacy would have recorded the species if it was present.	NM, DBCA

Appendix E

Fauna data

Fauna species list

Significant fauna likelihood of occurrence assessment guidelines

Significant fauna likelihood of occurrence assessment

Black Cockatoo habitat tree data

Fauna recorded during the survey

Family	Taxon	Common Name	Status
Birds			
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill	
Acanthizidae	*Acanthiza uropygialis*	Chestnut-rumped Thornbill	
Acanthizidae	*Gerygone fusca*	Western Gerygone	
Acanthizidae	*Smicrornis brevirostris*	Weebill	
Accipitridae	*Haliastur sphenurus*	Whistling Kite	
Artamidae	*Cracticus torquatus*	Grey Butcherbird	
Artamidae	*Gymnorhina tibicen*	Australian Magpie	
Cacatuidae	*Cacomantis pallidus*	Pallid Cuckoo	
Cacatuidae	*Eolophus roseicapilla*	Galah	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	Endangered
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon	
Columbidae	*Phaps chalcoptera*	Common Bronzewing	
Corvidae	*Corvus coronoides*	Australian Raven	
Cracticidae	*Strepera versicolor*	Grey Currawong	
Cuculidae	*Chrysococcyx basalis*	Horsfield's Bronze Cuckoo	
Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater	
Meliphagidae	*Manorina flavigula*	Yellow-throated Miner	
Meliphagidae	*Melithreptus brevirostris*	Brown-headed Honeyeater	
Monarchidae	*Grallina cyanoleuca*	Magpie-lark	
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler	
Pardalotidae	*Pardalotus striatus*	Striated Pardalote	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck	
Psittaculidae	*Melopsittacus undulatus*	Budgerigar	
Psittaculidae	*Polytelis anthopeplus*	Regent Parrot	
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail	
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	
Reptiles			
Agamidae	*Pogona minor minor*	Western Bearded Dragon	
Elapidae	*Pseudonaja affinis*	Dugite	
Scincidae	*Menetia greyii*	Common Dwarf Skink	
Scincidae	*Tiliqua rugosa*	Bobtail	
Mammals			
Canidae	*Vulpes vulpes*	Red Fox	Naturalised exotic
Leporidae	*Oryctolagus cuniculus*	Rabbit	Naturalised exotic
Macropdidae	*Macropus fuliginosus melanops*	Western Grey Kangaroo	

Significant fauna likelihood of occurrence assessment guidelines

Assessment outcome	Description
Present	Species recorded during the field survey or from recent, reliable records from within or close proximity to the survey area.
Likely	Species are likely to occur in the survey area where there is suitable habitat within the survey area and there are recent records of occurrence of the species in close proximity to the survey area. OR Species known distribution overlaps with the survey area and there is suitable habitat within the survey area.
Unlikely	Species assessed as unlikely include those species previously recorded within 10 km of the survey area however: There is limited (i.e. the type, quality and quantity of the habitat is generally poor or restricted) habitat in the survey area. The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area. OR Those species that have a known distribution overlapping with the survey area however: There is limited habitat in the survey area (i.e. the type, quality and quantity of the habitat is generally poor or restricted). The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area.
Highly unlikely	Species that are considered highly unlikely to occur in the survey area include: Those species that have no suitable habitat within the survey area. Those species that have become locally extinct, or are not known to have ever been present in the region of the survey area.

Definitions

Term	Description
study area	a 20 km buffer around the survey area
survey area	the area subject to the current survey
locality	the area within an approximate 20 km radius of the survey area

Significant fauna likelihood of occurrence assessment

Species	Status		Description and habitat requirements	Likelihood of occurrence
	BC Act/ DBCA	EPBC Act		
Mammals				
Dasyurus geoffroii Chuditch, Western Quoll	VU	VU	The Chuditch inhabits eucalypt forest (especially Jarrah, *Eucalyptus marginata*), dry woodland and mallee shrublands In Jarrah forest, Chuditch populations occur in both moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest. Most diurnal resting sites in sclerophyll forest consist of hollow logs or earth burrows (Van Dyke & Strahan 2008). The species can travel large distances, has a large home range and is sparsely populated through a large portion of its range. It generally requires extensive areas of connected native forest, woodland, or shrubland habitat.	Unlikely The habitat within the survey area is patchy and the surrounding area is largely cleared for agriculture. The survey area is not considered large enough to support this species which has a large home range. There are no recent records of this species within 10 km of the survey area.
Myrmecobius fasciatus Numbat	EN	EN	The numbat's distribution once encompassed a number of habitat types, including eucalypt forest, eucalypt woodland, Acacia woodland and Triodia grasslands. Current populations occupy several different habitat types: upland Jarrah forest, open eucalypt woodland, banksia woodland and tall closed shrubland. There are currently two remnant native populations at Dryandra and Perup, WA and several reintroduced populations including Boyagin Nature Reserve, Tutanning Nature Reserve, Batalling block and Karroun Hill Nature Reserve. At Dryandra, numbats inhabit Brown Mallet (*Eucalyptus astringens*) plantations. Habitats usually have an abundance of termites in the soil, hollow logs and branches for. This species has been part of a recovery plan since the late 1980's and has been relocated into several areas of the south west (Van Dyck and Strahan 2008).	Unlikely The current known range for this species is restricted to isolated populations that do not occur in proximity to the survey area. Given the level of clearing and fragmentation surrounding the survey area, the numbat is considered unlikely to occur.
Birds				
Leipoa ocellata Malleefowl	VU	VU	The Malleefowl generally occurs in semi-arid areas of Western Australia, from Carnarvon to south east of the Eyre Bird Observatory (south-east Western Australia). It occupies shrublands and low woodlands that are dominated by mallee vegetation, as well as native pine Callitris woodlands, Acacia shrublands, Broombush *Melaleuca uncinata* vegetation or coastal heathlands. The nest is a large mound of sand or soil and organic matter (Jones and Goth 2008; Morcombe, 2004).	Unlikely – irregular visitor A very small amount of shrubland habitat is present however suitable habitat is very small, regularly disturbed and fragmented. This species is unlikely to occupy the survey area (i.e. it is unlikely to be used for breeding) however individuals may visit the survey area on occasion.

Species	Status		Description and habitat requirements	Likelihood of occurrence
	BC Act/ DBCA	EPBC Act		
Pezoporus occidentalis Night Parrot	EN	EN	The Night Parrot inhabits arid and semi-arid areas that are characterised by having dense, low vegetation. Based on accepted records, the habitat of the Night Parrot consists of *Triodia* grasslands in stony or sandy environments and of samphire and chenopod shrublands, on floodplains and claypans, and on the margins of salt lakes, creeks or other sources of water. The distribution of the Night Parrot is very poorly understood (DCCEEW 2022c).	Highly Unlikely No suitable habitat present.
Falco hypoleucos Grey Falcon	VU	VU	The Grey Falcon is an Australian endemic, usually confined to the arid inland. It inhabits Triodia grassland, Acacia shrubland, and lightly timbered arid woodland (Morcombe 2004).	Unlikely This species is considered uncommon throughout its range. There are no records of this species within 50 km of the survey area.
Falco peregrinus Peregrine Falcon	OS		The Peregrine Falcon is seen occasionally anywhere in the south-west of Western Australia. It is found everywhere from woodlands to open grasslands and coastal cliffs - though less frequently in desert regions. The species nests primarily on ledges of cliffs, shallow tree hollows, and ledges of building in cities. (Morcombe 2004).	Likely The survey area provides suitable nesting and foraging habitat for this species. The closest known record is less than 10 km south-west of the survey area.
Migratory birds				
Calidris ferruginea Curlew Sandpiper	CR	CR, Mi	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters (DCCEEW 2022c).	Highly Unlikely No suitable habitat present for this species.
Apus pacificus Fork-tailed Swift	Mi	Mi	Fork-tailed Swift are widespread in coastal and sub-coastal areas between Augusta and Carnarvon, including some on nearshore and offshore islands. This species is almost exclusively aerial, flying 1 to 300 m above ground. This species is considered rare and a vagrant (DCCEEW 2022c).	Highly Unlikely No suitable habitat present for this species.

Species	Status		Description and habitat requirements	Likelihood of occurrence
	BC Act/ DBCA	EPBC Act		
Tringa nebularia Common Greenshank	Mi	Mi	Habitat is diverse, both inland and coastal. It is found inland on both permanent and temporary wetland – billabongs, swamps, lakes, floodplains, sewage farms and saltworks ponds and flooded irrigated crops. On the coast, uses sheltered estuaries and bays with extensive mudflats, mangrove swamps, muddy shallows of harbours and lagoons, occasionally rocky tidal ledges. Generally prefers wet and flooded mud and clay rather than sand (Morcombe 2004).	Highly unlikely No suitable habitat within the survey area.
Motacilla cinerea Grey Wagtail	Mi	Mi	The migratory species is widely distributed across the Palearctic region with several well marked populations. The nominate form is from western Europe including the Scandinavia, Mediterranean and British Isles regions. Another race breeds in eastern Europe and central Asia mainly along the mountain chains of the Urals, Tien Shan and along the Himalayas. They winter in Africa and Asia and sometimes end up in Australia as a vagrant. The third race breeds along the northeastern parts of Asia in Siberia extending to Korea and Japan. These winter in Southeast Asia and also can be a vagrant in Australia (DCCEEW 2022c).	Highly unlikely This species is usually confined to Europe, their presence in Australia is considered vagrant.
Reptiles				
Egernia stokesii badia Western Spiny-tailed Skink	EN	EN	Most records brown form of this species (Wheatbelt area and Shark Bay) are in York Gum (*Eucalyptus loxophleba*) woodland, with some records in Gimlet (*E. salubris*) and Salmon Gum (*E. salmonophloia*) woodland. Populations persist in woodland patches as small as one hectare and completely surrounded by wheatfields (DCCEEW 2022c). Hollow logs are used as refuge sites in woodland habitat (DCCEEW 2022c). An increasing number of skinks are being located in altered habitat under piles of wood, scrap metal or under buildings on private property (DCCEEW 2022c).	Likely Suitable habitat is present within the survey area. This species is known to persist in small woodland remnants.
Invertebrates				
Aganippe castellum *Tree-stem Trapdoor Spider*	P4		The Tree-Stem Trapdoor Spider inhabits flood-prone depressions and flats which support myrtaceous shrub communities. In particular, those areas supporting Broombush and Sheoaks (such as *Allocasuarina acutivalvis*) in sandy loam soils (ACC 2007). Until recently, the spider was known only from populations distributed across the north-eastern Wheatbelt from south of Mullewa and Dowerin to east of Tammin and Southern Cross. However, new populations have now been recorded in the Yilgarn region on the Mt Jackson, Windarling and Koolyanobbing ranges (Jarvie-Eggart 2015).	Unlikely Suitable habitat is patchy within the survey area. No spider burrows were identified during the survey. Given the history of disturbances to the survey area the presence of this species is considered unlikely.

Significant fauna likelihood of occurrence assessment

ID	Taxon	Common name	DBH	Number of hollows	Hollow size (cm)	Hollow height (m)	Hollow suitable	Notes	Easting	Northing
1	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733527	6539863
2	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733441	6540026
3	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733219	6540222
4	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733509	6540093
5	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733190	6539979
6	*Eucalyptus salmonophloia*	Salmon Gum	900	0	0	0			733666	6540101
7	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733542	6539945
8	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733203	6540100
9	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733501	6540134
10	*Eucalyptus salmonophloia*	Salmon Gum	800	0	0	0			733667	6540176
11	*Eucalyptus salmonophloia*	Salmon Gum	650	0	0	0			733664	6540049
12	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733632	6539895
13	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733294	6540071
14	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733524	6540111
15	*Eucalyptus salmonophloia*	Salmon Gum	600	0	0	0			733551	6539985
16	*Eucalyptus salmonophloia*	Salmon Gum	480	0	0	0			733303	6540078
17	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733500	6539983
18	*Eucalyptus salmonophloia*	Salmon Gum	330	0	0	0			733386	6540065
19	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733659	6540198
21	*Eucalyptus salmonophloia*	Salmon Gum	370	0	0	0			733390	6539925
22	*Eucalyptus salmonophloia*	Salmon Gum	380	0	0	0			733495	6539914
23	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733422	6540070
24	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733533	6539940
25	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733528	6539975

ID	Taxon	Common name	DBH	Number of hollows	Hollow size (cm)	Hollow height (m)	Hollow suitable	Notes	Easting	Northing
26	*Eucalyptus salmonophloia*	Salmon Gum	380	0	0	0			733234	6540181
27	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733291	6539995
28	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733420	6540066
29	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733502	6540039
30	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733281	6540255
31	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733512	6540010
32	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733177	6540173
33	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733489	6539942
34	*Eucalyptus salubris*	Gimlet	600	0	0	0			733520	6540210
35	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733419	6539898
36	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733309	6540051
37	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733297	6540071
38	*Eucalyptus salmonophloia*	Salmon Gum	380	0	0	0			733236	6540058
39	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733420	6540062
40	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733232	6540084
41	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733219	6540043
42	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733472	6540063
43	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733235	6540115
44	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733254	6540259
45	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733404	6540053
46	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733513	6539909
47	*Eucalyptus salmonophloia*	Salmon Gum	310	0	0	0			733226	6540187
48	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733377	6539953
49	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733506	6540110
50	*Eucalyptus salmonophloia*	Salmon Gum	800	0	0	0			733491	6540053

ID	Taxon	Common name	DBH	Number of hollows	Hollow size (cm)	Hollow height (m)	Hollow suitable	Notes	Easting	Northing
52	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733192	6540264
53	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733338	6539941
54	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733448	6539962
55	*Eucalyptus salmonophloia*	Salmon Gum	310	0	0	0			733232	6540085
56	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733537	6540144
57	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733488	6539943
58	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733425	6539905
59	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733525	6540052
60	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733715	6539828
61	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733714	6540176
62	*Eucalyptus salmonophloia*	Salmon Gum	460	0	0	0			733542	6539944
63	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733289	6539934
64	*Eucalyptus salmonophloia*	Salmon Gum	420	0	0	0			733315	6540148
65	*Eucalyptus salmonophloia*	Salmon Gum	430	0	0	0			733660	6539957
66	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733585	6540205
68	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733187	6539992
69	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733692	6539858
70	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733538	6540144
71	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733384	6540081
72	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733415	6540106
73	*Eucalyptus salmonophloia*	Salmon Gum	700	0	0	0			733503	6539949
74	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733231	6540068
75	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733348	6539912
76	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733581	6540043
77	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733219	6539992

ID	Taxon	Common name	DBH	Number of hollows	Hollow size (cm)	Hollow height (m)	Hollow suitable	Notes	Easting	Northing
79	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733239	6540253
80	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733364	6540082
81	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733250	6540139
82	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733671	6539852
83	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733461	6540151
84	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733202	6540226
85	*Eucalyptus salmonophloia*	Salmon Gum	480	0	0	0			733677	6539894
86	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733347	6540030
87	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733488	6540018
88	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733297	6540019
89	*Eucalyptus salmonophloia*	Salmon Gum	310	0	0	0			733262	6540190
90	*Eucalyptus salmonophloia*	Salmon Gum	470	0	0	0			733556	6540019
91	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733495	6540099
92	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733217	6539952
93	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733455	6539923
94	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733337	6540147
95	*Eucalyptus salmonophloia*	Salmon Gum	380	0	0	0			733175	6540146
96	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733681	6539874
97	*Eucalyptus salmonophloia*	Salmon Gum	370	0	0	0			733398	6539992
98	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733319	6540090
100	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733618	6539882
101	*Eucalyptus salmonophloia*	Salmon Gum	310	0	0	0			733191	6540228
102	*Eucalyptus salmonophloia*	Salmon Gum	560	0	0	0			733617	6540032
103	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733183	6540020
104	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733522	6539868

ID	Taxon	Common name	DBH	Number of hollows	Hollow size (cm)	Hollow height (m)	Hollow suitable	Notes	Easting	Northing
105	*Eucalyptus salmonophloia*	Salmon Gum	330	0	0	0			733639	6539849
106	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733258	6539957
107	*Eucalyptus salmonophloia*	Salmon Gum	380	0	0	0			733602	6539867
108	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733361	6540212
109	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733586	6540012
110	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733534	6540107
112	*Eucalyptus salmonophloia*	Salmon Gum	900	1	9	12	Potential	Hard to tell if actually hollow.	733609	6540164
113	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733371	6540146
114	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733471	6540056
115	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733382	6539946
116	*Eucalyptus salmonophloia*	Salmon Gum	480	0	0	0			733549	6539870
117	*Eucalyptus salmonophloia*	Salmon Gum	310	0	0	0			733190	6539967
118	*Eucalyptus salmonophloia*	Salmon Gum	330	0	0	0			733676	6539983
119	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733502	6539941
120	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733316	6540102
121	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733463	6540035
122	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733488	6540029
123	*Eucalyptus salmonophloia*	Salmon Gum	330	0	0	0			733694	6539842
124	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733283	6540190
125	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733396	6540076
126	*Eucalyptus salmonophloia*	Salmon Gum	680	0	0	0			733649	6540189
127	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733515	6540008
128	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733312	6540003
129	*Eucalyptus salmonophloia*	Salmon Gum	600	0	0	0			733472	6540010

ID	Taxon	Common name	DBH	Number of hollows	Hollow size (cm)	Hollow height (m)	Hollow suitable	Notes	Easting	Northing
130	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733470	6540125
131	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733511	6540140
132	*Eucalyptus salmonophloia*	Salmon Gum	460	0	0	0			733618	6539884
133	*Eucalyptus salubris*	Gimlet	550	0	0	0			733280	6540228
134	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733274	6540249
135	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733538	6540204
136	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733620	6539885
137	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733465	6539935
138	*Eucalyptus salmonophloia*	Salmon Gum	470	0	0	0			733606	6539882
139	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733225	6540228
140	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733354	6540004
141	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733503	6540038
142	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733378	6540077
143	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733498	6540007
144	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733709	6539818
145	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733398	6539990
146	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733457	6539959
147	*Eucalyptus salmonophloia*	Salmon Gum	600	0	0	0			733672	6540196
148	*Eucalyptus salmonophloia*	Salmon Gum	360	0	0	0			733396	6539956
149	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733484	6540186
150	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733682	6539905
151	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733561	6540028
152	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733210	6540094
153	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733345	6540125
154	*Eucalyptus salmonophloia*	Salmon Gum	700	0	0	0			733526	6540065

ID	Taxon	Common name	DBH	Number of hollows	Hollow size (cm)	Hollow height (m)	Hollow suitable	Notes	Easting	Northing
155	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733449	6540102
156	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733215	6540039
157	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733303	6539936
158	*Eucalyptus salmonophloia*	Salmon Gum	550	0	0	0			733522	6540099
159	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733234	6540184
160	*Eucalyptus salmonophloia*	Salmon Gum	480	0	0	0			733231	6540137
161	*Eucalyptus salmonophloia*	Salmon Gum	360	0	0	0			733291	6540009
162	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733519	6540030
163	*Eucalyptus salmonophloia*	Salmon Gum	650	0	0	0			733715	6540168
164	*Eucalyptus salmonophloia*	Salmon Gum	420	0	0	0			733259	6539953
165	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733212	6540032
166	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733229	6540041
167	*Eucalyptus salmonophloia*	Salmon Gum	470	0	0	0			733584	6539873
168	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733369	6540188
169	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733383	6540124
170	*Eucalyptus salmonophloia*	Salmon Gum	650	0	0	0			733533	6540118
171	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733362	6540124
172	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733194	6540246
173	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733348	6540138
174	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733319	6540187
175	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733633	6539895
176	*Eucalyptus salmonophloia*	Salmon Gum	550	0	0	0			733631	6539856
177	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733291	6540180
178	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733389	6540015
179	*Eucalyptus salmonophloia*	Salmon Gum	310	0	0	0			733323	6540023

ID	Taxon	Common name	DBH	Number of hollows	Hollow size (cm)	Hollow height (m)	Hollow suitable	Notes	Easting	Northing
180	*Eucalyptus salmonophloia*	Salmon Gum	600	1	10-15	7	Potential	Upright limb, unsure if hollow	733610	6540167
181	*Eucalyptus salmonophloia*	Salmon Gum	330	0	0	0			733324	6540094
183	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733231	6539973
184	*Eucalyptus salmonophloia*	Salmon Gum	600	0	0	0			733567	6540002
185	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733493	6539915
186	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733586	6539863
187	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733295	6540070
188	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733685	6539847
189	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733467	6539942
190	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733700	6539904
192	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733521	6540146
193	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733196	6540134
194	*Eucalyptus salmonophloia*	Salmon Gum	650	0	0	0			733719	6539929
195	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733336	6539939
196	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733307	6540069
197	*Eucalyptus salmonophloia*	Salmon Gum	330	0	0	0			733269	6539939
198	*Eucalyptus salmonophloia*	Salmon Gum	420	0	0	0			733686	6539846
199	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733436	6540093
200	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733484	6540062
201	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733222	6539994
202	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733607	6540002
203	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733542	6540142
231	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733938	6539803
204	*Eucalyptus salmonophloia*	Salmon Gum	610	1	8	9	Potential	Potential maybe slightly too small, potentially another	733209	6540263

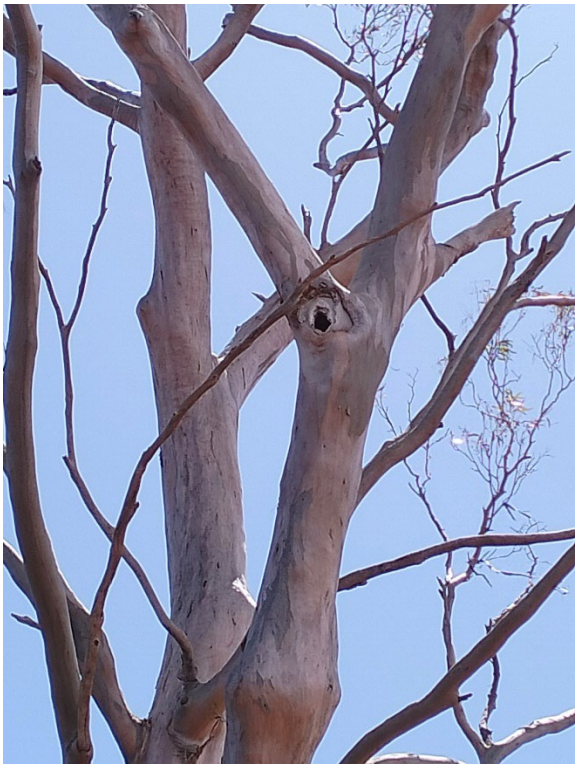
ID	Taxon	Common name	DBH	Number of hollows	Hollow size (cm)	Hollow height (m)	Hollow suitable	Notes	Easting	Northing
								hollow higher up. Galahs hanging around tree.		
205	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733384	6539968
206	*Eucalyptus salmonophloia*	Salmon Gum	480	0	0	0			733438	6540074
207	*Eucalyptus salmonophloia*	Salmon Gum	580	4	8 to 20	7	Yes	Multiple hollows ranging from small to medium sized entrance	733604	6540196
208	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733239	6539999
209	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733472	6540011
210	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733347	6539987
211	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733186	6540198
212	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733708	6539840
213	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733349	6539943
214	*Eucalyptus salmonophloia*	Salmon Gum	550	0	0	0			733622	6539983
215	*Eucalyptus salmonophloia*	Salmon Gum	600	1	8	5	No	Too small	733535	6540178
216	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733665	6539917
217	*Eucalyptus salmonophloia*	Salmon Gum	340	0	0	0			733659	6539884
218	*Eucalyptus salmonophloia*	Salmon Gum	350	0	0	0			733504	6540127
219	*Eucalyptus salmonophloia*	Salmon Gum	330	0	0	0			733171	6540142
220	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733301	6540085
221	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733263	6540145
222	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733292	6540132
223	*Eucalyptus salmonophloia*	Salmon Gum	450	0	0	0			733226	6539979
224	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733675	6539985
225	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733513	6540140

ID	Taxon	Common name	DBH	Number of hollows	Hollow size (cm)	Hollow height (m)	Hollow suitable	Notes	Easting	Northing
226	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733534	6540202
227	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733432	6540010
228	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733218	6539949
229	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733231	6540252
230	*Eucalyptus salmonophloia*	Salmon Gum	590	0	0	0			733627	6540189
232	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733997	6539863
233	*Eucalyptus salmonophloia*	Salmon Gum	360	0	0	0			733986	6539808
234	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733963	6539804
235	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733902	6539771
236	*Eucalyptus salmonophloia*	Salmon Gum	330	0	0	0			733998	6539860
237	*Eucalyptus salmonophloia*	Salmon Gum	500	0	0	0			733954	6539846
238	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733891	6539866
239	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733963	6539796
240	*Eucalyptus salmonophloia*	Salmon Gum	320	0	0	0			733912	6539826
241	*Eucalyptus salmonophloia*	Salmon Gum	300	0	0	0			733934	6539863
242	*Eucalyptus salmonophloia*	Salmon Gum	400	0	0	0			733970	6539813

Photographs of tree hollows

Tree #112: ***Eucalyptus salmonophloia*, one potential hollow (potentially too small and shallow)**

Tree #180: ***Eucalyptus salmonophloia*, one potential hollow**



Tree #204: ***Eucalyptus salmonophloia*****, one hollow (entrance appears too small)**

Tree #207: ***Eucalyptus salmonophloia*****, multiple hollows, some of suitable size.**

<u>Tree #215:</u> ***Eucalyptus salmonophloia*****, one hollow, not suitable (too small)**

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