



Greenfields Expansion

**Native Vegetation
Clearing Permit
(Purpose):
Supporting
Documentation**

Prepared for
Focus Operations Pty Ltd

October 2021

● people ● planet ● professional

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1 Introduction

1.1 Background

360 Environmental Pty Ltd (360 Environmental) was commissioned by Focus Operations Pty Ltd (FOPS) to prepare a Native Vegetation Clearing Permit (NVCP) (Purpose) application for clearing associated with the expansion of mining at Greenfields (GF), within the Coolgardie Gold Project (CGP). The Site is approximately 40 km west of Kalgoorlie and lies over the following tenements:

- M15/154
- M15/1432
- M15/645.

Under Section 51C of the *Environmental Protection Act 1986* (EP Act), the clearing of any native vegetation requires an approved clearing permit, unless an exemption applies. Exemptions for mining generally apply to areas of low impact mining and exploration, or for proposals that have already been assessed by the Environmental Protection Authority (EPA), Department of Water, Environment and Regulation (DWER) or Department of Mines, Industry Regulation and Safety (DMIRS) through a separate process.

The NVCP application is to clear up to 60 hectares (ha) of native vegetation within a 302.19 ha purpose permit boundary of the GF Development Envelope (Figure 1 and 2). The majority of the purpose permit boundary contains previously disturbed land (>68%), with the proposed clearing confined largely to the north-eastern edge of the northern waste rock dump and a portion of the southern waste rock dump (previously disturbed land).

1.2 Purpose of Clearing Permit Application

The purpose of this NVCP supporting document is to present the results of an assessment of the clearing aspects of this proposal against the ten clearing principles as outlined in the (then) Departments of Environment Regulation's (DER) *A guide to the assessment of applications to clear native vegetation* (2014) under Part V Division 2 of the EP Act. This report identifies the potential environmental impacts associated with the proposal based on the best available data. This report and accompanying NVCP Purpose Permit application form will be submitted to DMIRS for assessment.

1.3 Proposed Timeframe

Clearing is proposed to commence in Q1 2022 with mining likely to be completed in 2025.

1.4 Responsible Applicant

FOPS are responsible for the implementation of the clearing described within this report. Correspondence relating to this NVCP application should be addressed to:

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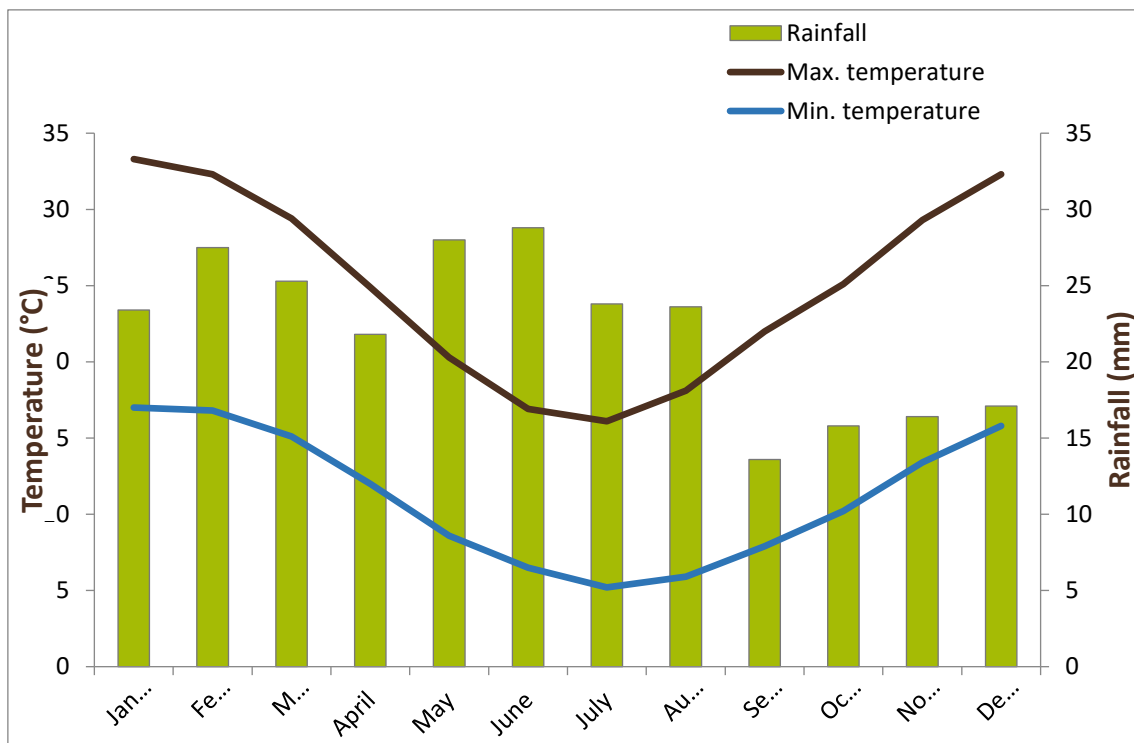
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2 Site Overview

2.1 Climate

Coolgardie experiences an arid to semi-arid Mediterranean climate. The closest Bureau of Meteorology (BoM) weather station with a complete dataset is Coolgardie Station (No. 012018), located approximately 5 km southwest of the Site (Bureau of Meteorology, 2021).

The long-term annual mean minimum temperature for Coolgardie is 11.2°C. The mean annual maximum temperature is 25°C. Coolgardie station receives rain for 48.6 days annually and the mean rain is 269.6 mm (Graph 1)(Bureau of Meteorology, 2021).



Graph 1: Long-term and Monthly total Rainfall, Maximum and Minimum Temperatures for Coolgardie Station (012018) (Bureau of Meteorology, 2021).

2.2 Topography

The topography of the GF mining area ranges between 400 m Australian Datum Height (ADH) and 450 m ADH.

2.3 Interim Biogeographic Regionalisation of Australia

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into 89 bioregions based on major biological, geographical, and geological attributes. These bioregions are subdivided into 419 subregions as part of a refinement of the IBRA framework (Department of the Environment and Energy, 2016).

The Site occurs within the Coolgardie bioregion and the Eastern Goldfields subregion (CO03). The Eastern Goldfields subregion is on the Yilgarn Craton's 'Eastern Goldfields Terrains'. The relief is subdued and comprises of gently undulating plains interrupted in the west with low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying geology is of gneisses and granites eroded into a flat plane covered with tertiary soils and with scattered exposures of bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line (Cowan, 2001).

The vegetation of the subregion is dominated by mallees, acacia thickets and shrub-heaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on ranges, and in valleys. Salt lakes support dwarf shrublands of samphire. Woodlands and *Dodonaea* shrubland occur on basic granulites of the Fraser Range.

2.4 Soil Landscape Systems

Soil landscapes and land system mapping of Western Australia describes broad soil and landscape characteristics from regional to local scales, and has been captured at scales ranging from 1:20,000 to 1:250,000 (Department of Primary Industries and Regional Development, 2019). The mining area is located within one soil land systems described below:

- Norseman: Undulating plains and uplands (with some sandplains and salt lakes) on granitic rocks of the Yilgarn Craton. Calcareous loamy earths, yellow sandy and loamy earths, red loamy earths, red deep sands, and Salt Lake soils (Figure 3).

2.5 Hydrology

The Greenfields pit lies within the Roe Paleo drainage system. The closest major aquifer is 2.5 km to the south-east and is a Wollubar sandstone occurring in the Hannan Paleochannel (Rockwater, 2010). Groundwater in the region is either saline or hyper saline, there are no known sources of freshwater. The depth to groundwater is up to 55 m in some mafic or ultra-mafic fractured rock aquifers across the region (FML, 2012). Groundwater storage is limited to secondary porosity present in discrete, local-scale fractures. Based on the limited interconnectivity of the aquifer zone aquifer recharge is likely to be local (Appendix D; AquaGeo, 2021).

There are no surface water bodies within the proposed clearing area, however numerous ephemeral salt lakes are present within the surrounding area. Significant water bodies in the area include Brown Lake, Red Lake, White Lake and Douglas Lake; all are located in excess of 4 km to the northeast of the proposal area and will not be impacted as a result of this proposal (Appendix E; FML, 2012).

The existing Greenfields open pit is located in a low area, with all surface water run-off from around the Three Mile Hill operation and neighbouring FML investments flowing into the open pit. Surface drainage has been highly modified in this area over time because of previous mining, installation of water transfer pipelines and roads (Appendix E) (Figure 4).

2.5.1 Desktop Assessment

A desktop review was undertaken to identify Threatened and Priority Flora and Ecological Communities previously recorded within the survey area and surrounds. The review involved:

- Review of findings from previous studies within or near the Coolgardie Project Area
- Review relevant existing literature as available
- Search Threatened and Priority Flora and Communities databases including:
 - DBCA Naturemap database (10 km and 20 km radius)
 - Commonwealth (EPBC Act) Protected Matters Database (PMST) (10 km and 20 km radius)
 - DBCA Threatened and Priority Flora (TPFL) Databases (custom database search request, 90 km radius)
 - Western Australian Herbarium Specimen (WA Herb) database (custom database search request, 90 km radius)
 - DBCA TEC Database (custom database search request, 50 km radius).
- Analysis of aerial imagery, broadscale vegetation mapping data, and vegetation and landscape feature spatial data to identify expected vegetation assemblages and significant landscape features.

2.6 Conservation Features

The site is not located within any Environmentally Sensitive Areas (ESA) and there are no ESAs located within a 20 km radius of the site (Department of Water and Environmental Regulation, 2018a). There are no DBCA Managed Lands located within a 20 km radius of the GF site.

A search of the Aboriginal Heritage Inquiry System (AHIS) shows that there are no sites of aboriginal heritage within the purpose permit boundary (Department of Planning Lands and Heritage, 2020).

The area proposed to be cleared is located within 5 km of the town of Coolgardie and is approximately 35 km west of Kalgoorlie. The Shire of Coolgardie is the largest producer of minerals in the region with gold and nickel mining operations supporting globally significant regional exports (Shire of Coolgardie, 2021). According to the Australian Bureau of Statistics (2016) the most common occupations in Coolgardie include machinery operators and drivers, technicians and trades workers, laborers, community and personal service workers and clerical and administrative workers, with 23.9% of employed people working in Gold Ore Mining. Given the historic mining that has occurred within the region and the potential for ongoing and future economic benefits, the proposed clearing of up to 60 ha is unlikely to impact on the amenity of the townsite.

2.7 Flora and Vegetation

A flora and vegetation survey was conducted across the area in 2009 by ecologist Dr E Van Etten. The survey included desktop research to gather background information on the Coolgardie Project Area and a reconnaissance survey to verify the background study and further delineate and characterise the flora and vegetation within the study area. More recently in 2021, Terratree Pty Ltd (Terratree) was commissioned to undertake a targeted flora and vegetation survey (formerly level 1) within the Coolgardie Project Area. The Coolgardie Project Area is approximately 885 hectares (survey area) including the Brilliant, Bonnievale and Greenfields project areas. The objective of the survey was to determine the presence of Threatened and Priority Flora and other species of conservation significance and Threatened and Priority Ecological Communities within the project area.

The targeted flora and vegetation survey consisted of a desktop assessment followed by a field survey. The desktop review aimed to identify Threatened and Priority Flora and Ecological Communities previously recorded within the survey area and surrounds. The assessment involved a review of previous studies, literature, and relevant spatial databases as well as analysis of aerial imagery, broadscale vegetation and landscape feature spatial data to identify expected vegetation assemblages and significant landscape features.

A targeted flora and vegetation field survey was conducted between the 16th and 20th of November 2020 by Terratree ecologists. The survey area was extensively travelled by vehicle and foot to verify and define vegetation communities and to search for Threatened or Priority flora identified as potentially occurring within the survey area during the desktop review. Where species could not be identified in the field, they were collected, labelled, pressed, dried and frozen in accordance with the requirements of the WA Herbarium.

2.7.1 Broad Vegetation Types

Mapping of pre-European broad vegetation within Western Australia was completed on a broad scale (1:1,000,000) by (Beard, 1976). These vegetation types were later re-assessed by Shepherd et. al (2002) with some larger vegetation units divided into smaller units. Together, this pre-European database contains a total of 89 vegetation types within Western Australia.

The Greenfields project area is mapped within the Coolgardie 9 vegetation type. Coolgardie 9 is described as having medium woodlands with coral gum (*Eucalyptus torquata*) and goldfields blackbutt (*E. le soufii*) (Department of Primary Industries and Regional Development, 2018). The representation at a state, regional and local level is shown in Table 1

Table 1: Broad Vegetation Types within the State, Regional and Local Representation (Department of Primary Industries and Regional Development, 2018)

Vegetation Type	Pre-European Extent (ha)	Current Extent (ha)	Remaining (%)	Current Extent Managed in DBCA Lands (%)
Representation across Western Australia				
Coolgardie 9	240,509.33	235,161.94	97.78	8.07
Representation across the Coolgardie Bioregion				
Coolgardie 9	240,441.99	235,100.97	97.78	8.07
Representation across the Eastern Goldfield Subregion				
Coolgardie 9	235,047.15	229,757.07	97.75	8.26
Representation across the Shire of Leonora				
Coolgardie 9	166,572.37	163,720.39	98.29	9.81

The EPA aims to retain ecological communities at a minimum of 30% of the pre-clearing extent of that community in each bioregion to meet the National Objectives and Targets for Biodiversity Conservation 2001-2005 (EPA 2008). The Coolgardie vegetation type meets the recommendation, it still has 97.78% representation remaining within the state.

2.7.2 Desktop Assessment Results

The previous surveys reviewed for the Coolgardie Project Area did not record any Threatened or Priority Flora or Ecological Communities as being present within the survey area. The database search using NatureMap and EPBC Protected Matters Search Tool (PMST) for Threatened and Priority flora (TPFL) records showed a total of 24 flora records within 20 km of the search area (Appendix A; Terratree, 2021a):

- One Threatened
- Ten Priority 1
- Four Priority 2
- Seven Priority 3
- Two Priority 4 flora species.

A list of the Threatened and Priority flora species recorded within the 20 km radius search area found on the NatureMap and EPBC Protected Matters database are presented in Table 2.

Table 2: Threatened and Priority flora recorded within 20 km radius of survey area.

Species Name	Conservation Status		<10 km
	DBCA	EPBC Act	
<i>Gastrolobium graniticum</i>	T	EN	Y
<i>Acacia coatesii</i> Maslin	P1	-	Y
<i>Acacia sclerophylla</i> var. <i>teretiuscula</i>	P1	-	-
<i>Acacia websteri</i>	P1	-	Y
<i>Austrostipa</i> sp. Carlingup Road	P1	-	-
<i>Dampiera plumosa</i>	P1	-	Y
<i>Eucalyptus websteriana</i> subsp. <i>norsemanica</i>	P1	-	-
<i>Lepidosperma</i> sp. Parker Range	P1	--	-
<i>Phebalium appressum</i>	P1	-	-
<i>Thryptomene</i> sp. Coolgardie	P1	-	Y
<i>Thryptomene planiflora</i> Rye	P1	-	Y
<i>Austrostipa</i> sp. Dowerin	P2	-	Y
<i>Hakea rigida</i>	P2	-	-
<i>Lepidium merrallii</i>	P2	-	Y
<i>Phebalium clavatum</i>	P2	-	-
<i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i>	P3	-	Y
<i>Austrostipa blackii</i>	P3	-	Y
<i>Chrysocephalum apiculatum</i> subsp. <i>norsemanense</i>	P3	-	Y
<i>Eremophila veronica</i>	P3	-	Y
<i>Grevillea georgeana</i>	P3	-	-
<i>Notisia intonsa</i>	P3	-	Y
<i>Phlegmatospermum eremaeum</i>	P3	-	-
<i>Eremophila caerulea</i> subsp. <i>merrallii</i>	P4	-	-
<i>Eucalyptus jutsonii</i> subsp. <i>jutson</i>	P4	-	-

2.7.3 Introduced Flora

The PMST search identified five Weeds of National Significance (WONS), with two of these species, *Carrichtera annua* (Ward's Weed) and *Cylindropuntia* spp. (Prickly Pears) occurring within 10 km of the survey area. The NatureMap search found 25 other introduced flora recorded within 20 km of the survey area (DBCA 2020b). Three environmental weeds, *Cenchrus ciliaris* (Buffel Grass), *Agrostis curvula* (African Lovegrass) and *Rumex vesicarius* (Ruby Dock) were listed (Appendix A). Table 3 shows the introduced flora species within 20 km of the site.

Table 3: Introduced flora recorded within 20 km radius of survey area.

Species	Common Name	Status	Distance with the Survey Area	
			< 10 km	10-20 km
<i>Lycium ferocissimum</i>	African Boxthorn	WONS	Y	
<i>Carrichtera annua</i>	Ward's Weed	WONS	Y	
<i>Cylindropuntia</i> spp.	Prickly Pears	WONS	-	Y
<i>Acacia pycnantha</i>	Golden Wattle	-	Y	-
<i>Brassica tournefortii</i>	Mediterranean Turnip	-	-	Y
<i>Cenchrus ciliaris</i>	Buffel Grass	Environmental Weed	Y	
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	-	-	Y
<i>Conyza sumatrensis</i>	-	-	Y	-
<i>Cylindropuntia tunicata</i>	-	WONS	Y	-
<i>Eragrostis curvula</i>	African Lovegras	Environmental weed	Y	-
<i>Glandularia aristigera</i>			Y	-
<i>Helianthus annuus</i>	Sunflower, Common Sunflower	-	Y	-
<i>Heliotropium europaeum</i>	Common Heliotrope	-	Y	-
<i>Limonium sinuatum</i>	Perennial Sea Lavender	-	Y	-
<i>Lythrum hyssopifolia</i>	Lesser Loosestrife		Y	-
<i>Malva parviflora</i>	Marshmallow	-	-	Y
<i>Marrubium vulgare</i>	Horehound	-	-	Y
<i>Medicago minima</i>	Small Burr Medic	-	Y	
<i>Monoculus monstrosus</i>			-	Y
<i>Opuntia elata</i>	-	WONS	Y	-
<i>Pentameris airoides</i> subsp. <i>airoides</i>			Y	-
<i>Phalaris paradoxa</i>	Paradoxa Grass	-	Y	-
<i>Rumex vesicarius</i>	Ruby Dock	Environmental weed	Y	-
<i>Salvia reflexa</i>	Mintweed	-	Y	-
<i>Salvia verbenaca</i>	Wild Sage	-	Y	-
<i>Schinus molle</i> var. <i>areira</i>	-	-	Y	-

Species	Common Name	Status	Distance with the Survey Area	
			< 10 km	10-20 km
<i>Sisymbrium orientale</i>	Indian Hedge Mustard	-	Y	-
<i>Spergularia diandra</i>	Lesser Sand Spurry	-	Y	-
<i>Urochloa panicoides</i>	-	-	Y	-
<i>Vicia monantha</i> subsp. <i>trifloral</i>	-	-	Y	-

2.7.4 Field Survey Results

A total of 95 species of flora from 28 families were recorded within the survey area. The most common families were:

- Scrophulariaceae, of which most were *Eremophila* spp
- Chenopodiaceae, of which most were *Maireana* spp
- Myrtaceae, of which most were Eucalyptus spp. and Melaleuca spp.

Two other common families were Fabaceae (mostly *Acacia* spp.) and Poaceae (grasses). Five introduced species were recorded, including two WONS, *Opuntia strica* and *Lycium ferocissimum*.

2.7.4.1 Confirmed Threatened and Priority Flora

No Threatened Flora were recorded within the survey area.

Three individuals of the Priority one species, *Acacia websteri* (P1), were recorded in Community 4, which is on the western edge of the survey area, near Nepean Road. *Acacia websteri* (P1) was not identified until after the survey, so its exact extent and location was not recorded. *Acacia websteri* (P1) is a shrub with yellow flowers and fibrous bark growing 1.2 to 5 m in red sand, loam or clay in low-lying areas and flats (WA Herbarium 2021). This species is not located within the proposed purpose permit boundary.

2.7.4.2 Potential Threatened and Priority Flora

Nine specimens collected could not be identified to species level because they were sterile at the time of survey. Of the specimens that could not be identified four specimens were from the genera of seven targeted species listed in the desktop review (Table 2). A likelihood assessment for the targeted flora occurring within the Survey Area was conducted and the results are presented in Table 4.

Table 4: Summary of the Likelihood assessment of the occurrence of Priority Flora

Collection Name	Potential Priority Species	Conservation Status	Likelihood Occurrence in Survey Area
<i>Austrostipa</i> sp	<i>Austrostipa blackii</i>	P2	Likely
	<i>Austrostipa</i> sp. Carlingup Road	P1	Unlikely
	<i>Austrostipa</i> sp. Dowerin	P2	Unlikely
<i>Eremophila</i> spp.	<i>Eremophila caerulea</i> subsp. <i>merrallii</i>	P4	Unlikely
	<i>Eremophila veronica</i>	P3	Very likely
<i>Phebalium</i> sp.	<i>Phebalium appressum</i>	P1	Unlikely
	<i>Phebalium clavatum</i>	P3	Unlikely

2.7.4.3 Vegetation Communities

The survey area is dominated by Eucalypt Mallee Woodlands and Open Woodlands with small areas of Mallee Shrublands and one Isolated *Eremophila* Heathland. Seven distinct communities were observed within the survey area (Terratree, 2021a). The identified communities are listed in Table 5. Table 6 summarises the communities present within the proposed clearing area (Figure 5).

No Threatened or Priority Ecological Communities (TECs or PECs) and No Environmentally Sensitive Areas (ESAs) were observed within the survey area.

Table 5: Summary of Vegetation Communities in the Survey Area

ID	Community Name	Structure Summary	Landscape Position	Area (ha)	Percentage of Survey Area %
C1	<i>Eucalyptus griffithsii</i> with <i>E. torquata</i>	Mallee woodland	Shallow stony soils, upper slopes	102.1	11.5
C2	<i>Eucalyptus clelandiorum</i> (Cleland's Blackbutt)	Mallee Woodland	Greenstone midslopes	73.5	8.3
C3	<i>Eucalyptus griffithsii</i> (<i>E.torquata</i> absent)	Mallee Woodland	Drainage lines	65.8	7.4
C4	<i>Acacia</i> spp. and <i>Allocasuarina</i> spp.	Mallee Shrubland	Laterite	6.9	0.8
C5	<i>E. campaspe</i> (Silver-topped gimlet)	Mallee Woodland	Greenstone midslopes, occasionally drainage areas	128.2	14.5
C6	<i>E. salmonophloia</i> (Salmon gum)	Open Woodland	Flats, low lying deep soils	173.0	19.6
C7	<i>Eremophila oppositifolia</i> (Mesa)	Isolated Heathland	Small stone mesa	0.6	0.1

ID	Community Name	Structure Summary	Landscape Position	Area (ha)	Percentage of Survey Area %
	Degraded	N/A	N/A	334.8	37.8
	Total			884.9	100

Table 6: Summary of Vegetation Communities in Purpose Permit Boundary

ID	Community Name	Structure Summary	Landscape Position	Area (ha)	Percentage Purpose Permit Boundary
C1	<i>Eucalyptus griffithsii</i> with <i>E. torquata</i>	Mallee woodland	Shallow stony soils, upper slopes	19.38	6.41
C2	<i>Eucalyptus clelandiorum</i> (Cleland's Blackbutt)	Mallee Woodland	Greenstone midslopes	12.75	4.22
C3	<i>Eucalyptus griffithsii</i> (<i>E. torquata</i> absent)	Mallee Woodland	Drainage lines	13.08	4.33
C4	<i>Acacia</i> spp. and <i>Allocasuarina</i> spp.	Mallee Shrubland	Laterite	2.14	0.71
C5	<i>E. campaspe</i> (Silver-topped gimlet)	Mallee Woodland	Greenstone midslopes, occasionally drainage areas	0	0
C6	<i>E. salmonophloia</i> (Salmon gum)	Open Woodland	Flats, low lying deep soils	0	0
C7	<i>Eremophila oppositifolia</i> (Mesa)	Isolated Heathland	Small stone mesa	0	0
	Degraded	N/A	N/A	10.3	3.41

2.7.4.4 Vegetation Condition

A large portion, 340.7ha (38.5%), of the survey area, was Degraded to Completely Degraded Table 7. These areas have been heavily modified by historic and current mining and exploration activities and lack vegetation structure and species diversity. Some degraded areas contain attempted rehabilitation and are dominated by chenopods such as *Atriplex nummularia*, *Maireana* spp. and introduced species (Figure 6).

Approximately 325.6 ha (36.9%) of the Survey Area remains in Good Condition and 217.7 ha (24.6%) despite large areas being disturbed Table 8 shows the condition ratings within the proposed clearing area.

Table 7: Vegetation condition ratings in Survey Area

Condition Rating	Area (Ha)	Percent (%)
Very Good	217.7	24.6
Good	326.6	36.9
Degraded-Completely Degraded	340.7	38.5
Total	885	100

Table 8: Vegetation condition ratings in Purpose Permit Boudnary

Condition Rating	Area (Ha)	Percent (%)
Very Good	47.39	15.7
Good	0.0	0
Degraded-Completely Degraded	10.3	3.4

2.7.4.5 Introduced Flora

Five introduced flora species were recorded. These include two Weeds of National Significance (WONS), *Lycium ferocissimum* (African Boxthorn) and *Opuntia stricta* (Prickly Pear), which is also categorized as a Declared Pest s22(2) (C3 Restricted) in WA under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) (DPIRD, 2021). The other weeds recorded were *Agave americana* (Century plant/Agave/Yucca) which is occasionally naturalised around old habitations and roadsides and along with *Asphodelus fistulosus* (Onion weed) and *Schinus mole* (Peppertree) is categorized as Permitted (s11) under the BAM Act (2007). Control measures must be implemented by land managers in areas infested with Declared plants in the C3 category.

Introduced flora recorded during the survey, along with their weed status and management category, is summarized in Table 9.

Table 9: Summary of introduced flora recorded in the survey area and their status.

Species		Status		
Scientific Name	Common Name	WAOL (2021)	Weeds Australia	WA Herbarium (2021)
<i>Agave americana</i>	Century plant/Agave/Yucca	Permitted (s11)		Occasionally Naturalised
<i>Asphodelus fistulosus</i>	Onion weed	Permitted (s11)	-	-
<i>Lycium ferocissimum</i>	African Boxthorn	Permitted (s11)	WONS	
<i>Opuntia stricta</i>	Common Prickly Pear	Declared Pest (s22(2) (C3 Restricted)	WONS	
<i>Schinus mole</i>	Peppertree	Permitted (s11)	-	-

2.8 Fauna

Western Ecological (WE) was commissioned by FML to undertake a basic fauna survey in the Coolgardie Project Area. The objective of the fauna survey was to define the fauna values in the survey area, to support future project planning, and inform environmental approvals. The survey comprised of a desktop survey and a field survey that was conducted between the 23rd and 27th of November 2020.

2.8.1 Desktop Assessment

A search of the DBCA Threatened Fauna Database (60 km), NatureMap (40 km) and the EPBC Protected Matters Search Tool (60 km) were undertaken to identify fauna species of conservation significance potentially occurring in the survey area.

The desktop assessment results showed a total 240 vertebrate species from 73 families. These were comprised of:

- 5 amphibian species from three families
- 66 reptile species from nine families
- 141 bird species from 48 families
- 28 mammal species from 13 families.

A total of 21 conservation significant vertebrate species (including Priority species) from 11 families were identified during the desktop review of the database searches. These were comprised of 18 bird species from eight families and three mammal species from three families.

A likelihood assessment was conducted for four significant species that were potentially considered to be found within the area. The likelihood of each species is based on the following criteria:

- Recorded: Recorded during the field survey or site reconnaissance.
- Likely: Suitable habitat is present in the survey area and the survey area is in the species' known distribution.
- Possible: Limited or no suitable habitat is present in survey area but is nearby. The species has good dispersal abilities and is known from the general area.
- Unlikely: No suitable habitat is present in survey area but is nearby, the species has poor dispersal abilities, but is known from the general area; or suitable habitat is present, however the survey area is outside of the species' known distribution.

The results of the likelihood assessment are presented in Table 10.

Table 10: Likelihood of Presence of Conservation Significant Vertebrates

Scientific Name	Common Name	Likelihood Occurrence	Conservation Status	
			EPBC Act	BC Act
<i>Leipoa ocellata</i>	Malleefowl	Possibly	VU	VU
<i>Tringa nebularia</i>	Common Greenshank	Unlikely	MI	MI
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Unlikely	MI	MI
<i>Calyptorhynchus latirostris</i>	Carnaby's Black Cockatoo	Unlikely	EN	EN

2.8.2 Field Survey Results

A total of 40 fauna species from 26 families were recorded in the survey area (Appendix C). All fauna species recorded are considered relatively common and widespread. The following reptile's species were recorded during the survey:

- Clawless Gecko (*Crenadactylus ocellatus*)
- Tree Dtella (*Gehyra variegata*)
- Bynoe's Gecko (*Heteronotia binoei*)
- Common Scaly Foot (*Pygopus lepidopus*)
- Shingleback (*Tiliqua rugosa*)
- Netted Dragon (*Ctenophorus reticulatus*)
- Sand Monitor (*Varanus gouldii*).

During the field survey, 30 bird species from 17 families were recorded. All bird species recorded are considered relatively common and widespread. A total of three mammal species were recorded:

- Red Kangaroo (*Macropus rufus*)
- European Rabbit (*Oryctolagus cuniculus*)
- Cattle (*Bos taurus*).

2.8.3 Fauna Habitat

A total of four broad fauna habitats were identified within the survey area, however a large proportion of the survey area was degraded. The four broad fauna habitat types described are as follows:

- Mallee Eucalyptus Woodland
- Salmon Gum Woodland
- Drainage Line
- Acacia Shrubland.

The remaining areas were classed as totally degraded/cleared/paddocks as well as previously cleared for mining activities, roadway sand tracks. Fauna habitat size is represented in Table 11.

Table 11: Fauna habitat extent in the survey area.

Fauna Habitat	Habitat Description	Habitat Extent (Ha)	Percentage (%) of Habitat Extent
Mallee Eucalyptus Woodland	Mallee Eucalyptus Woodland consisted of mixed mallee eucalypts including <i>E. graffithsii</i> , <i>E. torquate</i> , <i>E. clelandiorum</i> and <i>E. campaspe</i> , over scattered tall shrubs of <i>Eremophila</i> sp. and <i>Senna</i> sp.	346	39
Salmon Gum Woodland	Salmon Gum Woodland habitat consisted of scattered <i>E. salmonophloia</i> trees over a ground cover of scattered low shrubs and herbs.	184	21
Drainage Line	Drainage Line habitat consisted of <i>E. graffithsii</i> mallee trees over mixed <i>Acacia</i> species, over scattered low shrubs, and mixed grasses on sandy soils	32	4
Acacia Shrubland	Acacia Shrubland habitat consisted of mixed <i>Acacia</i> species, including <i>A. acuminata</i> and <i>A. collegialis</i> shrubland over <i>Allocasuarina</i> on sandy soils.	15	1
Degraded	-	308	35
Total	-	885	100

2.8.4 Conservation Significant Species

No conservation significant species were recorded in the survey area.

One conservation significant species is considered as Possibly occurring in the survey area, the Malleefowl. The Malleefowl (*Leipoa ocellata*) is listed as Vulnerable (Vu) under the EBPC Act and the *Biodiversity Conservation Act 2016* (BC Act). In the past century, the range of the Malleefowl has contracted, particularly in arid areas and at the periphery of its former range (Benshemesh, 2007). Historically, the species was originally common and widespread in semi-arid zones, mainly in scrubs of mallee and other low eucalypts on sandy and lateritic soils; also, acacia scrubs

on heavy red soils, especially north and east of the mulga-eucalypt line. The Malleefowl is now generally rare to uncommon and patchily distributed due to habitat loss. During the survey, no Malleefowl mounds or tracks were recorded in the survey area. A large part of the survey area is considered unsuitable for Malleefowl, as it consists of disturbed, degraded and cleared areas from previous and current mining activities.

3 Environmental Management Measures

3.1 Avoid

Engineering design of the mine and supporting infrastructure has been developed to minimise the clearing of vegetation while still enabling a safe work environment. Much of the area has already been cleared through previous actions.

3.2 Mitigation

Examples of environmental management measures which can be implemented to mitigate clearing impacts and management on site include but are not limited to the following:

- Clearing area will be demarcated prior to the commencement of project activities and prior to the commencement of native vegetation clearing.
- Induction of all contractors and/or internal personnel undertaking the clearing in accordance with FOPS internal procedures. GPS coordinates of clearing permit area to be supplied to contractor.
- Prior to clearing and earthworks commencing within the clearing permit area, the area will be clearly outlined (by barrier tape or star pickets) to ensure that no over clearing occurs beyond the permitted area.
- Prior to clearing activities, areas of native vegetation to be retained will be clearly demarcated by star pickets, coloured tape or bunting and all personnel should be made aware of the requirement to protect native vegetation in these areas.

FOPS will implement the company's Environmental Management System and Mine Closure Plan.

4 Assessment Against the Ten Clearing Principles

The proposed clearing activities have been assessed against the ten clearing principles as defined in DER's Guide to Assessment: Clearing of Native Vegetation under the EP Act, taking into account the current extent and condition of the native vegetation on the site. This assessment is presented in Table 12. The GF purpose permit boundary is 302.19 ha, only 60 ha will be cleared for the development and operation of the Project.

Table 12: Assessment Against the Ten Clearing Principles

Principle	Assessment
Principle (a) – Native vegetation should not be cleared if it comprises a high level of biological diversity	<p>Assessed Outcome: The proposed clearing is unlikely to be at variance with this principle.</p> <p>Flora and Vegetation</p> <p>A total of 95 species of flora from 28 families were recorded within the survey area. The most common families were:</p> <ul style="list-style-type: none"> • Scrophulariaceae, of which most were <i>Eremophila. spp</i> • Chenopodiaceae, of which most were <i>Maireana spp</i> • Myrtaceae, of which most were <i>Eucalyptus spp.</i> and <i>Melaleuca spp.</i> <p>Two other common families were Fabaceae (mostly <i>Acacia spp.</i>) and Poaceae (grasses). Five introduced species were recorded, including two Weed of National Significance (WONS), <i>Lycium ferocissimum</i> (African Boxthorn) and <i>Opuntia stricta</i> (Common Prickly Pear), which is also a Declared Pest s22(2) (C3 Restricted).</p> <p>No Threatened Flora species pursuant to the EPBC Act and or/gazetted as Threatened/Declared Rare Flora pursuant to the BC Act 2016 were recorded from the survey conducted by Terratree (Appendix A).</p> <p>A targeted <i>Acacia websteri</i> survey was conducted in April 2021 by Terratree (Appendix B) as a follow up of the flora and fauna survey that identified the potential occurrence of the species within the Coolgardie Project area. Three individuals of the targeted species, <i>Acacia websteri</i> (P1) were recorded on the western side of the survey area, near Nepean Rd. No <i>Acacia websteri</i> was recorded within the purpose permit boundary.</p> <p>Fauna</p> <p>A total of 21 conservation significant vertebrate species (including Priority species) from 11 families were identified during the desktop review of the database searches. These were comprised of 18 bird species from eight families and three mammal species from three families. A likelihood assessment was conducted for four significant species that were potentially considered to be found within the area. The following are the species assessed and their likelihood occurrence:</p> <ul style="list-style-type: none"> • Malleefowl (VU)- Possibly • Common Greenshank (MI)- Unlikely • Sharp-tailed Sandpiper (MI) (Unlikely)

Principle	Assessment
	<ul style="list-style-type: none"> • Carnaby's Black Cockatoo (EN) unlikely. <p>A total of 40 fauna species from 26 families were recorded in the survey area (Appendix C). All fauna species recorded are considered relatively common and widespread. The following reptile's species were recorded during the survey:</p> <ul style="list-style-type: none"> • Clawless Gecko (<i>Crenadactylus ocellatus</i>) • Tree Dtella (<i>Gehyra variegata</i>) • Bynoe's Gecko (<i>Heteronotia binoei</i>) • Common Scaly Foot (<i>Pygopuslepidopodus</i>) • Shingleback (<i>Tiliqua rugosa</i>) • Netted Dragon (<i>Ctenophorus reticulatus</i>) • Sand Monitor (<i>Varanus gouldii</i>). <p>During the field survey, 30 bird species from 17 families were recorded. All bird species recorded are considered relatively common and widespread. A total of three mammal species were recorded:</p> <ul style="list-style-type: none"> • Red Kangaroo (<i>Macropusrufus</i>) • European Rabbit (<i>Oryctolagus cuniculus</i>) • Cattle (<i>Bos taurus</i>). <p>No conservation significant species were recorded within the survey area.</p> <p>The proposed area to be cleared is synonymous with the surrounding geological and ecological environment of the Eastern Goldfields IBRA subregion. The area does not contain Threatened Ecological Communities or habitat required for conservation significant flora or fauna species. The proposed area to be cleared contains a large portion of previously disturbed land (68.5%) and two WONS were recorded as occurring within the area. Considering the Eastern Goldfields subregion covers an area of 5,102,428 ha, the proposed clearing of up to 60 ha of vegetation within a highly disturbed area is unlikely to impact the diversity of the area.</p>
<p>Principle (b) – Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significant habitat for fauna indigenous to Western Australia</p>	<p>Assessed Outcome: The proposed clearing is unlikely to be at variance with this principle.</p> <p>A desktop database search survey area identified a total of 21 conservation significant vertebrate species (including Priority species) from 11 families to be potentially occurring within the Coolgardie Project Area. A total of 40 fauna species from 26 families were recorded in the Coolgardie Project Area during a survey conducted by Terratree in 2021. All fauna species recorded are considered relatively common and widespread.</p> <p>Four broad fauna habitats were identified within the survey area; however, a large proportion of the survey area was degraded. The four broad fauna habitat types described are as follows:</p> <ul style="list-style-type: none"> • Mallee Eucalyptus Woodland • Salmon Gum Woodland • Drainage Line

Principle	Assessment
	<ul style="list-style-type: none"> • Acacia Shrubland. <p>A fauna survey for the Coolgardie Project Area shows that one conservation significant species is considered as possibly occurring in the survey area, the Malleefowl. Historically, the species was originally common and widespread in semiarid zones, mainly in scrubs of mallee and other low eucalypts on sandy and lateritic soils; also, acacia scrubs on heavy red soils, especially north and east of the mulga-eucalypt line. The Malleefowl is now generally rare to uncommon and patchily distributed due to habitat loss.</p> <p>No Malleefowl mounds or tracks were recorded within the proposed area to be cleared during the survey and a large portion of the proposal area is considered unsuitable habitat for Malleefowl due to previous disturbance.</p> <p>A large portion, 340.7ha (38.5%), of the survey area, was Degraded to Completely Degraded. These areas have been heavily modified by historic and current mining and exploration activities and lack vegetation structure and species diversity. Some degraded areas contain attempted rehabilitation and are dominated by chenopods such as <i>Atriplex nummularia</i>, <i>Maireana</i> spp. and introduced species. Approximately 325.6 ha (36.9%) of the Survey Area remains in Good Condition and 217.7 ha (24.6%) in Very Good Condition despite large areas being disturbed.</p> <p>Based on the vegetation condition of the area and the state of the remaining habitat, which is largely disturbed, the clearing of up to 60 ha does not comprise the whole or a part of or is necessary for the maintenance of a significant habitat for fauna indigenous to Western Australia.</p>
<p>Principle (c) – Native vegetation should not be cleared if it includes, or is necessary for the continued existence of rare flora</p>	<p>Assessed Outcome: The proposed clearing is unlikely to be at variance with this Principle.</p> <p>A total of 95 species of flora from 28 families were recorded within the survey area. One Priority species, <i>Acacia websteri</i> (P1) was recorded. A follow up targeted survey was conducted in areas of suitable habitat associated with acacia to determine the exact location and extent of this species in the survey area.</p> <p>Three individuals of the Targeted species, <i>Acacia websteri</i> (P1) were recorded on the western side of the survey area but no <i>Acacia websteri</i> was recorded in the proposed exploration drilling area or any other search areas.</p> <p>Results of the flora and vegetation survey and the targeted <i>Acacia websteri</i> survey show that there are no threatened flora species pursuant to the EPBC Act and or/gazetted as Threatened/Declared Rare Flora pursuant to the BC Act 2016 were recorded.</p>
<p>Principle (d) – Native vegetation should not be cleared if it comprises the whole or a part of or is necessary for the maintenance of a Threatened Ecological Community (TEC).</p>	<p>Assessed Outcome: The proposed clearing is unlikely to be at variance with this Principle.</p> <p>The survey area is dominated by Eucalypt Mallee Woodlands and Open Woodlands with small areas of Mallee Shrublands and one Isolated <i>Eremophila</i> Heathland. Seven distinct communities were observed within the survey area. The identified communities are listed in Table 5.</p> <p>No Threatened or Priority Ecological Communities (TECs or PECs) and No Environmentally Sensitive Areas (ESAs) were observed within the survey area. There are no ESAs located within a 20 km radius of the application area and no TECs or PECs located within a 20 km radius of the application area.</p>

Principle	Assessment
	Due to the absence of TEC's within the site and around, the clearing of up to 60 ha will not impact or comprises the whole or a part of or is necessary for the maintenance of a Threatened Ecological Community (TEC).
Principle (e) – Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared	<p>Assessed Outcome: The proposed clearing is unlikely to be at variance with this Principal.</p> <p>The site is mapped within one broad vegetation unit, Coolgardie 9. The EPA's Guidance Statement No. 33 has identified a minimum threshold of retention of 30% of pre-European extent of each community (Environmental Protection Authority, 2008). The Coolgardie 9 is well above the threshold of retention as it is still at 97.87% representation within the state.</p> <p>The proposed clearing of up to 60 ha of native vegetation will not have a significant impact on native vegetation within the subregion, region, and state.</p>
Principle (f) – Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland	<p>Assessed Outcome: The proposed clearing may be at variance with this Principle.</p> <p>There are no surface water bodies within the proposed clearing area, however numerous ephemeral salt lakes are present within the surrounding area and drainage lines are present within the purpose permit boundary. Significant water bodies in the area include Brown Lake, Red Lake, White Lake and Douglas Lake; all are located in excess of 4 km to the northeast of the proposal area and will not be impacted as a result of this proposal (FML, 2012).</p> <p>Drainage lines were identified as a habitat during the fauna survey (Western Ecological, 2021). This habitat consisted of <i>E. graffithisii</i> mallee trees over mixed shrubland species, including Acacia and Hakea species, over scattered low shrubs (including <i>Eremophila</i> sp., <i>Senna</i> sp. and <i>Atriplex</i> sp.) and mixed grasses. Any clearing around the drainage lines would impact the existing vegetation, hence clearing in those areas would be at variance with this principle.</p> <p>Note that while clearing in drainage lines would be at variance, the significance of the impact is low, and the current proposed clearing areas (for the expanded waste rock dumps) do not intersect drainage lines.</p>
Principle (g) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation	<p>Assessed Outcome: The proposed clearing is unlikely to be at variance with this principle.</p> <p>The (then) DER has defined land degradation as including the following (Department of Environment Regulation, 2014).</p> <ul style="list-style-type: none"> • The clearing of vegetation • Decline in vegetation condition • Soil erosion and soil acidity (caused by wind and water erosion due to vegetation clearing) • Salinity; or • Waterlogging/flooding. <p>The area is mapped as extremely low/ very low probability Acid Sulphate Soil (ASS) risk (CSIRO, 2021) and the environment surrounding the site is disturbed, with scattered vegetation and some mining pits around the site. As such, the clearing of up to 60 ha of vegetation is not likely to cause appreciable land degradation.</p>

Principle	Assessment
<p>Principle (h) – 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</p>	<p>Assessed Outcome: The Proposal is unlikely at variance with this Principle.</p> <p>The Site is not located within any Environmentally Sensitive Areas (ESA) and there are no ESAs located within a 20 km radius of the Site (Department of Water and Environmental Regulation, 2018a). There are no DBCA Managed Lands located within 20 km radius of the GF site.</p> <p>A search of the Aboriginal Heritage Inquiry System (AHIS) shows that there are no sites of aboriginal heritage in the Development Envelope (Department of Planning Lands and Heritage, 2020).</p> <p>Considering the area proposed to be cleared is located away from conservation areas, Environmentally Sensitive Areas, Wetlands and Aboriginal Heritage Sites, the clearing of up to 60 ha within the GF project is unlikely to impact on any environmental values of any conservation areas.</p>
<p>Principle (i) – 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</p>	<p>Assessed Outcome: The Proposal is unlikely at variance with this Principle.</p> <p>The closest major aquifer is 2.5 km to the south-east and is a Wollubar sandstone occurring in the Hannan Paleochannel (Rockwater, 2010). Groundwater in the region is either saline or hyper saline, there are no known sources of freshwater. The depth to groundwater is up to 55 m in some mafic or ultra-mafic fractured rock aquifers across the region (FML, 2012). The nearest PDWSA to site is located approximate 55 km north and is not assigned as priority. The PDWSA is a surface water source, Broad Arrow Dam Catchment Area.</p> <p>There are no surface water bodies within the proposed clearing area, however numerous ephemeral salt lakes are present within the surrounding area. Significant water bodies in the area include Brown Lake, Red Lake, White Lake and Douglas Lake; all are in excess of 4 km to the northeast of the proposal area and will not be impacted as a result of this proposal (FML, 2012).</p> <p>No Ramsar or Geomorphic wetlands were identified within the Coolgardie Project Area.</p> <p>Given the absence of perennial watercourses across the site and depth to groundwater, the proposed works will not interact with groundwater and surface water hence the clearing of vegetation will not cause deterioration in the quality of surface or groundwater.</p>
<p>Principle (j) – Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding</p>	<p>Assessed Outcome: The Proposal is unlikely at variance with this Principle.</p> <p>The Coolgardie area receives rain for an average of 48.6 days annually. The long term annual average rainfall for the site is 269.6 mm and the average annual evapotranspiration rate is 300 mm.</p> <p>There are no surface water bodies within the proposed clearing area, however numerous ephemeral salt lakes are present within the surrounding area. Significant water bodies in the area include Brown Lake, Red Lake, White Lake and Douglas Lake; all are in excess of 4 km to the northeast of the proposal area and will not be affected as a result of this proposal (FML, 2012).</p> <p>No Ramsar or Geomorphic wetlands were identified within the Coolgardie Project Area.</p> <p>The 100 Year ARI floodplain and flood fringe mapping did not identify the Development Envelope as being within a flood risk area (DWER, 2021).</p>

Principle	Assessment
	<p>Soils within the site are described as calcareous loamy earths, yellow sandy and red loamy earths, red deep sands that allow water to pass through easily. Considering the conditions of the purpose permit boundary, the clearing of up to 60 ha of vegetation will not likely cause, or exacerbate, the incidence of flooding.</p>

5 Summary of Assessment

In summary, after desktop and field assessments of the environmental values of the site, the proposal to clear up to 60 ha of native vegetation for the development of the Coolgardie Gold Project is unlikely to be at variance with nine of the Clearing Principles and may be at variance with Principle (f).

There are no surface water bodies within the proposed clearing area, however numerous ephemeral salt lakes are present within the surrounding area, with the closest significant water bodies located more than 4 km to the northeast of the application area and will not be impacted as a result of this proposal (FML, 2012).

Drainage lines were identified as a habitat during the fauna survey (Western Ecological, 2021). The drainage lines covered an area of 32 ha and provided 4% of the habitat extent within the survey area. The vegetation associations and fauna habitat present within the application area are well represented in the surrounding area. Whilst the application may be at variance to Principle (f) if clearing was to occur within drainage lines, the current proposed footprint does not intersect drainage line habitat, and the proposed clearing of up to 60 ha is unlikely to have a significant impact.

The vegetation proposed to be cleared is not representative of any conservation significant flora, TECs or PECs or valuable fauna habitat. The area has historically been disturbed through mining developments and grazing.

Given that the area proposed to be cleared occurs within an area of historic mining operations it is unlikely that the clearing of up to 60 ha of native vegetation would have a significant impact on the environmental values within the area. Furthermore, the majority of the proposed new landform disturbance is located within or adjacent to the current mining operations.

6 Limitations

This report is produced strictly in accordance with the scope of services set out in the contract or otherwise agreed in accordance with the contract. 360 Environmental makes no representations or warranties in relation to the nature and quality of soil and water other than the visual observation and analytical data in this report.

In the preparation of this report, 360 Environmental has relied upon documents, information, data, and analyses ('client's information') provided by the client and other individuals and entities. In most cases where client's information has been relied upon, such reliance has been indicated in this report. Unless expressly set out in this report, 360 Environmental has not verified that the client's information is accurate, exhaustive, or current and the validity and accuracy of any aspect of the report including, or based upon, any part of the client's information is contingent upon the accuracy, exhaustiveness, and currency of the client's information. 360 Environmental shall not be liable to the client or any other person in connection with any invalid or inaccurate aspect of this report where that invalidity or inaccuracy arose because the client's information was not accurate, exhaustive, and current or arose because of any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to 360 Environmental.

Aspects of this report, including the opinions, conclusions, and recommendations it contains, are based on the results of the investigation, sampling and testing set out in the contract and otherwise in accordance with normal practices and standards. The investigation, sampling and testing are designed to produce results that represent a reasonable interpretation of the general conditions of the site that is the subject of this report. However, due to the characteristics of the site, including natural variations in site conditions, the results of the investigation, sampling and testing may not accurately represent the actual state of the whole site at all points.

It is important to recognise that site conditions, including the extent and concentration of contaminants, can change with time. This is particularly relevant if this report, including the data, opinions, conclusions, and recommendations it contains, are to be used a considerable time after it was prepared. In these circumstances, further investigation of the site may be necessary.

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Figures



Legend

Greenfields Tenements

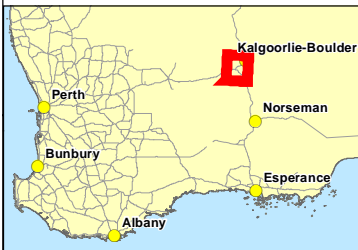
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-NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS-

LOCALITY MAP



PROJECT ID 4421 **DATE** 7/10/2021

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

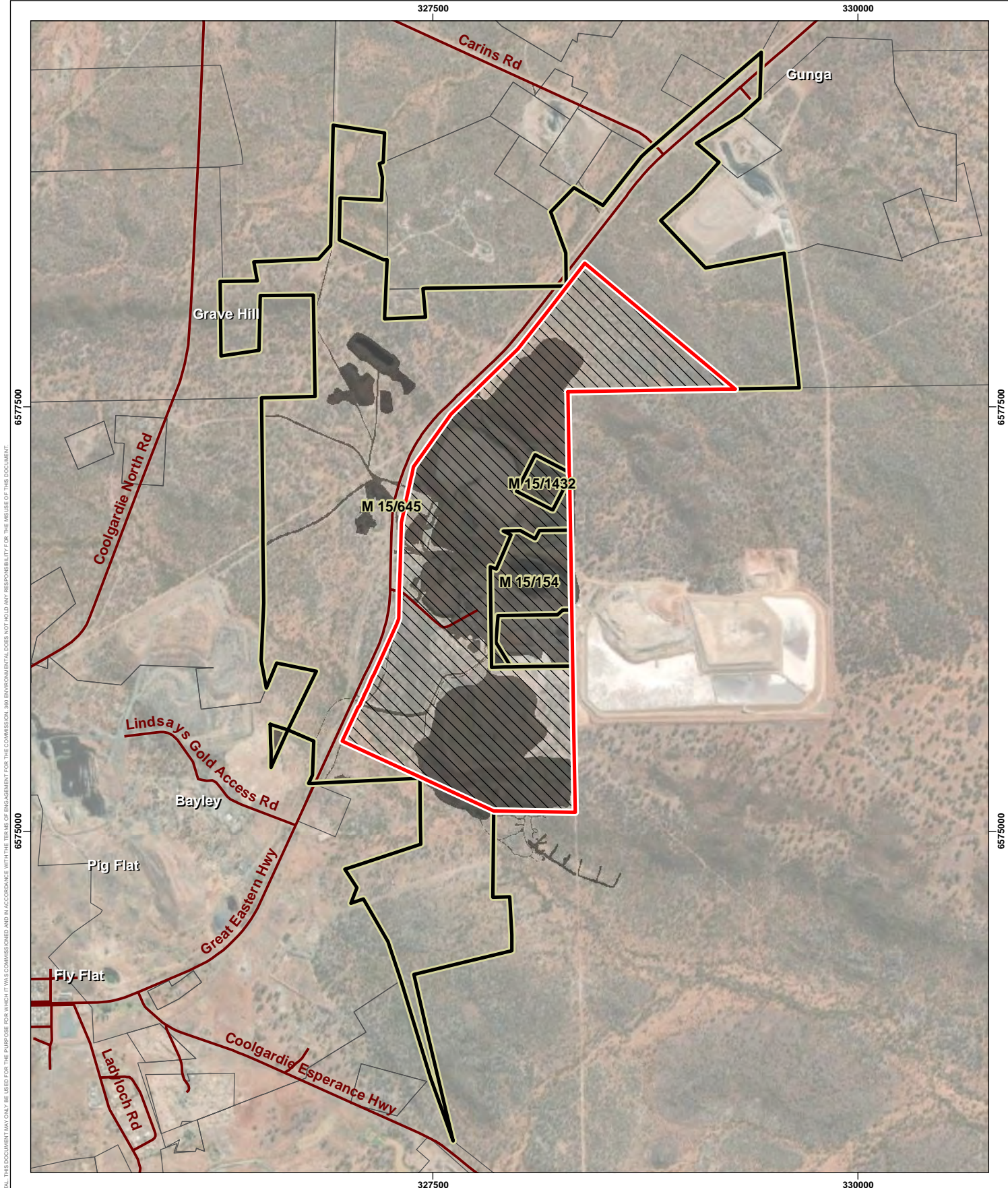
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Coolgardie Gold Project

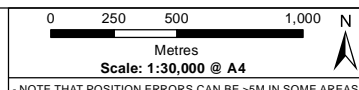
Figure 1
Site Location

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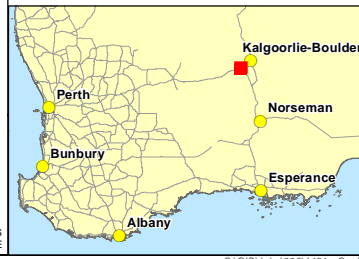
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- Legend**
- Greenfields Tenements
 - Development Envelope
 - Mining Lease
 - Clearing Footprint
 - Indicative Footprint
 - Road



- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS



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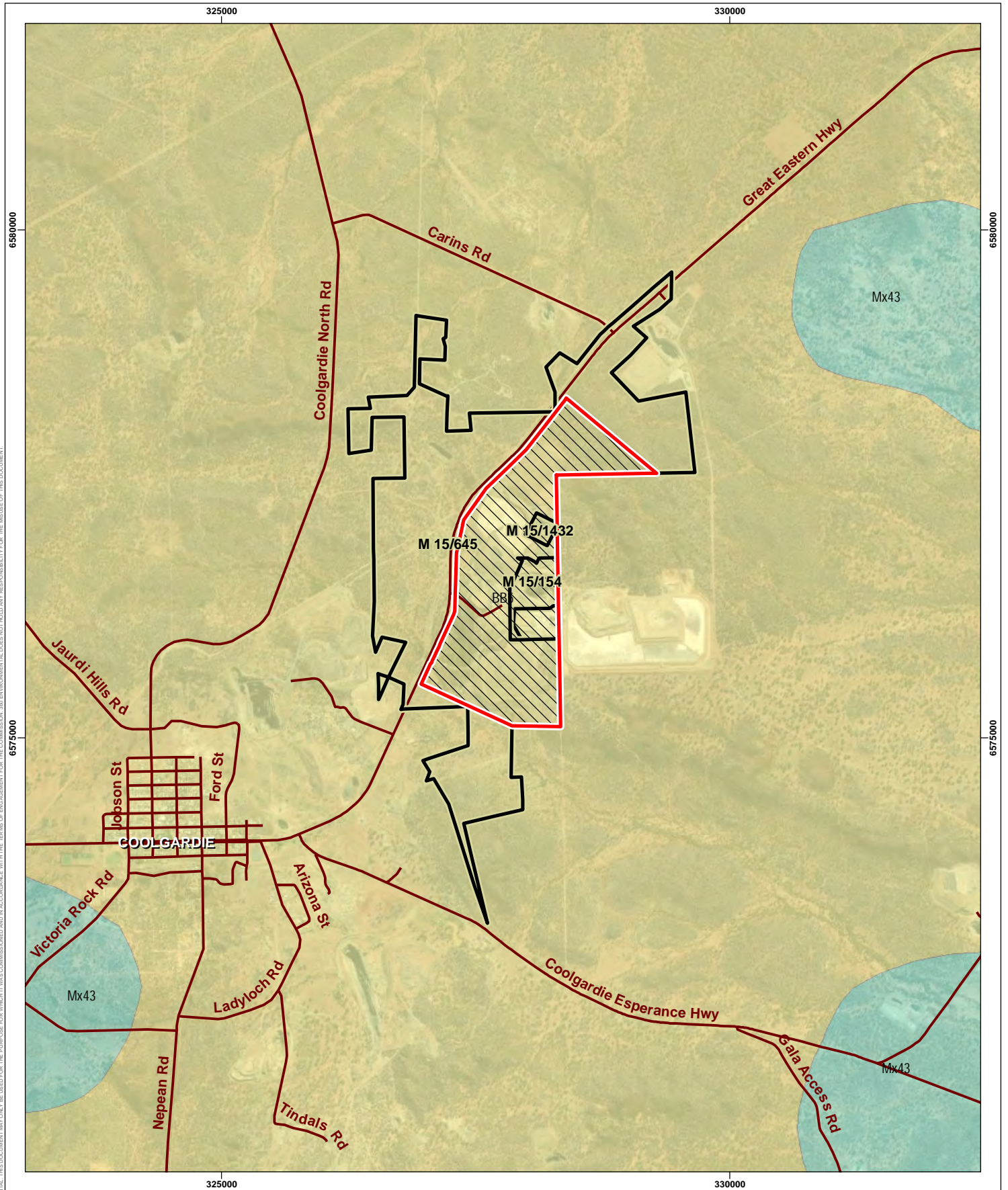
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Figure 2
Mining Tenements

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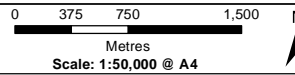
Legend

- Development Envelope
- Clearing Footprint
- Greenfields Tenements
- Road

Soil Landscape Systems

- BB5: Rocky ranges and hills of greenstones-basic igneous rocks.
- Mx43: Gently undulating valley plains and pediments; some outcrop of basic rock.

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LOCALITY MAP



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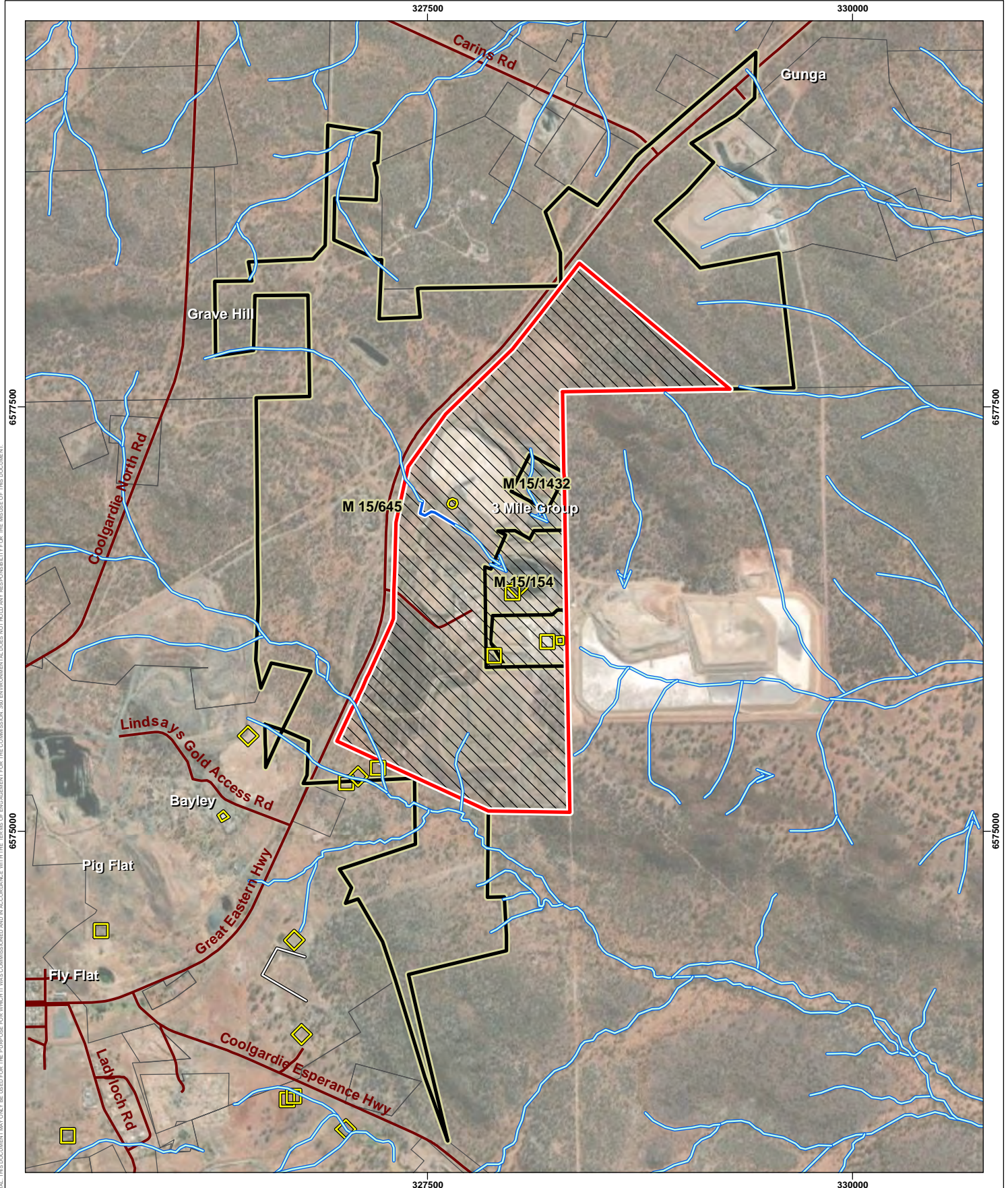
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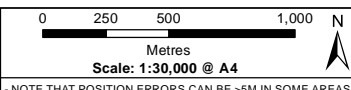
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Figure 3
Soils and Landsystems

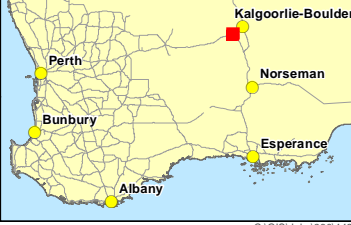


- Legend**
- Development Envelope
 - Clearing Footprint
 - Greenfields Tenements
 - Mining Lease
 - Road
 - Hydrology
 - Drain - major
 - Watercourse - minor, non-perennial
 - Earth Dam
 - Dam Wall



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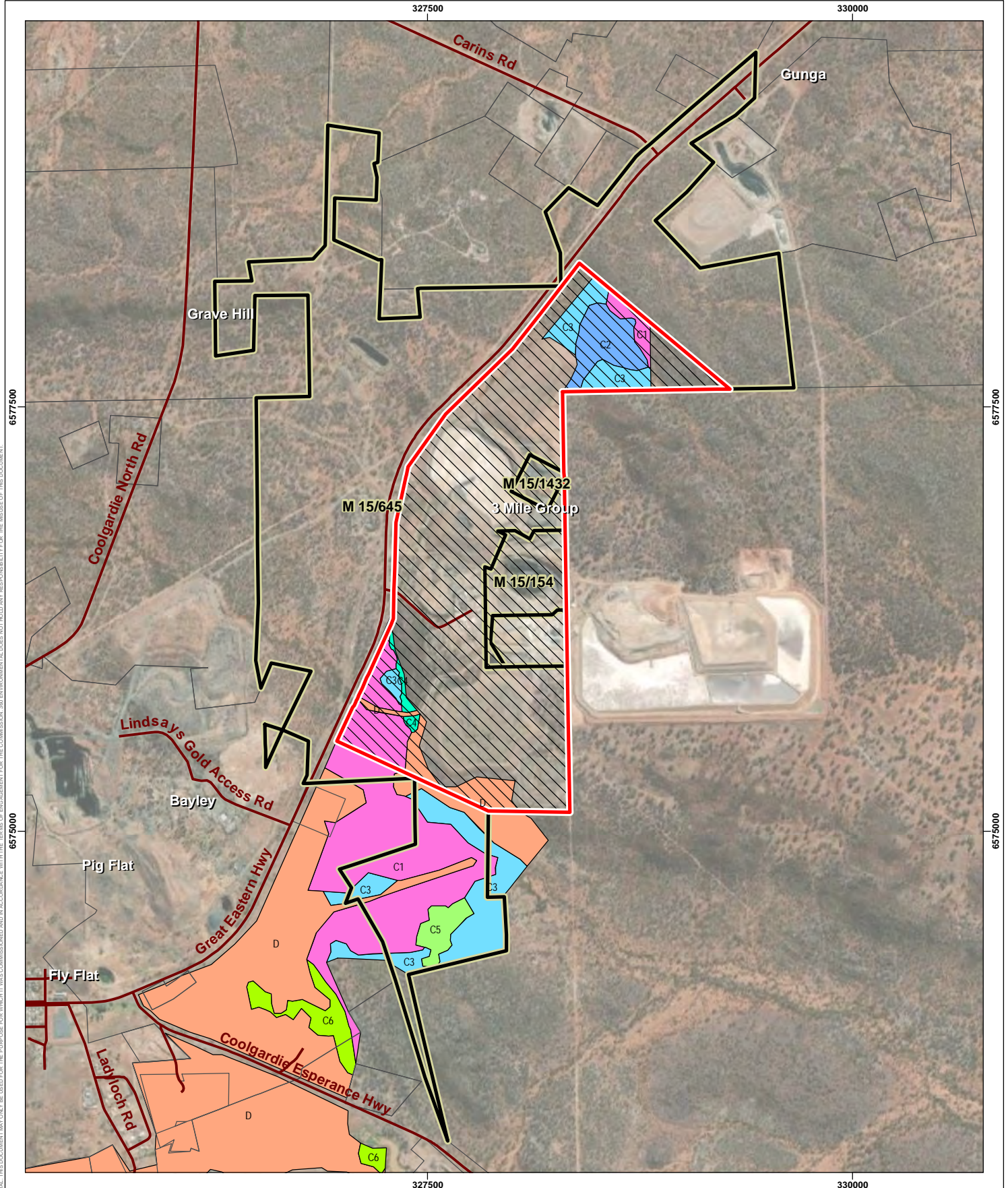
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Figure 4
Hydrology

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Legend

Development Envelope	C1
Clearing Footprint	C2
Greenfields Tenements	C3
Mining Lease	C4
Road	C5
	C6
	C7
	D

0 250 500 1,000 N
Metres
Scale: 1:30,000 @ A4

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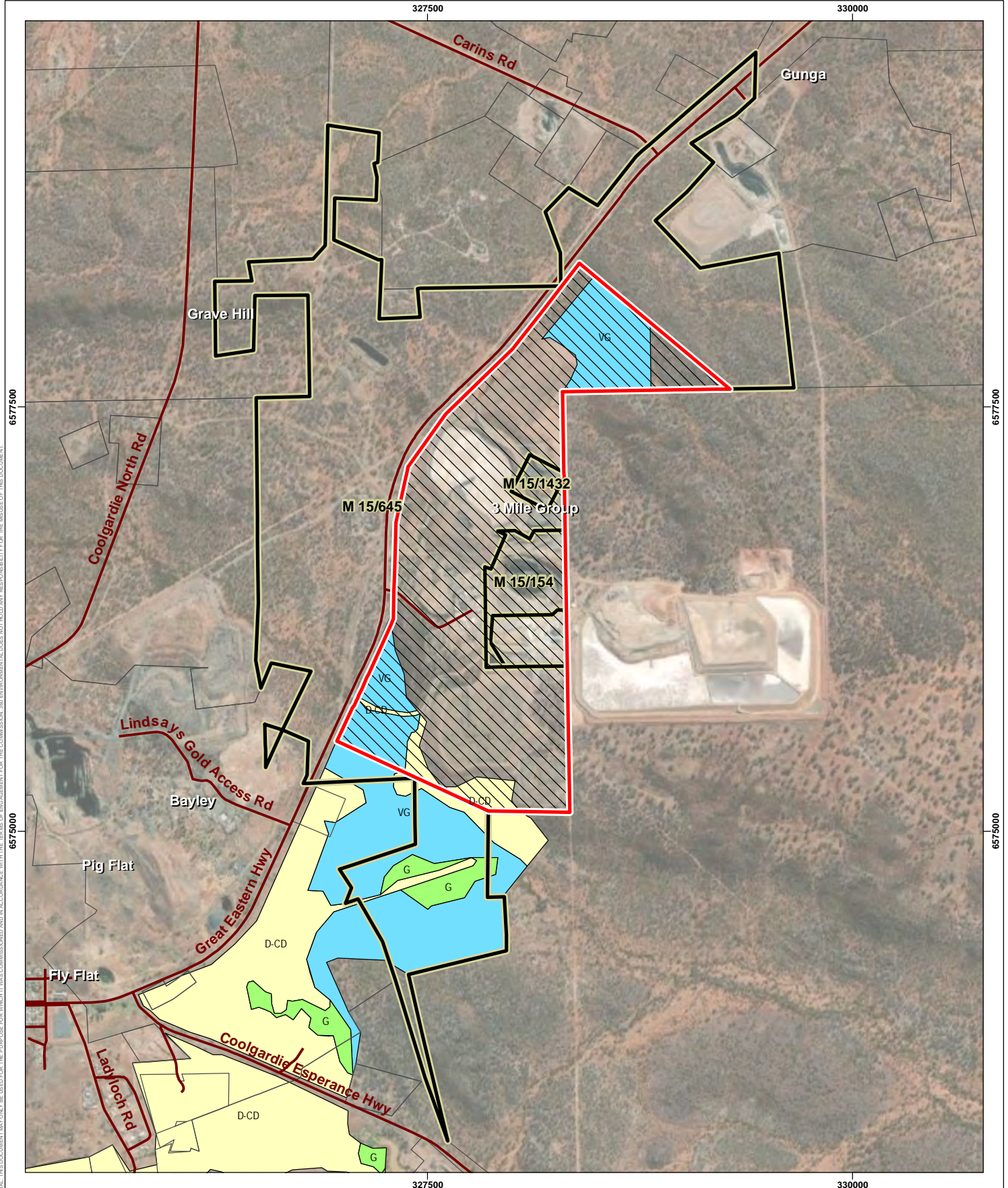
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Figure 5
Vegetation Types

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- TENEMENTS SOURCED DMIRS
- ORTHOPHOTO OPEN SOURCE



Legend

- Development Envelope
- Clearing Footprint
- Greenfields Tenements
- Mining Lease
- Road

Vegetation Condition

- Very Good
- Good
- Degraded-Completely Degraded

- TENEMENTS SOURCED DMIRS
- ORTHOPHOTO OPEN SOURCE

0 250 500 1,000 N
Metres
Scale: 1:30,000 @ A4

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Figure 6
Vegetation Condition

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Appendices

Appendix A Targeted Flora and Vegetation Survey 2021



Targeted Flora and Vegetation Survey - Coolgardie Gold Project

Prepared for Focus Minerals

Ref: T20040

**ecological assessment
& management**

Document Control

Revision	Details	Date	Author	Reviewer
Rev 0	Draft for Internal Review	27/02/2021	H. Legge	J. Grehan
Rev A	Draft for Submission to Client	01/03/2021	H. Legge	G. Blick
Rev B	Draft for Submission to Client	15/03/2021	H. Legge	G. Blick
Rev C	Revised final draft for Submission to Client	10/05/2021	H. Legge	G. Blick
Rev D	Final Report	23/06/2021	H. Legge	G. Blick



Joseph Grehan

Principal Ecologist

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Abbreviations and Acronyms

BAM Act	<i>Biosecurity and Agriculture Management Act 2007</i>
BC Act	<i>Biodiversity Conservation Act 2016</i>
BoM	Bureau of Meteorology
CALM	former Department of Conservation and Land Management (now DBCA), WA Government
CALM Act	<i>Conservation and Land Management Act 1984</i>
DAFWA	former Department of Agriculture and Food Western Australia (now DPIRD), WA Government
DBCA	Department of Biodiversity, Conservation and Attractions, WA Government
DEC	former Department of Environment and Conservation (now DBCA), WA Government
DEE	Department of the Environment and Energy, Australian Government
DPIRD	Department of Primary Industries and Regional Development, WA Government
DWER	Department of Water and Environmental Regulation, WA Government
EPA	Environmental Protection Authority, WA Government
EPBC Act	<i>Environment and Protection and Biodiversity Conservation Act 1999</i>
EP Act	<i>Environment Protection Act 1986</i>
ESA	Environmentally Sensitive Area
EWSWA	Environmental Weed Strategy for Western Australia
GDA94	Geocentric Datum Australia 1994
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature
PEC	Priority Ecological Community
TEC	Threatened Ecological Community
TPFL	Threatened and Priority Flora

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Executive Summary

Focus Minerals Ltd (Focus) commissioned Terratree Pty Ltd (Terratree) to undertake a Targeted flora and vegetation survey (formerly level 1) within their Coolgardie project area. The objective of the survey was to determine the presence of Threatened and Priority Flora and other species of conservation significance and Threatened and Priority Ecological Communities within the project area. This survey was undertaken in conjunction with a Basic fauna survey, the results of which will be in a separate report prepared by Western Ecological. The results of these surveys will inform future exploration programmes and associated environmental approval applications.

The Focus Coolgardie Project (hereafter referred to as 'the survey area') is located adjacent to Coolgardie on the south-east side. The survey area totals approximately 885 hectares (ha), over 300 ha of which is highly disturbed and degraded.

The Targeted flora and vegetation survey consisted of a desktop assessment followed by a field survey, conducted in accordance with the Environmental Protection Authority's (EPA) *Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016b) and applied in conjunction with the *Environmental Factor Guideline for Flora and Vegetation* (EPA 2016a).

The desktop review aimed to identify Threatened and Priority Flora and Ecological Communities previously recorded within the survey area and surrounds. This involved a review of previous studies, literature and relevant spatial databases as well as analysis of aerial imagery, broadscale vegetation and landscape feature spatial data to identify expected vegetation assemblages and significant landscape features.

The Targeted Flora and Vegetation field survey was conducted between the 16th and 20th of November 2020 by Principal Ecologist/Botanist Joseph Grehan and Senior Ecologist Heather Legge of Terratree.

The survey area was extensively travelled by vehicle and foot to verify and define vegetation communities and to search for Threatened or Priority flora identified as potentially occurring within the survey area during the desktop review. Relevés and opportunistic sampling were conducted to delineate vegetation communities and search for Targeted species.

Where species could not be identified in the field, they were collected, labelled, pressed, dried and frozen in accordance with the requirements of the WA Herbarium. Subsequently, their identification was confirmed by Senior Botanist-Taxonomist, Kathya Tippur, by comparing collections with pressed specimens housed at the herbarium and using taxonomic keys and other reference materials.

Some specimens collected could only be identified to genus level, due to being sterile at the time of survey. Any specimens that could only be identified to genus level were reviewed to see whether they were from

genera listed in the Targeted species list. In cases where they were of Targeted genera, an attempt was made by the botanist to rule out the Targeted species. If this was not possible, a desktop assessment was undertaken to determine the likelihood of these Threatened and Priority species occurring within the survey area.

A total of 95 species of flora from 28 families were recorded within the survey area. One Priority species, *Acacia websteri* (P1) was recorded. No Threatened Flora species were recorded.

Acacia websteri (P1) was identified after the field survey, and it is possible that this species could exist in multiple populations throughout the survey area. A follow-up Targeted survey should be conducted in areas of suitable habitat associated with *Acacia* and *Allocasuarina* dominated (Community 4) to determine the exact location and extent of this species in the survey area. *Acacia websteri* (P1) has distinctive features on the leaves and can be identified by close examination of the leaves, without the need for flowers or fruit. This allows flexibility of timing of this targeted search.

Nine of the 100 specimens collected could not be identified to species level because they were sterile at the survey time. Of these, four specimens were from genera of seven Priority species listed in the desktop review. The assessment of the likelihood of these Targeted Priority flora occurring within the survey area was conducted, which found one species, *Eremophila veronica* (P3), to be Very Likely, and one other species, *Austrostipa blackii* (P2), to be Likely to occur within the survey area. The other five targeted species were considered Unlikely to occur. Examination of the collected specimens compared with the Targeted species determined that it is unlikely any of the collected specimens are targeted species. *Eremophila veronica* (P3) can be ruled out entirely due to its distinctive foliage. *Austrostipa blackii* (P2) could not be ruled out, and future Spring searches Targeting *Austrostipa blackii* (P2), should be considered if disturbance is planned in drainage line areas associated with Community 3.

The survey area is dominated by Eucalypt Mallee Woodlands and Open Woodlands with small Mallee Shrublands areas and one Isolated Heathland. Seven distinct communities were observed within the survey area. No Threatened or Priority Ecological Communities (TECs or PECs) and No Environmentally Sensitive Areas (ESAs) were observed within the survey area.

A large portion, 340.7ha (38.5%), of the survey area was Degraded to Completely Degraded. 325.6ha (36.9%) remain in Good condition, and 217.7 ha (24.6%) remain in Very Good condition.

Five introduced species were recorded, including two Weed of National Significance (WONS), *Lycium ferocissimum* (African Boxthorn) and *Opuntia stricta* (Common Prickly Pear), which is also a Declared Pest s22(2) (C3 Restricted). Control measures are required a Declared Pest s22(2) (C3 Restricted) and therefore must be implemented for *Opuntia stricta*. Both species are highly invasive, and management actions should be undertaken for both species.

Terratree makes the following recommendations for the survey area:

- Avoid in the first instance, and, if unavoidable minimise and mitigate impacts to *Acacia websteri* (P1) flora and the vegetation communities that this species is associated with (Communities 4) until the species exact location and extent can be determined.
- Follow-up Targeted surveys should be in accordance with EPA Guidance (2016b) in late Autumn to search for *Acacia websteri* (P1) in Community 4.
- Consider a Targeted search for *Austrostipa blackii* (P2) in Community 3, drainage lines, in Spring if disturbance activities are planned in these areas.
- Undertake development activities so as to avoid incidental impacts to vegetation in Good to Very Good Condition wherever possible.
- Develop and implement a hygiene management plan to prevent the introduction and spread of introduced flora and pathogens
- Conduct weed eradication and control measures for WONS and Declared Pest species recorded, *Lycium ferocissimum* (African Boxthorn) (WONS) and *Opuntia stricta* (Common Prickly Pear) (WONS and Declared Pest).

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1 Introduction

1.1 Background

Focus Minerals Ltd (Focus) commissioned Terratree Pty Ltd (Terratree) to undertake a Targeted flora and vegetation survey within their Coolgardie project area. The objective of the survey was to determine the presence of Threatened and Priority Flora and other species of conservation significance and Threatened and Priority Ecological Communities within the project area. This survey was undertaken in conjunction with a Basic fauna survey, the results of which will be in a separate report prepared by Western Ecological. The results of these surveys will inform future exploration programmes and associated environmental approval applications.

1.2 Project Location and Size

The Focus Coolgardie Project (hereafter referred to as 'the survey area') is located adjacent to Coolgardie on the south-east side (**Figure 1**). The survey area is on the south-east of Nepean Rd and along Great Eastern Hwy and is comprised of three sections which are referred to in figures as 'South', 'Mid' and 'North'. The two largest sections lie less than 1 kilometre (km) from Coolgardie and are divided in two by the Coolgardie-Esperance Highway. The third and smallest section of the survey area lies approximately 5km further north-east along Great Eastern Hwy.

The survey area totals approximately 885 hectares (ha), over 300 ha of which is highly disturbed and degraded.

1.3 Scope of Work

The scope of work for the project included the following:

- Conduct a desktop assessment to determine the broad environmental values of the survey area and surrounds and to identify Threatened Ecological Communities (TECs), Priority Ecological Communities (PECs), Threatened or Priority Flora species that could potentially occur within the survey area.
- Undertake a Targeted flora and vegetation field survey of the survey area.
- Produce an inventory of the flora and vegetation communities present and
- Produced figures showing the location of any TECs, PECs or Threatened or Priority Flora if present.
- Produce figures showing the extent of the vegetation communities recorded.
- Produce figures showing the extent of any variation in vegetation condition observed.
- Prepare a comprehensive technical report detailing the results of the desktop assessment and field survey.
- Make management recommendations to avoid in the first instance, and, if unavoidable minimise and mitigate impacts to significant conservation values.

2 Regulatory Context

2.1 Relevant Legislation and Guidance

2.1.1 Government Legislation

The following legislation applies to flora, vegetation and the protection of biodiversity in Western Australia:

- Biodiversity Conservation Act 2016 (BC Act) (WA)
- Biosecurity and Agriculture Management Act 2007 (BAM Act) (WA)
- Conservation and Land Management Act 1984 (CALM Act) (WA)
- Environmental Protection Act 1986 (EP Act) (WA)
- Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Commonwealth).

2.1.2 Government Regulatory Guidelines

The following regulatory guidelines apply to flora, vegetation and the protection of biodiversity in Western Australia:

- Environmental Factor Guideline – Flora and Vegetation (EPA 2016a)
- Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual (EPA 2020)
- Environmental Protection (Clearing of Native Vegetation) Regulation 2004
- Environmental Protection (Environmentally Sensitive Areas) Notice 2005
- Guidance Statement No. 33 – Environmental Guidance for Planning and Development (EPA 2008)
- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016b)

2.2 Threatened and Priority Flora and Ecological Communities

2.2.1 Biodiversity Protection in Western Australia

Biodiversity in Western Australia is protected, managed and assessed under international, national and state agreements, legislation and policy. For Environmental Impact Assessment, the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the Western Australian *Biodiversity Conservation Act 2016* (BC Act) are of relevance to WA flora, fauna and ecological communities.

2.2.2 Biodiversity Conservation Act 2016 (WA)

At the State level, the BC Act provides protection for any native plant or animal species that is indigenous to Western Australia. Any activity in Western Australia that involves taking part of or the whole of a WA native plant or animal (including damage caused by human activities) may require a licence or permit to do so.

Under the BC Act, flora and fauna that have been adequately searched for and are deemed to be either rare or in danger of extinction are gazetted as Threatened species. Specially Protected species (e.g. migratory

animals) in need of special protection in the wild are provided with a separate categorisation under the Act. A third category exists for species considered to be Extinct.

The Threatened Species Scientific Committee provides advice to the Minister for Environment on the listing of flora and fauna species to be protected under the BC Act. Threatened species are categorised according to their level of threat using IUCN Red List criteria:

- Critically Endangered – considered to be facing an extremely high risk of extinction in the wild
- Endangered – considered to be facing a very high risk of extinction in the wild in the near future
- Vulnerable – considered to be facing a high risk of extinction in the wild in the medium-term future.

At the State level, the term ‘Threatened’ is commonly used to refer to all species under the classification of Threatened, regardless of their Commonwealth status.

Ecological communities are naturally occurring groups of plant, animals and other organisms that interact within a unique habitat. Under the BC Act, Threatened Ecological Communities (TECs) are now protected through a statutory listing. The Threatened Ecological Communities Scientific Committee provides advice to the Minister for Environment on the listing of ecological communities to be protected under the BC Act. TECs are categorised according to their level of threat:

- Critically Endangered
- Endangered
- Vulnerable
- Presumed Totally Destroyed.

Annually, a government gazette listing current Threatened and Extinct species under the BC Act is issued by the Western Australian Government and listed on the DBCA website. These taxa are legally protected and their removal, or impact to their surroundings, cannot be conducted without Ministerial approval, obtained specifically on each occasion for each population. As the BC Act is transitioning from the Wildlife Conservation Act 1950, the current lists are scheduled under the previous legislation and contain only flora and fauna species, not ecological communities. However, the current list of TECs has been endorsed by the Minister of Environment.

DBCA maintains lists of Priority flora and fauna species and ecological communities. These are taxa that are considered poorly known, uncommon or under threat but for which there is insufficient justification, based on known distribution and population sizes, for inclusion as Threatened species or TECs under the BC Act. The categories for Priority species and ecological communities give an indication of the priority for undertaking further surveys based on the number of known sites and degree of threat to those populations.

The DBCA lists are reviewed annually and published on their website, and include all Threatened, Extinct and Priority species and Threatened and Priority ecological communities in WA. DBCA enforces regulations under the BC Act to conserve all Threatened and Priority flora, fauna and ecological communities in WA and protect significant populations.

Conservation codes used for WA flora, fauna and ecological communities are provided in **Appendix A (Tables A.1 and A.2)**.

2.2.3 Environment Protection and Biodiversity Conservation Act 1999

At a Commonwealth level, threatened flora, fauna and ecological communities are protected under the EPBC Act. The species and ecological communities protected at the State level may be different to those protected at the Commonwealth Level (and vice versa). It is therefore important to confirm their status at both State and Commonwealth levels.

Under the provisions of the EPBC Act, proposed actions that potentially have a significant impact on a matter of national environmental significance must be referred to the Commonwealth Department of the Environment and Energy (DEE), and potentially for the approval of the Commonwealth Minister for the Environment, for a decision as to whether an assessment is required under the provisions of the Act. The matters of national environmental significance are:

- world heritage properties
- national heritage places
- wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed)
- nationally threatened species and ecological communities
- migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining)
- a water resource, in relation to coal seam gas development and large coal mining development.

The EPBC Act categorises Threatened species according to their level of threat:

- Extinct
- Extinct in the wild
- Critically endangered
- Endangered
- Vulnerable

- Conservation Dependent.

Threatened Ecological Communities are protected under the following categories under the EPBC Act:

- Critically Endangered
- Endangered
- Vulnerable.

Conservation codes used for Australian flora and TECs protected under the EPBC Act are provided in **Appendix A (Tables A.3 and A.4)**.

2.3 Environmentally Sensitive Areas

Under the Western Australian *Environmental Protection Act 1986* (EP Act), it is an offence to clear native vegetation without a permit or unless an exemption applies. The *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* declares Environmentally Sensitive Areas (ESAs) to include:

- defined wetlands and riparian vegetation within 50 m of these
- areas covered by Threatened Ecological Communities
- areas of vegetation within 50 m of rare flora
- Bush Forever sites
- declared World Heritage property sites
- areas included on the Register of the National Estate because of their natural heritage values.

Under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*, exemptions for low impact routine and management practices do not apply to ESAs and a clearing permit is required.

2.4 Introduced Flora (Weeds)

2.4.1 Impacts and Sources of Weeds

When introduced flora are establish an existing native vegetation complex, ecological and landscape values can be negatively impacted. Impacts from weeds include, but are not limited to:

- competition with native flora for light, water, space and nutrients
- introduction of associated plant pathogens and pests
- reduced floristic diversity
- altered vegetation structure
- increased risk of soil erosion in some instances
- altered fire regimes.

Weeds can be introduced into existing vegetation complexes by a variety of vectors, both natural and human influenced. Several of these, including wind, surface water and fauna, are naturally occurring processes. Human activities and influences which can introduce exotic flora species into an area include, but are not limited to:

- wheels and machinery, digging/drilling components, etc. that contain plant material or seeds
- altered surface water flow
- introduction of exotic fauna
- disturbance to vegetation and/or soil.

2.4.2 Weeds of National Significance (WONS)

At a national level, there are 32 weed species listed as Weeds of National Significance (WONS) (DAWE2021). These are plants that have been selected for their invasiveness and impact characteristics, potential and current area of spread and their primary industry, environmental and socioeconomic impacts. The Australian Weeds Strategy 2017–2027 (IPAC 2017) describes the broad goals and objectives in managing weeds in Australia, including WONS species. Many Weeds of National Significance are also declared pests under the BAM Act in WA.

2.4.3 Declared Pest Plants

The *Biosecurity and Agriculture Management Act 2007 (BAM Act)* seeks to prevent serious animal and plant pests and diseases from entering Western Australia and becoming established, and to minimise the spread and impact of any that are already present. The Minister for Agriculture can categorise an organism as a declared pest under the *BAM Act* if:

- it has or may have an adverse effect on another organism in the area; or human beings in the area; or the environment, or part of the environment, in the area; or agricultural activities, fishing or pearling activities, or related commercial activities, carried on, or intended to be carried on, in the area
- it may have an adverse effect on any of those things if it were present in the area, or if it were present in the area in greater numbers or to a greater extent.

The Western Australian Organism List lists organisms and their legal status in Western Australia under the *BAM Act* (DPIRD 2021) (**Table 1**).

Table 1: Legal status of organisms under the *BAM Act*

Status	Description
Declared Pest, Prohibited - s12	Prohibited organisms are declared pests by virtue of section 22(1), and may only be imported and kept subject to permits. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions.
Declared Pest - s22(2)	Declared pests must satisfy any applicable import requirements when imported, and may be subject to an import permit if they are potential carriers of high-risk organisms. They may also be subject to control and keeping requirements once within Western Australia.
Permitted - s11	Permitted organisms must satisfy any applicable import requirements when imported. They may be subject to an import permit if they are potential carriers of high-risk organisms.
Permitted, Requires Permit - r73	Regulation 73 permitted organisms may only be imported subject to an import permit. These organisms may be subject to restriction under legislation other than the Biosecurity and Agriculture Management Act 2007. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions.
Unlisted - s14	If you are considering importing an unlisted organism/s you will need to submit the name/s for assessment, as unlisted organisms are automatically prohibited entry into WA.

The *Biosecurity and Agriculture Management Regulations 2013* categorises declared pests into four control categories (DPIRD 2021) (Table 2).

Table 2: Control categories for declared pests

Declared Plant Category	Description
C1 - Exclusion	Organisms which should be excluded from part or all of Western Australia.
C2 - Eradication	Organisms which should be eradicated from part or all of Western Australia.
C3 - Management	Organisms that should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism or prevent or contain the spread of the organism.
Unassigned	Unassigned: Declared pests that are recognised as having a harmful impact under certain circumstances, where their subsequent control requirements are determined by a Plan or other legislative arrangements under the Act.

Under the BAM Act, a local government can also declare a plant to be a ‘pest plant’, so long as it is not already a declared plant under the Act. These plants are gazetted under a local government’s local laws and allow control to be enforced on any private land within a local government’s boundaries. A local law can be made for the purpose of:

“prescribing as a pest plant in that district any plant (other than a declared pest for that area) that, in its opinion, is likely to adversely affect the environment of the district, the value of property in the district or the health, comfort or convenience of the inhabitants of the district” (BAM Act).

2.4.4 Environmental Weeds

The State of the Environment Report (EPA 2007) states that Western Australia has over 1200 recognised weeds species. The Environmental Weed Strategy for Western Australia (EWSWA; CALM 1999) rated all weeds known in Western Australia at the time of publication according to their invasiveness, distribution and environmental impacts (**Table 3**). The weeds were classified into four categories: High, Moderate, Mild and Low. High-rated species are those that all three criteria apply to, and Moderate-rated species are those where only two of the criteria apply. The EWSWA assessed 1,350 weed species recorded in Western Australia, with 34 weed species classified as High.

Table 3: Criteria for Environmental Weeds Strategy rating (CALM 1999)

Criteria	Description
Invasiveness	Ability to invade bushland in good to excellent condition or ability to invade waterways.
Distribution	Wide current or potential distribution including consideration of known history of widespread distribution elsewhere in the world.
Environmental Impacts	Ability to change the structure, composition and function of ecosystems. In particular, an ability to form a monoculture in a vegetation community.

3 Existing Environment

3.1 Biogeography

The Interim Biogeographic Regionalisation for Australia (IBRA) has defined 89 bioregions and 419 subregions across Australia, based on climate, geology, landforms, native vegetation and species (DEE 2012). These provide a useful method for reporting biodiversity patterns and categorising survey areas. The survey area is located within the Coolgardie Region, in the Eastern Goldfields (COO3) IBRA subregion (DEE 2018).

A biodiversity audit of Western Australia's subregions classified this subregion as follows:

“Coolgardie 3 Eastern Goldfields subregion 3 lies on the Yilgarn Craton's 'Eastern Goldfields Terrains'. The relief is subdued and comprises of gently undulating plains interrupted in the west with low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying geology is of gneisses and granites eroded into a flat plane covered with tertiary soils and with scattered exposures of bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line (Cowan 2001)”.

3.2 Regional Vegetation

The Coolgardie IBRA region lies within South-Western Interzone Botanical Province as described by Beard (1990) which represents a transition zone between the wetter South-West and the more arid Eremaean Botanical Provinces. This interzone covers the transition in vegetation from spinifex and mulga in the east to eucalypt woodlands in the west (Bastin and ACRIS Management Committee 2008).

Coolgardie Eastern Goldfields subregion is described as mallees, acacia thickets and shrub-heaths on sandplains with diverse eucalypt woodlands occurring on ranges, valleys and around salt lakes which support dwarfed halophyte shrublands of samphire (Cowan 2001).

The vegetation sub-system association at the survey area is comprises of medium woodland dominated by *Eucalyptus torquata*, *E. lesouefii*, *E. clelandii* (now *E. clelandiorum*), *E. campaspe*, and *Casuarina cristata* over sparse shrublands of *Eremophila scoparia*, *Eremophila glabra*, *Eremophila oldfieldii*, *Acacia* spp., *Dodonaea lobulata* over a chenopod shrub layer (such as *Atriplex* spp. and *Maireana* spp.) (Beard *et al* 2013; DPIRD 2019b).

3.3 Soils and Landforms

Landforms of the Coolgardie bioregion comprise of rocky granite outcrops, low greenstone hills, laterite uplands and broad plains dissected by many salt lakes (Bastin and ACRIS Management Committee 2008).

High-level hierarchical landscape and soil zone mapping by the Department of Agriculture and Regional Development (DPIRD) classified the survey area as lying in the Norseman Soil-Landscape Zone within the Kalgoorlie Soil Province (DPIRD 2019c). The landforms of the Kalgoorlie soil province are undulating plains, with some sandplains, hills and salt lakes on granite and greenstone of the Yilgarn Craton (Tille 2006). Characteristics of these soil-landscapes are listed in **Table 4**.

Table 4: Soils and landforms within the Coolgardie Project survey area

Soil Landform Hierarchy	Description
Soil System Summary (DPIRD 2019c)	266_BB5 Rocky ranges and hills of greenstones-basic igneous rocks.
Soil Province (Purdie <i>et al</i> 2004)	Kalgoorlie Laterised plateau on Precambrian granites and gneisses with greenstone belts. Saltlake chains with much dissection near major salt lakes. Aeolian dust present. Soils may be calcareous, but red-brown hardpans are uncommon.
Soil Zone (Tille 2006)	Norseman Undulating plains and uplands (with some sandplains and salt lakes) on granitic rocks of the Yilgarn Craton. Calcareous loamy earths, yellow sandy and loamy earths, red loamy earths, red deep sands and salt lake soils.

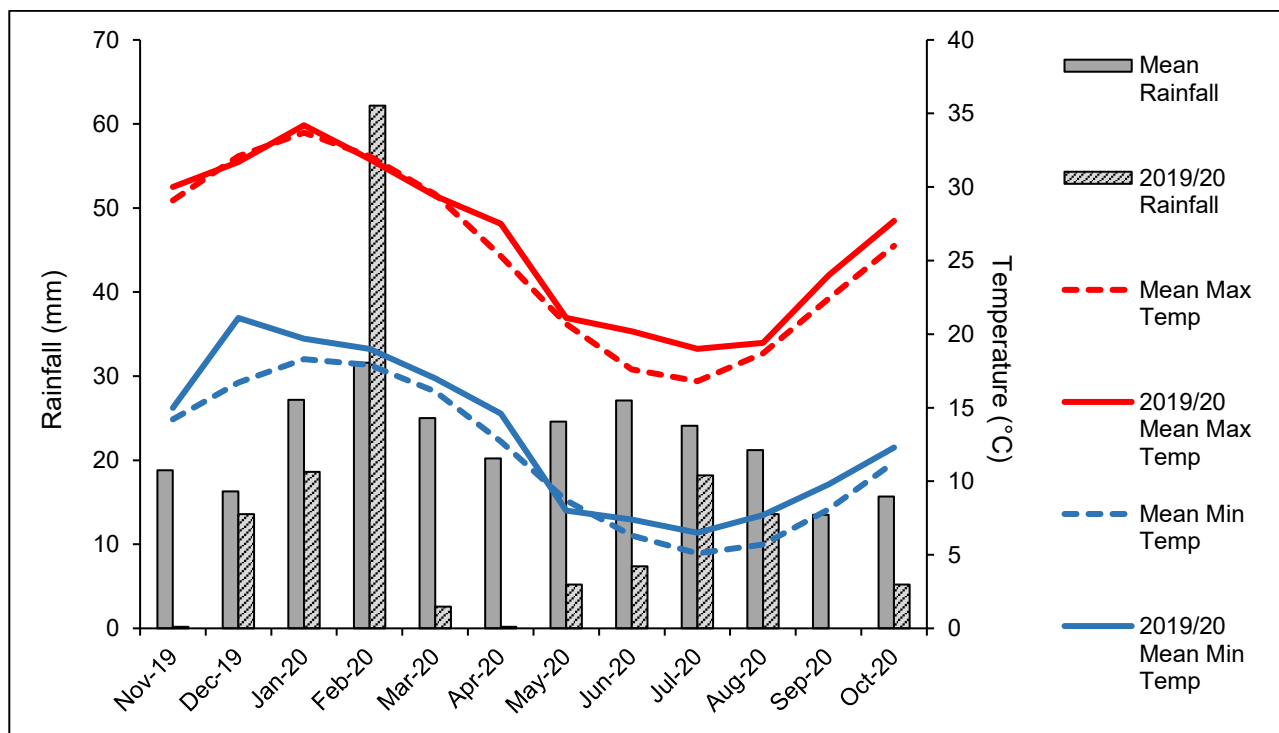
3.4 Climate

The bioclimate of the Coolgardie Eastern Goldfields subregion is described by Beard (1990) as mainly Sub-Eremaean, having an arid to semi-arid climate with 200-300 mm of annual rainfall.

The survey area lies in the warm and persistently dry 'Arid Grasslands' (Bws), Köppen Climate Class as classified by Peel *et al* (2007) and within the 'hot dry summer - cold winter' climate category with winter dominated rainfall as classified by the Bureau of Meteorology (BoM 2016).

Although closer to the survey area, the Coolgardie weather station lacks data from recent years. As such, data weather data has been obtained from the Kalgoorlie-Boulder Airport BoM weather station (no. 12038), 33.3km away. Temperature and rainfall data recorded at this weather station are shown in **Graph 1**. Monthly mean

temperatures were close to, although generally slightly higher than long-term mean records. In the twelve months preceding the survey, the area received 147mm rainfall, which is below the long term average annual rainfall of 265mm. November 2019, and March, April, May June, September and October 2020 were notably drier than average. However, considerable rainfall fell in February, which received 62.2mm. July and August received 18.2mm and 13.6mm respectively, slightly below average, however, climate was not considered a limitation to the survey.



Graph 1: Rainfall and temperature data for Kalgoorlie-Boulder Airport weather station no. 12038 (BoM 2021).

3.5 Historical Land Use and Disturbance

Dominant land uses in the area include Unallocated Crown Land (UCL), grazing on native pastures leaseholds, Aboriginal land, freehold land, mining leases and nature reserves (Bastin and ACRIS Management Committee 2008; Cowan 2001). Gold and nickel mining is important to the region’s economy, which is supplemented by pastoral activity and tourism. Kalgoorlie, Coolgardie and Norseman are the region’s major populations centres (Bastin and ACRIS Management Committee 2008).

4 Methods

The Targeted flora and vegetation survey (formerly Level 1) consisted of a desktop assessment followed by a field survey, conducted in accordance with the Environmental Protection Authority's (EPA) *Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016b) (hereafter referred to as the 'EPA Guidance') and applied in conjunction with the *Environmental Factor Guideline for Flora and Vegetation* (EPA 2016a).

4.1 Desktop Review Methods

Prior to the field assessment, a desktop review was undertaken to identify Threatened and Priority Flora and Ecological Communities previously recorded within the survey area and surrounds. The review involved:

- Review of findings from previous studies within or near the project area
- Review relevant existing literature as available
- Search Threatened and Priority Flora and Communities databases including;
 - DBCA Naturemap database (10km and 20km radius)
 - Commonwealth (EPBC Act) Protected Matters Database (PMST) (10km and 20km radius)
 - DBCA Threatened and Priority Flora (TPFL) Databases (custom database search request, 90km radius)
 - Western Australian Herbarium Specimen (WA Herb) database (custom database search request, 90km radius)
 - DBCA TEC Database (custom database search request, 50km radius)
- Analysis of aerial imagery, broadscale vegetation mapping data, and vegetation and landscape feature spatial data to identify expected vegetation assemblages and significant landscape features.

4.2 Field Survey Strategy

The Targeted Flora and Vegetation field survey was conducted between the 16th and 20th of November 2020 by Principal Ecologist / Botanist Joseph Grehan and Senior Ecologist Heather Legge of Terratree.

The survey area was extensively travelled by vehicle and foot to verify and define vegetation communities and to search for Threatened or Priority flora identified as potentially occurring within the survey area during the desktop review. Relevés and opportunistic sampling were conducted to delineate vegetation communities and search for Targeted species.

Where species could not be identified in the field, they were collected, labelled, pressed, dried and frozen in accordance with the requirements of the WA Herbarium. Subsequently, their identification was confirmed by

Senior Botanist-Taxonomist, Kathya Tippur, by comparing collections with pressed specimens housed at the herbarium and using taxonomic keys and other reference materials.

In some cases, collected specimens can only be identified to the genus level. For example, when they are sterile at the time of the survey, they may lack distinguishing features, such as flower or fruits, necessary for species-level identification. Any specimens that could only be identified to genus level were reviewed to see whether they were from genera listed in the Targeted species list. In cases where they were of Targeted genera, in the first instance, an attempt was made by the botanist to rule out the Targeted species. If this was not possible, an assessment was undertaken to determine the likelihood of these Threatened and Priority species occurring within the survey area. The assessment involved consideration of habitat, including soil types, landscape position and associated vegetation communities of the species in question, along with a review of the recorded distribution of these species around the survey area using the custom search of DBCA WA Herbarium and TPFL Databases (DBCA 2020c, DBCA 2020d). This data provides useful information on the expected habitat and associated vegetation of Priority species if they were to occur within the survey area.

Survey Limitations are discussed in **Section 5.6**.

4.3 Relevés and Opportunistic Sampling

A total of 21 relevés were sampled, representing a minimum of three and up to five relevés in each vegetation community, except for Community 7, which had a very limited distribution. A significant proportion of the survey area was visually assessed on foot and vehicle and opportunistic sampling. Field data was collected using hand-held GPS units (GDA 94).

Relevé locations were selected using aerial photography, topographic features, and field observations to represent vegetation diversity. Standardised data collection sheets were used to ensure consistent data records for the following features in each relevé:

- Observer
- Date
- Location/site
- GPS Location (GDA 94)
- Species observed
- Soil type and colour
- Topography
- Degree and nature of disturbances

4.4 Determining Vegetation Communities

Vegetation communities encountered within the survey area are described using the National Vegetation Information System (NVIS) structural formation terminology in accordance with the Australian vegetation Attribute Manual (NVIS TWG 2017). The terminology table adapted from the manual is provided in **Appendix D**. The NVIS structural formations are standardised terminology integrating and growth form, height and cover within each stratum. The dominant species are included in the description of each stratum to produce detailed and practical vegetation descriptions. In conjunction with edaphic and landscape features, the dominant species in each stratum are used to identify distinct floristic communities.

4.5 Assessing Vegetation Condition

The Keighery vegetation disturbance scale was used to determine the condition of vegetated areas within the project area. This scale is outlined in **Table 5**.

Table 5: Keighery vegetation disturbance scale (Keighery 1994, Adapted from EPA 2016b)

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

4.6 Mapping

Vegetation community areas and condition were digitised using QGIS 3.10 (QGIS Development team 2021), by digitising vector polygons over a high-resolution aerial photography layer (**Figure 2, Figure 3**).

Vegetation mapping delineates plant communities and condition in accordance with **Table 5** and **Table 10**. A combination of aerial photography and ground-truthing was used to interpret the vegetation patterns present in the survey area.

5 Results

5.1 Desktop Review Results

5.1.1 Previous Studies

The findings of previous surveys conducted within the project area and general surrounds were reviewed. Relevant reports are listed in **Table 6**. The van Etten (2009) report was the most recent and applicable. None of these surveys recorded any Threatened or Priority Flora or Ecological Communities as being present within their respective survey areas.

Minesite Rehabilitation Services Pty Ltd (1995) noted a small presence of *Lycium ferocissimum* (African Boxthorn), which is a WONS.

Table 6: Previous environmental surveys within or near the survey area

Author	Year	Reference
Dr Eddie van Etten	2009	<i>Flora and Vegetation of Focus Minerals Limited's Open Pits Project Area, Coolgardie, Western Australia</i> . Unpublished Report Prepared for Minesite Environmental Pty Ltd, Kalgoorlie.
Woodman Environmental Consulting Pty Ltd	2002	<i>Flora and vegetation Survey, Three-mile Hill In-Pit Tailings Storage Facility Surrounds</i> . Unpublished Report Prepared for Coolgardie Mining Company Pty Ltd.
Minesite Rehabilitation Services Pty Ltd	1995	<i>Biological Study and Rehabilitation Schedule for Notice of Intent, Brilliant/North Open Pit Project</i> . Unpublished report Prepared for Goldfan Limited Coolgardie Operations.

5.1.2 Threatened and Priority Flora

The database search using NatureMap and EPBC Protected Matters Search Tool (PMST) for Threatened and Priority flora (TPFL) records showed a total of 24 flora records within 20km from the search area. TPFL within 20km consisted of one Threatened, ten Priority 1, four Priority 2 and seven Priority 3 and two Priority 4 flora species. Thirteen of these occur within 10km (DAWE 2020, DBCA2020b). **Table 7** lists the Threatened and Priority flora species recorded within the 20km radius search area in the NatureMap and EPBC Protected Matters database and specifies those which occur within 10km. **Appendix B** presents the 20km NatureMap search report in full, and the full EPBC Protected Matters Database search results are presented in **Appendix C**. The DBCA WA Herbarium and TPFL Databases custom search showed no records within the survey area but several very nearby (DBCA 2020c, DBCA 2020d). This data provides useful information on the expected habitat and associated vegetation of Priority species potentially occurring within the survey area.

Table 7 : Threatened and Priority flora recorded within 20km radius of survey area (DAWE 2020, DBCA 2020)

Taxon Name and Conservation Status		DBCA	EBPC	<10km
THREATENED	<i>Gastrolobium graniticum</i>	T	EN	♦
PRIORITY 1	<i>Acacia coatesii</i> Maslin			♦
	<i>Acacia sclerophylla</i> var. <i>teretiuscula</i>			
	<i>Acacia websteri</i>			♦
	<i>Austrostipa</i> sp. <i>Carlingup Road</i>			
	<i>Dampiera plumosa</i>			♦
	<i>Eucalyptus websteriana</i> subsp. <i>norsemanica</i>			
	<i>Lepidosperma</i> sp. <i>Parker Range</i>			
	<i>Phebalium appressum</i>			
	<i>Thryptomene</i> sp. <i>Coolgardie</i>			♦
	<i>Thryptomene planiflora</i> Rye			♦
PRIORITY 2	<i>Austrostipa</i> sp. <i>Dowerin</i>			♦
	<i>Hakea rigida</i>			
	<i>Lepidium merrallii</i>			♦
	<i>Phebalium clavatum</i>			
PRIORITY 3	<i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i>			
	<i>Austrostipa blackii</i>			♦
	<i>Chrysocephalum apiculatum</i> subsp. <i>norsemanense</i>			♦
	<i>Eremophila veronica</i>			♦
	<i>Grevillea georgeana</i>			♦
	<i>Notisia intonsa</i>			
	<i>Phlegmatospermum eremaeum</i>			♦
PRIORITY 4	<i>Eremophila caerulea</i> subsp. <i>merrallii</i>			
	<i>Eucalyptus jutsonii</i> Maiden subsp. <i>jutsonii</i>			

(VU: Vulnerable, EN: Endangered, CR: Critically Endangered)

5.1.3 Threatened and Priority Ecological Communities

There are no Threatened or Priority Ecological Communities (TECs or PECs) in, or within 20km of the survey area (DAWE 2020). The DBCA TEC database custom search revealed no TECs within 50km of survey area (DBCA 2020e).

5.1.4 Environmentally Sensitive Areas

The PMST searches revealed no ESAs within 20km of the survey area (DAWE 2020).

5.1.5 Introduced Flora

The PMST search revealed two WONS, *Carrichtera annua* (Ward's Weed) and *Cylindropuntia* spp. (Prickly Pears) occurring within 10 km of the survey area (DAWE 2020). Specifically, the NatureMap Search recorded *Cylindropuntia tunicata* (Hudson Pear) (WONS) (DBCA 2020b).

Minesite Rehabilitation Services Pty Ltd (1995) noted a small presence of WONS, *Lycium ferocissimum* (African Boxthorn).

The NatureMap search found the 27 other introduced flora recorded within 10km of the survey area (DBCA 2020b). Three environmental weeds, *Cenchrus ciliaris* (Buffel Grass), *Eragrostis curvula* (African Lovegrass) and *Rumex vesicarius* (Ruby Dock) were listed.

Introduced flora within 20km of the survey area recorded during the desktop assessment is listed in **Table 8**. The full NatureMap and PMST search report is provided in **Appendix B** and **Appendix C**.

Table 8: Introduced flora recorded within 20km radius of survey area

Species	Status	Source		
		DBCAs (NatureMap Distance)	EPBC (PMST)	Previous Surveys*
<i>Lycium ferocissimum</i> (African Boxthorn)	WONS	<10km		♦
<i>Carrichtera annua</i> (Ward's Weed)	WONS	<10km	♦	
<i>Cylindropuntia</i> spp. (Prickly Pears)	WONS	10-20km	♦	
<i>Acacia pycnantha</i> (Golden Wattle)		<10km		
<i>Brassica tournefortii</i> (Mediterranean Turnip)		10-20km		
<i>Cenchrus ciliaris</i> (Buffel Grass)	Environmental weed	10-20km		
<i>Conyza bonariensis</i> (Flaxleaf Fleabane)		<10km		
<i>Conyza sumatrensis</i>		<10km		
<i>Cylindropuntia tunicata</i>	WONS	<10km		
<i>Eragrostis curvula</i> (African Lovegrass)	Environmental weed	<10km		
<i>Glandularia aristigera</i>		<10km		
<i>Helianthus annuus</i> (Sunflower, Common Sunflower)		<10km		
<i>Heliotropium europaeum</i> (Common Heliotrope)		<10km		
<i>Limonium sinuatum</i> (Perennial Sea Lavender)		<10km		
<i>Lythrum hyssopifolia</i> (Lesser Loosestrife)		<10km		
<i>Malva parviflora</i> (Marshmallow)		10-20km		
<i>Marrubium vulgare</i> (Horehound)		10-20km		
<i>Medicago minima</i> (Small Burr Medic)		<10km		
<i>Monoculus monstrosus</i>		10-20km		
<i>Opuntia elata</i>	WONS	<10km		
<i>Papaver hybridum</i> (Rough Poppy)		<10km		
<i>Pentameris airoides subsp. airoides</i>		<10km		
<i>Phalaris paradoxa</i> (Paradoxa Grass)		<10km		
<i>Rumex vesicarius</i> (Ruby Dock)	Environmental weed	<10km		
<i>Salvia reflexa</i> (Mintweed)		<10km		
<i>Salvia verbenaca</i> (Wild Sage)		<10km		
<i>Schinus molle</i> var. <i>areira</i>		<10km		
<i>Sisymbrium orientale</i> (Indian Hedge Mustard)		<10km		
<i>Spergularia diandra</i> (Lesser Sand Spurry)		<10km		
<i>Urochloa panicoides</i>		<10km		
<i>Vicia monantha</i> subsp. <i>trifloral</i>		<10km		

*Minesite Rehabilitation Services Pty Ltd (1995)

5.2 Field Survey Results

5.2.1 Flora

A total of 95 species of flora from 28 families were recorded within the survey area. The most common families were Scrophulariaceae, of which most were *Eremophila* spp., Chenopodiaceae, of which most were *Maireana* spp. and Myrtaceae, of which most were *Eucalyptus* spp. and some *Melaleuca* spp. Two other common families were Fabaceae (mostly *Acacia* spp.) and Poaceae (grasses). *Eremophila* was the most diverse and common genus, occurring in all communities and with eleven species confirmed. *Acacia* and *Eucalyptus* were the next most diverse and common genera, both occurring in six of the communities with eight confirmed species. The most widespread species were *Atriplex nummularia* (Old-man saltbush), *Atriplex vesicaria* (Bladder saltbush), *Olearia muelleri* (Goldfields daisy) and *Scaevola spinescens* (Currant bush) which were present in all seven vegetation communities. *Cratystylis conocephala* (Greybush), *Dodonaea lobulata* (Bead Hopbush), *Maireana triptera* (Threewinged Bluebush) and *Senna artemisioides* subsp. *filifolia* were the next most common and widespread, with each being found in five communities.

Five introduced species were recorded, including two WONS. A complete list of all recorded flora is included in **Appendix E**.

5.2.2 Confirmed Threatened and Priority Flora (species recorded)

No Threatened Flora were recorded.

One Priority species, *Acacia websteri* (P1), was recorded in community 4 in relevé C3R4, which is on the western edge of the survey area, near Nepean Rd. *Acacia websteri* (P1) was not identified until after the survey, so its exact extent and location was not recorded. The relevé where this species was recorded is shown in **(Figure 2a and 2b)**.

Acacia websteri (P1) is a shrub with yellow flowers and fibrous bark growing 1.2 to 5m in red sand, loam or clay in low-lying areas and flats (WA Herbarium 2021). Photos of examples of *Acacia websteri* (P1) are included in **Photo 1**.

5.2.3 Potential Threatened and Priority Flora (Targeted Genus Recorded, Species Unconfirmed)

Nine specimens collected could not be identified to species level because they were sterile at the time of survey. Of these, four specimens were from genera of seven Targeted species listed in the desktop review **(Table 7)**. For these genera, an assessment of the likelihood of these Targeted flora occurring within the survey area was conducted. This assessment is included in **Appendix F** and summarised in **Table 9**. Only one species, *Eremophila veronica* (P3), is considered Very Likely to occur within the survey area, and one other species, *Austrostipa blackii* (P2), is considered Likely. All five of the others are considered Unlikely to occur within the survey area, and therefore it is unlikely that the specimens collected are these species.

Although the specimens were sterile any identifying features present were closely examined and compared with all Targeted species, particularly those which were considered Very Likely to occur in the assessment area. Examination of the collected specimens compared with the Targeted species determined that it is unlikely any of the collected specimens are targeted species. *Eremophila veronica* (P3) can be ruled out entirely due to its distinctive foliage. *Austrostipa blackii* (P2) could not be ruled out, however, it is not considered very likely that any of these specimens are Targeted species.

Table 9: Summary of Likelihood assessment of the occurrence of Priority Flora collected of Targeted genera

Collection Name and ID	Potential Priority Species	Conservation Status	Likelihood Occurrence in Survey Area
<i>Austrostipa</i> sp. (CS84)	<i>Austrostipa blackii</i>	Priority 2	Likely
	<i>Austrostipa</i> sp. Carlingup Road	Priority 1	Unlikely
	<i>Austrostipa</i> sp. Dowerin	Priority 2	Unlikely
<i>Eremophila</i> spp. (CS10, CS32)	<i>Eremophila caerulea</i> subsp. <i>merrallii</i>	Priority 4	Unlikely
	<i>Eremophila veronica</i>	Priority 3	Very Likely
<i>Phebalium</i> sp. (CS68)	<i>Phebalium appressum</i>	Priority 1	Unlikely
	<i>Phebalium clavatum</i>	Priority 3	Unlikely

5.3 Vegetation Communities

The survey area is dominated by Eucalypt Mallee Woodlands and Open Woodlands with small areas of Mallee Shrublands and one Isolated *Eremophila* Heathland. Seven distinct communities were observed within the survey area. Communities 1 to 7 are summarised in **Table 10** and described in detail in **Appendix G (Tables G.1 – G.7** respectively), including photo examples for each community. No Threatened or Priority Ecological Communities (TECs or PECs) and No Environmentally Sensitive Areas (ESAs) were observed within the survey area.

Vegetation communities are indicatively mapped using a combination of field data, aerial imagery and spatial data such as contours and geology to define their boundaries in **Figure 2 (Figures 2a, 2b, and 2c)**. Vegetation communities were primarily distinguished from one another by dominant upper strata species (See **Section 4.4**). The dominant upper stratum species were determined by subtle changes in soil surface characteristics creating a complex mosaic. Trends in vegetation communities are observable based on landscape position and soil type, with an ecotone or transitional area between communities. Vegetation community mapping in **Figure 2a, 2b, and 2c** represents the most common vegetation community in each landscape position at a broader scale, and the boundaries represent the approximate mid-point of an ecotone between communities.

Covering the largest area of 173ha (19.6% of the total survey area), Community 6, *E. salmonophloia* (Salmon gum) Open Woodland over chenopod understory occupies deep flat soils. Moving up through the landscape, the second most common community, Community 5, *E. Campaspe* Mallee Woodlands occupies 128ha (14.5%) on lower slopes of greenstone rises, and some stony drainage lines, where chenopods again dominate lower the stratum. Further up the landscape, Community 2 *Eucalyptus clelandiorum* (Cleland's Blackbutt) Mallee Woodlands is found on 73.5ha (8.3%) of greenstone mid-slopes. Mallee woodlands of Community 1 *Eucalyptus griffithsii* and *E. torquata* occupy 102ha (11.5%) on shallow stony upper slopes, interspersed with drainage lines of Community 3 *Eucalyptus griffithsii* Mallee Woodland, which lacks *E. torquata* and occupies approximately 66ha (7.4%). Community 4, *Acacia* spp. and *Allocasuarina* spp. Mallee Shrublands occupy two pockets of lateritic ridges totalling 6.9ha (0.8%). Finally, one small ironstone mesa of 0.6ha (0.1%) contains Community 7, *Eremophila oppositifolia* Isolated Heathland.

Approximately 335ha (37.8%) was in Degraded or Completely Degraded vegetation condition and were not mapped due to the absence of the vegetation structure necessary to adequately describe the vegetation community that would ordinarily have been present (Figure 2, Figure 3).

Table 10: Summary of Vegetation Communities in the survey area

ID	Community Name	Structure Summary	Landscape Position	Area (Ha)	Percent of Survey area (%)
C1	<i>Eucalyptus griffithsii</i> with <i>E.torquata</i>	Mallee woodland	Shallow stony soils, upper slopes	102.1	11.5
C2	<i>Eucalyptus clelandiorum</i> (Cleland's Blackbutt)	Mallee Woodland	Greenstone midslopes	73.5	8.3
C3	<i>Eucalyptus griffithsii</i> (<i>E. torquata</i> absent)	Mallee Woodland	Drainage lines	65.8	7.4
C4	<i>Acacia</i> spp. and <i>Allocasuarina</i> spp.	Mallee Shrubland	Laterite	6.9	0.8
C5	<i>E. campaspe</i> (Silver-topped gimlet)	Mallee Woodland	Greenstone midslopes, occasionally drainage areas	128.2	14.5
C6	<i>E. salmonophloia</i> (Salmon gum)	Open Woodland	Flats, low lying deep soils	173.0	19.6
C7	<i>Eremophila oppositifolia</i> (Mesa)	Isolated Heathland	Small ironstone mesa	0.6	0.1
Degraded	N/A	N/A	N/A	334.8	37.8
Total				884.9	100

5.4 Vegetation Condition

A large portion, 340.7ha (38.5%), of the survey area, was Degraded to Completely Degraded. These areas have been heavily modified by historic and current mining and exploration activities and lack vegetation structure and species diversity (**Photo 2; Photo 3**). Some degraded areas contain attempted rehabilitation and are dominated by chenopods such as *Atriplex nummularia*, *Maireana* spp. and introduced species (**Photo 4**).

Despite large areas of disturbance, 325.6ha (36.9%) remain in Good condition (**Photo 5**) and 217.7ha (24.6%) remain in Very Good condition (**Photo 6**). All relevés were recorded in Good to Very Good Condition so that accurate species richness could be observed.

The areas and percentages of different vegetation condition categories for the survey area are presented in **Table 11**. Vegetation condition is represented spatially in **Figure 3 (3a, 3b, 3c and 3d)**. Like vegetation communities, the vegetation condition is a mosaic and therefore, figures are indicative only and present the dominant vegetation condition in each area.

Table 11: Area statement of vegetation condition ratings in survey area

Condition Rating	Area (Ha)	Percent (%)
Very Good	217.7	24.6
Good	326.6	36.9
Degraded-Completely Degraded	340.7	38.5
Total	885	100

5.5 Introduced Flora

Five introduced flora species were recorded. These include two Weeds of National Significance (WONS), *Lycium ferocissimum* (African Boxthorn) and *Opuntia stricta* (Prickly Pear) (Weeds Australia 2021), which is also categorised as a Declared Pest s22(2) (C3 Restricted) in WA under the *BAM Act* (DPIRD 2021) (**Table 1, Table 2**) (**Photo 7**). Control measures must be implemented by land managers in areas infested with Declared plants in the C3 category (DPIRD 2019a).

The other weeds recorded were *Agave americana* (Century plant/Agave/Yucca) which is occasionally naturalised around old habitations and roadsides (WA Herbarium 2021) and along with *Asphodelus fistulosus* (Onion weed) and *Schinus mole* (Peppertree) is categorised as Permitted (s11) under the *BAM Act* (2007) (DPIRD 2021) (**Table 1**). Control measures are not mandated for plants categorised as Permitted (s11) (DPIRD 2021).

Introduced flora recorded during the survey, along with their weed status and management category, is summarised in **Table 12**.

Table 12: Summary of introduced flora recorded in the survey area and their status

Species		Status		
Scientific Name	Common name	WAOL (2021)	Weeds Australia (2021)	WA Herbarium (2021)
<i>Agave americana</i>	Century plant/Agave/Yucca	Permitted (s11)		Occasionally Naturalised
<i>Asphodelus fistulosus</i>	Onion weed	Permitted (s11)		
<i>Lycium ferocissimum</i>	African Boxthorn	Permitted (s11)	WONS	
<i>Opuntia stricta</i>	Common Prickly Pear	Declared Pest (s22(2) (C3 Restricted)	WONS	
<i>Schinus mole</i>	Peppertree	Permitted (s11)		

5.5.1 *Lycium ferocissimum* (African Boxthorn) (WONS)

Several individuals of *Lycium ferocissimum* were recorded dispersed widely throughout the ‘mid’ and ‘south’ sections of the survey area (**Photo 7**).

Lycium ferocissimum is a quickly spreading, large spiny shrub that grows to 5m tall and wide (Weeds Australia 2020a). It can quickly establish impenetrable spiny thickets, which harbour pests, and prevent land access and over-run native species (Weeds Australia 2021a).

5.5.2 *Opuntia stricta* (Common Prickly Pear) (WONS and Declared Pest)

One individual *Opuntia stricta* (Common Prickly Pear) was recorded in the north of the ‘mid’ section of the survey area. Example photo of this species are included in (**Photo 8**).

Opuntia stricta is an erect spreading shrub usually growing to 0.5 to 1m and up to 2m tall, and up to 5m wide (Weeds Australia 2021b). It an aggressive, drought tolerant weeds that spreads by seeds and segment fragments and can form dense impenetrable infestations which take over natural areas and pastoral lands, harbour pests and cause injury to people and animals (Weeds Australia 2021b). *Opuntia stricta* was once a catastrophic weed of parts of Queensland and New South Wales until the introduction of the cactoblastis moth as biological control (Weeds Australia 2021b).

5.6 Survey Limitations

The potential limitations of the survey, as outlined in the EPA Guidance (EPA 2016b) are listed and their impacts discussed in **Table 13**.

Table 13: Discussion of potential limitations to the survey (adapted from EPA 2016b)

<p>1. Availability of contextual information at a regional and local scale</p>
<p>Not a Limitation - There was adequate local and regional background information to inform the Desktop study of the survey area.</p>
<p>2. Competency and experience of the team carrying out the survey, including experience in the bioregion surveyed</p>
<p>Not a Limitation - The field survey was carried out by suitably qualified and experienced Ecologists with substantial botanical surveying within the region, and subsequent plant identification undertaken conducted by Taxonomist Kathya Tippur (MSc. Botany) who has extensive experience as in Botany-Taxonomy throughout Western Australia.</p>
<p>3. Proportion of flora recorded and/or collected, any identification issues or taxonomic uncertainty</p>
<p>Partial Limitation - The survey and relevés were undertaken in accordance with EPA Guidance (2016b) and plant specimens collected when botanists were not able to identify plants in the field. Opportunistic sampling was undertaken between relevés to ensure the survey area was adequately sampled.</p> <p>Because <i>Acacia websteri</i> (P1) was identified after the field survey, the exact location and number of individuals in this population not recorded.</p> <p>Nine of the 100 collected specimens could only be identified to genus level. In cases when these specimens were from genus that were in the Targeted list of TPFL species (i.e. <i>Eremophila</i> sp., <i>Austrostipa</i> sp. <i>Phebalium</i> sp.) initially an attempt was made to rule out the Targeted species. If this was not possible, an assessment was undertaken to determine the likelihood of the TPFL species to occur within the survey area.</p>
<p>4. Survey Effort and Extent</p>
<p>Possible Limitation - The total survey area was 885ha and the total area in at least Good condition was 544.3ha, so it was not possible to cover the entire area in great detail. However, the intensity of the survey was adequate. Twenty-one relevés were undertaken over 5 days, and by the end of the survey no new vegetation types and few new plant species were being encountered.</p>
<p>5. Access restrictions within the survey area</p>
<p>Not a Limitation - Access to the survey site was not inhibited, all necessary parts of the survey areas could be accessed by vehicle or on foot.</p>
<p>6. Survey timing, rainfall, season of survey</p>
<p>Limitation - The EPA Guidance (2016b) recommends the Interzone be surveyed September -November with supplementary surveys after autumn rains and the survey was undertaken in November. September 2019 was completely dry, and October was much drier than average. Furthermore, total rainfall in the 12 months preceding the survey was well below average. Therefore, annual species were likely underrepresented, and many perennial species were sterile at the time of survey making identification to species level difficult. Nine of the 100 specimens collected could not be identified beyond genus levels, and of these 4 were from genera on the Targeted flora list, so could not be ruled out as being Priority species in this list. The survey was conducted outside of the recorded flowering timing of some Targeted species</p>

7. Disturbance that may have affected the results of survey (e.g., fire, flood or clearing)

Not a Limitation - A total of 340.7ha of the 885ha was in Degraded to Completely Degraded condition and could not be assessed. Disturbance was not a limitation throughout the rest of the survey area.

8. Other limitations (e.g., Mapping reliability, resources)

Not a Limitation - There were no other survey specific limitations.

6 Discussion

6.1 Flora

A total of 95 species of flora from 28 families were recorded within the survey area. The most common and diverse genus was *Eremophila* which was recorded in all communities, with eleven species identified. *Acacia* and *Eucalyptus* were the next most diverse and common genera, both occurring in six communities with eight confirmed species. The most widespread species were *Atriplex nummularia* (Old-man saltbush), *Atriplex vesicaria* (Bladder saltbush), *Olearia muelleri* (Goldfields daisy) and *Scaevola spinescens* (Currant bush) which were present in every vegetation community. *Cratystylis conocephala* (Greybush), *Dodonaea lobulata* (Bead Hopbush), *Maireana triptera* (Threewinged Bluebush) and *Senna artemisioides* subsp. *filifolia* were the next most common and widespread species. Five introduced species were recorded, including two WONS, of which one is also a Declared pest in WA.

6.1.1 Threatened and Priority Flora

No Threatened Flora species were recorded. One Priority species, *Acacia websteri* (P1), was recorded

***Acacia websteri* (P1)**

Acacia websteri (P1) was collected in Community 4 in C4R2 on the western edge of the survey area, near Nepean Rd. The specimen was identified after the field survey, so the exact location and number of individuals in this population not recorded. A follow-up Targeted survey should be conducted to confirm this. It is possible that this species is present in other parts of the survey area, particularly within Community 4 vegetation, which is an *Acacia* - *Allocasuarina* dominated mallee shrubland. Community 4 has a restricted distribution represented in three small areas totaling 6.9ha (0.8%) within the survey area (**Figure 2a**).

Acacia websteri (P1) is known to occur in 50 records in WA in the central southern inland areas from Bencubbin to Coolgardie-Kalgoorlie areas from the (DBCA 2020b). Custom database searches of the DBCA TPFL and WA Herbarium databases revealed four other *Acacia websteri* (P1) populations outside the survey area, nearby, to the west-north-west of where it was recorded in the survey area. The species is found in three populations of 3, 5 and 19 individuals located 250 to 300m from the survey area boundary near where *Acacia websteri* (P1) was recorded (DBCA 2020c; DBCA 2020d). Another population of 35 individuals is recorded 975m away in the same direction (DBCA 20020c). Therefore, it is possible that this species could exist in multiple populations throughout the survey area.

6.1.2 Potential Threatened and Priority Flora (Targeted Genus Recorded, Species Unconfirmed)

Nine specimens collected could not be identified to species level because they were sterile at the survey time. Of these, four specimens were from genera of seven Targeted Priority species listed in the desktop review.

For these genera, an assessment of the likelihood of these Targeted flora occurring within the survey area was conducted (**Appendix F**), which found only one species, *Eremophila veronica* (P3), to be Very Likely, and one other species, *Austrostipa blackii* (P2), Likely to occur within the survey area (**Table 7**). All five of the others are considered Unlikely to occur within the survey area, and therefore it is unlikely that the specimens collected are these species. Furthermore, identifying features present were closely examined and compared with Targeted species, particularly those which were considered Very likely to occur in the assessment area. It is not considered likely that any of these specimens are Targeted species. *Eremophila veronica* (P3) has distinctive foliage, and the specimen collected during the survey is not consistent with this species. It is not possible to rule out *Austrostipa blackii* (P2) with the sterile specimen collected, and this species may occur in the survey area.

Austrostipa blackii (P2), flowers from September to November (WA Herbarium 2021). This species may be observable in the field while not flowering, however species-level identification will require flowers or fruiting material. The *Austrostipa* sp. specimen was collected from Community 3, associated with drainage lines. Future Spring searches Targeting *Austrostipa blackii* (P2), should be considered if disturbance is planned in drainage line areas associated with Community 3.

6.2 Vegetation Communities

No Threatened or Priority Ecological Communities (TECs or PECs) and No Environmentally Sensitive Areas (ESAs) were observed within the survey area.

The vegetation condition of more than 300ha was found to be Degraded or Completely Degraded and therefore could not be mapped as vegetation communities. The dominant upper stratum species were determined by changes in soil characteristics and landscape position, and communities were highly mosaic. The result of this is a complex mosaic of vegetation communities that can change rapidly over a small area. In particular, Communities 2 and 5, Mallee Woodlands dominated by *Eucalyptus clelandiorum* (Cleland's Blackbutt) and *E. campaspe* (Silver Gimlet), respectively, are strongly associated with one another and highly mosaic. However, vegetation community trends are observable based on landscape position and soil type, with an ecotone or transitional area between communities.

Seven distinct communities were observed within the survey area. The survey area is dominated by Eucalypt Mallee Woodlands and Open Woodlands. Community 4, *Acacia* spp. and *Allocasuarina* spp. Mallee Shrublands occupy two pockets of lateritic ridges totalling 6.9ha (0.8% of the total survey area). One small ironstone mesa of 0.6ha (0.1%) contains Community 7, *Eremophila oppositifolia* Isolated Heathland. Community 6, *E. salmonophloia* (Salmon gum) open woodland is the most widespread, covering 173ha (19.6%), in deeper soils. Community 5, *E. Campaspe* Mallee Woodlands is the second-most widespread, occupying 128ha (14.5%)

on lower slopes of greenstone rises, and some stony drainage lines. Community 1 *Eucalyptus griffithsii* and *E. torquata* occupy 102ha (11.5%) on shallow stony upper slopes. Community 2 *E. clelandiorum* (Cleland's Blackbutt) Mallee Woodland occupies 73.5ha (8.3%) of greenstone midslopes. Community 3 *E. griffithsii* Mallee Woodland lacking *E. torquata* and occupies approximately 66ha (7.4%) in drainage lines.

This vegetation structure and composition is typical of the region and is consistent with the region's subsystem description (described in **Section 3.2**).

6.3 Vegetation Condition

A large portion, 340.7ha (38.5%), of the survey area was Degraded to Completely Degraded. Degraded areas are comprised of areas that have been impacted by mining and exploration activities over long periods of time and now lack healthy vegetation structure and density, as described in **Table 5**. Completely Degraded vegetation was observed in infrastructure areas, such as water holding facilities, roads, and areas that have been completely cleared of vegetation. Despite large areas of disturbance, 325.6ha (36.9%) remain in Good condition, and 217.7 ha (24.6%) remain in Very Good condition. Generally, the Salmon gum communities on the broad valley flats (Community 6) were in poorer condition, and tended to be in Good condition, compared with vegetation higher in the landscape on undulating shallow soils, which tended to be in Very Good condition.

6.4 Introduced Flora

Out of the 95 species recorded, five are introduced species. These include two Weeds of National Significance (WONS), *Lycium ferocissimum* (African Boxthorn) and *Opuntia stricta* (Prickly Pear) (Weeds Australia 2021), which is also categorised as a Declared Pest s22(2) (C3 Restricted) in WA under the *BAM Act* (DPIRD 2021). Control measures must be implemented by land managers in areas infested with Declared plants in the C3 category (DPIRD 2019a). Both these species are highly invasive, and national best practice control manuals have been developed for *Lycium ferocissimum* and invasive *Opuntioidei* cacti in Australia.

The other weeds recorded were *Agave americana* (Century plant/Agave/Yucca) which is occasionally naturalised around old habitations and roadsides (WA Herbarium 2021). *Agave americana*, along with *Asphodelus fistulosus* (Onion weed) and *Schinus mole* (Peppertree), is categorised as Permitted (s11) under the *BAM Act* (2007) (DPIRD 2021). Control measures for species categorised as Permitted (s11) are not mandatory under the *BAM Act* (DPIRD 2021).

6.4.1 *Lycium ferocissimum* (African Boxthorn) (WONS)

Lycium ferocissimum (African boxthorn) has been present in small numbers in the area since 1995 (Mine Site Rehabilitation 1995) and several dispersed widely throughout the 'mid' and 'south' sections of the survey area.

Spreading quickly, the large shrub can rapidly establish impenetrable spiny thickets, which harbour pests and prevent land access (Weeds Australia 2021a). Once properly established, it is difficult to eradicate, and prevention is the most cost-effective form of weed control, and early action is crucial to help prevent its spread (Weeds Australia 2021a). Therefore, both physical and chemical control methods should be undertaken early. Any control efforts must be long-term to prevent the re-establishment of populations from existing populations (Weeds Australia 2021a).

6.4.2 *Opuntia stricta* (Common Prickly Pear) (WONS and Declared Pest)

One individual *Opuntia stricta* (Common Prickly Pear) was recorded in the north of the 'mid' section of the survey area. An aggressive, drought-tolerant weed that spreads by seeds and segment fragments, *Opuntia stricta* can form dense impenetrable infestations which take over natural areas and pastoral lands, harbour pests and cause injury to people and animals (Weeds Australia 2021b). *Opuntia stricta* was once a catastrophic weed of parts of Queensland and New South Wales until the introduction of the *Cactoblastis* moth as biological control (Weeds Australia 2021b).

Opuntia stricta (Common Prickly Pear) is classified as a Declared pest s22(2) (C3 Restricted), as described in **Table 2** (DPIRD 2021) and therefore, it is a requirement that control measures be undertaken in the survey area to manage this species.

Although Prickly pears do have a biological control agent, the efficacy of biological control agents is limited in dry climates or on plants growing in poor soils. Physical removal remains the best form of control and herbicide application (Weeds Australia 2021b).

Management requirements for areas infested with Declared pest species in Category 3 (C3) are as follows:

- "The infested area must be managed in such a way that alleviates the impact, reduces the number or distribution or prevents or contains the spread of the declared pest in this area
- Ensure that any person conducting an activity on the land is aware that measures are required to be taken to control the declared pest" (DPIRD 2019a).

DPIRD (2019a) recommends that land managers:

- "Treat to destroy all plants, prevent seed set and prevent the spread of seed or plant parts within and from the area on or vehicles and/or machinery prior to seed set each year
- Erect a biosecurity sign for persons conducting any activity on the land."

7 Conclusions and Recommendations

A total of 95 species of flora from 28 families were recorded within the survey area. No Threatened Flora species were recorded. One Priority species, *Acacia websteri* (P1), was recorded. *Acacia websteri* (P1) was collected in Community 4 in C4R2. The specimen was identified after the field survey, so a follow-up Targeted survey should be conducted, ideally after autumn rains to determine the exact location and extend of this species in C4R2 and throughout Community 4 and in other areas of suitable habitat. Four other populations of *Acacia websteri* (P1) occur nearby, outside the survey area (DBCA 2020c; DBCA 2020d). Therefore, it is possible that this species could exist in multiple populations throughout the survey area. *Acacia websteri* (P1) has distinctive features on the leaves and can be identified by close examination of the leaves, without the need for flowers or fruit. This allows flexibility of timing of the targeted search.

Nine specimens collected could not be identified to species level because they were sterile at the survey time. Of these, four specimens were from genera of seven Targeted Priority species listed in the desktop review. The assessment of the likelihood of these Targeted Priority flora occurring within the survey area found only one species, *Eremophila veronica* (P3), to be Very Likely, and one other species, *Austrostipa blackii* (P2), Likely to occur within the survey area. The collected *Eremophila* sp. specimens are not *Eremophila veronica* (P3), however, the *Austrostipa* sp., specimen, could possibly be *Austrostipa blackii* (P2), although this is not considered likely. Future Spring surveys Targeting *Austrostipa blackii* (P2), should be considered if disturbance is planned in drainage line areas associated with Community 3.

The survey area is dominated by Eucalypt Mallee Woodlands and Open Woodlands with small Mallee Shrublands areas and one Isolated Heathland. Seven distinct communities were observed within the survey area. No Threatened or Priority Ecological Communities (TECs or PECs) and No Environmentally Sensitive Areas (ESAs) were observed within the survey area.

A large portion, 340.7ha (38.5%), of the survey area was Degraded to Completely Degraded. 325.6ha (36.9%) remain in Good condition, and 217.7ha (24.6%) remain in Very Good condition.

Five introduced species were recorded, including two Weed of National Significance (WONS), *Lycium ferocissimum* (African Boxthorn) and *Opuntia stricta* (Common Prickly Pear), which is also a Declared Pest s22(2) (C3 Restricted) (DPIRD 2021). Control measures are required a Declared Pest s22(2) (C3 Restricted) (DPIRD 2019a) and therefore must be implemented for *Opuntia stricta*. Both species are highly invasive, and management actions should be undertaken for both species. National best practice control manuals have been developed for *Lycium ferocissimum* and invasive *Opuntioideae* cacti in Australia, and these should be referred to when developing and conducting control measures.

Terratree makes the following recommendations for the survey area:

- Avoid in the first instance, and, if unavoidable minimise and mitigate impacts to *Acacia websteri* (P1) flora and the vegetation communities that this species is associated with (Communities 4) until the species exact location and extent can be determined.
- Follow-up Targeted surveys should be in accordance with EPA Guidance (2016b) in late Autumn to search for *Acacia websteri* (P1) in Community 4.
- Consider a Targeted search for *Austrostipa blackii* (P2) in drainage lines in Community 3, in Spring if disturbance activities are planned in these areas.
- Undertake development activities so as to avoid incidental impacts to vegetation in Good to Very Good Condition wherever possible.
- Develop and implement a hygiene management plan to prevent the introduction and spread of introduced flora and pathogens
- Conduct weed eradication and control measures for WONS and Declared Pest species recorded, *Lycium ferocissimum* (African Boxthorn) (WONS) and *Opuntia stricta* (Common Prickly Pear) (WONS and Declared Pest).

8 References

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Photos



Photo 1: *Acacia websteri* (P1) (World Wide Wattle 2020, photographer B.R. Maslin).



Photo 2: Degraded area showing the impacts of disturbance and loss of vegetation structure and richness.



Photo 3: Examples of various disturbances to vegetation within the survey area.



Photo 4: Rehabilitation area dominated by chenopods such *Atriplex nummularia* and *Maireana* spp. and some introduced flora.



Photo 5: Example of Vegetation in Good Condition taken at C6R1.



Photo 6: Example of Vegetation in Very Good Condition in the survey area, taken at C1R1.



Photo 7: *Lycium ferocissimum* (African Boxthorn) a WONS in a Degraded part of the survey area.



Photo 8: *Opuntia stricta* (Prickly Pear) was observed during the survey (WA Herbarium 2021).

Figures

Figure 1: Project location map

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Legend

- Survey Area
- Roads
- Towns



Overview

Focus Minerals Coolgardie Targeted Flora and Vegetation Survey - Location



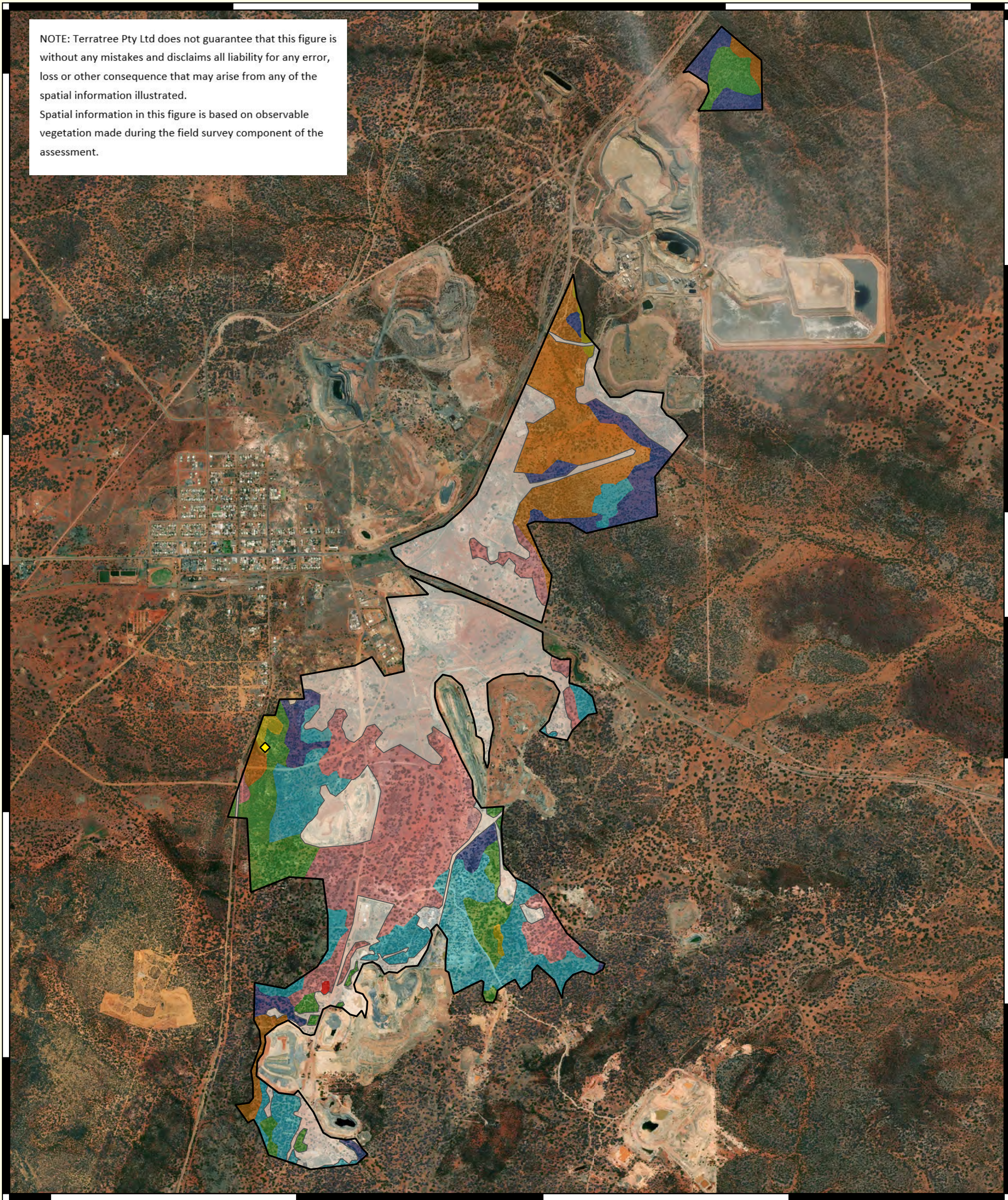
Datum: GDA 1994
Projection: MGA Zone 51
Scale: 1: 30 000 at A3

Date: 12/02/2021	Prepared: H. Legge	Project No: T20040
Expiry:	Checked: J. Grehan	
Figure 1	Revision:	
	Review:	

Figure 2a: Vegetation Communities and Priority Flora within the Survey Area – Overview

NOTE: Terratree Pty Ltd does not guarantee that this figure is without any mistakes and disclaims all liability for any error, loss or other consequence that may arise from any of the spatial information illustrated.

Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.



Legend

Survey Area

Priority Flora

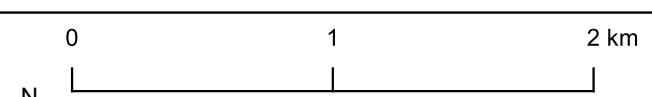
Acacia websteri (P1)

Vegetation Communities

- C1 - *Eucalyptus griffithsii*, *E. torquata*
- C2 - *E. clelandiorum* (Cleland's Blackbutt)
- C3 - *E. griffithsii* (*E. torquata* absent)
- C4 - *Acacia* spp. and *Allocasuarina* spp.
- C5 - *E. campaspe* (Silver Gimlet)
- C6 - *E. salmonphloia* (Salmon gum)
- C7 - *Eremophila oppositifolia* (Mesa)
- D - Degraded

Focus Minerals Coolgardie Flora Survey

Vegetation Communities & Priority Flora - Overview



Datum: GDA 1994
 Projection: MGA Zone 50
 Scale: 1: 29 000 at A3

Date: 12/04/2021	Prepared: H. Legge	Project No: T20040
Expiry:	Checked: J. Grehan	
Figure 2a	Revision:	
	Review:	

Figure 2b: Vegetation communities and Priority flora within the survey area – South

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NOTE: Terratree Pty Ltd does not guarantee that this figure is without any mistakes and disclaims all liability for any error, loss or other consequence that may arise from any of the spatial information illustrated.

Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.

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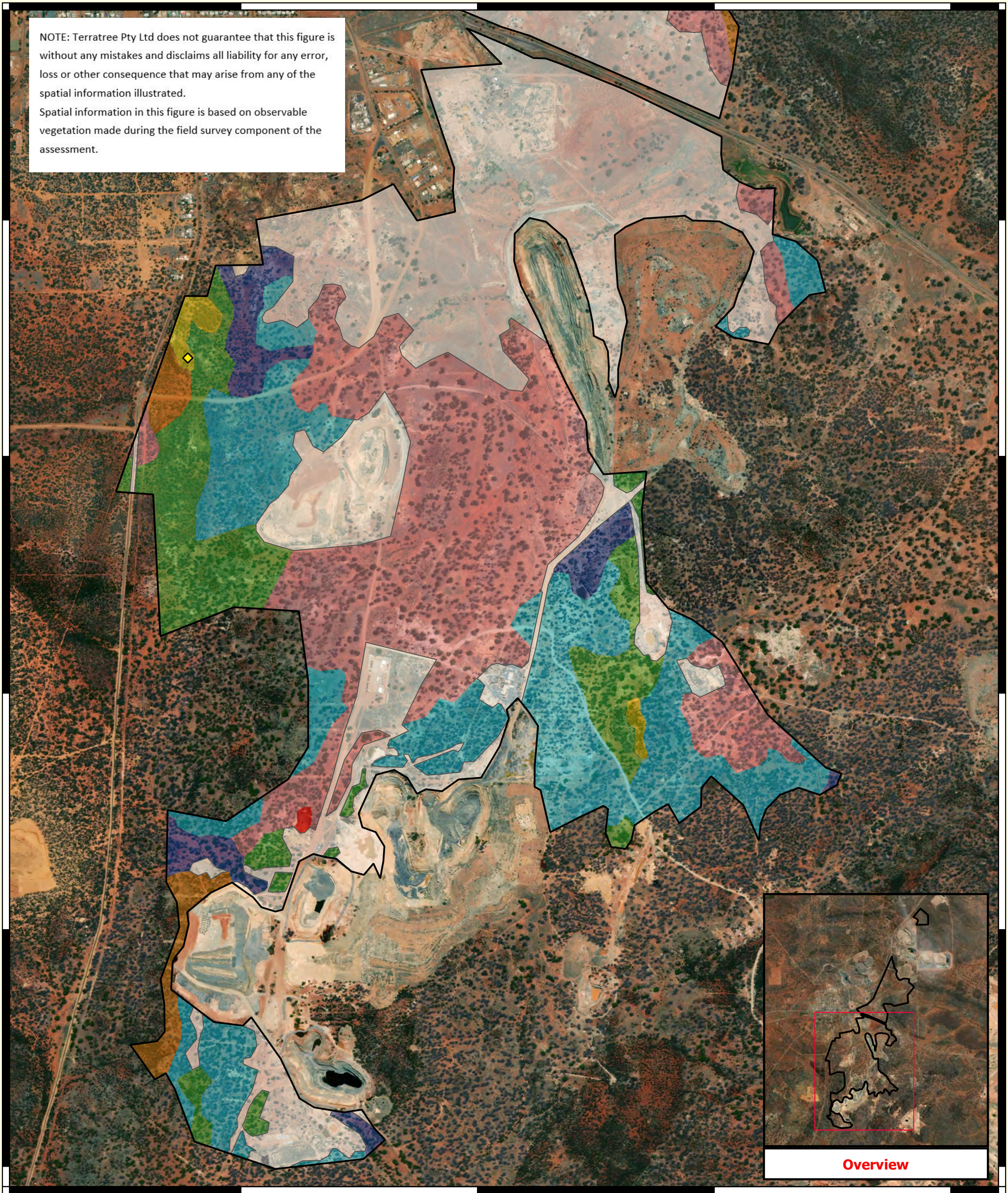
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Legend

□ Assessment Area

Priority Flora

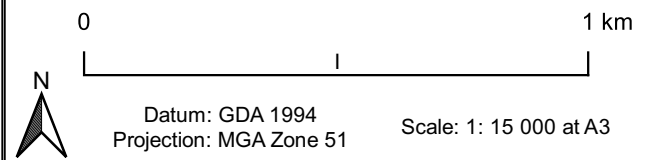
◆ *Acacia websteri* (P1)

Vegetation Communities

- C1 - *Eucalyptus griffithsii*, *E. torquata*
- C2 - *E. clelandiorum* (Cleland's Blackbutt)
- C3 - *E. griffithsii* (*E. torquata* absent)
- C4 - *Acacia* spp. and *Allocasuarina* spp.
- C5 - *E. campaspe* (Silver Gimlet)
- C6 - *E. salmonphloia* (Salmon gum)
- C7 - *Eremophila oppositifolia* (Mesa)
- D - Degraded

Focus Minerals Coolgardie Flora Survey

Vegetation Communities & Priority Flora - South



Date: 12/04/2021	Prepared: H. Legge	Project No: T20040
Expiry:	Checked: J. Grehan	
Figure 2b	Revision:	
	Review:	

Figure 2c: Vegetation communities and Priority flora within the survey area – Mid

326000

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NOTE: Terratree Pty Ltd does not guarantee that this figure is without any mistakes and disclaims all liability for any error, loss or other consequence that may arise from any of the spatial information illustrated.

Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.

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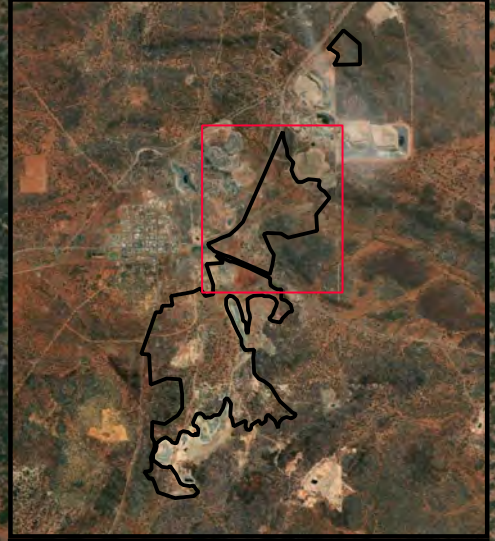
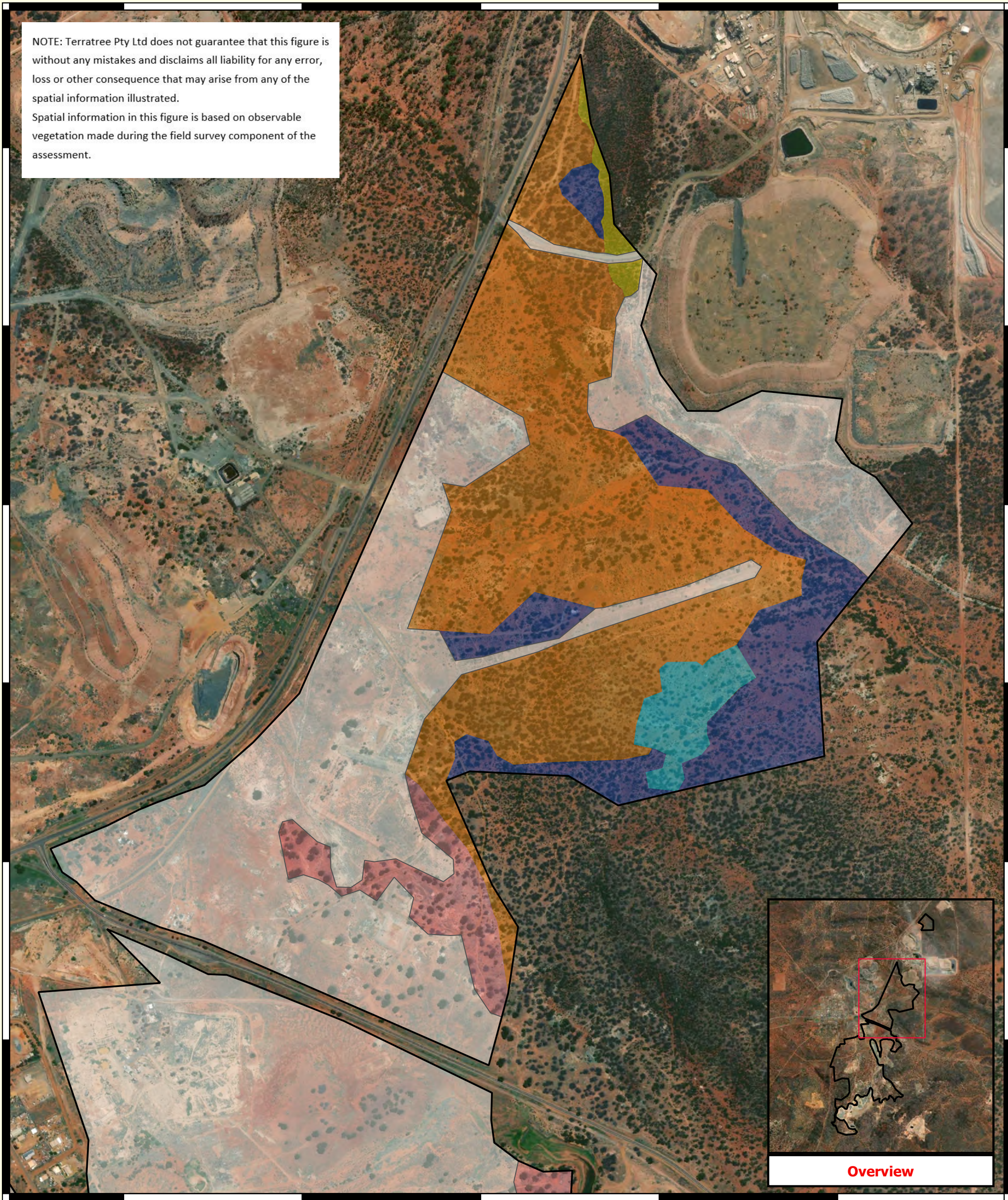
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Overview

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Legend

Survey Area

Vegetation Communities

- C1 - *Eucalyptus griffithsii*, *E. torquata*
- C3 - *E. griffithsii* (*E. torquata* absent)
- C4 - *Acacia* spp. and *Allocasuarina* spp.
- C5 - *E. campaspe* (Silver Gimlet)
- C6 - *E. salmonphloia* (Salmon gum)
- D - Degraded

Focus Minerals Coolgardie Flora Survey

Vegetation Communities - Mid

0 0.5 km



Datum: GDA 1994
 Projection: MGA Zone 51
 Scale: 1: 10 000 at A3

Date: 12/04/2021	Prepared: H. Legge	Project No: T20040
Expiry:	Checked: J. Grehan	
Figure 2c	Revision:	Terratree
	Review:	

Figure 2d: Vegetation communities within the survey area – North

328000 328200 328400 328600 328800 329000

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Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.

6578400
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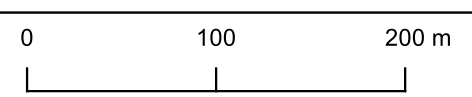
Overview

328000 328200 328400 328600 328800 329000

Legend

-  Survey Area
- Vegetation Communities**
-  C1 - *Eucalyptus griffithsii*, *E. torquata*
-  C2 - *E. clelandiorum* (Cleland's Blackbutt)
-  C3 - *E. griffithsii* (*E. torquata* absent)

**Focus Minerals Coolgardie Flora Survey
Vegetation Communities - North**



Datum: GDA 1994
Projection: MGA Zone 51
Scale: 1: 4 000 at A3


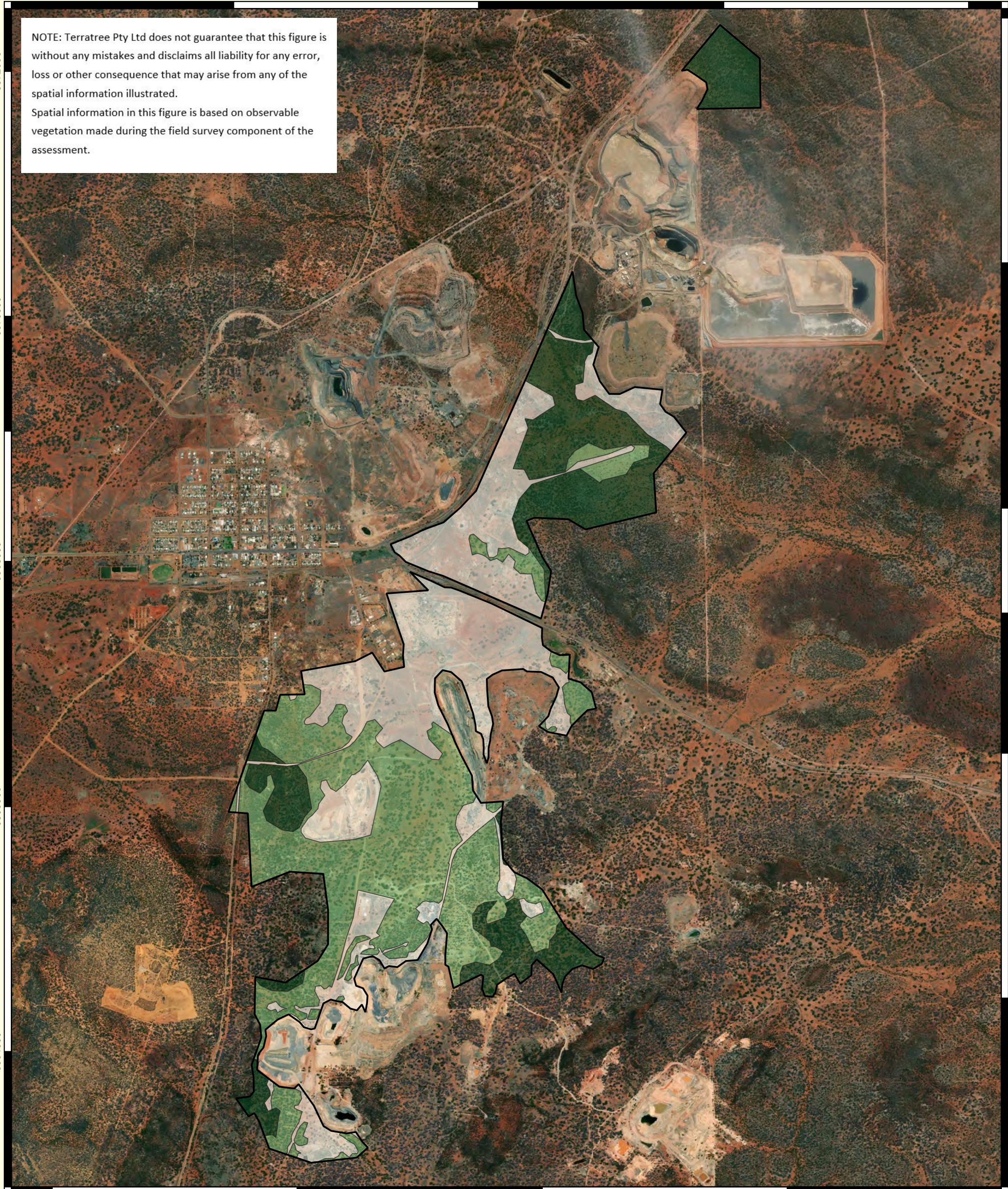
Date: 12/02/2021	Prepared: H. Legge	Project No: T20040
Expiry:	Checked: J. Grehan	
Figure 2d	Revision:	
	Review:	

Figure 3a: Vegetation Condition – Overview

NOTE: Terratree Pty Ltd does not guarantee that this figure is without any mistakes and disclaims all liability for any error, loss or other consequence that may arise from any of the spatial information illustrated.

Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.



Legend

Survey Area

Vegetation Condition

Very Good

Good

Degraded-Completely Degraded

Focus Minerals Coolgardie Flora Survey
Vegetation Condition - overview

0 1 2 km



Datum: GDA 1994
Projection: MGA Zone 50

Scale: 1: 29 000 at A3

Date: 22/02/2021

Prepared: H. Legge

Project No: T20040

Expiry:

Checked: J. Grehan

Figure 3a

Revision:

Review:



Figure 3b: Vegetation Condition – South

325000

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NOTE: Terratree Pty Ltd does not guarantee that this figure is without any mistakes and disclaims all liability for any error, loss or other consequence that may arise from any of the spatial information illustrated.

Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.

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Legend

Survey Area

Vegetation Condition

Degraded-Completely Degraded

Good

Very Good

Focus Minerals Coolgardie Flora Survey Vegetation Condition - south

0 1 km



Datum: GDA 1994
Projection: MGA Zone 51

Scale: 1: 15 000 at A3

Date: 22/02/2021

Prepared: H. Legge

Project No: T20040

Expiry:

Checked: J. Grehan

Figure 3b

Revision:

Review:

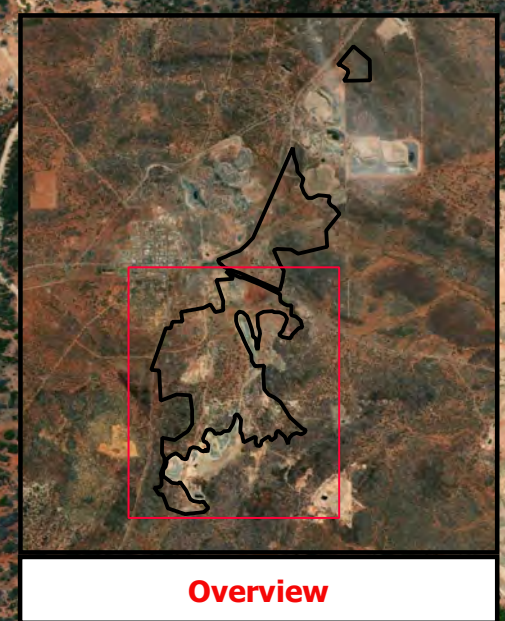


Figure 3c: Vegetation Condition – Mid

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NOTE: Terratree Pty Ltd does not guarantee that this figure is without any mistakes and disclaims all liability for any error, loss or other consequence that may arise from any of the spatial information illustrated.

Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.

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328000

Legend

Survey Area

Vegetation Condition

Degraded-Completely Degraded

Good

Very Good

Focus Minerals Coolgardie Flora Survey

Vegetation Condition - Mid

0 0.5 km



Datum: GDA 1994
Projection: MGA Zone 51

Scale: 1: 10 000 at A3

Date: 22/02/2021

Prepared: H. Legge

Project No: T20040

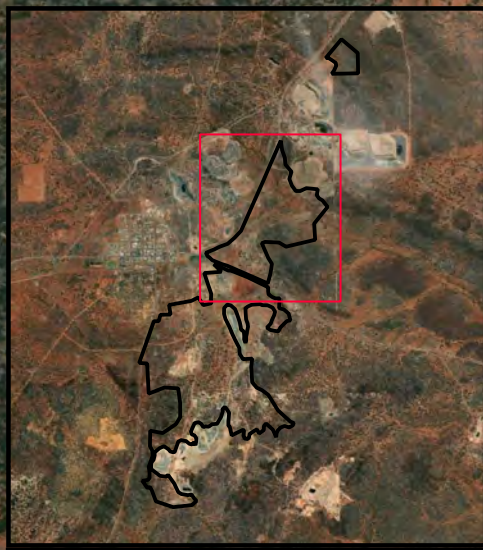
Expiry:

Checked: J. Grehan

Figure 3c

Revision:

Review:



Overview

Figure 3d: Vegetation Condition – North

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NOTE: Terratree Pty Ltd does not guarantee that this figure is without any mistakes and disclaims all liability for any error, loss or other consequence that may arise from any of the spatial information illustrated.
Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.



Overview

328000 328200 328400 328600 328800 329000

Legend

Survey Area

Vegetation Condition

Very Good

Focus Minerals Coolgardie Flora Survey

Vegetation Condition - North

0 100 200 m



Datum: GDA 1994
Projection: MGA Zone 51
Scale: 1: 4 000 at A3

Date: 22/02/2021	Prepared: H. Legge	Project No: T20040
Expiry:	Checked: J. Grehan	
Figure 3d	Revision:	
	Review:	

Appendices

Appendix A: Conservation Codes under WA and Commonwealth Legislation

Table A.1: Conservation Codes for Western Australia Flora and Fauna (DBCA 2019)

Category	Code	Definition
Threatened Species	T: Threatened Species	Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the <i>Biodiversity Conservation Act 2016</i> (BC Act). Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna. Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened Flora. The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria.
	CR: Critically Endangered Species	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 <i>BC Act</i> in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.
	EN: Endangered Species	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 <i>BC Act</i> in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.
	VU: Vulnerable Species	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 <i>BC Act</i> in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.
Extinct Species	EX: Extinct Species	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 <i>BC Act</i>). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.
	EW: Extinct in the Wild Species	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 <i>BC Act</i>). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
Specially Protected Species	MI: Migratory Species	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 <i>BC Act</i>). 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

Category	Code	Definition
		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 <i>BC Act</i> 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. Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
	CD: Species of Special Conservation Interest (Conservation Dependent Fauna)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the <i>BC Act</i>). Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
	OS: Other Specially Protected Species	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 <i>BC Act</i>). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
Priority Species	Priority 1: Poorly Known Species	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
	Priority 2: Poorly-known Species	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
	Priority 3: Poorly-known species	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
	Priority 4: Rare, Near Threatened and Other Species in Need of Monitoring	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Table A.2: Conservation Codes for Western Australia Ecological Communities (DEC 2013)

Code	Definition
<p>PD: Presumed Totally Destroyed</p>	<p>An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies):</p> <p>A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or</p> <p>B) All occurrences recorded within the last 50 years have since been destroyed.</p>
<p>CR: Critically Endangered</p>	<p>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. An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria:</p> <p>A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply:</p> <ul style="list-style-type: none"> i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years); ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. <p>B) Current distribution is limited, and one or more of the following apply:</p> <ul style="list-style-type: none"> i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years); ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes; iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. <p>C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).</p>
<p>EN: Endangered</p>	<p>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. An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria:</p> <p>A) The geographic range, and/or total area occupied, and/or number of discrete occurrences</p>

Code	Definition
	<p>have been reduced by at least 70% since European settlement and either or both of the following apply:</p> <ul style="list-style-type: none"> i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years); ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated. <p>B) Current distribution is limited, and one or more of the following apply):</p> <ul style="list-style-type: none"> i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years); ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes; iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes. <p>C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).</p>
VU: Vulnerable	<p>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. An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium (within approximately 50 years) to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria:</p> <p>A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.</p> <p>B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.</p> <p>C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long-term future because of existing or impending threatening processes.</p>
Priority One: Poorly-known ecological communities	<p>Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤ 5 occurrences or a total area of ≤ 100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.</p>
Priority Two: Poorly-known ecological communities	<p>Communities that are known from few occurrences with a restricted distribution (generally ≤ 10 occurrences or a total area of ≤ 200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.</p>
Priority Three: Poorly known ecological	<p>(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:</p>

Code	Definition
communities	<p>(ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or;</p> <p>(iii) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc.</p> <p>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.</p>
Priority Four: 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.	<p>These communities require regular monitoring.</p> <p>(i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.</p> <p>(ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category.</p> <p>(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.</p>
Priority Five: Conservation Dependent ecological communities	<p>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.</p>

Table A.3: Conservation Codes for Threatened Species under the Commonwealth EPBC Act

Code	Definition
Ex: Extinct	<p>A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.</p>
ExW: Extinct in the Wild	<p>A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:</p> <p>(a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or</p> <p>(b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.</p>
CE: Critically Endangered	<p>A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.</p>
E: Endangered	<p>A native species is eligible to be included in the endangered category at a particular time if, at that time:</p> <p>(a) it is not critically endangered; and</p> <p>(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</p>
V: Vulnerable	<p>A native species is eligible to be included in the vulnerable category at a particular time if, at that time:</p> <p>(a) it is not critically endangered or endangered; and</p> <p>(b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.</p>

Code	Definition
CD: Conservation Dependent	<p>A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:</p> <p>(a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or</p> <p>(b) the following subparagraphs are satisfied:</p> <ul style="list-style-type: none"> (i) the species is a species of fish; (ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

Table A.4: Conservation Codes for Threatened Ecological Communities under the Commonwealth *EPBC Act*

Code	Definition
CE: Critically Endangered	An ecological community is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E: Endangered	<p>An ecological community is eligible to be included in the endangered category at a particular time if, at that time:</p> <p>(a) it is not critically endangered; and</p> <p>(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</p>
V: Vulnerable	<p>An ecological community is eligible to be included in the vulnerable category at a particular time if, at that time:</p> <p>(a) it is not critically endangered nor endangered; and</p> <p>(b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.</p>

Appendix B: Complete NatureMap Search Results

NatureMap Species Report_Coolgardie20km

Created By Guest user on 10/08/2020

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 121° 10' 00" E, 30° 57' 23" S
Buffer 20km
Group By Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	655	2936
Priority 1	10	34
Priority 2	4	7
Priority 3	7	14
Priority 4	2	2
Protected under international agreement	2	4
Rare or likely to become extinct	2	17
TOTAL	682	3014

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
Rare or likely to become extinct				
1.	11034 <i>Gastrolobium graniticum</i>		T	
2.	24557 <i>Leipoa ocellata</i> (Malleefowl)		T	
Protected under international agreement				
3.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
4.	24808 <i>Tringa nebularia</i> (Common Greenshank, greenshank)		IA	
Priority 1				
5.	44469 <i>Acacia coatesii</i>		P1	Y
6.	11765 <i>Acacia sclerophylla</i> var. <i>teretiusscula</i>		P1	
7.	3600 <i>Acacia websteri</i>		P1	
8.	36283 <i>Austrostipa</i> sp. Carlingup Road (S. Kern & R. Jasper LCH 18459)		P1	
9.	7463 <i>Dampiera plumosa</i>		P1	
10.	13053 <i>Eucalyptus websteriana</i> subsp. <i>norsemanica</i>		P1	
11.	30438 <i>Lepidosperma</i> sp. Parker Range (N. Gibson & M. Lyons 2094)		P1	
12.	16621 <i>Phebalium appressum</i>		P1	
13.	20680 <i>Thryptomene</i> sp. Coolgardie (E. Kelso s.n. 1902)		P1	Y
14.	36017 <i>Thryptomene</i> sp. Londonderry (R.H. Kuchel 1763)		P1	
Priority 2				
15.	34556 <i>Austrostipa</i> sp. Dowerin (G. Wiehl F 8004)		P2	
16.	16047 <i>Hakea rigida</i>		P2	
17.	3031 <i>Lepidium merrallii</i>		P2	
18.	4498 <i>Phebalium clavatum</i>		P2	
Priority 3				
19.	13897 <i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i>		P3	
20.	17232 <i>Austrostipa blackii</i>		P3	
21.	47074 <i>Chrysocephalum apiculatum</i> subsp. <i>norsemanense</i>		P3	
22.	7278 <i>Eremophila veronica</i>		P3	
23.	2009 <i>Grevillea georgeana</i>		P3	
24.	48227 <i>Notisia intonsa</i>		P3	
25.	3059 <i>Phlegmatospermum eremaeum</i>		P3	
Priority 4				
26.	13641 <i>Eremophila caerulea</i> subsp. <i>merrallii</i>		P4	
27.	31815 <i>Eucalyptus jutsonii</i> subsp. <i>jutsonii</i>		P4	
Non-conservation taxon				
28.	3200 <i>Acacia acuminata</i> (Jam, Mangard)			
29.	14584 <i>Acacia ancistrophylla</i> var. <i>ancistrophylla</i>			
30.	3216 <i>Acacia andrewsii</i>			
31.	3236 <i>Acacia beauverdiana</i> (Pukkati)			
32.	3249 <i>Acacia calcarata</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
33.	3251 <i>Acacia camptoclada</i>			
34.	3256 <i>Acacia chrysellia</i>			
35.	44514 <i>Acacia collegialis</i>			
36.	3264 <i>Acacia colletioides</i> (Wait-a-while)			
37.	3269 <i>Acacia coolgardiensis</i> (Spinifex Wattle)			
38.	15281 <i>Acacia desertorum</i> var. <i>desertorum</i>			
39.	3315 <i>Acacia duriuscula</i>			
40.	32118 <i>Acacia effusifolia</i>			
41.	3318 <i>Acacia enervia</i>			
42.	12257 <i>Acacia enervia</i> subsp. <i>explicata</i>			
43.	3324 <i>Acacia erinacea</i>			
44.	15282 <i>Acacia gibbosa</i>			
45.	3366 <i>Acacia hemiteles</i>			
46.	3378 <i>Acacia inaequiloba</i>			
47.	16164 <i>Acacia inceana</i> subsp. <i>inceana</i>			
48.	3393 <i>Acacia jennerae</i>			
49.	3408 <i>Acacia lasiocalyx</i> (Silver Wattle, Wilyurwur)			
50.	3416 <i>Acacia leptopetala</i>			
51.	3426 <i>Acacia longispinea</i>			
52.	3440 <i>Acacia merrallii</i>			
53.	3451 <i>Acacia multispicata</i>			
54.	3452 <i>Acacia murrayana</i> (Sandplain Wattle)			
55.	3463 <i>Acacia nyssophylla</i>			
56.	3478 <i>Acacia pachypoda</i>			
57.	3495 <i>Acacia prainii</i> (Prain's Wattle)			
58.	3504 <i>Acacia pycnantha</i> (Golden Wattle)	Y		
59.	3512 <i>Acacia rendlei</i>			
60.	3513 <i>Acacia resinimarginea</i>			
61.	3514 <i>Acacia resinistipulea</i>			
62.	3539 <i>Acacia sericocarpa</i>			
63.	<i>Acacia</i> sp.			
64.	3577 <i>Acacia tetragonophylla</i> (Kurara, Wakalpuka)			
65.	15292 <i>Acacia yorkakinensis</i> subsp. <i>acrita</i>			
66.	24559 <i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
67.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
68.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
69.	24265 <i>Acanthiza uropygialis</i> (Chestnut-rumped Thornbill)			
70.	25544 <i>Aegotheles cristatus</i> (Australian Owllet-nightjar)			
71.	13904 <i>Allocaeusuarina acutivalvis</i> subsp. <i>acutivalvis</i>			
72.	1722 <i>Allocaeusuarina corniculata</i>			
73.	<i>Allodessus bistrigatus</i>			
74.	2652 <i>Alternanthera nodiflora</i> (Common Joyweed)			
75.	19467 <i>Aluta appressa</i>			
76.	19466 <i>Aluta aspera</i> subsp. <i>aspera</i>			
77.	6565 <i>Alyxia buxifolia</i> (Dysentery Bush)			
78.	12025 <i>Amphipogon caricinus</i> var. <i>caricinus</i>			
79.	11614 <i>Amyema gibberula</i> var. <i>gibberula</i>			
80.	2383 <i>Amyema preissii</i> (Wireleaf Mistletoe)			
81.	<i>Aname armigera</i>			
82.	<i>Aname mainae</i>			
83.	24312 <i>Anas gracilis</i> (Grey Teal)			
84.	24313 <i>Anas platyrhynchos</i> (Mallard)			
85.	24315 <i>Anas rhynchotis</i> (Australasian Shoveler)			
86.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
87.	40910 <i>Androcalva luteiflora</i> (Yellow-flowered Rulingia)			
88.	7836 <i>Angianthus tomentosus</i> (Camel-grass)			
89.	47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)			
90.	<i>Anidiops villosus</i>			
91.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
92.	31876 <i>Arabidella chrysodema</i>			
93.	2992 <i>Arabidella trisecta</i>			
94.	41324 <i>Ardea modesta</i> (great egret, white egret)			
95.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
96.	24610 <i>Ardeotis australis</i> (Australian Bustard)			
97.	207 <i>Aristida contorta</i> (Bunched Kerosene Grass)			
98.	12063 <i>Aristida holathera</i> var. <i>holathera</i>			
99.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
100.	24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)			
101.	24356 <i>Artamus personatus</i> (Masked Woodswallow)			
102.	27587 <i>Aspicilla calcarea</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
103.	7846 <i>Asteridea athrioides</i>			
104.	20726 <i>Astus subroseus</i>			
105.	11489 <i>Atriplex acutibractea</i> subsp. <i>karoniensis</i>			
106.	2453 <i>Atriplex codonocarpa</i> (Flat-topped Saltbush)			
107.	2455 <i>Atriplex eardleyae</i>			
108.	2459 <i>Atriplex holocarpa</i> (Pop Saltbush)			
109.	11516 <i>Atriplex nummularia</i> subsp. <i>spathulata</i> (Old Man Saltbush)			
110.	11791 <i>Atriplex quadrivalvata</i> var. <i>quadrivalvata</i>			
111.	2478 <i>Atriplex spongiosa</i> (Pop Saltbush)			
112.	2481 <i>Atriplex vesicaria</i> (Bladder Saltbush)			
113.	<i>Austracantha minax</i>			
114.	17237 <i>Austrostipa elegantissima</i>			
115.	17238 <i>Austrostipa eremophila</i>			
116.	17246 <i>Austrostipa nitida</i>			
117.	17247 <i>Austrostipa platychaeta</i>			
118.	17251 <i>Austrostipa scabra</i>			
119.	17255 <i>Austrostipa trichophylla</i>			
120.	24318 <i>Aythya australis</i> (Hardhead)			
121.	<i>Backbourkia heroine</i>			
122.	5344 <i>Baeckea elderiana</i>			
123.	36038 <i>Baeckea</i> sp. <i>Koonadgin</i> (B.L. Rye & M.E. Trudgen BLR 241137)			
124.	1815 <i>Banksia elderiana</i> (Swordfish Banksia)			
125.	<i>Barnardius zonarius</i>			
126.	<i>Berosus nutans</i>			
127.	4598 <i>Beyeria lechenaultii</i> (Pale Turpentine Bush)			
128.	34257 <i>Beyeria sulcata</i> var. <i>sulcata</i>			
129.	25798 <i>Billardiera fusiformis</i> (Australian Bluebell)			
130.	24319 <i>Biziura lobata</i> (Musk Duck)			
131.	4409 <i>Boronia coerulea</i>			
132.	18427 <i>Bossiaea cucullata</i>			
133.	7871 <i>Brachyscome ciliaris</i>			
134.	7880 <i>Brachyscome lineariloba</i>			
135.	7882 <i>Brachyscome perpusilla</i>			
136.	42381 <i>Brachyurophis semifasciatus</i> (Southern Shovel-nosed Snake)			
137.	3000 <i>Brassica tournefortii</i> (Mediterranean Turnip)	Y		
138.	19069 <i>Brunonia</i> sp. <i>Goldfields</i> (K.R. Newbey 6044)			
139.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
140.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
141.	2853 <i>Calandrinia eremaea</i> (Twining Purslane)			
142.	96 <i>Callitris preissii</i> (Rottnest Island Pine, Maro)			
143.	5408 <i>Calothamnus gilesii</i>			
144.	7903 <i>Calotis hispidula</i> (Bindy Eye)			
145.	5442 <i>Calytrix birdii</i>			
146.	13654 <i>Calytrix breviseta</i> subsp. <i>stipulosa</i>			
147.	3008 <i>Carrichtera annua</i> (Ward's Weed)	Y		
148.	12658 <i>Casuarina pauper</i> (Black Oak)			
149.	258 <i>Cenchrus ciliaris</i> (Buffel Grass)	Y		
150.	7922 <i>Cephalopterum drummondii</i> (Pompom Head)			
151.	7924 <i>Ceratogyne obionoides</i> (Wingwort)			
152.	24086 <i>Cercartetus concinnus</i> (Western Pygmy-possum, Mundarda)			
153.	24186 <i>Chalinolobus gouldii</i> (Gould's Wattle Bat)			
154.	1215 <i>Chamaexeros fimbriata</i>			
155.	12818 <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			
156.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
157.	2487 <i>Chenopodium curvispicatum</i>			
158.	47909 <i>Cheramoeca leucosterna</i> (White-backed Swallow)			
159.	271 <i>Chloris truncata</i> (Windmill Grass)			
160.	765 <i>Chrysitrix distigmata</i>			
161.	13138 <i>Chrysocephalum puteale</i>			
162.	48177 <i>Cladia muelleri</i>			
163.	28208 <i>Cladonia cervicornis</i> subsp. <i>verticillata</i>			
164.	24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
165.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
166.	24399 <i>Columba livia</i> (Domestic Pigeon)	Y		
167.	4553 <i>Comesperma drummondii</i> (Drummond's Milkwort)			
168.	4561 <i>Comesperma scoparium</i> (Broom Milkwort)			
169.	40923 <i>Commersonia krauophylla</i> (Brittle Leaved Rulingia)			
170.	40927 <i>Commersonia magniflora</i> subsp. <i>oblongifolia</i>			
171.	15611 <i>Conospermum stoechadis</i> subsp. <i>stoechadis</i> (Common Smokebush)			
172.	6612 <i>Convolvulus clementii</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
173.	7939 <i>Conyza bonariensis</i> (Flaxleaf Fleabane)	Y		
174.	20074 <i>Conyza sumatrensis</i>	Y		
175.	7419 <i>Coopermookia strophiolata</i>			
176.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
177.	24416 <i>Corvus bennetti</i> (Little Crow)			
178.	25592 <i>Corvus coronoides</i> (Australian Raven)			
179.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
180.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
181.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
182.	11709 <i>Crassula colorata</i> var. <i>acuminata</i>			
183.	11563 <i>Crassula colorata</i> var. <i>colorata</i>			
184.	20268 <i>Crassula tetramera</i>			
185.	7950 <i>Cratystylis microphylla</i> (Small-leaved Grey Bush)			
186.	16183 <i>Cryptandra aridicola</i>			
187.	4809 <i>Cryptandra pungens</i>			
188.	24871 <i>Ctenophorus cristatus</i> (Bicycle Dragon)			
189.	24874 <i>Ctenophorus isolepis</i> subsp. <i>citrinus</i> (Yellowy Military Dragon)			
190.	24882 <i>Ctenophorus nuchalis</i> (Central Netted Dragon)			
191.	24888 <i>Ctenophorus salinarum</i> (Salt Pan Dragon)			
192.	25026 <i>Ctenotus atlas</i>			
193.	25080 <i>Ctenotus uber</i> subsp. <i>uber</i> (Spotted Ctenotus)			
194.	17417 <i>Cullen discolor</i>			
195.	6747 <i>Cyanostegia angustifolia</i> (Tinsel-flower)			
196.	6751 <i>Cyanostegia microphylla</i> (Tinsel Flower)			
197.	25089 <i>Cyclodomorphus melanops</i> subsp. <i>elongatus</i> (Slender Blue-tongue)			
198.	24322 <i>Cygnus atratus</i> (Black Swan)			
199.	20281 <i>Cylindropuntia tunicata</i>	Y		Y
200.	290 <i>Dactyloctenium radulans</i> (Button Grass)			
201.	7451 <i>Dampiera lavandulacea</i>			
202.	7456 <i>Dampiera luteiflora</i> (Yellow Dampiera)			
203.	7477 <i>Dampiera stenostachya</i> (Narrow-spiked Dampiera)			
204.	13158 <i>Dampiera tenuicaulis</i> var. <i>curvula</i>			
205.	13159 <i>Dampiera tenuicaulis</i> var. <i>tenuicaulis</i>			
206.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
207.	41025 <i>Dasymalla terminalis</i> (Native Foxglove)			
208.	6218 <i>Daucus glochidiatus</i> (Australian Carrot)			
209.	3813 <i>Daviesia grahamii</i>			
210.	3823 <i>Daviesia nematophylla</i>			
211.	24995 <i>Delma australis</i>			
212.	25247 <i>Demansia psammophis</i> subsp. <i>psammophis</i> (Yellow-faced Whipsnake)			
213.	6771 <i>Dicrastylis parvifolia</i>			
214.	32346 <i>Didymodon torquatus</i>			
215.	25469 <i>Diplodactylus granariensis</i>			
216.	24929 <i>Diplodactylus granariensis</i> subsp. <i>granariensis</i>			
217.	24940 <i>Diplodactylus pulcher</i>			
218.	27725 <i>Diploschistes thunbergianus</i>			
219.	2499 <i>Dissocarpus paradoxus</i> (Curious Saltbush)			
220.	4753 <i>Dodonaea amblyophylla</i>			
221.	4769 <i>Dodonaea lobulata</i> (Bead Hopbush)			
222.	4770 <i>Dodonaea microzyga</i>			
223.	12034 <i>Dodonaea microzyga</i> var. <i>acrolobata</i>			
224.	4780 <i>Dodonaea stenozyga</i>			
225.	11247 <i>Dodonaea viscosa</i> subsp. <i>angustissima</i>			
226.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
227.	49090 <i>Drosera</i> sp. <i>Branched styles</i> (S.C. Coffey 193)			
228.	24650 <i>Drymodes brunneopygia</i> (Southern Scrub-robin)			
229.	6966 <i>Duboisia hopwoodii</i> (Pituri, Kundugu)			
230.	33501 <i>Dysphania cristata</i> (Crested Goosefoot)			
231.	33480 <i>Dysphania pumilio</i> (Clammy Goosefoot)			
232.	25094 <i>Egretta formosa</i>			
233.	<i>Egretta novaehollandiae</i>			
234.	<i>Elanus axillaris</i>			
235.	47937 <i>Elseya melanops</i> (Black-fronted Dotterel)			
236.	2511 <i>Enchylaena tomentosa</i> (Barrier Saltbush)			
237.	12064 <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> (Barrier Saltbush)			
238.	356 <i>Enneapogon avenaceus</i> (Bottle Washers)			
239.	<i>Enochrus elongatulus</i>			
240.	<i>Eolophus roseicapillus</i>			
241.	24651 <i>Eopsaltria australis</i> subsp. <i>griseogularis</i> (Western Yellow Robin)			
242.	24567 <i>Epthianura albigrons</i> (White-fronted Chat)			

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243.	376 <i>Eragrostis curvula</i> (African Lovegrass)	Y		
244.	378 <i>Eragrostis dielsii</i> (Mallee Lovegrass)			
245.	399 <i>Eragrostis xerophila</i> (Knotty-butt Neverfail)			
246.	25109 <i>Eremiascincus richardsonii</i> (Broad-banded Sand Swimmer)			
247.	7180 <i>Eremophila alternifolia</i> (Poverty Bush)			
248.	16377 <i>Eremophila caerulea</i> subsp. <i>caerulea</i>			
249.	13807 <i>Eremophila caperata</i>			
250.	7189 <i>Eremophila clarkei</i> (Turpentine Bush)			
251.	17156 <i>Eremophila clavata</i>			
252.	14895 <i>Eremophila decipiens</i> subsp. <i>decipiens</i>			
253.	7195 <i>Eremophila dempsteri</i>			
254.	7198 <i>Eremophila deserti</i>			
255.	7200 <i>Eremophila drummondii</i>			
256.	7212 <i>Eremophila gibbosa</i>			
257.	14340 <i>Eremophila glabra</i> subsp. <i>glabra</i>			
258.	7219 <i>Eremophila granitica</i> (Thin-leaved Poverty Bush)			
259.	15112 <i>Eremophila interstans</i> subsp. <i>interstans</i>			
260.	15111 <i>Eremophila interstans</i> subsp. <i>virgata</i>			
261.	7226 <i>Eremophila ionantha</i> (Violet-flowered Eremophila)			
262.	16363 <i>Eremophila maculata</i> subsp. <i>brevifolia</i> (Native Fuchsia)			
263.	14632 <i>Eremophila oblonga</i>			
264.	15003 <i>Eremophila oldfieldii</i> subsp. <i>angustifolia</i>			
265.	17168 <i>Eremophila oldfieldii</i> subsp. <i>oldfieldii</i>			
266.	18570 <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>			
267.	14594 <i>Eremophila parvifolia</i> subsp. <i>auricampa</i>			
268.	15172 <i>Eremophila rugosa</i>			
269.	7264 <i>Eremophila saligna</i> (Willowy Eremophila)			
270.	7267 <i>Eremophila scoparia</i> (Broom Bush ())			
271.	17162 <i>Eremophila subfloccosa</i> subsp. <i>lanata</i>			
272.	417 <i>Eriachne pulchella</i> (Pretty Wanderrie)			
273.	45244 <i>Ericomyrtus serpyllifolia</i>			
274.	2514 <i>Eriochiton sclerolaenoides</i> (Woolly Bindii)			
275.	<i>Eriophora biapicata</i>			
276.	4332 <i>Erodium botrys</i> (Long Storksbill)	Y		
277.	4333 <i>Erodium cicutarium</i> (Common Storksbill)	Y		
278.	4334 <i>Erodium crinitum</i> (Corkscrew)			
279.	4335 <i>Erodium cygnorum</i> (Blue Heronsbill)			
280.	14377 <i>Erymophyllum ramosum</i> subsp. <i>ramosum</i>			
281.	5581 <i>Eucalyptus campaspe</i> (Silver Gimlet)			
282.	14300 <i>Eucalyptus celastroides</i> subsp. <i>celastroides</i> (Mirret)			
283.	48436 <i>Eucalyptus clelandiorum</i>			
284.	5607 <i>Eucalyptus corrugata</i> (Rough-fruited Mallee)			
285.	5612 <i>Eucalyptus cylindrocarpa</i> (Woodline Mallee)			
286.	34811 <i>Eucalyptus distuberosa</i> subsp. <i>distuberosa</i>			
287.	5637 <i>Eucalyptus eremophila</i> (Tall Sand Mallee)			
288.	15667 <i>Eucalyptus eremophila</i> subsp. <i>eremophila</i> (Sand Mallee)			
289.	5648 <i>Eucalyptus flocktoniae</i> (Merrit, Merid)			
290.	18521 <i>Eucalyptus flocktoniae</i> subsp. <i>flocktoniae</i>			
291.	14277 <i>Eucalyptus fraseri</i> subsp. <i>fraseri</i>			
292.	5665 <i>Eucalyptus griffithsii</i> (Griffith's Grey Gum)			
293.	5675 <i>Eucalyptus incrassata</i> (Lerp Mallee)			
294.	15682 <i>Eucalyptus leptophylla</i> (Narrow-leaved Red Mallee)			
295.	13056 <i>Eucalyptus leptopoda</i> subsp. <i>subluta</i>			
296.	5697 <i>Eucalyptus lesouefii</i> (Goldfields Blackbutt)			
297.	20802 <i>Eucalyptus longissima</i>			
298.	5726 <i>Eucalyptus oleosa</i> (Giant Mallee)			
299.	20091 <i>Eucalyptus oleosa</i> subsp. <i>oleosa</i>			
300.	5745 <i>Eucalyptus pileata</i> (Capped Mallee)			
301.	18580 <i>Eucalyptus planipes</i>			
302.	5747 <i>Eucalyptus platycorys</i> (Boorabbin Mallee)			
303.	19064 <i>Eucalyptus prolixa</i>			
304.	12380 <i>Eucalyptus ravida</i> (Silver-topped Gimlet)			
305.	5761 <i>Eucalyptus rigidula</i> (Stiff-leaved Mallee)			
306.	12693 <i>Eucalyptus salicola</i> (Salt Gum)			
307.	5766 <i>Eucalyptus salmonophloia</i> (Salmon Gum, Wurak)			
308.	5767 <i>Eucalyptus salubris</i> (Gimlet)			
309.	13027 <i>Eucalyptus tenera</i>			
310.	5792 <i>Eucalyptus torquata</i> (Coral Gum)			
311.	5793 <i>Eucalyptus transcontinentalis</i> (Redwood, Pungul)			
312.	18293 <i>Eucalyptus urna</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
313.	34775 <i>Eucalyptus vittata</i>			
314.	5798 <i>Eucalyptus websteriana</i> (Webster's Mallee)			
315.	13054 <i>Eucalyptus websteriana</i> subsp. <i>websteriana</i>			
316.	5802 <i>Eucalyptus yilgarnensis</i> (Yorrell)			
317.	16722 <i>Euryomyrtus maidenii</i>			
318.	10977 <i>Exocarpos aphyllus</i> (Leafless Ballart)			
319.	25621 <i>Falco berigora</i> (Brown Falcon)			
320.	24471 <i>Falco berigora</i> subsp. <i>berigora</i> (Brown Falcon)			
321.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
322.	25623 <i>Falco longipennis</i> (Australian Hobby)			
323.	5197 <i>Frankenia desertorum</i>			
324.	5204 <i>Frankenia interioris</i>			
325.	5209 <i>Frankenia pauciflora</i> (Seaheath)			
326.	25727 <i>Fulica atra</i> (Eurasian Coot)			
327.	24957 <i>Gehyra purpurascens</i>			
328.	24959 <i>Gehyra variegata</i>			
329.	12780 <i>Gilberta tenuifolia</i>			
330.	29836 <i>Glandularia aristigera</i>	Y		
331.	33620 <i>Glischrocaryon angustifolium</i>			
332.	6143 <i>Glischrocaryon aureum</i> (Common Popflower)			
333.	3943 <i>Glycyrrhiza acanthocarpa</i> (Native Liquorice)			
334.	11801 <i>Gonocarpus confertifolius</i> var. <i>helmsii</i>			
335.	7499 <i>Goodenia concinna</i> (Elegant Goodenia)			
336.	7506 <i>Goodenia elderi</i>			
337.	7514 <i>Goodenia havilandii</i>			
338.	12523 <i>Goodenia helmsii</i>			
339.	7527 <i>Goodenia mimuloides</i>			
340.	7565 <i>Goodenia xanthosperma</i> (Yellow-seeded Goodenia)			
341.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
342.	1946 <i>Grevillea acacioides</i>			
343.	1949 <i>Grevillea acuaría</i>			
344.	1962 <i>Grevillea beardiana</i> (Red Combs)			
345.	1971 <i>Grevillea cagiana</i> (Red Toothbrushes)			
346.	13453 <i>Grevillea didymobotrya</i> subsp. <i>didymobotrya</i>			
347.	8832 <i>Grevillea excelsior</i> (Flame Grevillea)			
348.	14413 <i>Grevillea haplantha</i> subsp. <i>haplantha</i>			
349.	19314 <i>Grevillea hookeriana</i> subsp. <i>apicioloba</i>			
350.	19541 <i>Grevillea nematophylla</i> subsp. <i>nematophylla</i>			
351.	2056 <i>Grevillea paniculata</i>			
352.	2077 <i>Grevillea pterosperma</i>			
353.	13458 <i>Grevillea sarissa</i> subsp. <i>sarissa</i>			
354.	2104 <i>Grevillea teretifolia</i> (Round Leaf Grevillea)			
355.	2116 <i>Grevillea uncinulata</i> (Hook-leaf Grevillea)			
356.	2807 <i>Gunniopsis quadrifida</i> (Sturts Pigface)			
357.	2783 <i>Gyrostemon racemiger</i>			
358.	2163 <i>Hakea francisiana</i> (Emu Tree)			
359.	2182 <i>Hakea minyma</i>			
360.	6684 <i>Halgania andromedifolia</i>			
361.	29840 <i>Halgania cyanea</i> var. <i>Allambi Stn</i> (B.W. Strong 676)			
362.	31117 <i>Halgania cyanea</i> var. <i>Charleville</i> (R.W. Purdie +111)			
363.	6691 <i>Halgania integerrima</i>			
364.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
365.	6180 <i>Haloragis trigonocarpa</i>			
366.	17725 <i>Hannafordia bissillii</i> subsp. <i>latifolia</i>			
367.	8008 <i>Helianthus annuus</i> (Sunflower, Common Sunflower)	Y		
368.	6710 <i>Heliotropium europaeum</i> (Common Heliotrope)	Y		
369.	25115 <i>Hemiergis initialis</i> subsp. <i>initialis</i>			
370.	6776 <i>Hemiphora elderi</i> (Red Velvet)			
371.	42408 <i>Hesperoedura reticulata</i>			
372.	24961 <i>Heteronotia binoei</i> (Bynoe's Gecko)			
373.	4941 <i>Hibiscus solanifolius</i>			
374.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
375.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
376.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
377.	5815 <i>Homalocalyx thryptomenoides</i>			
378.	15447 <i>Hyalosperma glutinosum</i> subsp. <i>glutinosum</i>			
379.	12756 <i>Hyalosperma zacchaeus</i>			
380.	11973 <i>Hybanthus floribundus</i> subsp. <i>curvifolius</i>			
381.	48651 <i>Hysterobaeckea ochropetala</i> subsp. <i>reliqua</i>			
382.	<i>Idiommata blackwalli</i>			

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383.	8087 <i>Isoetopsis graminifolia</i> (Cushion Grass)			
384.	911 <i>Isolepis congrua</i>			
385.	7397 <i>Isotoma petraea</i> (Rock Isotome, Tundiwari)			
386.	4043 <i>Kennedia prorepens</i>			
387.	6779 <i>Lachnostachys coolgardiensis</i>			
388.	<i>Lampona cylindrata</i>			
389.	<i>Latrodoctus hasseltii</i>			
390.	4957 <i>Lawrencia repens</i>			
391.	7569 <i>Lechenaultia brevifolia</i>			
392.	27825 <i>Lecidea ochroleuca</i>			
393.	19237 <i>Leiocarpa websteri</i>			
394.	12628 <i>Lemooria burkittii</i>			
395.	3034 <i>Lepidium papillosum</i> (Warty Peppergrass)			Y
396.	1073 <i>Lepidobolus chaetocephalus</i> (Bristle-headed Chaff Rush)			
397.	1074 <i>Lepidobolus deserti</i>			
398.	<i>Lepidosperma</i> sp.			
399.	471 <i>Leptochloa digitata</i> (Whorled Cane Grass)			
400.	4056 <i>Leptosema daviesioides</i>			
401.	5848 <i>Leptospermum fastigiatum</i>			
402.	12692 <i>Leptospermum subtenuae</i>			
403.	25155 <i>Lerista muelleri</i>			
404.	25162 <i>Lerista picturata</i>			
405.	42411 <i>Lerista timida</i>			
406.	6401 <i>Leucopogon hamulosus</i>			
407.	16049 <i>Leucopogon</i> sp. Clyde Hill (M.A. Burgman 1207)			
408.	25659 <i>Lichenostomus leucotis</i> (White-eared Honeyeater)			
409.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
410.	6489 <i>Limonium sinuatum</i> (Perennial Sea Lavender)	Y		
411.	4061 <i>Lotus cruentus</i> (Redflower Lotus)			
412.	30935 <i>Lucasium maini</i>			
413.	6967 <i>Lycium australe</i> (Australian Boxthorn)			
414.	5281 <i>Lythrum hyssopifolia</i> (Lesser Loosestrife)	Y		
415.	24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo)			
416.	2535 <i>Maireana appressa</i>			
417.	2542 <i>Maireana erioclada</i>			
418.	2543 <i>Maireana eriosphaera</i>			
419.	2544 <i>Maireana georgei</i> (Satiny Bluebush)			
420.	2545 <i>Maireana glomerifolia</i> (Ball Leaf Bluebush)			
421.	2554 <i>Maireana pentagona</i> (Hairy Bluebush)			
422.	2555 <i>Maireana pentatropis</i>			
423.	2560 <i>Maireana pyramidata</i> (Sago Bush)			
424.	2561 <i>Maireana radiata</i>			
425.	2565 <i>Maireana suaedifolia</i>			
426.	2567 <i>Maireana tomentosa</i> (Felt Bluebush)			
427.	11662 <i>Maireana tomentosa</i> subsp. <i>tomentosa</i>			
428.	2568 <i>Maireana trichoptera</i> (Downy Bluebush)			
429.	2569 <i>Maireana triptera</i> (Threewinged Bluebush)			
430.	24326 <i>Malacothynchus membranaceus</i> (Pink-eared Duck)			
431.	5864 <i>Malleostemon peltiger</i>			
432.	5865 <i>Malleostemon roseus</i>			
433.	5866 <i>Malleostemon tuberculatus</i>			
434.	25652 <i>Malurus leucopterus</i> (White-winged Fairy-wren)			
435.	24551 <i>Malurus pulcherrimus</i> (Blue-breasted Fairy-wren)			
436.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
437.	4961 <i>Malva parviflora</i> (Marshmallow)	Y		
438.	41544 <i>Malva weinmanniana</i>			
439.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
440.	19421 <i>Marianthus bicolor</i> (Painted Marianthus)			
441.	6881 <i>Marrubium vulgare</i> (Horehound)	Y		
442.	12949 <i>Marsdenia australis</i>			
443.	4077 <i>Medicago minima</i> (Small Burr Medic)	Y		
444.	15063 <i>Melaleuca acuminata</i> subsp. <i>acuminata</i>			
445.	19380 <i>Melaleuca calyptroides</i>			
446.	5896 <i>Melaleuca cordata</i>			
447.	5909 <i>Melaleuca elliptica</i> (Granite Bottlebrush, Ngow)			
448.	19486 <i>Melaleuca hamata</i>			
449.	5922 <i>Melaleuca lanceolata</i> (Rottnest Teatree, Moonah)			
450.	5925 <i>Melaleuca lateriflora</i> (Gorada)			
451.	5929 <i>Melaleuca leiocarpa</i>			
452.	14700 <i>Melaleuca macronychia</i> subsp. <i>macronychia</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
453.	15663 <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>			
454.	20287 <i>Melaleuca zeteticorum</i>			
455.	25663 <i>Melithreptus brevirostris</i> (Brown-headed Honeyeater)			
456.	25184 <i>Menetia greyii</i>			
457.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)			
458.	954 <i>Mesomelaena preissii</i>			
459.	25693 <i>Microeca fascinans</i> (Jacky Winter)			
460.	9187 <i>Micromyrtus erichsenii</i>			
461.	19787 <i>Micromyrtus monotaxis</i>			
462.	8105 <i>Millotia myosotidifolia</i>			
463.	4089 <i>Mirbelia depressa</i>			
464.	4094 <i>Mirbelia microphylla</i>			
465.	4097 <i>Mirbelia ramulosa</i>			
466.	4099 <i>Mirbelia seorsifolia</i>			
467.	24904 <i>Moloch horridus</i> (Thorny Devil)			
468.	490 <i>Monachather paradoxus</i>			
469.	29418 <i>Monoculus monstrosus</i>	Y		
470.	4664 <i>Monotaxis luteiflora</i>			
471.	25240 <i>Morelia spilota</i> subsp. <i>imbricata</i> (Carpet Python)			
472.	24223 <i>Mus musculus</i> (House Mouse)	Y		
473.	14186 <i>Myriocephalus pygmaeus</i>			
474.	25425 <i>Neobatrachus kunapalari</i> (Kunapalari Frog)			
475.	25426 <i>Neobatrachus pelobatoides</i> (Humming Frog)			
476.	25427 <i>Neobatrachus sutor</i> (Shoemaker Frog)			
477.	<i>Nicodamus mainae</i>			
478.	6978 <i>Nicotiana rotundifolia</i> (Round-leaved Tobacco)			
479.	24096 <i>Ningai yvonneae</i> (Southern Ningai)			
480.	24229 <i>Notomys mitchellii</i> (Mitchell's Hopping-mouse)			
481.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
482.	8134 <i>Olearia exiguiifolia</i> (Small-leaved Daisy Bush)			
483.	8136 <i>Olearia homolepis</i>			
484.	19023 <i>Olearia incana</i>			
485.	8140 <i>Olearia muelleri</i> (Goldfields Daisy)			
486.	8145 <i>Olearia pimeleoides</i> (Pimelea Daisybush, Burrobunga)			
487.	8149 <i>Olearia rudis</i> (Rough Daisybush)			
488.	44401 <i>Olearia</i> sp. <i>Eremicola</i> (Diels & Pritzel s.n. PERTH 00449628)			
489.	8152 <i>Olearia subspicata</i> (Spiked Daisy Bush)			
490.	31799 <i>Opuntia elata</i>	Y		
491.	24618 <i>Oreoica gutturalis</i> (Crested Bellbird)			
492.	<i>Ostracoda</i> (unident.)			
493.	4355 <i>Oxalis perennans</i>			
494.	<i>Ozestheria packardi</i>			
495.	12642 <i>Ozothamnus cassiope</i>			
496.	24619 <i>Pachycephala inornata</i> (Gilbert's Whistler)			
497.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
498.	2964 <i>Papaver hybridum</i> (Rough Poppy)	Y		
499.	25253 <i>Parasuta gouldii</i>			
500.	25254 <i>Parasuta monachus</i>			
501.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
502.	40424 <i>Pentameris airoides</i> subsp. <i>airoides</i>	Y		
503.	2274 <i>Persoonia saundersiana</i>			
504.	3674 <i>Petalostyllis cassioides</i>			
505.	48060 <i>Petrochelidon ariel</i> (Fairy Martin)			
506.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
507.	24659 <i>Petroica goodenovii</i> (Red-capped Robin)			
508.	2308 <i>Petrophile seminuda</i>			
509.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
510.	552 <i>Phalaris paradoxa</i> (Paradoxa Grass)	Y		
511.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
512.	4497 <i>Phebalium canaliculatum</i>			
513.	14883 <i>Phebalium laevigatum</i>			
514.	4501 <i>Phebalium lepidotum</i>			
515.	4504 <i>Phebalium tuberculosum</i>			
516.	18506 <i>Philotheca tomentella</i>			
517.	5231 <i>Pimelea angustifolia</i> (Narrow-leaved Pimelea)			
518.	11185 <i>Pimelea microcephala</i> subsp. <i>microcephala</i>			
519.	12104 <i>Pimelea spiculigera</i> var. <i>thesioides</i>			
520.	11910 <i>Pimelea suaveolens</i> subsp. <i>flava</i>			
521.	19744 <i>Pittosporum angustifolium</i>			
522.	6812 <i>Pityrodia lepidota</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
523.	7300 <i>Plantago drummondii</i> (Sago Weed)			
524.	14198 <i>Plantago</i> sp. Mt Magnet (A.S. George 6793)			
525.	24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
526.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
527.	45238 <i>Podolepis aristata</i> subsp. <i>affinis</i>			
528.	8173 <i>Podolepis capillaris</i> (Wiry Podolepis)			
529.	8177 <i>Podolepis lessonii</i>			
530.	8180 <i>Podolepis rugata</i> (Pleated Podolepis)			
531.	24907 <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
532.	8187 <i>Pogonolepis muelleriana</i>			
533.	24681 <i>Poliocephalus poliocephalus</i> (Hoary-headed Grebe)			
534.	30854 <i>Polytelis anthopeplus</i> subsp. <i>westralis</i> (Regent Parrot)			
535.	4815 <i>Pomaderris forrestiana</i>			
536.	24683 <i>Pomatostomus superciliosus</i> (White-browed Babbler)			
537.	2884 <i>Portulaca oleracea</i> (Purslane, Wakati)			
538.	24769 <i>Porzana fluminea</i> (Australian Spotted Crane)			
539.	15822 <i>Prostanthera althoferi</i> subsp. <i>althoferi</i>			
540.	6912 <i>Prostanthera campbellii</i>			
541.	6916 <i>Prostanthera grylloana</i>			
542.	6917 <i>Prostanthera incurvata</i>			
543.	24237 <i>Pseudomys hermannsburgensis</i> (Sandy Inland Mouse)			
544.	25263 <i>Pseudonaja modesta</i> (Ringed Brown Snake)			
545.	25434 <i>Pseudophryne occidentalis</i> (Western Toadlet)			
546.	27998 <i>Psora crenata</i>			
547.	28000 <i>Psora decipiens</i>			
548.	12216 <i>Pterostylis roensis</i>			
549.	18657 <i>Pterostylis</i> sp. <i>inland</i> (A.C. Beaglehole 11880)			
550.	48481 <i>Pterostylis tryphera</i>			
551.	2707 <i>Ptilotus carlsonii</i>			
552.	48602 <i>Ptilotus eremita</i>			
553.	2721 <i>Ptilotus exaltatus</i> (Tall Mulla Mulla)			
554.	2727 <i>Ptilotus gaudichaudii</i>			
555.	2729 <i>Ptilotus grandiflorus</i>			
556.	2732 <i>Ptilotus holosericeus</i>			
557.	2747 <i>Ptilotus obovatus</i> (Cotton Bush)			
558.	42344 <i>Purnella albifrons</i> (White-fronted Honeyeater)			
559.	24278 <i>Pyrrholaemus brunneus</i> (Redthroat)			
560.	4964 <i>Radyera farragei</i> (Knobby Hibiscus)			
561.	2581 <i>Rhagodia drummondii</i>			
562.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
563.	13306 <i>Rhodanthe battii</i>			
564.	13241 <i>Rhodanthe chlorocephala</i> subsp. <i>rosea</i>			
565.	13301 <i>Rhodanthe floribunda</i>			
566.	13293 <i>Rhodanthe haigii</i>			
567.	13234 <i>Rhodanthe manglesii</i>			
568.	13249 <i>Rhodanthe oppositifolia</i> subsp. <i>oppositifolia</i>			
569.	13252 <i>Rhodanthe pygmaea</i>			
570.	13253 <i>Rhodanthe rubella</i>			
571.	24982 <i>Rhynchoedura ornata</i> (Western Beaked Gecko)			
572.	4701 <i>Ricinocarpos stylosus</i>			
573.	4704 <i>Ricinocarpos velutinus</i>			
574.	6018 <i>Rinzia carnosus</i> (Fleshy-leaved Rinzia)			
575.	48882 <i>Roepera apiculata</i>			
576.	48892 <i>Roepera glauca</i> (Pale Twinleaf, Pale Twin-leaf)			
577.	48898 <i>Roepera ovata</i>			
578.	48899 <i>Roepera reticulata</i>			
579.	2443 <i>Rumex vesicarius</i> (Ruby Dock)	Y		
580.	40425 <i>Rytidosperma caespitosum</i>			
581.	40427 <i>Rytidosperma setaceum</i>			
582.	30434 <i>Salsola australis</i>			
583.	6928 <i>Salvia reflexa</i> (Mintweed)	Y		
584.	6929 <i>Salvia verbenaca</i> (Wild Sage)	Y		
585.	2356 <i>Santalum acuminatum</i> (Quandong, Wamga)			
586.	2359 <i>Santalum spicatum</i> (Sandalwood, Wilarak)			
587.	7644 <i>Scaevola spinescens</i> (Currant Bush, Maroon)			
588.	17056 <i>Schinus molle</i> var. <i>areira</i>	Y		
589.	8200 <i>Schoenia cassiniana</i> (Schoenia)			
590.	13287 <i>Schoenia filifolia</i> subsp. <i>filifolia</i>			
591.	1015 <i>Schoenus subaphyllus</i>			
592.	2606 <i>Sclerolaena cuneata</i> (Yellow Bindii)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
593.	2609 <i>Sclerolaena diacantha</i> (Grey Copperburr)			
594.	2610 <i>Sclerolaena drummondii</i>			
595.	2615 <i>Sclerolaena fusiformis</i>			
596.	2625 <i>Sclerolaena obliquicuspis</i> (Limestone Bindii)			
597.	<i>Scolopendra laeta</i>			
598.	<i>Scolopendra morsitans</i>			
599.	8207 <i>Senecio glossanthus</i> (Slender Groundsel)			
600.	25881 <i>Senecio lacustrinus</i>			
601.	17645 <i>Senna artemisioides</i>			
602.	12276 <i>Senna artemisioides</i> subsp. <i>filifolia</i>			
603.	17558 <i>Senna artemisioides</i> subsp. <i>x artemisioides</i>			
604.	18430 <i>Senna cardiosperma</i>			
605.	16378 <i>Senna pleurocarpa</i>			
606.	12315 <i>Senna pleurocarpa</i> var. <i>angustifolia</i>			
607.	12314 <i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>			
608.	14579 <i>Senna</i> sp. <i>Austin</i> (A. Strid 20210)			
609.	18446 <i>Senna stowardii</i>			
610.	46824 <i>Seringia velutina</i> (Velvet firebush)			
611.	4970 <i>Sida calyxymenia</i> (Tall Sida)			
612.	16924 <i>Sida spodochroma</i>			
613.	25266 <i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
614.	28060 <i>Siphula coriacea</i>			
615.	3072 <i>Sisymbrium orientale</i> (Indian Hedge Mustard)	Y		
616.	30948 <i>Smicronis brevisstris</i> (Weebill)			
617.	24108 <i>Sminthopsis crassicaudata</i> (Fat-tailed Dunnart)			
618.	24109 <i>Sminthopsis dolichura</i> (Little long-tailed Dunnart)			
619.	6998 <i>Solanum cleistogamum</i>			
620.	7013 <i>Solanum hoplopetalum</i> (Thorny Solanum)			
621.	7018 <i>Solanum lasiophyllum</i> (Flannel Bush, Mindjulu)			
622.	7023 <i>Solanum nummularium</i> (Money-leaved Solanum)			
623.	7030 <i>Solanum plicatile</i>			
624.	2914 <i>Spergularia diandra</i> (Lesser Sand Spurry)	Y		
625.	4734 <i>Stackhousia muricata</i>			
626.	3076 <i>Stenopetalum filifolium</i>			
627.	3077 <i>Stenopetalum lineare</i> (Narrow Thread Petal)			
628.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
629.	8238 <i>Streptoglossa liatroides</i>			
630.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
631.	24923 <i>Strophurus assimilis</i> (Goldfields Spiny-tailed Gecko)			
632.	24927 <i>Strophurus elderi</i>			
633.	7685 <i>Stylidium arenicola</i>			
634.	7714 <i>Stylidium dielsianum</i> (Tangle Triggerplant)			
635.	7751 <i>Stylidium limbatum</i> (Fringed-leaved Triggerplant)			
636.	25269 <i>Suta fasciata</i> (Rosen's Snake)			
637.	4220 <i>Swainsona canescens</i> (Grey Swainsona)			
638.	4221 <i>Swainsona colutooides</i> (Bladder Vetch)			
639.	4231 <i>Swainsona kingii</i>			
640.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
641.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
642.	30870 <i>Taeniopygia guttata</i> (Zebra Finch)			
643.	<i>Tamopsis circumvidens</i>			
644.	<i>Tasmanicosa leuckartii</i>			
645.	31492 <i>Tecticornia disarticulata</i>			
646.	2822 <i>Tetragonia eremaea</i>			
647.	4530 <i>Tetratheca efoliata</i>			
648.	1701 <i>Thelymitra antennifera</i> (Vanilla Orchid)			
649.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
650.	6058 <i>Thryptomene kochii</i>			
651.	6068 <i>Thryptomene urceolaris</i>			
652.	1338 <i>Thysanotus manglesianus</i> (Fringed Lily)			
653.	<i>Thysanotus</i> sp.			
654.	6279 <i>Trachymene ornata</i> (Spongefruit)			
655.	48141 <i>Tribonyx ventralis</i> (Black-tailed Native-hen)			
656.	12652 <i>Trichanthodium skirrophorum</i>			
657.	16986 <i>Trymalium myrtillus</i> subsp. <i>myrtillus</i>			
658.	24851 <i>Turnix velox</i> (Little Button-quail)			
659.	30814 <i>Tympanocryptis cephalus</i> (Pebble Dragon)			
660.	39408 <i>Tympanocryptis lineata</i> (Lined Earless Dragon)			
661.	24983 <i>Underwoodisaurus milii</i> (Barking Gecko)			
662.	18326 <i>Urochloa panicoides</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
663.	<i>Uromycladium tepperianum</i>			
664.	25218 <i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
665.	7658 <i>Velleia discophora</i> (Cabbage Poison)			
666.	7664 <i>Velleia rosea</i> (Pink Velleia)			
667.	6073 <i>Verticordia chrysantha</i>			
668.	6109 <i>Verticordia picta</i> (Painted Featherflower)			
669.	6113 <i>Verticordia pritzelii</i> (Pritzel's Featherflower)			
670.	24206 <i>Vespadelus regulus</i> (Southern Forest Bat)			
671.	17261 <i>Vicia monantha</i> subsp. <i>triflora</i>	Y		
672.	48986 <i>Vincetoxicum lineare</i>			
673.	11387 <i>Vittadinia cervicalaris</i> var. <i>cervicalaris</i>			
674.	8273 <i>Vittadinia sulcata</i>			
675.	7386 <i>Wahlenbergia gracilentia</i> (Annual Bluebell)			
676.	13331 <i>Waitzia acuminata</i> var. <i>acuminata</i>			
677.	46093 <i>Waitzia fitzgibbonii</i>			
678.	6938 <i>Westringia cephalantha</i>			
679.	34603 <i>Westringia cephalantha</i> var. <i>caterva</i>			
680.	9247 <i>Westringia rigida</i> (Stiff Westringia)			
681.	28327 <i>Xanthoparmelia semiviridis</i>			
682.	28186 <i>Xanthoparmelia versicolor</i>			

Conservation Codes

T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

¹ For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Appendix C: EPBC Protected Matters Search Results



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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 13/01/21 12:32:36

[Summary](#)

[Details](#)

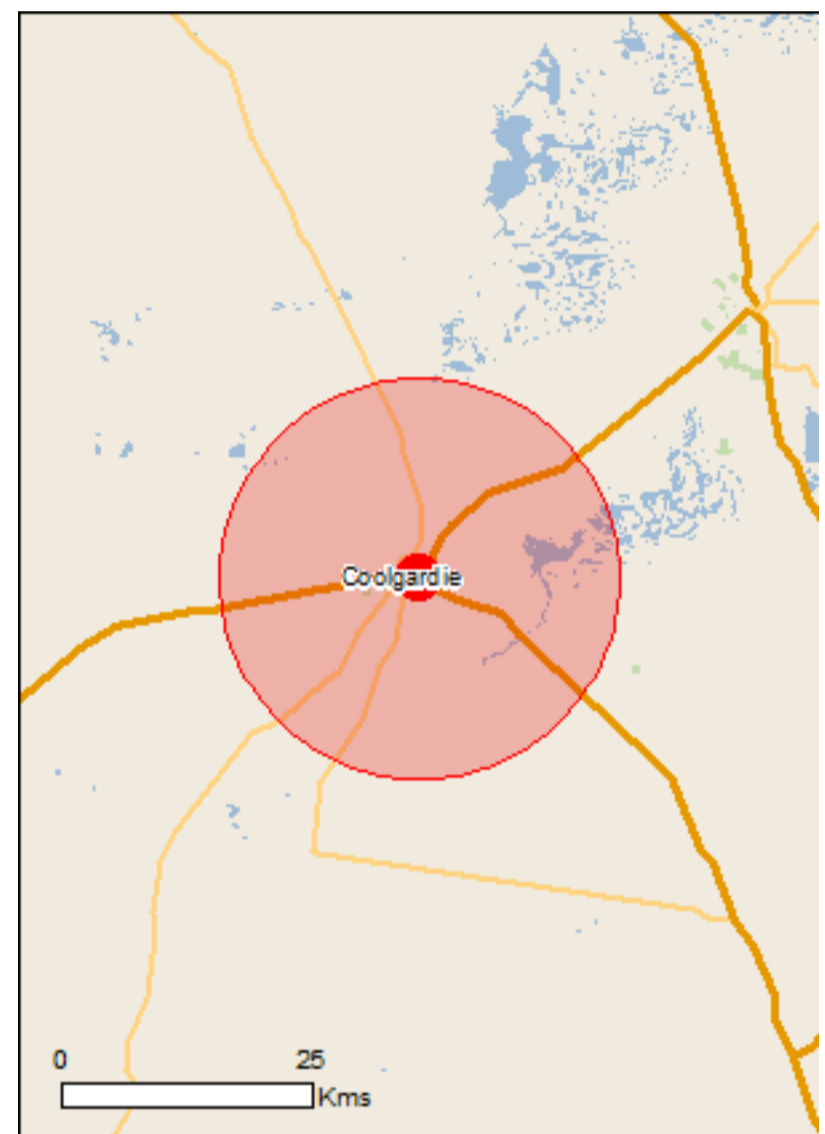
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



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[Coordinates](#)

Buffer: 20.0Km



Summary

Matters of National Environmental 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:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	7
Listed Migratory Species:	7

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 environment anywhere.

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 Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	3
Regional Forest Agreements:	None
Invasive Species:	14
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

National Heritage Properties		[Resource Information]
Name	State	Status
Historic		
Goldfields Water Supply Scheme, Western Australia	WA	Listed place

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area

Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area

Plants		
Gastrolobium graniticum Granite Poison [14872]	Endangered	Species or species habitat may occur within area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area

Migratory Wetlands Species		
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Name	Threatened	Type of Presence
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [\[Resource Information \]](#)

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.

Name
Commonwealth Land -

Listed Marine Species [\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species

Name	Threatened	Type of Presence
Motacilla cinerea Grey Wagtail [642]		habitat may occur within area Species or species habitat may occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Kangaroo Hills Timber Reserve	WA
Scahill Timber Reserve	WA
Yallari Timber Reserve	WA

Invasive Species	[Resource Information]
Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.	

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Carrichtera annua Ward's Weed [9511]		Species or species habitat likely to occur within area
Cylindropuntia spp. Prickly Pears [85131]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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.

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

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-30.95426 121.17718

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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Appendix D: NVIS Structural Formation Terminology (NVIS TWG 2017)

Cover Characteristics								
Foliage cover*	70-100	30-70	10-30	<10	≈0	0-5	unknown	
Crown cover**	>80	50-80	20-50	0.25-20	<0.25	0-5	unknown	
% Cover***	>80	50-80	20-50	0.25-20	<0.25	0-5	unknown	
Cover code****	d	c	i	r	bi	bc	unknown	
Growth Form	Height Ranges (m)	Structural Formation Classes						
tree, palm	<10,10-30, >30	closed forest	open forest	woodland	open woodland	isolated trees	isolated clumps of trees	trees
tree mallee	<3, <10, 10-30	closed mallee forest	open mallee forest	mallee woodland	open mallee woodland	isolated mallee trees	isolated clumps of mallee trees	mallee trees
shrub, cycad, grass-tree, tree-fern	<1,1-2,>2	closed shrubland	shrubland	open shrubland	sparse shrubland	isolated shrubs	isolated clumps of shrubs	shrubs
mallee shrub	<3, <10, 10-30	closed mallee shrubland	mallee shrubland	open mallee shrubland	sparse mallee shrubland	isolated mallee shrubs	isolated clumps of mallee shrubs	mallee shrubs
heath shrub	<1,1-2,>2	closed heathland	heathland	open heathland	sparse heathland	isolated heath shrubs	isolated clumps of heath shrubs	heath shrubs
chenopod shrub	<1,1-2,>2	closed chenopod shrubland	chenopod shrubland	open chenopod shrubland	sparse chenopod shrubland	isolated chenopod shrubs	isolated clumps of chenopod shrubs	chenopod shrubs
samphire shrub	<0.5,>0.5	closed samphire shrubland	samphire shrubland	open samphire shrubland	sparse samphire shrubland	isolated samphire shrubs	isolated clumps of samphire shrubs	samphire shrubs
hummock grass	<2,>2	closed hummock grassland	hummock grassland	open hummock grassland	sparse hummock grassland	isolated hummock grasses	isolated clumps of hummock grasses	hummock grasses
tussock grass	<0.5,>0.5	closed tussock grassland	tussock grassland	open tussock grassland	sparse tussock grassland	isolated tussock grasses	isolated clumps of tussock grasses	tussock grasses
other grass	<0.5,>0.5	closed grassland	grassland	open grassland	sparse grassland	isolated grasses	isolated clumps of grasses	other grasses
edge	<0.5,>0.5	closed sedgeland	sedgeland	open sedgeland	sparse sedgeland	isolated sedges	isolated clumps of sedges	sedges
rush	<0.5,>0.5	closed rushland	rushland	open rushland	sparse rushland	isolated rushes	isolated clumps of rushes	rushes
forb	<0.5,>0.5	closed forbland	forbland	open forbland	sparse forbland	isolated forbs	isolated clumps of forbs	forbs
fern	<1,1-2,>2	closed fernland	fernland	open fernland	sparse fernland	isolated ferns	isolated clumps of ferns	ferns
bryophyte	<0.5	closed bryophyteland	bryophyteland	open bryophyteland	sparse bryophyteland	isolated bryophytes	isolated clumps of bryophytes	bryophytes
lichen	<0.5	closed lichenland	lichenland	open lichenland	sparse lichenland	isolated lichens	isolated clumps of lichens	lichens
vine	<10,10-30, >30	closed vineland	vineland	open vineland	sparse vineland	isolated vines	isolated clumps of vines	vines
aquatic	0-0.5, <1	closed aquatic bed	aquatic bed	open aquatic bed	sparse aquatics	isolated aquatics	isolated clumps of aquatics	aquatics
seagrass	0-0.5, <1	closed seagrass bed	seagrassbed	open seagrassbed	sparse seagrassbed	isolated seagrasses	isolated clumps of seagrasses	seagrasses

*refer notes below.

Notes

The table is based on native vegetation, but can be used in a similar fashion for non-native vegetation and revegetation.

* Foliage Cover is defined for each stratum as 'the proportion of the ground, which would be shaded if sunshine came from directly overhead'. It includes branches and leaves and is obtained by multiplying Crown Cover with Crown type

(Hnatiuk *et al* 2009). It is applied to a stratum in a plot, rather than an individual crown, with the NVIS measure for a vegetation type ideally being a summary of several plots. Foliage Projective Cover, which considers only the vertical projection of photosynthetic components (generally leaves), can be measured by line interception methods for tree, shrub and ground layer vegetation (Specht, R.L and Specht 1999).

** Crown Cover (canopy cover) as per Hnatiuk *et al* (2009). Although relationships between this attribute and Foliage Cover are dependent on season, species, species age etc., the crown cover category classes have been adopted as the defining measure.

*** The percentage cover is defined as the percentage of a strictly defined plot area, covered by vegetation. This can be an estimate and is a less precise measure than using, for example, a point intercept transect method on ground layer, or overstorey vegetative cover. That is, for precisely measured values (e.g. crown densitometer or point intercept transects) the value measured would be 'foliage' cover. Where less precise or qualitative measures are used these will most probably be recorded as 'percentage' cover.

The last column of the Table is designed to cater for situations, in existing data, where the cover value for the growth form is unknown.

Appendix E: All species collected during the Targeted flora survey

Family	Species	Conservation Code
Amaranthaceae	<i>Atriplex</i> sp.	
	<i>Atriplex vesicaria</i>	
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	
	<i>Ptilotus obovatus</i>	
	<i>Ptilotus helichrysoides</i>	
Anacardiaceae	<i>Schinus molle</i>	Introduced
Apocynaceae	<i>Alyxia buxifolia</i>	
	<i>Vincetoxicum lineare</i>	
Asparagaceae	<i>Agave americana</i>	Naturalised
Asphodelaceae	<i>Asphodelus fistulosus</i>	Introduced
Asteraceae	<i>Cratystylis conocephala</i>	
	<i>Olearia muelleri</i>	
	<i>Olearia pimeleoides</i>	
Cactaceae	<i>Opuntia stricta</i>	WONS
Campanulaceae	<i>Isotoma petraea</i>	
Casuarinaceae	<i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>	
	<i>Allocasuarina campestris</i>	
	<i>Allocasuarina helmsii</i>	
	<i>Casuarina pauper</i>	
Chenopodiaceae	<i>Maireana brevifolia</i>	
	<i>Maireana pyramidata</i>	
	<i>Maireana radiata</i>	
	<i>Maireana sedifolia</i>	
	<i>Maireana</i> sp.	
	<i>Maireana</i> sp.	
	? <i>Maireana</i> sp.	
	<i>Maireana triptera</i>	
	<i>Rhagodia spinescens</i>	
	<i>Salsola australis</i>	
	<i>Sclerolaena diacantha</i>	
<i>Tecticornia disarticulata</i>		
Convolvulaceae	<i>Convolvulus recurvatus</i>	
Euphorbiaceae	<i>Beyeria ?sulcata</i>	
Fabaceae	<i>Acacia acuminata</i>	
	<i>Acacia collegialis</i>	
	<i>Acacia erinacea</i>	
	<i>Acacia excentrica</i>	
	<i>Acacia hemiteles</i>	
	<i>Acacia multispicata</i>	
	<i>Acacia websteri</i>	P1
	<i>Acacia tetragonophylla</i>	
	<i>Senna artemisioides</i> subsp. <i>filifolia</i>	
Frankeniaceae	<i>Frankenia fecunda</i>	
Hemerocallidaceae	<i>Dianella revoluta</i>	
Goodeniaceae	<i>Scaevola spinescens</i>	
Lamiaceae	<i>Prostanthera grylloana</i>	
	<i>Prostanthera incurvata</i>	
	<i>Westringia rigida</i>	
Malvaceae	<i>Sida spodochroma</i>	
	<i>Solanum nummularium</i>	

Family	Species	Conservation Code
Myrtaceae	<i>Eucalyptus campaspe</i>	
	<i>Eucalyptus celastroides</i>	
	<i>Eucalyptus clelandiorum</i>	
	<i>Eucalyptus griffithsii</i>	
	<i>Euryomyrtus maidenii</i>	
	<i>Eucalyptus oleosa</i> subsp. <i>oleosa</i>	
	<i>Eucalyptus salmonophloia</i>	
	<i>Eucalyptus torquata</i>	
	<i>Eucalyptus transcontinentalis</i>	
	<i>Melaleuca hamata</i>	
	<i>Melaleuca sheathiana</i>	
Pittosporaceae	<i>Pittosporum angustifolium</i>	
Poaceae	<i>Austrostipa</i> sp.	
	<i>Cynodon dactylon</i>	
	<i>Enneapogon caerulescens</i>	
	<i>Eragrostis</i> sp.	
	<i>Rytidosperma acerosum</i>	
	<i>Sporobolus ramigerus</i>	
	<i>Triodia tomentosa</i>	
	<i>Paspalidium basicladum</i>	
Proteaceae	<i>Grevillea acuaria</i>	
	<i>Hakea</i> ? <i>platysperma</i>	
Rhamnaceae	<i>Cryptandra aridicola</i>	
Rutaceae	<i>Phebalium</i> sp.	
Santalaceae	<i>Santalum acuminatum</i>	
Sapindaceae	<i>Dodonaea lobulata</i>	
	<i>Dodonaea microzyga</i>	
	<i>Dodonaea stenozyga</i>	
Scrophulariaceae	<i>Eremophila</i> ? <i>decipiens</i>	
	<i>Eremophila drummondii</i>	
	<i>Eremophila gibbosa</i>	
	<i>Eremophila glabra</i> subsp. <i>glabra</i>	
	<i>Eremophila interstans</i> subsp. <i>interstans</i>	
	<i>Eremophila linearis</i>	
	<i>Eremophila oldfieldii</i>	
	<i>Eremophila oppositifolia</i>	
	<i>Eremophila parvifolia</i> ?subsp. <i>auricampi</i>	
	<i>Eremophila parvifolia</i> subsp. <i>auricampi</i>	
	<i>Eremophila scoparia</i>	
	<i>Eremophila</i> sp.	
	<i>Eremophila</i> sp.	
	<i>Myoporum</i> sp.	
Solanaceae	<i>Lycium australe</i>	
	<i>Lycium ferocissimum</i>	WONS
	<i>Solanum lasiophyllum</i>	

Appendix F: Priority Flora of Recorded Genera Likelihood of Occurrence Assessment

Collection	Potential Priority Species	Conservation Status	Habitat		Flowering time (WA Herbarium 2021)	Details from record within 20km of Survey Area (DBCA 2020d)			Likelihood Occurrence in Survey Area
			Soils and Landscape	Associated Vegetation		Distance and Direction	Soils and Landscape	Associated Vegetation	
<i>Austrostipa</i> sp. (CS84)	<i>Austrostipa blackii</i>	Priority 2	Heavy soils (Sharp and Simon 2002)	Not described	Sep to Nov	2.2km SW	West north-west facing gently inclined lower slope of basalt with red-brown deep sandy clay loam soils	Mid-dense mallee woodland of <i>Eucalyptus griffithsii</i> over open shrubland of <i>Dodonaea lobulata</i> and <i>Eremophila glabra</i> subsp. <i>glabra</i> over sparse low shrubland of <i>Ptilotus obovatus</i> .	Likely
	<i>Austrostipa</i> sp. <i>Carlingup Road</i>	Priority 1	Not described	Not described	2 records in Sep and Oct (ALA 2021)	9.6km WSW	North north-east facing gently inclined mid-slope of basalt with red-brown shallow sandy soils.	Open tall shrubland of <i>Acacia</i> sp. <i>Norseman</i> over mid-dense shrubland of <i>Dodonaea lobulata</i> and <i>Eremophila oldfieldii</i> subsp. <i>angustifolia</i> over sparse low shrubland of <i>Ptilotus obovatus</i> .	Unlikely
	<i>Austrostipa</i> sp. <i>Dowerin</i>	Priority 2	Not described	Not described	8 records in Oct. 1 in Nov (ALA 2021)	6.7km SE	South-east facing moderately inclined upper slope of basalt. Very slightly rocky basalt outcrop with red-brown shallow sandy clay loam soils.	Open tall shrubland of <i>Acacia</i> sp. <i>Norseman</i> over sparse shrubland of <i>Dodonaea lobulata</i> over open low shrubland of <i>Ptilotus obovatus</i> .	Unlikely
<i>Eremophila</i> spp. (CS10, CS32)	<i>Eremophila caerulea</i> subsp. <i>merrallii</i>	Priority 4	Sand, clay or loam on undulating plains (WA Herbarium 2020; (Brown and Buirchell 2011 p51).	<i>Eucalyptus salubris</i> , <i>E. eremophila</i> and <i>Eremophila decipiens</i> (Brown and Buirchell 2011 p51)	Oct to Dec (Brown and Buirchell 2011 p. 51)	5.6km N	No information provided.	No information provided.	Unlikely

	<i>Eremophila veronica</i>	Priority 3	Stony clay, clay loam. Lateritic breakaways (WA Herbarium 2020)	Found in low <i>Eucalyptus salubris</i> , <i>E. grafitthsii</i> , <i>E. campaspe</i> , woodland with <i>Atriplex buburyana</i> , <i>Santalum acuminatum</i> and <i>Eremophila ionantha</i> (Brown and Buirchell 2011 p.279).	Apr to May	530m W and 7.7km SW	Partly disturbed area.	Woodland, <i>Eucalyptus salubris</i> , <i>Acacia burkittii</i> , <i>Cylindropuntia tunicata</i> . And Low Woodland of <i>Eucalyptus salubris</i> with <i>Atriplex bunburyana</i> , <i>Santalum acuminatum</i> .	Very Likely
<i>Phebalium sp.</i> (CS68)	<i>Phebalium appressum</i>	Priority 1	Yellow sandplain (WA Herbarium 2021)		Jul	Approx. 14 and 20km NW	Mid slope between mallee woodland and sandplain heath. Brown sandy loam. And Yellow Sand Plain	Open tree mallee over low scrub (<i>Acacia burkittii</i> , <i>Melaleuca hamata</i>) over dwarf scrub (<i>Baekkea sp.</i>) over <i>Triodia</i> .	Unlikely
	<i>Phebalium clavatum</i>	Priority 3	Sandplains (WA Herbarium 2021)		Aug to Sep	10.5km SSW	No information provided	No information provided	Unlikely

Appendix G: Vegetation Community Detailed Descriptions

Table G. 1: Community 1 Details: *Eucalyptus griffithsii* with *E. torquata* Mallee woodland


NVIS Description				
Mallee woodland <10m of <i>Eucalyptus griffithsii</i> and <i>Eucalyptus torquata</i> over sparse mallee shrubland <3m of <i>Eremophila</i> sp., <i>Exocarpos aphyllus</i> , <i>Dodonaea stenozyga</i> and <i>Senna artemisioides</i> subsp. <i>filifolia</i> over open heathland <1m of <i>Scaevola spinescens</i> , <i>Olearia muelleri</i> , <i>Westringia rigida</i> and <i>Grevillea acuaria</i> . Isolated areas with an additional mid-story of open mallee shrubland 3-10m of <i>Allocasuarina helmsii</i> .				
Landscape Position	Species Richness	Area (% of total survey area)	Number of Relevés	All species in Community
Shallow stony soils on upper slopes	25	102.1 ha (11.55%)	3	<i>Acacia erinacea</i> <i>Acacia tetragonophylla</i> <i>Allocasuarina helmsii</i> <i>Alyxia buxifolia</i> <i>Atriplex nummularia</i> <i>Atriplex vesicaria</i> <i>Casuarina pauper</i> <i>Cratystylis conocephala</i> <i>Dodonaea lobulata</i> <i>Dodonaea stenozyga</i> <i>Eremophila glabra</i> subsp. <i>glabra</i> <i>Eremophila parvifolia</i> <i>Eremophila</i> sp. <i>Eucalyptus clelandiorum</i> <i>Eremophila oldfieldii</i> <i>Eucalyptus griffithsii</i> <i>Eucalyptus torquata</i> <i>Exocarpos aphyllus</i> <i>Grevillea acuaria</i> <i>Maireana sedifolia</i> <i>Olearia muelleri</i> <i>Santalum acuminatum</i> <i>Senna artemisioides</i> subsp. <i>filifolia</i> <i>Scaevola spinescens</i> <i>Westringia rigida</i>
				
Photo: C1R2				

Table G. 2: Community 1 Details: *Eucalyptus clelandiorum* (Cleland's Blackbutt) Mallee woodland


NVIS Description				
Mallee woodland <10m (to forest 10-30m) of <i>E. clelandiorum</i> over sparse mallee shrubland 3-10m of <i>Melaleuca sheathiana</i> , <i>Exocarpos aphyllus</i> and <i>Eremophila</i> sp. over sparse heathland 1-2m of <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Atriplex nummularia</i> and <i>Scaevola spinescens</i> .				
Landscape Position	Species Richness	Area (% of total survey area)	Number of Relevés	All species in Community
Greenstone midslopes and some drainage areas.	28	73.5 ha (8.3%)	3	<i>Atriplex vesicaria</i> <i>Acacia erinacea</i> <i>Atriplex nummularia</i> <i>Beyeria ?sulcata</i> <i>Cratystylis conocephala</i> <i>Dodonaea lobulata</i> <i>Eremophila interstans</i> subsp. <i>interstans</i> <i>Eremophila oldfieldii</i> <i>Eremophila scoparia</i> <i>Eremophila</i> sp. <i>Eremophila</i> sp. <i>Eremophila parvifolia</i> subsp. <i>auricampi</i> <i>Eucalyptus Campaspe</i> <i>Eucalyptus clelandiorum</i> <i>Eucalyptus griffithsii</i> <i>Eucalyptus torquata</i> <i>Exocarpos aphyllus</i> <i>Maireana radiata</i> <i>Maireana</i> sp. <i>Maireana triptera</i> <i>Melaleuca hamata</i> <i>Melaleuca sheathiana</i> <i>Myoporum</i> sp. <i>Olearia muelleri</i> <i>Phebalium</i> sp. <i>Scaevola spinescens</i> <i>Senna artemisioides</i> subsp. <i>filifolia</i> <i>Westringia rigida</i>
 <p>Photo: C2R3</p>				

Table G. 3: Community 3 Details: *Eucalyptus griffithsii* Mallee Woodland, *E. torquata* absent


NVS Description				
Mallee Woodland <10m of <i>E. griffithsii</i> and <i>Eucalyptus clelandiorum</i> over open mallee shrubland <3m of <i>Eremophila ?interstans</i> subsp. <i>interstans</i> , <i>Eremophila</i> spp. and <i>Exocarpos aphyllus</i> , over open heathland 1-2m of <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Atriplex nummularia</i> , <i>Acacia erinacea</i> and <i>Westringia rigida</i> , over heathland <1m of <i>Scaevola spinescens</i> , <i>Dodonaea lobulata</i> and <i>Olearia muelleri</i> .				
Landscape Position	Species Richness	Area (% of total survey area)	Number of Relevés	All species in Community
Drainage lines	35	65.8 ha (7.4)	5	<p><i>Acacia acuminata</i> <i>Acacia erinacea</i> <i>Acacia hemiteles</i> <i>Alyxia buxifolia</i> <i>Atriplex nummularia</i> <i>Atriplex</i> sp. <i>Atriplex vesicaria</i> <i>Austrostipa</i> sp. <i>Cratystylis conocephala</i> <i>Dianella revoluta</i> <i>Dodonaea lobulata</i> <i>Dodonaea stenozyga</i> <i>Eremophila ?decepiens</i> <i>Eremophila glabra</i> subsp. <i>glabra</i> <i>Eremophila interstans</i> subsp. <i>interstans</i> <i>Eremophila</i> <i>Eremophila parvifolia</i> <i>Eremophila parvifolia</i> subsp. <i>auricampi</i> <i>Eremophila oldfieldii</i> <i>Eremophila scoparia</i> <i>?Eragrostis</i> sp. <i>Eucalyptus clelandiorum</i> <i>Eucalyptus griffithsii</i> <i>Exocarpos aphyllus</i> <i>Lycium australe</i> <i>Maireana pyramidata</i> <i>Maireana sedifolia</i> <i>Maireana</i> sp. <i>Maireana triptera</i> <i>Olearia muelleri</i> <i>Santalum acuminatum</i> <i>Scaevola spinescens</i> <i>Sclerolaena diacantha</i> <i>Senna artemisioides</i> subsp. <i>filifolia</i> <i>Solanum lasiophyllum</i> <i>Vincetoxicum lineare</i></p>
				
Photo: C3R3				

Table G. 4: Community 1 Details: *Acacia* spp. and *Allocasuarina* spp. Mallee Shrubland


NVS Description				
Mallee shrubland <10m of <i>Acacia acuminata</i> , <i>Acacia collegialis</i> , <i>Grevillea acuaria</i> and <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> over open heathland 1-2m of <i>Eremophila linearis</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> and <i>Scaevola spinescens</i> over open heathland <1m of <i>Dodonaea microzyga</i> .				
Landscape Position	Species Richness	Area (% of total survey area)	Number of Relevés	All species in Community
Lateritic ridges	27	6.9ha (0.8)	3	<p><i>Acacia acuminata</i> <i>Acacia collegialis</i> <i>Acacia websteri</i> (P1) (C4R2) <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> <i>Allocasuarina campestris</i> <i>Alyxia buxifolia</i> <i>Cratystylis conocephala</i> <i>Cryptandra aridicola</i> <i>Dodonaea microzyga</i> <i>Eremophila gibbosa</i> <i>Eremophila linearis</i> <i>Eremophila oppositifolia</i> <i>Eremophila</i> sp. <i>Eucalyptus torquata</i> <i>Euryomyrtus maidenii</i> <i>Grevillea acuaria</i> <i>Hakea ?platysperma</i> <i>Olearia muelleri</i> <i>Phebalium</i> sp. <i>Prostanthera grylloana</i> <i>Santalum acuminatum</i> <i>Scaevola spinescens</i>, <i>Sclerolaena diacantha</i> <i>Senna artemisioides</i> subsp. <i>filifolia</i> <i>Solanum lasiophyllum</i> <i>Triodia tomentosa</i> <i>Vincetoxicum lineare</i></p>
				
Photo: C4R2				

Table G. 5: Community 1 Details: *Eucalyptus campaspe* (Silver-topped gimlet) Mallee Woodland


NVS Description				
Mallee woodland <10m of <i>E. campaspe</i> and <i>E. celastroides</i> over sparse mallee shrubland <3m of <i>Eremophila interstans</i> subsp. <i>interstans</i> , <i>Eremophila oppositifolia</i> over sparse heathland 1-2m of <i>Atriplex nummularia</i> and <i>Scaevola spinescens</i> over sparse heathland <1m of <i>Atriplex vesicaria</i> , <i>Dodonaea lobulata</i> and <i>Westringia rigida</i> .				
Landscape Position	Species Richness	Area (% of total survey area)	Number of Relevés	All species in Community
Greenstone midslopes, occasionally drainage areas.	20	128.2ha (14.5%)	3	<i>Acacia excentrica</i> <i>Acacia multispicata</i> <i>Alyxia buxifolia</i> <i>Atriplex nummularia</i> <i>Atriplex vesicaria</i> <i>Dodonaea lobulata</i> <i>Eucalyptus campaspe</i> <i>Eucalyptus celastroides</i> <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> <i>Eremophila glabra</i> subsp. <i>glabra</i> <i>Eremophila interstans</i> subsp. <i>interstans</i> <i>Eremophila oppositifolia</i> <i>Maireana sedifolia</i> <i>Maireana triptera</i> <i>Olearia muelleri</i> <i>Ptilotus obovatus</i> <i>Salsola australis</i> <i>Santalum acuminatum</i> <i>Scaevola spinescens</i> <i>Sclerolaena diacantha</i>
				
Photo: C5R1				

Table G. 6: Community 1 Details: *Eucalyptus salmonophloia* (Salmon gum) Open Woodland



NVS Description				
Open woodland 10-30m of <i>E. salmonophloia</i> over sparse heathland 1-2m of <i>Atriplex nummularia</i> over sparse heathland <1m of <i>Atriplex vesicaria</i> and <i>Maireana</i> sp.				
Landscape Position	Species Richness	Area (% of total survey area)	Number of Relevés	All species in Community
Flats, low lying deep soils	17	173.0ha (19.6%)	3	<i>Atriplex nummularia</i> <i>Atriplex</i> sp. <i>Atriplex vesicaria</i> <i>E. campaspe</i> <i>E. salmonophloia</i> <i>E. transcontinentalis</i> <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> <i>Eremophila glabra</i> subsp. <i>glabra</i> <i>Exocarpos aphyllus</i> <i>Grevillea acuaria</i> <i>Maireana</i> sp. <i>Maireana triptera</i> <i>Olearia muelleri</i> <i>Scaevola spinescens</i> <i>Sclerolaena diacantha</i> <i>Senna artemisioides</i> subsp. <i>filifolia</i> <i>Solanum lasiophyllum</i>
				
Photo: C6R1				

Table G. 7: Community 1 Details: *Eremophila oppositifolia* Heathland on Mesa

NVS Description				
Isolated heathland 1-2m of <i>Eremophila oppositifolia</i> over sparse heathland <1m of <i>Dodonaea microzyga</i> , <i>Ptilotus helichrysoides</i> , <i>Atriplex vesicaria</i> and <i>Rhagodia spinescens</i> .				
Landscape Position	Species Richness	Area (% of total survey area)	Number of Relevés	All species in Community
Small ironstone mesa	17	0.6 ha (0.1%)	1	<i>Acacia erinacea</i> <i>Atriplex nummularia</i> <i>Atriplex vesicaria</i> <i>Cratystylis conocephala</i> <i>Dodonaea lobulata</i> <i>Dodonaea microzyga</i> <i>Eremophila oppositifolia</i> <i>Frankenia fecunda</i> <i>Isotoma petraea</i> <i>Maireana triptera</i> <i>Olearia muelleri</i> <i>Ptilotus helichrysoides</i> <i>Rhagodia spinescens</i> <i>Rytidosperma acerosum</i> <i>Scaevola spinescens</i> <i>Solanum lasiophyllum</i> <i>Vincetoxicum lineare</i>
				
Photo: C7R1				

Appendix B

Targeted Flora Survey for

***Acacia websteri* 2021**

Targeted Flora Search for *Acacia websteri* (Priority 1)

Addendum Report to Terratree (2020) Targeted Flora and Vegetation Survey - Coolgardie Gold Project [ref: T20040]

Prepared for Focus Minerals

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Abbreviations and Acronyms

BAM Act	<i>Biosecurity and Agriculture Management Act 2007</i>
BC Act	<i>Biodiversity Conservation Act 2016</i>
BoM	Bureau of Meteorology
C4	Community four (Terratree 2020)
DBCA	Department of Biodiversity, Conservation and Attractions, WA Government
DER	former Department of Environment Regulation (now DWER), WA Government
DPIRD	Department of Primary Industries and Regional Development, WA Government
DWER	Department of Water and Environmental Regulation, WA Government
EPA	Environmental Protection Authority, WA Government
EP Act	<i>Environment Protection Act 1986</i>
GDA94	Geocentric Datum Australia 1994
GPS	Global Positioning System
WoNS	Weed of National Significance

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Executive Summary

In 2020 Focus Minerals Ltd (Focus) commissioned Terratree Pty Ltd (Terratree) to undertake a Targeted flora and vegetation survey within their Coolgardie Gold Project area (Terratree 2020). The objective of the survey was to determine the presence of Threatened and Priority Flora and other species of conservation significance and Threatened and Priority Ecological Communities within the project area.

The Targeted flora and vegetation survey consisted of a desktop assessment followed by a field survey in November 2020. One Priority species, *Acacia websteri* (P1) was recorded during the survey in 2020. The specimen was identified after the field survey and a follow-up Targeted search was therefore required in areas of suitable habitat to determine the exact location and extent of this species within the survey area.

Focus commissioned Terratree to undertake this targeted search for *Acacia websteri* (P1) in early 2021 in areas of suitable vegetation communities within the Coolgardie Gold Project survey area. This report is an addendum to the Terratree (2020) Targeted flora and vegetation survey report and presents the results of the Targeted search for *Acacia websteri* conducted in April 2021. Further environmental and regulatory contextual information can be found in the Terratree (2020) full survey report. The results of these surveys will inform future exploration programmes and associated environmental approval applications.

Prior to the field search, a review of the Terratree (2020) survey report, spatial data and aerial imagery was undertaken to locate key areas to concentrate the field search. The planned Targeted search areas totalled 12.9 ha and comprised of the associated acacia-dominated vegetation community and an area of proposed exploration drilling.

The 2021 Targeted flora search was conducted in accordance with the Environmental Protection Authority's (EPA) *Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016b) and applied in conjunction with the *Environmental Factor Guideline for Flora and Vegetation* (EPA 2016a), between the 27th and 29th of April 2021 by Senior Ecologist Heather Legge and Senior Taxonomist/Botanist Kathya Tippur of Terratree.

All areas of Community 4 were searched as they were observed on-ground. An additional area of Community 3, a *Eucalyptus griffithsii* Mallee Woodland, associated with drainage lines was also searched due to the presence of a tall shrub understory and proximity to the recorded *Acacia websteri*. In total, an area of 19.73 ha was thoroughly searched.

Targeted search areas were traversed on foot in corridors of a maximum of 25m. When *Acacia websteri* (P1) was recorded, surrounding areas were also traversed. Other notable species, such as Weeds of National Significance (WoNS), were also recorded.

Field data was collected using hand-held GPS units (GDA 94) to an accuracy of 3 m. Locations of individuals and populations of *Acacia websteri* (P1) were later digitised using QGIS 3.10 (QGIS Development team 2021). Photographs were also taken of any recorded *Acacia websteri* (P1) and surrounding habitat. There were no significant limitations to the Targeted search.

Acacia websteri (P1) could be observed and identified in the field, however, specimens were still collected for confirmation. In addition, in cases where any other potential Threatened or Priority Flora could not be identified in the field, these were also collected for subsequent identification at the WA Herbarium by Senior Botanist-Taxonomist, Kathya Tippur.

Three individuals of the Targeted species, *Acacia websteri* (P1) were recorded on the western edge of the survey area, near Nepean Rd. No *Acacia websteri* was recorded in the proposed exploration drilling area or any other search areas. As a priority 1 species, impacts to *Acacia websteri* (P1) should be avoided.

No other non-Targeted Threatened or Priority native flora species were recorded in during the search.

One significant introduced species, *Cylindropuntia tunicata* (Hudson Pear), was recorded in the vicinity of the *Acacia websteri*, near Nepean Rd. *Cylindropuntia tunicata*, is a Weed of National Significance (WoNS) and is also listed under the BAM Act as a Declared Pest s22(2) Control Category 3 (Restricted) throughout Western Australia (DPIRD 2021).

Control measures are required for a Declared Pest s22(2) (C3 Restricted) (DPIRD 2019) and therefore must be implemented for *Cylindropuntia tunicata*. National best practice control manuals have been developed for invasive *Opuntioid* cacti in Australia, which can be downloaded from the DPIRD website (DPIRD 2017), and these should be referred to when developing and implementing control measures.

Terratree makes the following recommendations:

- Avoid impacts to the three individuals of *Acacia websteri* (P1) by applying an adequate buffer to surrounding native vegetation
- Develop and implement a hygiene management plan to prevent the introduction and spread of introduced flora and pathogens, especially *Opuntioid* cacti
- Conduct weed eradication and control measures for WoNS and Declared Pest species recorded, *Cylindropuntia tunicata* (Hudson Pear).

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1 Introduction

1.1 Background

In 2020 Focus Minerals Ltd (Focus) commissioned Terratree Pty Ltd (Terratree) to undertake a Targeted flora and vegetation survey within their Coolgardie Gold Project area (Terratree 2020). The objective of the survey was to determine the presence of Threatened and Priority Flora and other species of conservation significance and Threatened and Priority Ecological Communities within the project area.

The Targeted flora and vegetation survey consisted of a desktop assessment followed by a field survey in November 2020 conducted in accordance with the Environmental Protection Authority's (EPA) *Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016b) applied in conjunction with the *Environmental Factor Guideline for Flora and Vegetation* (EPA 2016a).

One Priority species, *Acacia websteri* (P1) was recorded during the survey in 2020. The specimen was identified after the field survey and a follow-up Targeted search was therefore required in areas of suitable habitat to determine the exact location and extent of this species within the survey area.

Focus commissioned Terratree to undertake this targeted search for *Acacia websteri* in early 2021 in areas of suitable vegetation communities within the Coolgardie Gold Project survey area. This report is an addendum to the Terratree (2020) Targeted flora and vegetation survey report and presents the results of the Targeted search for *Acacia websteri* conducted in April 2021. Further environmental and regulatory contextual information can be found in the Terratree (2020) full survey report.

The results of these surveys will inform future exploration programmes and associated environmental approval applications.

1.2 Scope of Work

The scope of work for the project included the following:

- Undertake a thorough Targeted flora field search for *Acacia websteri* (P1) within suitable vegetation communities.
- Opportunistically search for *Acacia websteri* (P1) and other conservation significant flora or weeds within the broader CGP 2020 survey area.
- Produce an inventory of the numbers of and locations of *Acacia websteri* (P1) individuals and populations within these areas.
- Produced figures showing the location of *Acacia websteri* (P1) and any other Threatened or Priority Flora if present and provide spatial data (.shp, GDA 94).

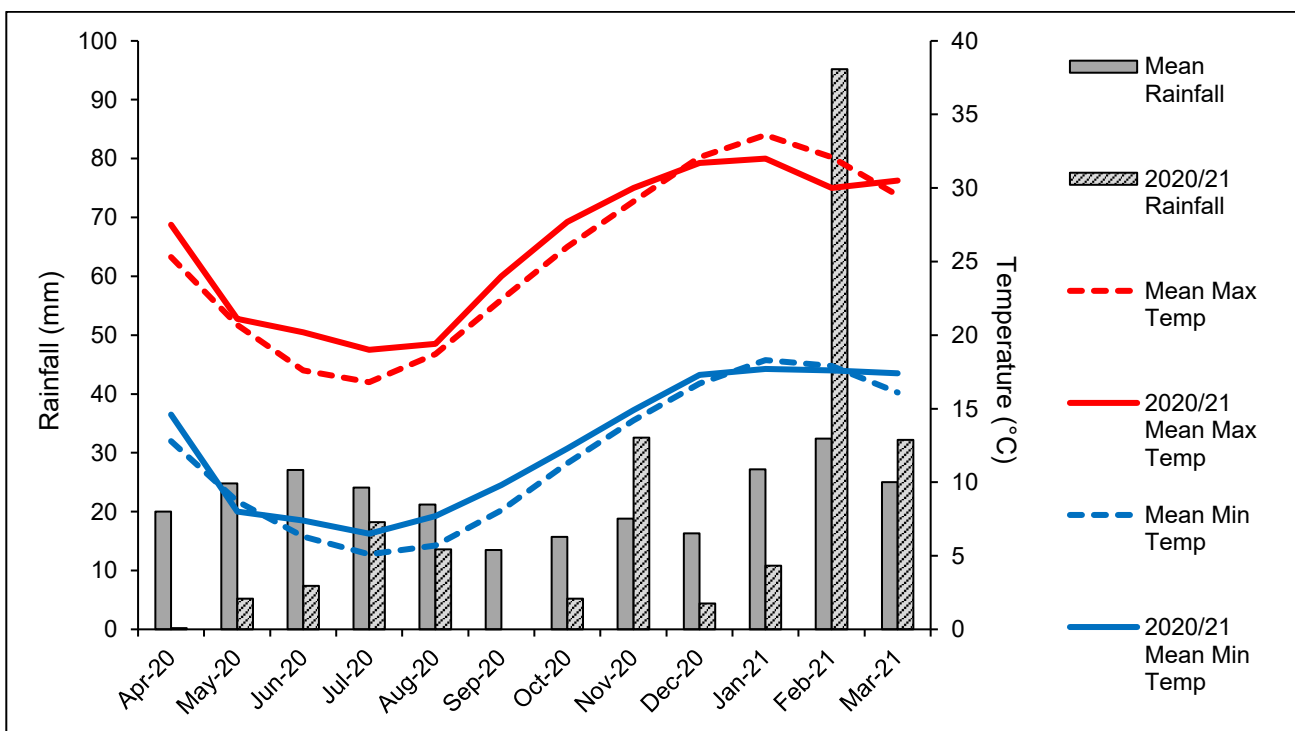
- Prepare an addendum report detailing the methods and results of the search.

1.3 Climate Preceding the Search

Weather data has been obtained from the Kalgoorlie-Boulder Airport BoM weather station (no. 12038), 33.3km away. Although closer to the survey area, the Coolgardie weather station lacks data from recent years.

Temperature and rainfall data recorded at this weather station in the 12 months prior to the survey compared with long term averages are shown in **Graph 1**. Monthly mean temperatures were close to, although generally, slightly higher than long-term mean records. In the twelve months preceding the survey, the area received 225mm rainfall, which is close to but below the long-term average annual rainfall of 265mm.

Most months were drier or much drier than average except for February, which received 95.2mm rainfall, which is significantly higher than the 32.4mm long term mean. November and March also received slightly higher than average rainfall. Climate was not considered a limitation to the search.



Graph 1: Rainfall and temperature data for Kalgoorlie-Boulder Airport weather station no. 12038 (BoM 2021).

2 Methods

2.1 Desktop Review

An extensive desktop assessment was conducted as part of the 2020 Targeted flora and vegetation survey, and therefore, not required for this Targeted search (Terratree 2020). Prior to the field search, a review of the Terratree (2020) survey report, spatial data and aerial imagery was undertaken to locate key areas to concentrate the field search.

The Desktop review determined the key areas to concentrate the Targeted search totalling 12.9 ha. The planned Targeted search areas comprised of the associated vegetation community and an area of proposed exploration drilling. **Figure 1a** presents an overview of the proposed Targeted search area.

The Terratree (2020) survey found that the survey area is dominated by Eucalypt Mallee Woodlands and Open Woodlands with small areas of Mallee Shrublands and one Isolated Eremophila Heathland. Seven distinct communities were observed within the survey area. The Priority species, *Acacia websteri* (P1), was recorded in Community 4, relevé C4R2, on the western edge of the survey area, near Nepean Rd. Therefore, beginning at relevé C4R2, all areas of Community 4 would be the focus of the Targeted search. Community 4 is described in accordance with NVIS Structural Formation Terminology (NVIS TWG 2017) as:

“Mallee shrubland <10m of *Acacia acuminata*, *Acacia collegialis*, *Grevillea acuaria* and *Allocasuarina acutivalvis* subsp. *acutivalvis* over open heathland 1-2m of *Eremophila linearis*, *Senna artemisioides* subsp. *filifolia* and *Scaevola spinescens* over open heathland <1m of *Dodonaea microzyga* ()” (Terratree 2020).

Community 4 was expected to occupy three pockets associated with lateritic soils totalling 6.9 ha. These three areas in the south, central and north of the study area are shown in **Figure 2b**, **Figure 3c** and **Figure 4d**, respectively. Further details about Community 4 are provided in **Appendix A**.

Focus advised Terratree of eight proposed exploration drill sites and their access tracks, the nearest of which is located approximately 125 metres (m) from relevé C4R2. These proposed drill sites were added to the planned search area in addition to Community 4. Applying a buffer of 50 m to the drill sites and a 25 m buffer to access tracks, produced a total drill site search area of 5.86 ha. The planned drill site search area is shown in **Figure 3c**.

2.2 Targeted Field Search

The Targeted flora search was conducted in accordance with the Environmental Protection Authority’s (EPA) *Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016b)

(hereafter referred to as the 'EPA Guidance') and applied in conjunction with the *Environmental Factor Guideline for Flora and Vegetation* (EPA 2016a).

Acacia websteri (P1) has distinctive features on the phyllodes and can be identified by close examination of the phyllodes, without the need for flowers or fruit. This allows flexibility of timing of this targeted search; however, the EPA guidance recommends follow up searches be conducted in Autumn (EPA 2016b).

The Targeted flora search for *Acacia websteri* (P1) was conducted between the 27th and 29th of April 2021 by Senior Ecologist Heather Legge and Senior Taxonomist/Botanist Kathya Tippur of Terratree.

Acacia websteri (P1) could be observed and identified in the field, however, specimens were still collected for confirmation. In addition, in cases where any other potential Threatened or Priority Flora could not be identified in the field, these were also collected for identification. These specimens were labelled, pressed, dried and frozen according to the WA Herbarium requirements. Their identification was subsequently confirmed by Senior Botanist-Taxonomist, Kathya Tippur by comparing collections with pressed specimens housed at the herbarium and using taxonomic keys and other reference materials.

Beginning at C4R2, all key search areas were traversed on foot in corridors of a maximum of 25m. When *Acacia websteri* (P1) was recorded, surrounding areas were also traversed. Other notable species, such as Weeds of National Significance (WoNS), were also recorded.

Field data was collected using hand-held GPS units (GDA 94) to an accuracy of 3 m. Locations of individuals and populations of *Acacia websteri* (P1) were later digitised using QGIS 3.10 (QGIS Development team 2021). Photographs were also taken of any recorded *Acacia websteri* (P1) and surrounding habitat.

All areas of Community 4 were searched as they were observed on-ground, which was slightly different to how they had been mapped over aerial imagery, with lower intensity ground-truthing in the previous survey. An additional area of Community 3, a *Eucalyptus griffithsii* Mallee Woodland, associated with drainage lines was also searched. Despite the understory being dominated by *Eremophila* spp. rather than *Acacia* spp. this area was included due to the presence of a tall shrub understory and proximity to the recorded *Acacia websteri* (**Figure 3c**). The actual area thoroughly covered during the Targeted search is shown against the planned search areas in **Figure 1a**, **Figure 2b**, **Figure 3c** and **Figure 4d**. In total, an area of 19.73 ha was thoroughly searched.

EPA Guidance outlines potential survey limitations (EPA 2016b). There were no significant limitations to the Targeted search.

3 Results

3.1 Targeted Species - *Acacia websteri* (Priority 1)

Three individuals of the targeted species, *Acacia websteri* (P1) were recorded on the western edge of the survey area, near Nepean Rd. No *Acacia websteri* was recorded in the proposed exploration drilling area or other search areas. The location of the recorded *Acacia websteri* is shown in **Figure 5**. Details including the GPS location and reference to photos of these three individuals are listed in **Table 1**.

All three individuals of *Acacia websteri* found during the search were located near C4R2 and were associated with Community 4.

Table 1: Location of *Acacia websteri* (P1)

Specimen ID	Species	Status	GPS Location		Location Description	Photo Reference
			EASTING	NORTHING		
FM01	<i>Acacia websteri</i>	P1	324704.53	6572509.37	Adjacent to the powerline track on the north side.	Photo 1
FM02	<i>Acacia websteri</i>	P1	324704.72	6572462.81	16 m South of track	Photo 2 Targeted Priority 1 species found during the search, <i>Acacia websteri</i> (P1) specimen FM01. Photo 2
FM05	<i>Acacia websteri</i>	P1	324705.94	6572458.84	Alongside FM02	Photo 3

3.2 Other Significant Flora - *Cylindropuntia tunicata* (WoNS and Declared Pest s22(2) C3)

No other non-targeted Threatened or Priority native flora species were recorded in during the search.

One significant introduced species, *Cylindropuntia tunicata* (Hudson Pear), was recorded near Nepean Rd. Although known to occur within 10 km of the search area (DBCA 2020a), this species was not previously recorded in the survey area in the 2020 survey or previous surveys (Terratree 2020). A single patch of several

individuals of *Cylindropuntia tunicata* was recorded approximately 40 m east-south-east of the FM01 *Acacia websteri* and just over 50m north-east of FM02 and FM05, as shown in **Figure 5** and **Photo 4**. Details of this species' weed status and recorded location are provided in **Table 2**.

Cylindropuntia tunicata is a densely branched cactus that grows up to 1.5m tall and 3m wide, cylindrical stem segments up to 25 centimetres (cm), densely covered with pale spines 3-6 cm long. Fruit are sterile, and the stem segments detach easily, and the plant spreads vegetatively (Weeds of Australia 2021). *Cylindropuntia tunicata* is Weed of National Significance (WoNS), also listed under the BAM Act as a Declared Pest s22(2) Control Category 3 (Restricted) throughout Western Australia and is an Environmental weed (DPIRD 2021). Dense infestations of *Cylindropuntia tunicata* impact native biodiversity in semi-arid areas by displacing native flora. Spines may cause serious injury to humans, livestock and native fauna (Weeds of Australia 2021).

Table 2: Details of significant introduced flora recorded during the search.

Species	Common Name	National Status	WA Status	GPS Location		Location Description
				EASTING	NORTHING	
<i>Cylindropuntia tunicata</i>	Hudson Pear	WoNS	Declared Pest (s22(2) (C3 – Restricted)	324745.31	6572499.18	Approximately 40m ESE of FM01

4 Discussion

4.1 Targeted Species - *Acacia websteri* (Priority 1)

Acacia websteri (P1) is a shrub with yellow flowers and fibrous bark growing 1.2 to 5m in red sand, loam or clay in low-lying areas and flats (WA Herbarium 2021). Three individuals of the Targeted species, *Acacia websteri* (P1) were recorded on the western edge of the survey area, near Nepean Rd. These three individuals of *Acacia websteri* were located, as expected, near C4R2 and none were recorded in other search areas. As anticipated, the *Acacia websteri* were associated with Community 4. No *Acacia websteri* was recorded in the nearby *Eremophila* spp. dominated Community 3, which was searched due to the presence of a dense shrub layer and proximity to the recorded occurrences of *Acacia websteri*. Likewise, no *Acacia websteri* was recorded in the proposed exploration drilling area, which is covered by different vegetation communities.

The Department of Biodiversity Conservation and Attractions (DBCA) enforces regulations under the *Biodiversity Conservation Act* (BC Act) 2015 to conserve Priority flora in WA. Priority flora are those species considered by DBCA to be poorly known, uncommon or under threat but for which there is insufficient justification, based on known distribution and population sizes, for inclusion as Threatened species under the BC Act. The categories for Threatened and Priority species and Ecological Communities give an indication of the priority for undertaking further surveys based on the number of known sites and degree of threat to those populations. The Priority 1 listing of *Acacia websteri* indicates that this species in urgent need of further study.

Priority 1 species are those which are;

“known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g., agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes” (DBCA 2019).

Acacia websteri (P1) is known to occur in 50 records in WA in the central southern inland areas from Bencubbin to Coolgardie-Kalgoorlie areas from the (DBCA 2020a). Most of these known occurrences are found around Coolgardie, and there are four records of *Acacia websteri* populations nearby the survey area as close as 250 m away from the central Targeted search area (DBCA 2020b).

Under the *Environmental Protection Act* EP Act (1986), all clearing of native vegetation requires a clearing permit unless an exemption applies. Generally, clearing is not permitted where biodiversity values would be significantly negatively impacted (DER 2014). Applications for clearing permits are assessed under 10 Clearing

principles. Principle (a) is “Native vegetation should not be cleared if it comprises a high level of biological diversity” (DER 2014). Priority flora are a measure of biodiversity values considered under this principle. If present, they indicate potentially higher biodiversity that would normally be expected in an area, therefore worthy of protection (DER 2014).

4.2 Other Significant Flora - *Cylindropuntia tunicata* (WoNS and Declared Pest s22(2) C3)

No other non-Targeted Threatened or Priority native flora species were recorded in during the search.

One significant introduced species, *Cylindropuntia tunicata*, was recorded in the vicinity of the *Acacia websteri*, near Nepean Rd.

Commonly known as Hudson Pear, *Cylindropuntia tunicata* is a member of the highly invasive cacti group, *Opuntioideae* cacti. *Cylindropuntia tunicata* was found in the Desktop search for the 2020 survey as occurring within 10 km of the survey area (DBCA 2020a). Although one *Opuntioideae* cacti, *Opuntia stricta* (Prickly Pear) was recorded during the Terratree (2020) survey, *Cylindropuntia tunicata*, was not found during the previous survey.

Dense infestations of *Cylindropuntia tunicata* impact native biodiversity in semi-arid areas by displacing native flora and long spines may cause serious injury to native fauna (Weeds of Australia 2021). Humans and livestock can also be harmed, and the plant presents an economic threat. Almost all *Opuntioideae* cacti are listed as WoNS and Declared Pests in Australia. *Cylindropuntia tunicata*, is a Weed of National Significance (WoNS) and is also listed under the BAM Act as a Declared Pest s22(2) Control Category 3 (Restricted) throughout Western Australia (DPIRD 2021).

At a national level, there are just 32 weed species listed as WoNS (DAWE2021). These are plants that have been selected for their invasiveness and impact characteristics, potential and current area of spread and their primary industry, environmental and socioeconomic impacts. Many Weeds of National Significance are also Declared pests under the BAM Act in WA. Land managers must implement control measures in areas infested with Declared plants in the C3 category (DPIRD 2019). Given the proximity of *Cylindropuntia tunicata* to *Acacia websteri*, just 40 m management is more crucial.

The C3 control category requires that;

“Organisms that should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism or prevent or contain the spread of the organism” (DPIRD 2021).

Management requirements for areas infested with Declared pest species in Category 3 (C3) are as follows:

- “The infested area must be managed in such a way that alleviates the impact, reduces the number or distribution or prevents or contains the spread of the declared pest in this area
- Ensure that any person conducting an activity on the land is aware that measures are required to be taken to control the declared pest” (DPIRD 2019a).

DPIRD (2019a) recommends that land managers:

- “Treat to destroy all plants, prevent seed set and prevent the spread of seed or plant parts within and from the area on or vehicles and/or machinery prior to seed set each year
- Erect a biosecurity sign for persons conducting any activity on the land.”

National best practice control manuals have been developed for *Opuntioid* cacti in Australia (DPIRD 2017). Physical removal (care to take all parts) and strategic herbicide application are the best forms of control.

The distribution of *Cylindropuntia tunicata* weed is still restricted to the Eastern Goldfields, specifically the Coolgardie region (WA Herbarium), and caution should be taken to prevent further spread. The fruit of *Cylindropuntia tunicata* is sterile, and the plants spread vegetatively, meaning stem segments detach easily and grow roots upon contact with soil (Weeds of Australia 2021). Therefore, as well as management to eradicate *Cylindropuntia tunicata*, it is critical to implement biosecurity to prevent its spread. When activities are undertaken in this area, it is important to stay on established tracks and undertake vehicle and footwear hygiene checks before moving to new areas.

5 Conclusions and Recommendations

Three individuals of the Targeted species, *Acacia websteri* (P1) were recorded on the western edge of the survey area, near Nepean Rd. No *Acacia websteri* was recorded in the proposed exploration drilling area or any other search areas. As a priority 1 species, impacts to *Acacia websteri* (P1) should be avoided.

No other non-Targeted Threatened or Priority native flora species were recorded in during the search.

One significant introduced species, *Cylindropuntia tunicata* (Hudson Pear), was recorded in the vicinity of the *Acacia websteri*, near Nepean Rd. *Cylindropuntia tunicata*, is a Weed of National Significance (WoNS) and is also listed under the BAM Act as a Declared Pest s22(2) Control Category 3 (Restricted) throughout Western Australia (DPIRD 2021).

Control measures are required for a Declared Pest s22(2) (C3 Restricted) (DPIRD 2019) and therefore must be implemented for *Cylindropuntia tunicata*. National best practice control manuals have been developed for invasive *Opuntioid* cacti in Australia, which can be downloaded from the DPIRD website (DPIRD 2017), and these should be referred to when developing and implementing control measures.

Terratree makes the following recommendations:

- Avoid impacts to the three individuals of *Acacia websteri* (P1) by applying an adequate buffer to surrounding native vegetation
- Develop and implement a hygiene management plan to prevent the introduction and spread of introduced flora and pathogens, especially *Opuntioid* cacti
- Conduct weed eradication and control measures for WoNS and Declared Pest species recorded, *Cylindropuntia tunicata* (Hudson Pear).

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Photos



Photo 1: Targeted Priority 1 species found during the search, *Acacia websteri* (P1) specimen FM01.



Photo 2: Targeted Priority 1 species found during the search *Acacia websteri* (P1) specimen FM02.



Photo 3: Targeted Priority 1 species found during the search *Acacia websteri* (P1) specimen FM05.



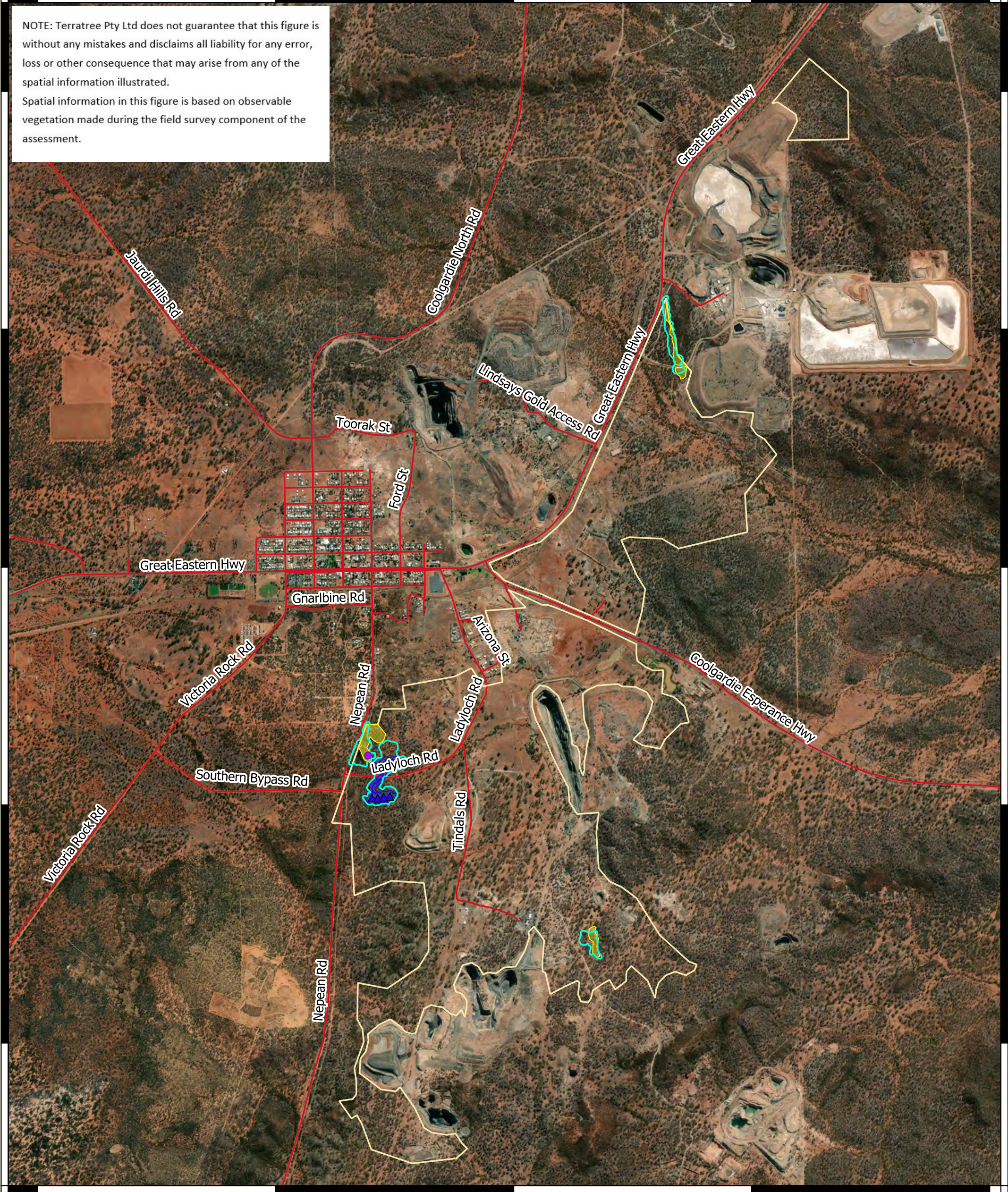
Photo 4: *Cylindropuntia tunicata* (Hudson Pear) (WoNS and Declared Pest s22(2)-C- Restricted) found during the search.

Figures

Figure 1a: Search Area Overview

NOTE: Terratree Pty Ltd does not guarantee that this figure is without any mistakes and disclaims all liability for any error, loss or other consequence that may arise from any of the spatial information illustrated.

Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.



Legend

- Target Area - Releve C4R2
- Actual *Acacia websteri* (P1) Targeted Search Area (April 2021)
- Planned Search Area - Expected *Acacia* Community (C4)
- Planned Additional Search Area - Proposed Drill Areas
- Proposed Drill Access
- Targeted Flora and Vegetation Survey Area (Nov 2020)



Overview

Focus Minerals Coolgardie

Acacia websteri Targeted Search Area Overview

0 1 2 km



Datum: GDA 1994 Projection: MGA Zone 51 Scale: 1: 30 000 at A3

Date: 29 June 2021 Prepared: H. Legge Project No: T21015

Expiry: Checked: J. Grehan

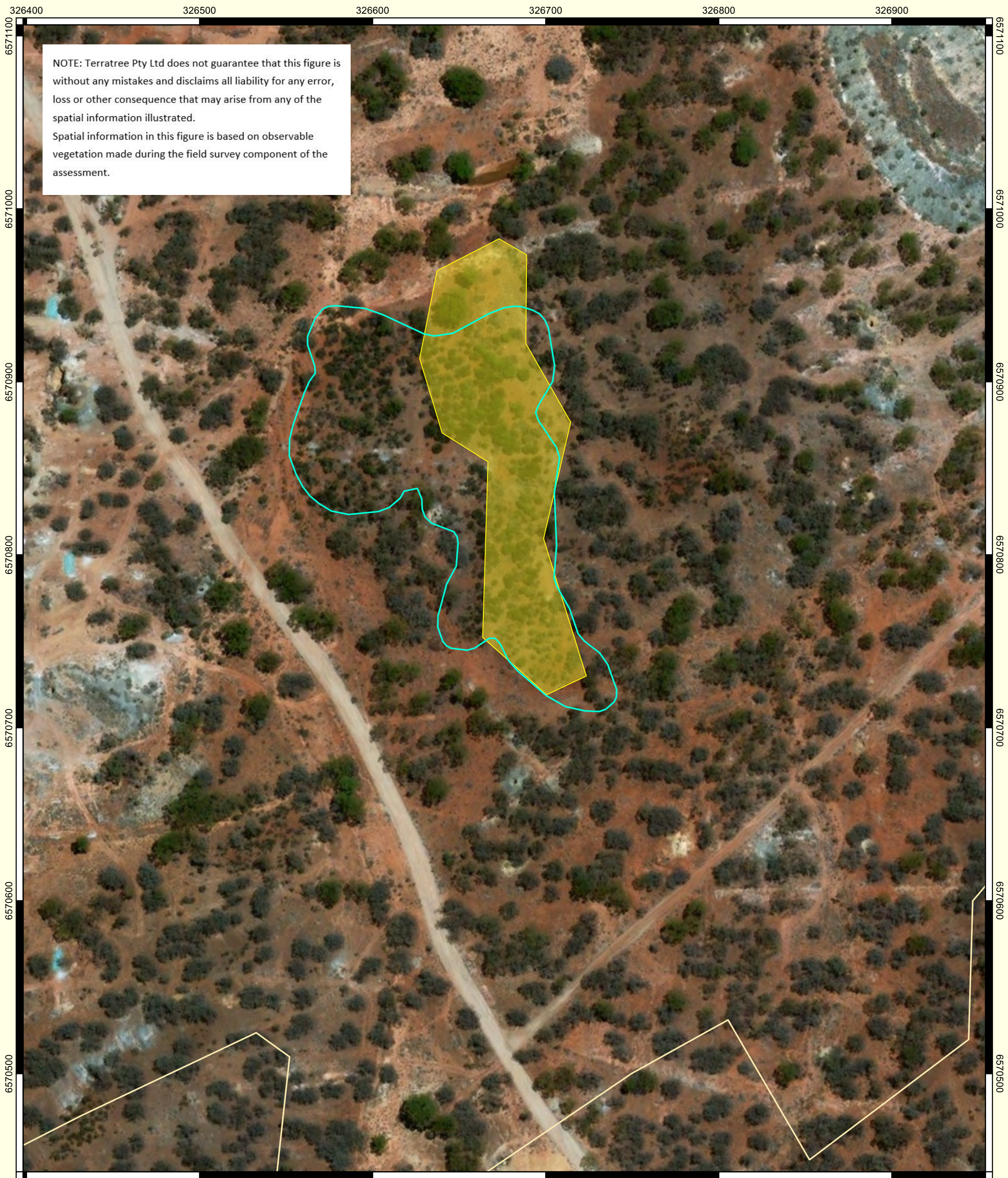
Figure 1a

Revision:

Review:



Figure 2b: Search Area – South



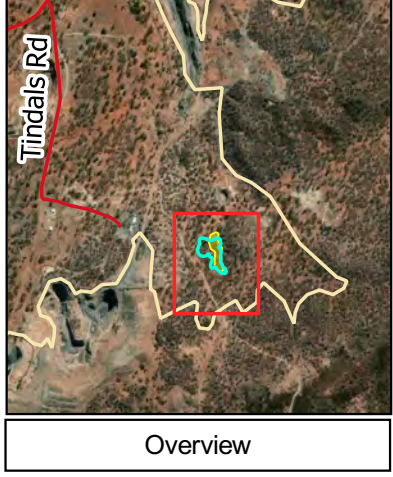
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 Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.

326400 326500 326600 326700 326800 326900

6570500 6570600 6570700 6570800 6570900 6571000 6571100

Legend

- Actual *Acacia websteri* (P1) Targeted Search Area (April 2021)
- Planned Search Area - Expected Acacia Community (C4)
- Targeted Flora and Vegetation Survey Area (Nov 2020)



Focus Minerals Coolgardie
***Acacia websteri* Targeted Search Area South**

0 50 100 m

Datum: GDA 1994
 Projection: MGA Zone 51
 Scale: 1: 2 000 at A3

Date: 24 June 2021	Prepared: H. Legge	Project No: T21015
Expiry:	Checked: J. Grehan	
Figure 1b	Revision:	
	Review:	

Figure 3c: Search Area – Central

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Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.

6572800

6572600

6572400

6572200

6572000

6571800

6572800

6572600

6572400

6572200

6572000

6571800

Legend

- Actual *Acacia websteri* (P1) Targeted Search Area (April 2021)
- Target Area - Releve C4R2
- Planned Search Area - Expected *Acacia* Community (C4)
- Planned Additional Search Area - Proposed Drill Areas
- Proposed Drill Access
- ▲ Proposed Drill Site
- Targeted Flora and Vegetation Survey Area (Nov 2020)

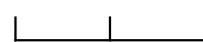


Overview

Focus Minerals Coolgardie

Acacia websteri Targeted Search Area Central

0 50 100 m



Datum: GDA 1994
Projection: MGA Zone 51

Scale: 1: 4 000 at A3



Date: 29 June 2021	Prepared: H. Legge	Project No: T21015
Expiry:	Checked: J. Grehan	
Figure 1c	Revision:	
	Review:	

Figure 4d: Search Area – North

327000

327200

327400

327600

NOTE: Terratree Pty Ltd does not guarantee that this figure is without any mistakes and disclaims all liability for any error, loss or other consequence that may arise from any of the spatial information illustrated.

Spatial information in this figure is based on observable vegetation made during the field survey component of the assessment.

6576400

6576200

6576000

6575800

6575600

6576400

6576200

6576000

6575800

6575600

Great Eastern Hwy

Three Mile Hill - Greenfields Access Rd

327000

327200

327400

327600

Legend

- Actual *Acacia websteri* (P1) Targeted Search Area (April 2021)
- Planned Search Area - Expected Acacia Community (C4)
- Targeted Flora and Vegetation Survey Area (Nov 2020)

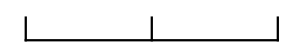


Overview

Focus Minerals Coolgardie

Acacia websteri Targeted Search Area North

0 50 100 m



Datum: GDA 1994
Projection: MGA Zone 51

Scale: 1: 3 000 at A3



Date: 24 June 2021

Prepared: H. Legge

Project No: T21015

Expiry:

Checked: J. Grehan

Figure 1d

Revision:

Review:



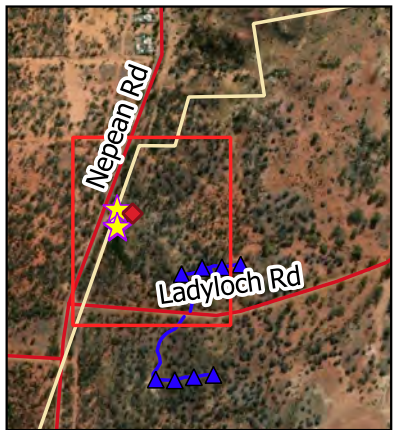
Figure 5: Targeted Search Results - *Acacia websteri* (P1) and WoNS Location



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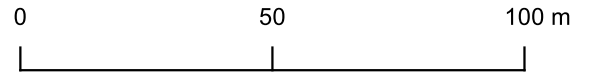
Legend

- ★ *Acacia websteri* (Priority 1)
- ◆ *Cylindropuntia tunicata* (WoNS)
- Proposed Drill Access
- ▲ Proposed Drill Site
- Targeted Flora and Vegetation Survey Area (Nov 2020)



Overview

**Focus Minerals Coolgardie
Targeted Search Results
Acacia websteri & WoNS Locations**




Datum: GDA 1994
Projection: MGA Zone 51
Scale: 1: 1500 at A3

Date: 24 June 2021	Prepared: H. Legge	Project No: T21015
Expiry:	Checked: J. Grehan	
Figure 2	Revision:	
	Review:	

Appendices

Appendix A: Vegetation Community 4 Detailed Descriptions

Table A.1: Community 4 Details: *Acacia* spp. and *Allocasuarina* spp. Mallee Shrubland

NVS Description				
Mallee shrubland <10m of <i>Acacia acuminata</i> , <i>Acacia collegialis</i> , <i>Grevillea acuaria</i> and <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> over open heathland 1-2m of <i>Eremophila linearis</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> and <i>Scaevola spinescens</i> over open heathland <1m of <i>Dodonaea microzyga</i> .				
Landscape Position	Species Richness	Area (% of total survey area)	Number of Relevés	All species in Community
Lateritic ridges	27	6.9ha (0.8)	3	<i>Acacia acuminata</i> <i>Acacia collegialis</i> <i>Acacia websteri</i> (P1) (C4R2) <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> <i>Allocasuarina campestris</i> <i>Alyxia buxifolia</i> <i>Cratystylis conocephala</i> <i>Cryptandra aridicola</i> <i>Dodonaea microzyga</i> <i>Eremophila gibbosa</i> <i>Eremophila linearis</i> <i>Eremophila oppositifolia</i> <i>Eremophila</i> sp. <i>Eucalyptus torquata</i> <i>Euryomyrtus maidenii</i> <i>Grevillea acuaria</i> <i>Hakea ?platysperma</i> <i>Olearia muelleri</i> <i>Phebalium</i> sp. <i>Prostanthera grylloana</i> <i>Santalum acuminatum</i> <i>Scaevola spinescens</i> , <i>Sclerolaena diacantha</i> <i>Senna artemisioides</i> subsp. <i>filifolia</i> <i>Solanum lasiophyllum</i> <i>Triodia tomentosa</i> <i>Vincetoxicum lineare</i>
				
Photo: C4R2				

Appendix C

Terrestrial Fauna Survey 2021



Coolgardie Gold Project

Basic Terrestrial Fauna Survey
Final Report

Prepared for Focus Minerals Limited
February 2021



Limitations

Scope of services

This report ("the report") has been prepared by Western Ecological Pty Ltd (WE) in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and WE. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

Reliance on data

In preparing the report, WE have relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, WE have not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WE have also not attempted to determine whether any material matter has been omitted from the data. WE will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WE. The making of any assumption does not imply that WE have made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. WE disclaim responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

Report Version	Revision No.	Purpose	Author / Reviewer	Submitted to Client	
				Form	Date
Draft Report	1	For client review	Western Ecological / Focus Minerals	Electronic	10/02/2021
Final Report	2	Client submission	Western Ecological / Focus Minerals	Electronic	17/02/2021



Executive Summary

Focus Minerals Ltd commissioned Western Ecological (WE) to undertake a Basic fauna survey in the Coolgardie area. WE understands that the project involves exploration and further development of the Coolgardie Gold Project, which is adjacent to the town of Coolgardie, approximately 35 km west of Kalgoorlie in Western Australia.

The outcome of the survey undertaken by WE and the information supplied in this report will be used to inform the environmental assessment and approvals process.

The desktop assessment involved searches of NatureMap, the EPBC Protected Matters Search Tool (EPBC PMST) and DBCA Threatened Fauna Database. Results of the databases searches returned a total of 240 vertebrate species from 73 families. These were comprised of five amphibian species from three families, 66 reptile species from nine families, 141 bird species from 48 families, and 28 mammal species from 13 families.

A total of 21 conservation significant vertebrate species (including Priority species) from 11 families were identified during the desktop review of the database searches. These were comprised of 18 bird species from eight families and three mammal species from three families.

A total of 40 fauna species, from 26 families were recorded during the field survey. This comprised of seven reptile species from six families, 30 bird species from 17 families and three mammal species from three families. All species recorded were considered to be common and widespread.

A total of 34 habitat assessments and ten reptile searches were undertaken during the field survey. A total of four fauna habitats types were recorded, these were Mallee Eucalyptus Woodland, Salmon Gum Woodland, Acacia Shrubland and Drainage Line Habitat. The most widespread habitat across the survey area was Mallee Eucalyptus Woodland, consisting of 39% of the survey area. Much of the survey area (35%) was degraded in condition due to previous clearing, mining exploration, tracks and roads.



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1 Introduction

1.1 Background

Focus Minerals Ltd commissioned Western Ecological (WE) to undertake a Basic fauna survey in the Coolgardie area. WE understands that the project involves exploration and further development of the Coolgardie Gold Project, which is adjacent to the town of Coolgardie, approximately 35 km west of Kalgoorlie in Western Australia (Figure 1).

Gold was discovered in Coolgardie in 1892 the year before the first find in Kalgoorlie. The first modern exploration and mining in the Coolgardie area commenced in the late 1970s-early 1980s. Since 1892, historic and modern mining has produce in excess of 2.8 million ounces from the Coolgardie area. As such the area has been subject to long-term disturbance associated with mining for almost 130 years.

1.2 Scope and Objective

The scope to be undertaken was as follows:

- Basic (previously known as level 1) fauna survey
- Document the above in a concise report.

The objective of the fauna survey was to define the fauna values in the survey area, to support future project planning, and inform environmental approvals.



Figure 1: Survey Location



Scale 1:80,000

GDA94 - MGA Zone 51

Legend

Survey Area



1.4 Legislative Context

Fauna in Western Australia (WA) is protected formally and informally by various legislative and non-legislative measures, which are as follows:

- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Western Australian Biodiversity Conservation Act 2016* (BC Act).

Non-legislative measures:

- WA Department of Biodiversity, Conservation and Attractions (DBCA) Priority lists for flora, ecological communities and fauna
- Recognition of locally significant populations by DBCA.

A short description of each is given below. Other definitions, including species conservation categories, are provided in Appendix 1.

EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) aims to protect matters of national environmental significance, which are detailed in Appendix 1. Under the EPBC Act, the Commonwealth Department of Agriculture, Water and the Environment (DAWE) lists protected species and Threatened Ecological Communities (TECs) by criteria set out in the Act. Species are conservation significant if they are listed as Threatened (i.e. Critically Endangered, Endangered and Vulnerable) or Migratory.

Bird species protected as Migratory under the EPBC Act include those listed under international migratory bird agreements relating to the protection of birds, which migrate between Australia and other countries, for which Australia has agreed. This includes the Japan-Australia Migratory Bird Agreement (JAMBA), the China-Australia Migratory Bird Agreement (CAMBA), the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Some marine fauna or terrestrial fauna that use marine habitats are listed as Marine under the EPBC Act. These species are only considered conservation significant when a proposed development occurs in a Commonwealth marine area (i.e. any Commonwealth Waters or Commonwealth Marine Protected Area). Outside of such areas, the EPBC Act does not consider these species to be matters of national environmental significance, so are not protected under the Act.

BC Act

The *Biodiversity Conservation Act 2016* (BC Act) replaced both the *Wildlife Conservation Act 1950* and the *Sandalwood Act 1929* and came into effect on 1 January 2019. The aim of the new Act is to conserve and protect biodiversity and to promote the ecologically sustainable use of biodiversity components in the State, and will bring more activities within the scope of biodiversity laws.

Taxa listed as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1a, 1b, and 1c), or is a rediscovered species to be regarded as threatened species under section 26(2) of the BC Act. Other categories include extinct or extinct in the wild and they are listed under section 23 (1) of the BC Act (Appendix 1).

If 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, they are covered under section 13(1) of the BC Act and are called specially protected species. Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act can't also be listed as Specially Protected species (see Appendix 1 for a more detailed description of each threat category).



Threatened Ecological Communities (TECs) are also covered under the BC Act and are placed into three categories of critically endangered, endangered or vulnerable under section 27(1a, 1b, and 1c) of the BC Act depending on their threat status.

DBCA Priority Species and Communities

DBCA lists species that are possibly threatened but that do not meet criteria for listing under the BC Act, or are otherwise data deficient, and adds them 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 fauna or flora. 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. Consideration 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 (see Appendix 1 for more detail of the priority codes).

The DBCA also has a list of Priority Ecological Communities (PECs) that have scant information available to be considered a TEC, or which are rare but not currently threatened. Ecological communities that do not meet survey criteria or that are not sufficiently defined are added to the PEC list under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as a TEC. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for near threatened, or that have been recently removed from the threatened list, are placed in priority 4. These ecological communities require regular monitoring. Conservation dependent ecological communities are placed in priority 5.

Informal Recognition of Threatened Fauna

Certain populations or communities of fauna may be of local significance or interest because of their patterns of distribution and abundance. For example, fauna may be locally significant because they are range extensions to the previously known distribution or are newly discovered species (and have the potential to be of conservation significance). In addition, many species are in decline as a result of threatening processes (land clearing, grazing, and changed fire regimes) and relict populations of such species assume local importance for DBCA. It is not uncommon for DBCA to make comment on these species of interest.

1.4 Bioregions and Climate

Bioregions

The Biogeographic Regionalisation of Australia (IBRA7) divides Australia into 89 bioregions based on major biological, geographical and geological attributes. These bioregions are subdivided into 419 subregions as part of a refinement of the IBRA framework (DEE 2016). The survey area sits within the Coolgardie 3 subregion (COO3 – Eastern Goldfields subregion) which forms part of the Coolgardie Bioregion, of which there are three subregions.

The climate is Arid to Semi-arid with 200-300 mm of rainfall, sometimes in summer but usually in winter. Coolgardie 3 lies on the Yilgarn Craton's 'Eastern Goldfields Terrains'. The relief is limited and consists of gently undulating plains interrupted in the west with low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite (Cowan 2001). The underlying geology is of gneisses and granites eroded into a flat plane covered with tertiary soils and with scattered exposures of bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line (Cowan 2001).

The vegetation consists of Mallees, Acacia thickets and shrubheaths on sandplains. Diverse Eucalyptus woodlands occur around salt lakes, on ranges, and in valleys. Salt lakes support dwarf shrublands of samphire. Woodlands and Dodonaea shrubland occur on basic granulites of the Fraser Range. The area is rich in endemic Acacias. Land use consists primarily of primarily of Crown reserves, grazing, conservation and mining (Cowan 2001).

Climate

The nearest and most relevant Bureau of Meteorology (BoM) weather station is Kalgoorlie-Boulder Airport (Station No. 12038) which is approximately 30 km north east of the survey area, with rainfall and temperature records from 1939 to 2020 (BoM 2021). Please note that there is a weather station at Coolgardie (not sure if it is still active) has incomplete rainfall records, particularly from 2010 onwards and for 2020 there are only rainfall records for January and February. Further to this temperature data is only available from 1897 to 1953 (BoM 2021).

The annual long-term average (1939 – 2020) rainfall at the Kalgoorlie-Boulder Airport weather station is 264.9 mm (BoM 2021), with the lowest average monthly rainfall being 13.5 mm in September, while the highest average monthly rainfall is 31.6 mm in June (BoM 2020) (Figure 2). On average the warmest month of the year at the Kalgoorlie-Boulder Airport weather station is January with a mean maximum temperature of 33.7°C. July is the coolest month of the year with a mean maximum temperature of 16.8°C (Figure 2).

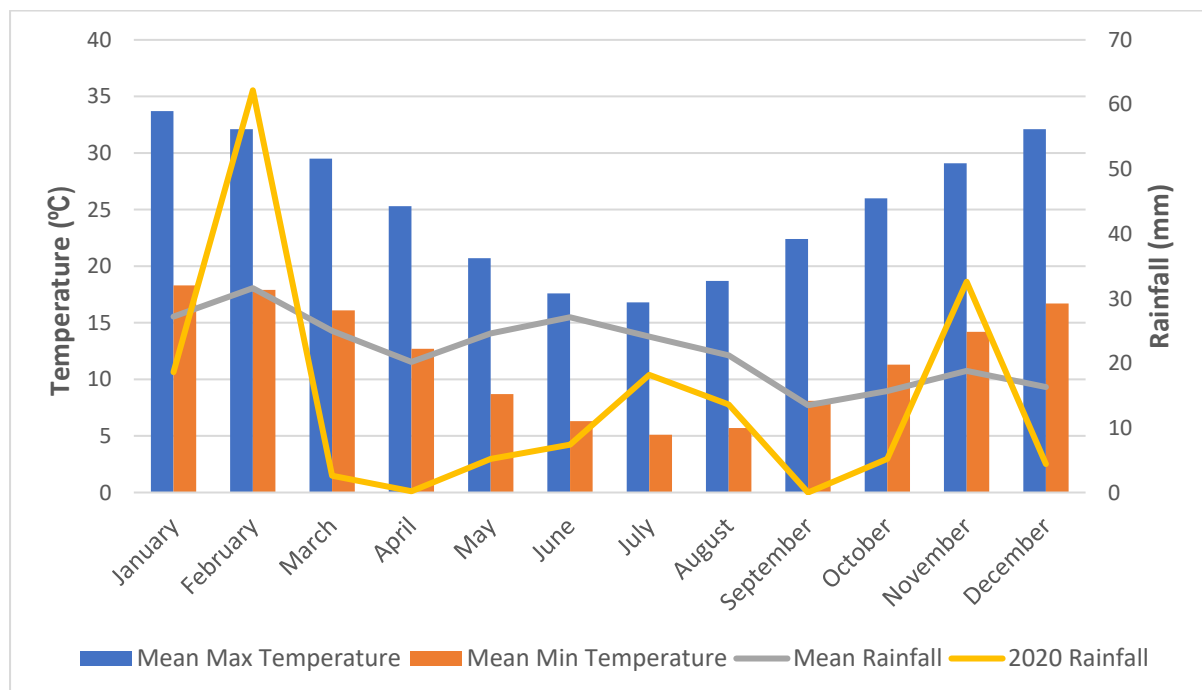


Figure 2: Temperate and Rainfall Data for Kalgoorlie (taken from BoM Climate Data Online).

No rainfall was recorded in the survey area during the assessment. Total rainfall for 2020 at the Kalgoorlie-Boulder Airport weather station was 170.2 mm which is well below the long-term average of 264.9 mm. Only two months of 2020 (February and November 2020) received more than the average (Figure 2). In 2019 there was even less rainfall recorded at the Kalgoorlie-Boulder Airport weather station, with only 143.2 mm being recorded. Max temperatures during the survey were above the long-term monthly average of 30°C on all days.

2 Methods

2.1 Requirements for Fauna Surveys

The fauna survey was completed in accordance with the following Environmental Protection Authority (EPA) and DAWE requirements for the environmental surveying and reporting of fauna surveys in WA, where relevant and practical, and as documented in:

- EPA Statement of Environmental Principles, Factors and Objectives (EPA 2018)
- EPA Environmental Factor Guideline: Terrestrial Fauna (EPA 2016)
- EPA Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2020)
- Survey Guidelines for Australia's Threatened Birds. EPBC Act survey guidelines 6.2 (2010) (DSEWPaC)
- Survey Guidelines for Australia's Threatened Mammals. EPBC Act survey guidelines 6.5 (2011) (DSEWPaC)
- Survey Guidelines for Australia's Threatened Reptiles. EPBC Act survey guidelines 6.6 (2011) (DSEWPaC)
- National Recovery Plan for Malleefowl *Leipoa ocellata* Department for Environment and Heritage (J. Benschmesh 2007).

2.2 Desktop Assessment

Searches of the DBCA Threatened Fauna Database (60 km) NatureMap 40 km [maximum radius possible] and the EPBC Protected Matters Search Tool (EPBC PMST) (60 km) were undertaken to identify fauna species of conservation significance potentially occurring in the survey area (DBCA 2021a, DBCA 2021b, DAWE 2021) (Appendix 2). These searches were centred on the following co-ordinates 30° 57' 17"S and 121° 09' 59"E.

2.3 Field Survey

The field survey was undertaken over five days (including travel) from the 23 – 27 November 2020 by two qualified Zoologists (Dr Ron Firth and Laura Stevens). As per the scope and proposal, the following survey methods were undertaken.

2.3.1 Habitat Assessment

Habitat assessments were undertaken to assess their potential to support species of conservation significance and the quality of habitat they provide to a wider suite of fauna. Fauna habitat assessments were undertaken to define and delineate the main broad fauna habitat types present. The habitat assessments were documented systematically for each habitat type on standardised field sheets. The habitat assessments consisted of the following:

- location of the broad habitat type within the survey area (GPS co-ordinate) and its relative percentage
- habitat condition was assessed at each assessment site as 'completely degraded' through to 'pristine', based on the scale given in Keighery (1994)
- landscape position
- dominant vegetation and structure (e.g., number of vegetation strata)
- hollow-bearing trees and dead stags (e.g. average size and abundance of hollows)
- description of any rock and rocky outcrops
- logs (e.g., abundance and size)
- substrate (e.g., leaf litter)
- wetlands, creeks, rivers, dams and other water bodies
- description of any observed nests and roosts (if present)
- subterranean roosts (e.g., caves, disused mineshafts and/or adits)
- associated fauna species observed using the habitat
- disturbance (e.g., cattle grazing, fire)
- photo showing a typical example of the broad habitat type.



A total of 34 habitat assessments were undertaken in the survey area during the assessment (Appendix 3). The location of the habitat assessments can be seen in Figure 3.

2.3.2 Reptile Search Sites

Reptiles were actively searched for in the survey area. Reptile searches were undertaken for twenty minutes at locations throughout the survey area, in addition to the habitat assessment locations. The reptile searches included looking through leaf litter, (particularly under Eucalyptus trees, where a deep layer of leaf litter and bark had often accumulated), overturning rocks, looking under decorticating bark (where present) and under piles of rubbish. The location of the reptile searches can be seen in Figure 3.

2.3.3 Opportunistic Searches

Fauna were recorded opportunistically during the survey. This involved looking through leaf litter and overturning rocks, whilst walking in the survey area. Other recordings included visual sightings of active fauna such as reptiles and birds, signs of species presence such as burrows and scats of mammals and reptiles, and aural observations of amphibian and bird species. Observation (visual or heard) of species considered of conservation significance were recorded by means of a hand-held GPS if present.

2.3.4 Conservation Significant Fauna Assessment

Based on database search results and known distributions only one species of conservation significance was considered during the field assessment and it was the Malleefowl (*Leipoa ocellata*).

Areas considered to be suitable habitat were assessed for evidence of Malleefowl activity, and this included:

- Malleefowl tracks
- Malleefowl nesting mounds including status (inactive/ active) and activity according to the following criteria:
 - Nest in preparation – eggs not laid (evidence of litter trail)
 - Mound is in progress/ maintenance – eggs assumed to be laid
 - Evidence of chicks leaving nest – chicks fledging site / shell fragments
 - Decommissioned – spreading and returning of mound soil
- Malleefowl individual sightings and assessment of age (chick/ adult)
- Opportunistic observations of Malleefowl evidence (tracks, mounds and or individual sightings) within the survey area.

2.3.5 Taxonomy

For species identified in the desktop assessment, where there is doubt to their true taxonomy (through subsequent name changes or taxonomic reviews), an effort was made to determine the current scientific name for each taxon. In some cases, old scientific names were presented where correct nomenclature could not be determined due to name changes. Some taxon names may be followed by 'sp.', meaning that the species name was not given in the data source or the identification is in doubt. Where there are previously recorded taxa such as this that have the potential to be a conservation significant species, they are discussed specifically in the results and discussion sections.

Taxonomy and nomenclature in this report follows the accepted listing of published terrestrial vertebrate species, primarily the West Australian (WA) Museum (2020). In addition, the following are also considered; the listing for amphibians and reptiles is consistent with Chapple *et al.* (2019), Wilson & Swan (2017) and (to a lesser extent) Cogger (2014); bird listings are consistent with Christidis & Boles (2008) and mammal listings are consistent with Woinarski *et al.* (2014).

3 Results

3.1 Survey Limitations

Survey constraints are often difficult to predict, as is the extent to which they influence survey effort. Survey limitations and constraints of the fauna survey are outlined below in Table 1.

Table 1: Limitations and constraints associated with the survey

Variable	Impact on Survey Outcome
Access	The entire survey area (approximately 885 ha) was accessible and traversed by vehicle and by foot.
Experience	<p>The personnel who undertook the survey were practitioners suitably qualified in their respective fields with relevant experience as specified by the EPA Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2020).</p> <p>The personnel were as follows:</p> <ul style="list-style-type: none"> • Dr Ron Firth (Principal Ecologist) • Laura Stevens (Principal Zoologist).
Timing, weather, season	<p>The survey was conducted as a Basic fauna survey and therefore primarily about defining and describing habitats present. Timing, weather and season, therefore, are not deemed a prime consideration.</p> <p>No rainfall was recorded in the survey area during the assessment. Total rainfall for 2020 at the Kalgoorlie-Boulder Airport weather station was 170.2 mm which is below the long-term average of 264.9 mm. Only two months of 2020 (February and November 2020) received more than the average (Figure 2). In 2019 there was even less rainfall recorded at the Kalgoorlie-Boulder Airport weather station, with only 143.2 mm being recorded. Max temperatures during the survey were above the long-term monthly average of 30°C on all days.</p> <p>It is difficult to determine what the impacts of the low rainfall are on the fauna in the survey area and their detectability. However, there is likely to be an impact on food resources either directly or indirectly and this is likely to impact on their abundance and consequently their detectability, but this is not quantifiable from the work undertaken so far. Further this and as mentioned above, the assessment was undertaken at the basic level, which is primarily about defining and delineating habitat.</p> <p>The survey was undertaken from 23 – 27 November 2020 (including travel). There were therefore no limitations to the survey due to timing, weather or season, given the level of assessment undertaken.</p>
Scope	<p>The survey consisted of a Basic fauna survey (formally known as a level 1 fauna survey).</p> <p>During the field survey, the entire survey area was assessed to define the habitats and fauna values.</p>
Completeness	<p>A total of:</p> <ul style="list-style-type: none"> • 885 ha was assessed during the Basic fauna survey • 34 habitat assessment were undertaken • 10 reptile searches were undertaken • 39 fauna species were recorded in the survey area • Four fauna habitat types were recorded

Disturbance	Historically, more than 2.6 million ounces of gold have been produced from the Coolgardie gold belt since mining commenced in 1892. Considerable disturbance from mining and exploration has therefore affected the area for well over 100 years. This ongoing disturbance was evident in much of the survey area.
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3.2 Database Results

Results of the databases searches outlined a total of 240 vertebrate species from 73 families (Appendix 2). These were comprised of five amphibian species from three families, 66 reptile species from nine families, 141 bird species from 48 families, and 28 mammal species from 13 families.

A total of 21 conservation significant vertebrate species (including Priority species) from 11 families were identified during the desktop review of the database searches (Appendix 2). These were comprised of 18 bird species from eight families and three mammal species from three families.

The DBCA Threatened Fauna Database returned a total of 12 conservation significant fauna species from within a 60 km radius of the survey area. The results of which can be seen in Figure 4. No Conservation Significant fauna were recorded in the survey area. The closest record to the survey area is the Common Greenshank which was recorded just 20 m to the east of the survey area at Coolgardie Gorge Wetland.

Shorebirds and Waterbirds

A total of 15 of waterbird species were returned in the database. These were a combination of waders/shorebirds, migratory sea/marine birds and waterbirds. These wetland avifauna such as wading birds, including Plovers and Sandpipers inhabit estuaries, mudflats, saltmarshes, sandflats and beaches, with shallow water edges, where they feed on invertebrates such as worms, molluscs, insects and crustaceans (Garnett *et al.* 2011). Suitable habitat for these shorebird and waterbird species is not present in the survey area, therefore they have been omitted from any further discussion.

Now regionally extinct

A number of species in the database searches were also known to be historical records of species now locally extinct, for example the Numbat (*Myrmecobius fasciatus*) and Bilby (*Macrotis lagotis*), both of which were present in NatureMap, but not in the EPBC PMST or DBCA Threatened fauna database. As such these species have also been omitted from further discussion.

Database errors and anomalies

Occasionally there are errors and/or anomalies in the database searches that are sourced from the various government departments, for example, the Grey Wagtail (*Motacilla cinerea*), which is a rare visitor (Johnstone & Storr 1998) and the Grey Falcon (*Falco hypoleucos*), whose distribution is to the east of the survey area (Slater *et al.* 2009). These species have been omitted from any further discussion.

It is important to note, that the EPBC PMST is not entirely based on point records, but also on broader information, including bioclimatic distribution models, whereas the DBCA threatened fauna database and NatureMap is. Consequently, the results of the EPBC PMST are in some cases less accurate, particularly at a local scale (e.g., the Western Quoll [*Dasyurus geoffroii*]). As a result, the EPBC PMST can include species that do not occur in the survey area because, for example, there is no habitat available or they are now known to be locally extinct. These species have therefore been omitted from any further discussion.

In addition, many fauna are not distributed evenly across the landscape, are more abundant in some places than others, and consequently more detectable (Currie 2007). Furthermore, some small, common ground-dwelling reptile and mammal species tend to be habitat specific, and many bird species can occur as regular migrants, occasional visitors or vagrants. Therefore, all these species have been excluded from any further discussion.

Conservation Significant Fauna

With the aforementioned shorebirds, waterbirds, locally/regionally extinct and database errors species removed, a total of four conservation significant species retrieved from the database searches are considered as either likely, possibly or unlikely to occur. Of these four conservation significant species, no species were recorded during the assessment, no species are

considered Likely to occur, one species is considered as Possibly occurring and three are considered Unlikely to occur in the survey area (Table 2). All species will be considered in section 4.1 of the discussion below.

The Likelihood of each species is based on the following criteria:

- Recorded: Recorded during the field survey or site reconnaissance
- Likely: Suitable habitat is present in the survey area and the survey area is in the species' known distribution
- Possible: Limited or no suitable habitat is present in survey area, but is nearby. The species has good dispersal abilities and is known from the general area
- Unlikely: No suitable habitat is present in survey area but is nearby, the species has poor dispersal abilities, but is known from the general area; or suitable habitat is present, however the survey area is outside of the species' known distribution.

Table 2: Conservation significant fauna potentially occurring in the survey area

CR = Critically Endangered under the EBPC Act, EN = Listed as Endangered under the EBPC Act, VU = Listed as Vulnerable under the EBPC Act, MI = Listed as Migratory under the EBPC Act, CD = Conservation Dependent under the EBPC Act, OS = Other specially protected species under the EBPC Act, IA = Migratory birds protected under an International Agreement, IUCN Threat categories (BC Act). P = Listed as Priority by the DBCA.

Common name	Species name	Conservation Status (EPBC Act)	Conservation Status (WA BC Act)	Likelihood
Birds				
Malleefowl	<i>Leipoa ocellata</i>	Vu	Vu	Possibly
Common Greenshank	<i>Tringa nebularia</i>	Mi	Mi	Unlikely
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	Mi	Mi	Unlikely
Carnaby's Black Cockatoo	<i>Calyptorhynchus latirostris</i>	En	En	Unlikely

3.3 Field Assessment Results

A total of 40 fauna species from 26 families were recorded in the survey area (Appendix 4). All fauna species recorded are considered relatively common and widespread.

3.3.1 Fauna Assemblage

Amphibians

No amphibian species were recorded during the field assessment (Appendix 4).

Reptiles

During the field survey, seven reptile species were recorded (Appendix 4). The South-western Clawless Gecko (*Crenadactylus ocellatus*), Tree Dtella (*Gehyra variegata*) Bynoe's Gecko (*Heteronotia binoei*) Common Scaly Foot (*Pygopus lepidopodus*) and Shingleback (*Tiliqua rugosa*) were all recorded in active fauna searches. The species were recorded under bark, in wood piles, leaf litter and under rubbish in various locations. The Western Netted Dragon (*Ctenophorus reticulatus*) was observed on a track and the Monitor species (considered likely to be the Sand Monitor [*Varanus gouldii*], was recorded from tracks and diggings. Photographs of a number of reptile species recorded during the field survey can be seen in Plates 1-4.

Birds

During the field survey, 30 bird species from 17 families were recorded (Appendix 4). All bird species recorded are considered relatively common and widespread.

Mammals

During the field survey three mammal species were recorded, the Red Kangaroo (*Macropus rufus*) and two introduced species, the European Rabbit (*Oryctolagus cuniculus*) and Cattle (*Bos taurus*) (Appendix 4).



Plate 1: Bynoe's Gecko (*Heteronotia binoei*)



Plate 2: South-western Clawless Gecko (*Crenadactylus ocellatus*)



Plate 3: Shingleback (*Tiliqua rugosa*)



Plate 4: Tree Dtella (*Gehyra variegata*)

3.4 Fauna Habitat

A total of 34 habitat assessments were undertaken during the field survey, the details of which can be seen in Table 3, Figure 3 and Appendix 3. A total of four broad fauna habitat types were described, however, a large proportion of the survey area was considered to be degraded.

Table 3: Habitat Assessment Locations

Habitat Assessment	Easting (GDA94)	Northing (GDA94)	Fauna Habitat Type
1	328526	6577936	Mallee Eucalyptus Woodland
2	328586	6577702	Mallee Eucalyptus Woodland
3	328400	6578059	Mallee Eucalyptus Woodland
4	327283	6575995	Mallee Eucalyptus Woodland
5	327258	6575566	Mallee Eucalyptus Woodland
6	327826	6574946	Drainage Line
7	327126	6574768	Mallee Eucalyptus Woodland
8	327713	6574478	Mallee Eucalyptus Woodland
9	327027	6574385	Mallee Eucalyptus Woodland
10	326878	6573953	Salmon Gum Woodland
11	326185	6572378	Salmon Gum Woodland
12	327220	6572751	Mallee Eucalyptus Woodland
13	327200	6572560	Mallee Eucalyptus Woodland
14	327237	6570667	Salmon Gum Woodland
15	326451	6571247	Mallee Eucalyptus Woodland
16	326260	6571038	Mallee Eucalyptus Woodland
17	325336	6569174	Salmon Gum Woodland
18	324823	656968	Mallee Eucalyptus Woodland
19	324740	6569615	Mallee Eucalyptus Woodland
20	324626	6569495	Acacia Shrubland
21	324685	6572425	Acacia Shrubland
22	324790	6570467	Salmon Gum Woodland
23	324737	6570291	Mallee Eucalyptus Woodland
24	325773	6570856	Mallee Eucalyptus Woodland
25	326679	6570964	Mallee Eucalyptus Woodland
26	326495	6570760	Mallee Eucalyptus Woodland
27	324719	6571591	Mallee Eucalyptus Woodland
28	325773	6570856	Mallee Eucalyptus Woodland
29	326181	6571442	Salmon Gum Woodland
30	326056	6572028	Salmon Gum Woodland
31	325340	6572483	Salmon Gum Woodland
32	325375	6571473	Salmon Gum Woodland
33	325300	6572287	Salmon Gum Woodland
34	325630	6571492	Salmon Gum Woodland

The four broad fauna habitat types described are as follows:

- Mallee Eucalyptus Woodland
- Salmon Gum Woodland
- Drainage Line
- Acacia Shrubland

The remaining areas were classed as totally degraded/cleared/paddocks as well as previously cleared for mining activities, roadways and tracks. Fauna Habitat type and size can be seen in Table 4 and Figure 5. Examples of the fauna habitat types can be seen in Plates 5 – 8.

Table 4: Fauna habitat type and extent in the survey area.

Fauna Habitat	Habitat extent in survey area (Ha)	Habitat extent in survey area (%)
Mallee Eucalyptus Woodland	346	39
Salmon Gum Woodland	184	21
Drainage Line	32	4
Acacia Shrubland	15	1
Degraded	308	35
Total	884	100



Plate 5: Mallee Eucalyptus Woodland.

Mallee Eucalyptus Woodland consisted of mixed mallee eucalypts including *E. graffithsii*, *E. torquate*, *E. clelandiorum* and *E. campaspe*, over scattered tall shrubs of *Eremophila* sp. and *Senna* sp.



Plate 6: Salmon Gum Woodland.

Salmon Gum Woodland habitat consisted of scattered *E. salmonophloia* trees over a ground cover of scattered low shrubs and herbs.



Plate 7: Drainage Line

Drainage Line habitat consisted of *E. graffithisii* mallee trees over mixed *Acacia* species, over scattered low shrubs and mixed grasses on sandy soils.



Plate 8: Acacia Shrubland

Acacia Shrubland habitat consisted of mixed Acacia species, including *A. acuminata* and *A. collegialis* shrubland over *Allocasuarina* on sandy soils.

3.5 Reptile Searches

A total of ten reptile searches were undertaken during the field survey, the details of which can be seen in Table 5 and Figure 3.

Table 5: Reptile Search Locations

Habitat Assessment	Easting (GDA94)	Northing (GDA94)	Fauna Habitat Type
1	328657	6577898	Mallee Eucalyptus Woodland
2	328118	6575004	Degraded Mallee Eucalyptus Woodland
3	327143	6574830	Mallee Eucalyptus Woodland
4	327261	6574684	Mallee Eucalyptus Woodland
5	325338	6572405	Salmon Gum Woodland
6	326174	6572557	Salmon Gum Woodland
7	326379	6572140	Salmon Gum Woodland
8	326343	6571167	Mallee Eucalyptus Woodland
9	326572	6570925	Mallee Eucalyptus Woodland
10	324938	6569195	Mallee Eucalyptus Woodland

3.6 Significant Fauna Assessment

The survey area was assessed for suitable Malleefowl habitat. The survey area was traversed on foot and by vehicle and no Malleefowl mounds, tracks or diggings were recorded.

4 Discussion

4.1 Fauna of Conservation Significance

A total of four conservation significant species retrieved from the database searches are considered as either Likely, Possibly or Unlikely to occur in the survey area. Of these four conservation significant species, none were recorded during the survey. The four species and their likelihood to occur in the survey area are discussed below.

4.1.1 Species Recorded in the survey area

No conservation significant species were recorded in the survey area.

4.1.2 Species considered Likely to occur in the survey area

No conservation significant species are considered Likely to occur in the survey area.

4.1.3 Species considered as Possibly occurring in the survey area

One conservation significant species is considered as Possibly occurring in the survey area, the Malleefowl.

Malleefowl (*Leipoa ocellata*)

The Malleefowl (*Leipoa ocellata*) is listed as Vulnerable (Vu) under the EBPC Act and the BC Act. In the past century, the range of the Malleefowl has contracted, particularly in arid areas and at the periphery of its former range (Benshemesh 2007). In Australia, clearing for Agriculture has eliminated and fragmented much of the Malleefowl habitat, resulting in localised extinctions and fragmented populations (Garnett *et al.* 2011). In WA since 1981, the range of the Malleefowl has been estimated to have contracted by between 28 and 30% (Benshemesh 2007; Parsons *et al.* 2008).

Historically, the species was originally common and widespread in semiarid zones, mainly in scrubs of mallee and other low eucalypts on sandy and lateritic soils; also, acacia scrubs on heavy red soils, especially north and east of the mulga-eucalypt line. The Malleefowl is now generally rare to uncommon and patchily distributed due to habitat loss.

During the assessment, no Malleefowl mounds or tracks were recorded in the survey area. The DBCA threatened fauna database returned 84 records of the Malleefowl in a 60 km radius of the survey area, with the most recent record being from 2019. This record was approximately 10 km to the north-east of the survey area in Mallee Eucalyptus Woodland. The closest record of the Malleefowl was 1.2 km to the north of the survey area. This record is from 2013 year and is in Mallee Eucalyptus Woodland habitat.

A large part of the survey area is considered unsuitable for Malleefowl, as it consists of disturbed, degraded and cleared areas from previous and current mining activities (308 ha / 35%). These areas provide no shelter or vegetation for Malleefowl to build mounds. The Drainage Line habitat, contains relatively denser vegetation in the way of mixed acacia woodland, however it was considered to be too sparse for Malleefowl mound construction and Malleefowl are unlikely to build mounds in areas of drainage due to the possibility of flooding. The Salmon Gum Woodland is too sparse and generally lacks mid-storey vegetation making it unsuitable for Malleefowl.

Some parts of the survey area however, do contain habitat that is considered suitable for Malleefowl. Habitat in the way of acacia shrubland, scrubs of mallee and other low eucalypts on sandy soil is present in the survey area. The Mallee Eucalyptus Woodland and Acacia Shrubland habitat types are therefore considered potential habitat for Malleefowl. It is important to note, that in many areas of Mallee Eucalyptus Woodland, it is too open to be considered suitable for Malleefowl as it does not provide enough shelter. The areas of Eucalyptus Woodland and Acacia Shrubland that are dense enough to be suitable for Malleefowl and provide the required shelter total approximately 134 ha, which can be seen in Figure 6. These particular areas of Mallee Eucalyptus Woodland and Acacia Shrubland provide adequate shelter and suitable vegetation, as well as sandy soils for Malleefowl to construct mounds.

Many records (including recent and nearby records) of the Malleefowl and suitable habitat in the survey area, result in the Malleefowl being considered Possibly occurring in the survey area. It is important to note that the survey area is large and much of it is degraded and heavily disturbed, therefore the likelihood of this occurrence will be limited to the areas of vegetation



primarily consisting of Mallee Eucalyptus Woodland and to a lesser extent Acacia Shrubland. Within these habitat types, this likelihood is limited to the areas with vegetation that is considered dense enough to provide adequate shelter.

4.1.4 Species considered Unlikely to occur in the survey area

A total of three species are considered Unlikely to occur in the survey area, the Sharp-tailed sandpiper, Common Greenshank and Carnaby's Black Cockatoo.

Common Greenshank (*Tringa nebularia*)

The Common Greenshank (*Tringa nebularia*) is listed as Migratory and Marine (MiMa) under the EPBC Act and the BC Act. The Common Greenshank is a noisy, large, heavy greenshank that is a common to uncommon migrant from Asia to coastal mudflats, estuaries, salt marshes, mangroves, lakes and swamps throughout Australia (Slater *et al.* 2009).

The DBCA threatened fauna database returned four records of the Common Greenshank in the vicinity of the survey area. The most recent of which is from 2013 and approximately 20 m to the east of the survey area near Coolgardie Gorge Wetland. Although this record is close to the survey area, this wetland habitat is not present in the survey area, therefore this species will not occur. The Common Greenshank is therefore considered Unlikely to occur in the survey area.

Sharp-tailed Sandpiper (*Calidris acuminata*)

The Sharp-tailed Sandpiper (*Calidris acuminata*) is listed as Migratory and Marine (MiMa) under the EPBC Act and the BC Act. The Sharp-tailed Sandpiper is a medium-sized sandpiper with boldly mottled upperparts, rufous crown, green legs and finely streaked breast. The species is a common migrant from Siberia to coastal, sub-coastal and inland wetlands throughout Australia (Slater *et al.* 2009).

The DBCA threatened fauna database returned eight records of the Sharp-tailed Sandpiper in the vicinity of the survey area. Only two of these records are less than twenty years old, one being from Young River Station which is approximately 25 km to the north-west of the survey area and the other from Silver Lake, which is approximately 50 km to the south-east of the survey area. A lack of nearby records and a lack of suitable habitat in the way of wetlands results in the Sharp-tailed Sandpiper being considered Unlikely to occur in the survey area.

Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*)

Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is listed as Endangered (En) under the EPBC Act and the BC Act. Carnaby's Black Cockatoo is endemic to south-west WA, and is distributed from the Murchison River to Esperance and inland to Coorow, Kellerberrin and Lake Cronin (Cale 2003). The species was once common, but the population has declined significantly in the last half century, and is now locally extinct in some areas (Johnstone & Storr 1998; Shah 2006). In the last 45 years (prior to Cale 2003) the species has suffered a 50% reduction in its abundance (Cale 2003). Since then, trend analyses of the Great Cocky Counts 2010 – 2019 identified strong indications that the population of Carnaby's Black-Cockatoo inhabiting the Perth-Peel Coastal Plain continues to decline and despite a recent stabilisation (2016 – 2018) of the local population, the trend since 2010 shows a 35% decline of Carnaby's Black Cockatoo (BirdLife 2020).

Salmon Gum, a known breeding and roosting tree for Carnaby's Black Cockatoo, was recorded in the survey area. The survey area, however is approximately 250 km to the east of the known distribution range of the species (Appendix 5).

The DBCA threatened fauna database returned four records of Carnaby's Black Cockatoo, all of which were from 2016 - 2018 from Kalgoorlie, which is approximately 35 km from the survey area. These records are from outside of the known distribution range of Carnaby's Black Cockatoo, so may be database errors, or an outlying population. In addition, three of these records had no detail regarding certainty of species identification, so again, there is a chance of these records being errors.

A lack of records and the location of the survey area being outside of the species known range, result in Carnaby's Black Cockatoo being considered Unlikely to occur in the survey area.

4.2 Fauna Habitat

Mallee Eucalyptus Woodland

Mallee Eucalyptus Woodland comprised 39% (346 ha) of the survey area. This habitat consisted of a number of mallee eucalypts, including *E. graffithsii*, *E. torquate*, *E. clelandiorum* and *E. campaspe*, over scattered tall shrubs, over mixed low shrubs including *Eremophila* sp., *Atriplex* sp. and *Senna* sp.

The mallee eucalyptus and mid-storey shrubs provide structure and habitat for a number of small birds, including the Grey Shrike-thrush (*Colluricincla harmonica*), Crested Bellbird (*Oreoica gutturalis*) and various Honeyeater species, all of which were recorded in this habitat. The ground-storey shrubs and areas of plentiful leaf-litter, provided shelter required by small burrowing species, particularly reptile species.

Some parts of the Mallee Eucalyptus Woodland also contains habitat that is considered suitable for Malleefowl (Figure 6). Areas with denser mallee eucalypts trees provide adequate shelter and suitable vegetation, as well as sandy soils for Malleefowl to construct mounds. The overstory of mixed mallee eucalyptus trees and some vegetation in the mid-story provide vegetation and shade for Malleefowl mound construction, with a suitable amount of space between trees and shrubs to construct mounds. The mound comprises a large mass of sand, usually 3-5 metres in diameter and one metre high, in which up to a cubic metre of moist litter is buried. (Benshemesh 2007).

Some parts of the Mallee Eucalyptus Woodland, although contain suitable vegetation and sandy soils, are too sparse and therefore too open for Malleefowl mound construction.

Salmon Gum Woodland

Salmon Gum Woodland comprised 21% (184 ha) of the survey area. This habitat consisted of stands of remnant Salmon Gum Woodland with limited vegetation structure. The majority of the Salmon Gum Woodland lacked mid-story vegetation and contained limited ground cover. Where ground cover was present, it consisted of low mixed shrubs including *Dodnaea* sp., *Ptilotus* sp. and *Atriplex* sp. The large Salmon Gums provide habitat for a number of bird species, for example the Australian Ringneck, which breeds in hollows. and These trees, particularly the larger ones drop considerable quantities of leaf that accumulate under the trees which provides habitat for small reptile species.

Drainage Line

Drainage Line habitat comprised 4% (32 ha) of the survey area. This habitat consisted of *E. graffithsii* mallee trees over mixed shrubland species, including *Acacia* and *Hakea* species, over scattered low shrubs (including *Eremophila* sp., *Senna* sp. and *Atriplex* sp.) and mixed grasses. The vegetation structure provided by the larger trees, as well as some vegetation in the mid and ground storey provided habitat for a suite of fauna species including the Red Kangaroo (tracks and scats), Honeyeaters and other bird species, as well as reptiles. Leaf litter and sandy soils provide potential shelter and habitat for small mammal and particularly small burrowing reptile species.

Acacia Shrubland

Acacia Shrubland habitat comprised 1% (15 ha) of the survey area. This habitat consisted of a mix of *Acacia* species including *A. acuminata* and *A. collegialis*, over *Allocasuarina* and *Grevillea* tall shrubs over *Eremophila* sp. and *Senna* sp.. This habitat provides shelter for small bird species, including Fairy-wrens, with some vegetation in the ground-storey and some leaf-litter present, providing habitat for small reptiles and skinks such as those in the genus *Lerista*.



5 Conclusion

Gold and other resources have been mined in Coolgardie for almost 130 years. Since 1892 an excess of 2.8 million ounces of Gold has been produced from the Coolgardie area. These long-term and ongoing impacts through mining, exploration (clearing of vegetation), grazing, changes to fire regimes and the introduction of weeds, has resulted in fragmented patches of vegetation and a lack of vegetation structure in large sections of the survey area. This loss of vegetation and absence of structure throughout large parts of the survey area has had an impact on the suite of fauna species that would have originally occurred in the region.

Results of the fauna databases searches outlined a total of 240 vertebrate species from 73 families and a total of 21 conservation significant vertebrate species (including Priority species) from 11 families in the vicinity of the survey area. During the survey a total of 40 fauna species, from 26 families were recorded. No species of conservation significance were recorded during the field survey and all fauna species recorded are considered relatively common and widespread.

A total of four fauna habitats types were recorded in the survey area, the most widespread being Mallee Eucalyptus Woodland with a total of 346 ha (39%). A total of 308 ha (38%) of the survey area is considered to be degraded in nature, and so provides little habitat to fauna species.



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Figures

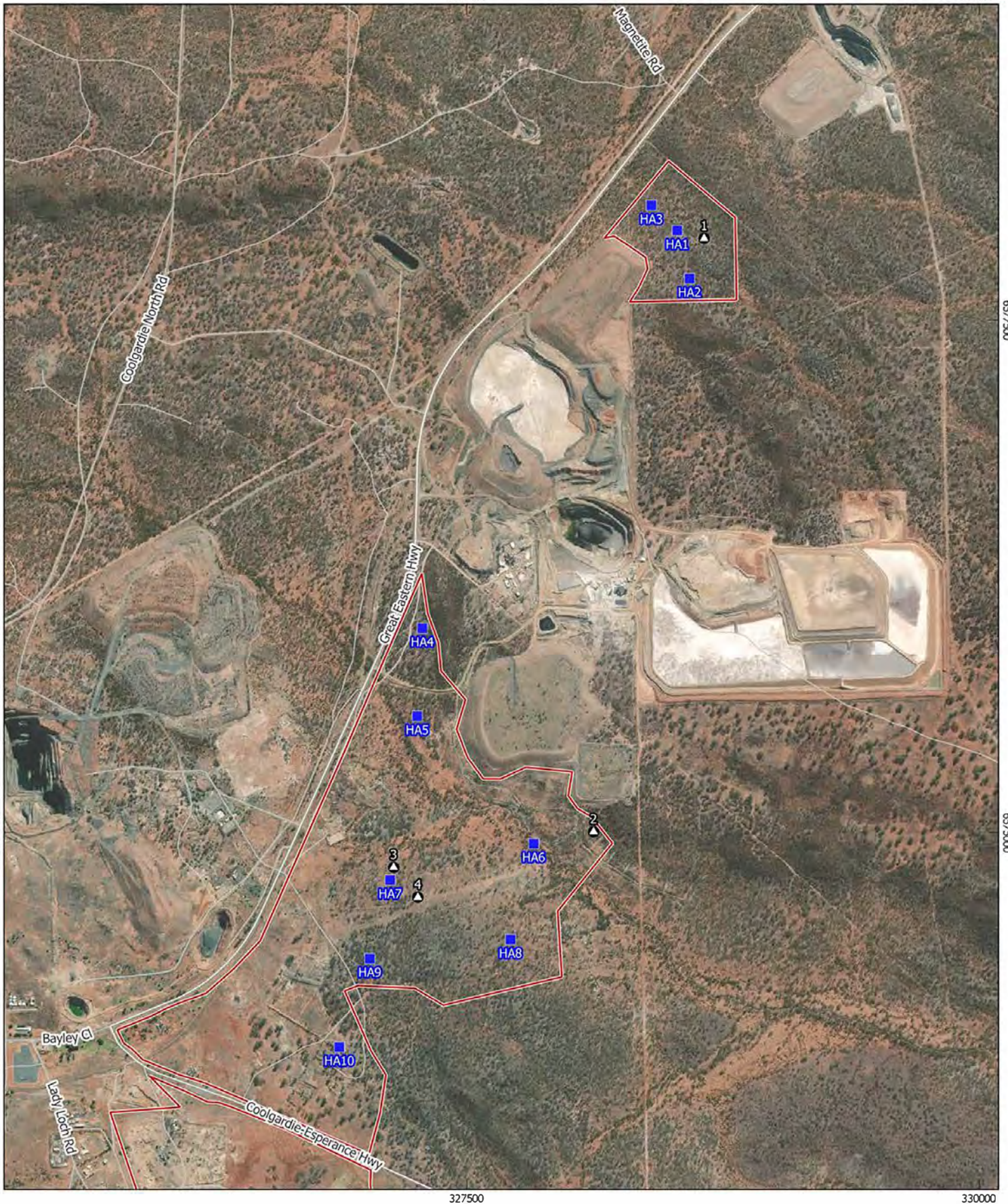
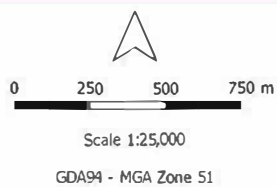





Figure 3: Fauna Assessment Locations



Legend

-  Reptile Search Location
-  Habitat Assessment
-  Survey Area



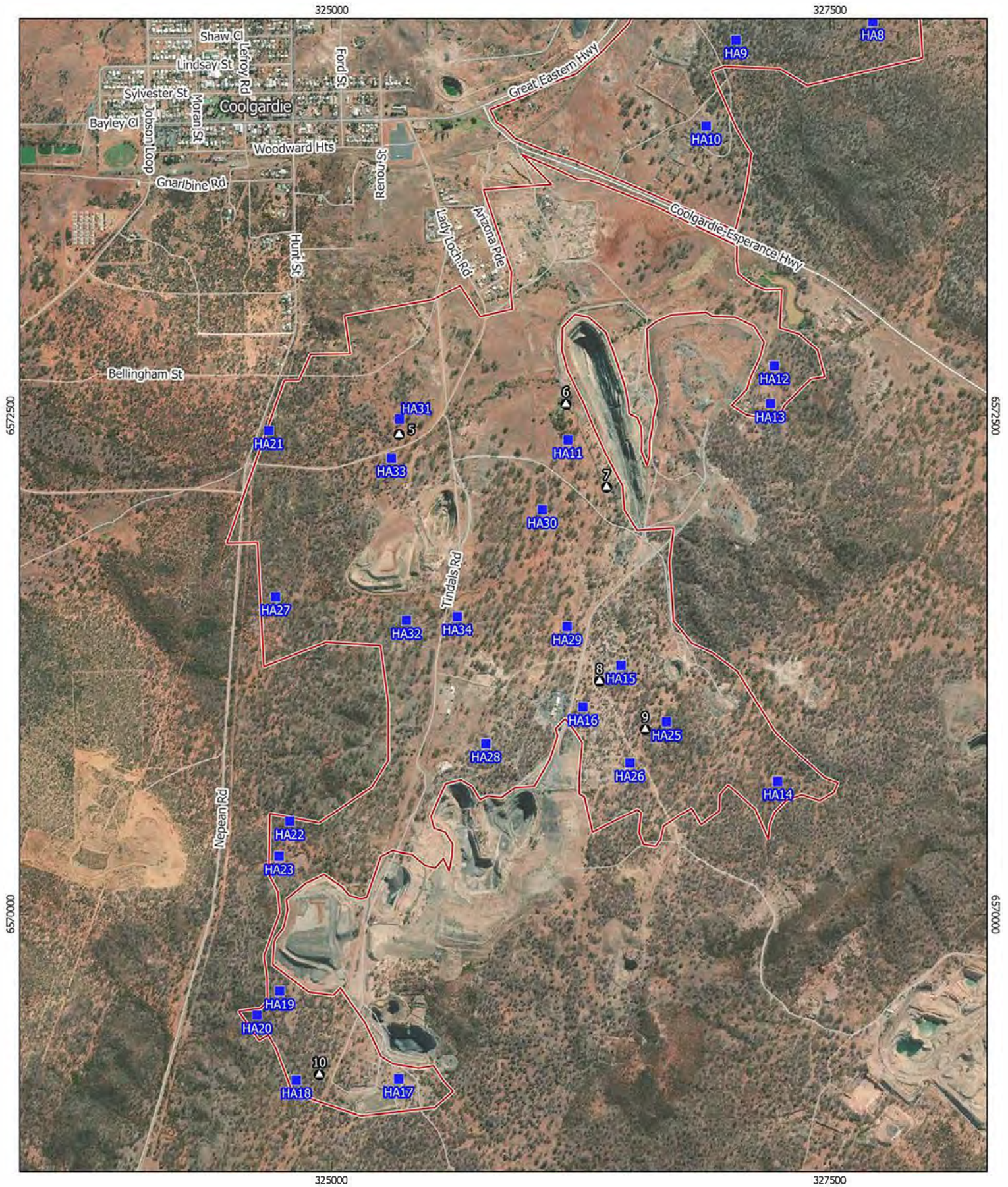
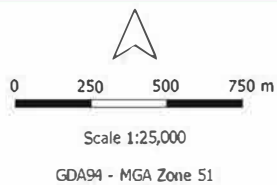


Figure 3: Fauna Assessment Locations



Legend

- Habitat Assessment
- Reptile Search Location
- Survey Area



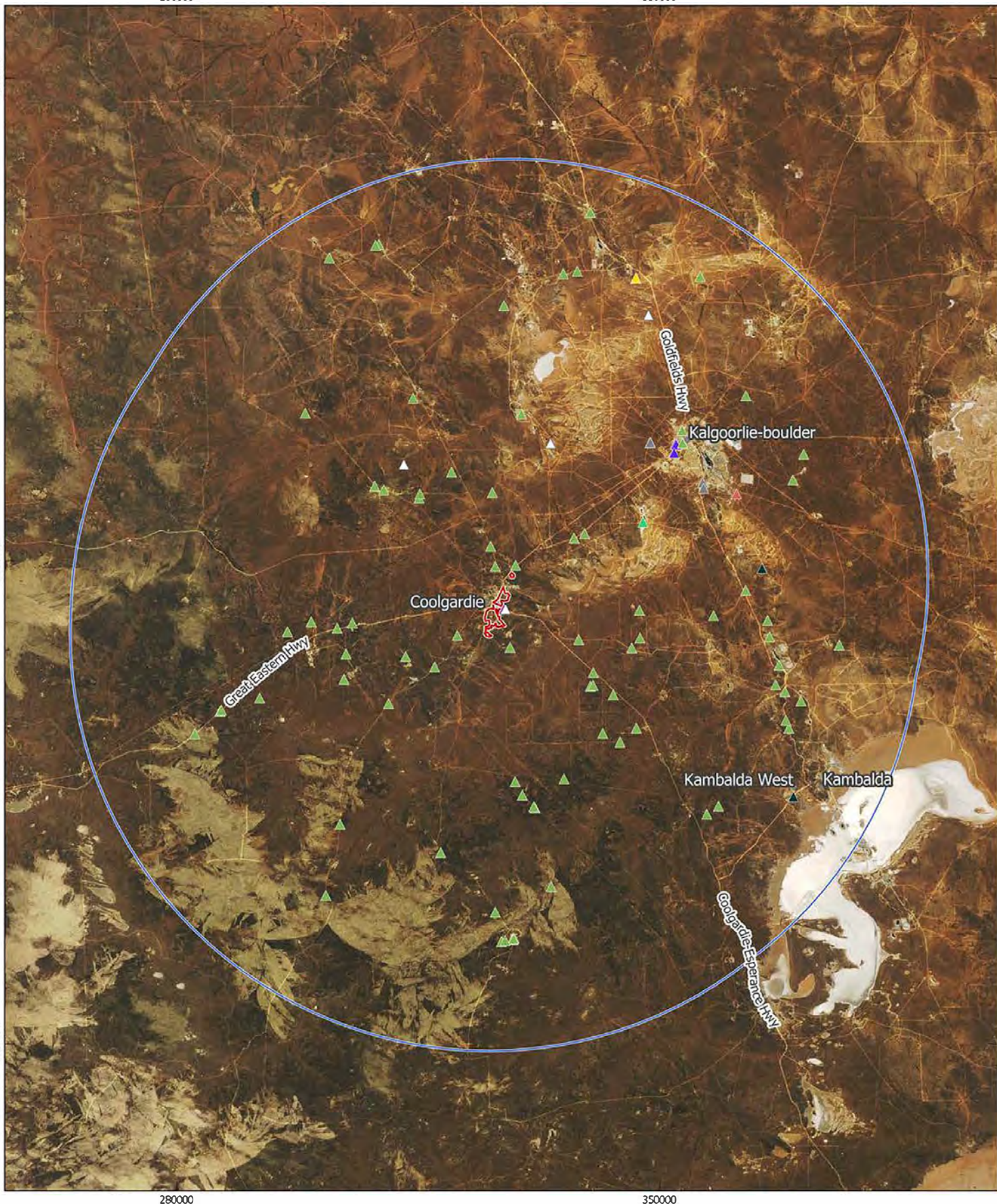
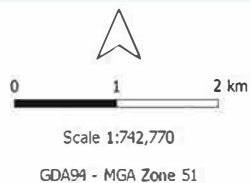


Figure 4: Conservation Significant Fauna (DBCA Records)



Legend

Threatened Fauna

- | | | | |
|----------------------|-----------------------|--------------------------|------------------|
| ▲ Carnaby's Cockatoo | ▲ Curlew Sandpiper | ▲ Malleefowl | ▲ Wood Sandpiper |
| △ Common Greenshank | ▲ Glossy Ibis | ▲ Red-necked Stint | ▭ Survey Area |
| ▲ Common Sandpiper | ▲ Grey-tailed Tattler | ▲ Sanderling | |
| | ▲ Hooded Plover | ▲ Sharp-tailed Sandpiper | |

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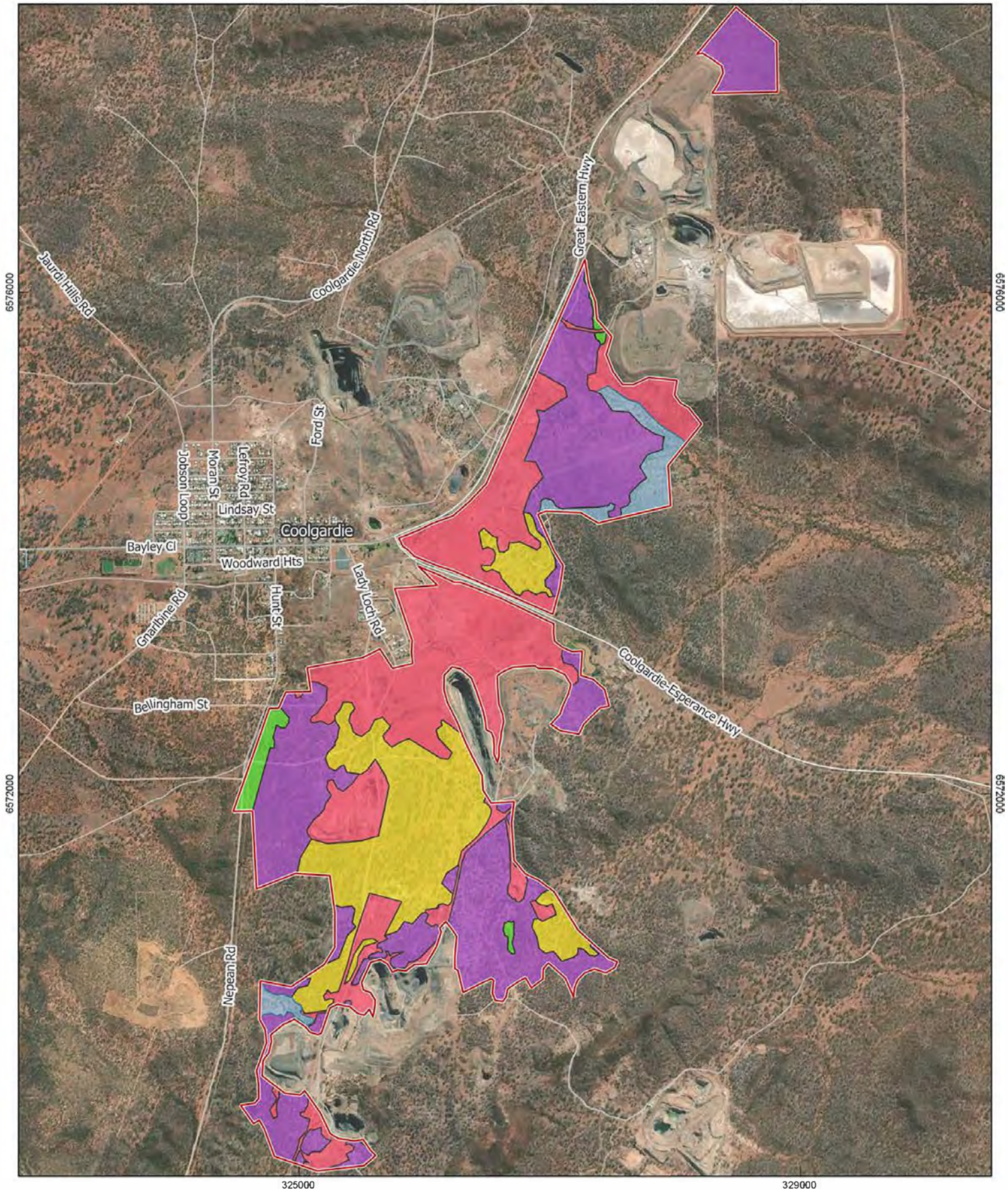
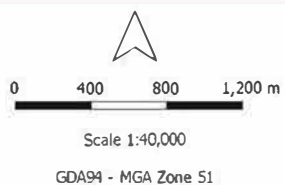


Figure 5: Fauna Habitat



Legend

- Survey Area
- Drainage Line
- Degraded
- Acacia Shrubland
- Mallee Eucalyptus Woodland
- Salmon Gum Woodland



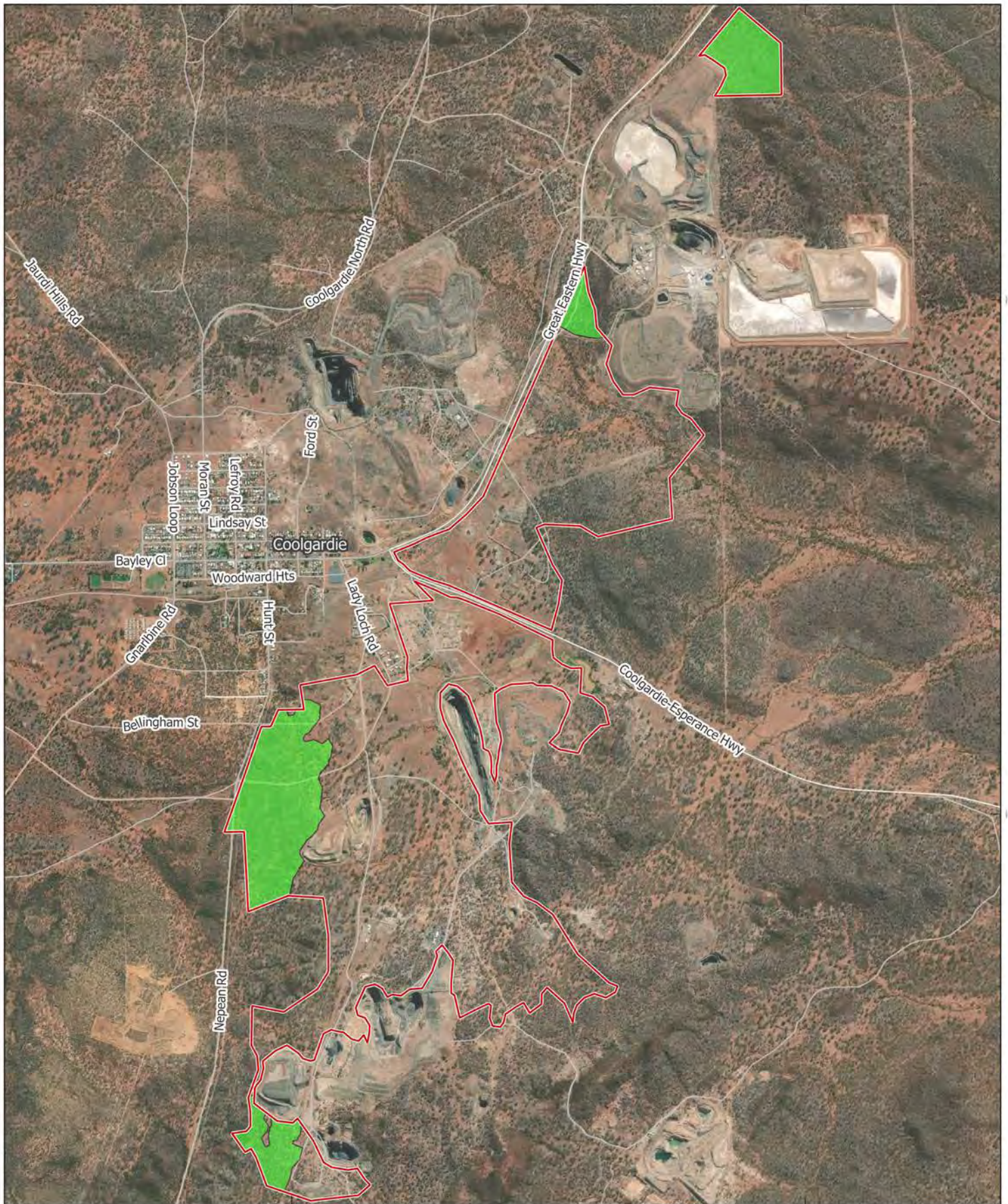
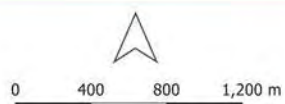


Figure 6: Potential Malleefowl Habitat



Scale 1:40,000

GDA94 - MGA Zone 51

Legend

- Survey Area
- Potential Malleefowl Habitat





Appendices



Appendix 1: Conservation Categories



Categories of Threatened Fauna Species under the EPBC Act

Conservation Code	Description
Ex	Extinct Taxa which at a particular time if, at the time, there is no reasonable doubt that the last member of the species has died.
ExW	Extinct in the Wild Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	Critically Endangered Taxa which at a particular time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
En	Endangered Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Vu	Vulnerable Taxa which 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.

Source: Environment Protection and Biodiversity Conservation Act 1999.



Categories of Threatened Flora and Fauna Species under the BC Act



Department of **Biodiversity,
Conservation and Attractions**

CONSERVATION CODES

For Western Australian Flora and Fauna

Threatened, Extinct and Specially Protected fauna or flora¹ are species² which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

The Wildlife Conservation (Specially Protected Fauna) Notice 2018 and the Wildlife Conservation (Rare Flora) Notice 2018 have been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the Biodiversity Conservation Act 2016.

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T Threatened species

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR Critically endangered species

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. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN Endangered species

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. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU Vulnerable species

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. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.



Conservation codes for Western Australian flora and fauna

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX Extinct species

Species where *"there is no reasonable doubt that the last member of the species has died"*, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form"*, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting 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 species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species

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.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

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).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.



Conservation codes for Western Australian flora and fauna

P Priority 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 fauna or flora.

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.

1 **Priority 1: Poorly-known species**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

2 **Priority 2: Poorly-known species**

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

3 **Priority 3: Poorly-known species**

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

4 **Priority 4: Rare, Near Threatened and other species in need of monitoring**

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

¹The definition of flora includes algae, fungi and lichens

²Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).



Appendix 2: Fauna Database Searches

SCI_NAME	COM_NAME	CLASS	WA_LISTING	WA status	EPBC status	Date	SOURCE	CERTAINTY	OBS_METHOD	OBS_TYPE	COUNT	SITE	ACCURACY M	FAMILY	GENUS	SPECIES
Actitis hypoleucos	Common Sandpiper	BIRD	Specially Protected - migratory	MI	MI	24/12/2011	BIRDATA					The Gorge (Coolgardie)	0	Scolopaciidae	Actitis	hypoleucos
Actitis hypoleucos	Common Sandpiper	BIRD	Specially Protected - migratory	MI	MI	1/01/2013	BIRDATA					Coolgardie Gorge wetland	0	Scolopaciidae	Actitis	hypoleucos
Actitis hypoleucos	Common Sandpiper	BIRD	Specially Protected - migratory	MI	MI	3/10/2014	BIRDATA					coolgardie gorge	0	Scolopaciidae	Actitis	hypoleucos
Calidris acuminata	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	19/11/1980	BIRDATLAS1					FEYSVILLE	18000	Scolopaciidae	Calidris	acuminata
Calidris acuminata	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	30/11/1980	BIRDATLAS1					KARLKURLA	18000	Scolopaciidae	Calidris	acuminata
Calidris acuminata	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	29/08/1981	BIRDATLAS1					KANOWNA	18000	Scolopaciidae	Calidris	acuminata
Calidris acuminata	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	31/12/1981	BIRDATLAS1					KARLKURLA	18000	Scolopaciidae	Calidris	acuminata
Calidris acuminata	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	31/01/2001	BIRDATLAS2					Kopai Lake	100	Scolopaciidae	Calidris	acuminata
Calidris acuminata	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	31/01/2001	BIRDATLAS2					Kopai Lake	100	Scolopaciidae	Calidris	acuminata
Calidris acuminata	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	26/02/2006	BIRDATLAS2					Young River Station Lake	100	Scolopaciidae	Calidris	acuminata
Calidris acuminata	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	13/10/2012	BIRDATA					Silver Lake	0	Scolopaciidae	Calidris	acuminata
Calidris alba	Sanderling	BIRD	Specially Protected - migratory	MI	MI	13/10/2016	BIRDATA					Hannan Lake	0	Scolopaciidae	Calidris	alba
Calidris ferruginea	curlew sandpiper	BIRD	Threatened - Critically endangered	CR	CR	26/02/2006	BIRDATLAS2					Young River Station Lake	100	Scolopaciidae	Calidris	ferruginea
Calidris ruficollis	Red-necked stint	BIRD	Specially Protected - migratory	MI	MI	26/02/2006	BIRDATLAS2					Young River Station Lake	100	Scolopaciidae	Calidris	ruficollis
Calyptorhynchus latirostris	Camaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	12/11/2016	BIRDATA					367 Collins	200	Psittacidae	Calyptorhynchus	latirostris
Calyptorhynchus latirostris	Camaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	9/12/2016	BIRDATA					Cape Lilac on alley	0	Psittacidae	Calyptorhynchus	latirostris
Calyptorhynchus latirostris	Camaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	30/08/2017	BIRDATA					Piccadilly St West	0	Psittacidae	Calyptorhynchus	latirostris
Calyptorhynchus latirostris	Camaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	14/06/2018	TFAUNA	Very Certain (photo, specimen, expert)	Opportunistic sighting	Day sighting	1	Southern corner of Hay St and Hutton St	1000	Cacatidae	Calyptorhynchus	latirostris
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/01/1902	TFAUNA	Moderately certain	Opportunistic sighting	Secondary sign		Boorara	10000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/01/1910	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	Kalgoorlie	50000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	4/11/1947	TFAUNA	Moderately certain	Opportunistic sighting	Secondary sign		PO Kalgoorlie	50000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	28/01/1965	TFAUNA	Moderately certain	Historical (written)	Secondary sign		12 miles North of Coolgardie	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/05/1985	TFAUNA	Certain	Opportunistic sighting	Sighting	2	Jaurdie Hills	10000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/01/1988	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	Eight Mile Rock dam	0	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/01/1988	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	WMC sand pit Jaurdie Hills Rd	0	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/01/1991	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	Kangaroo Hills Timber Reserve	0	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	29/07/1994	TFAUNA	Certain	Opportunistic sighting	Secondary sign		one active nest at Bullabulling No. 8 Pumping station.	10000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/09/1994	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	2	22 kms west of Coolgardie	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	8/02/1995	TFAUNA	Moderately certain	Opportunistic sighting	Day sighting	1	Yerilla Sandalwood Reserve	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	8/02/1995	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	Yallan Timber Reserve	0	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	8/02/1995	TFAUNA	Moderately certain	Opportunistic sighting	Day sighting	1	Yerilla Sandalwood Reserve	0	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/06/1996	TFAUNA	Moderately certain	Opportunistic sighting	Secondary sign		4WD Holland Track, 200km NE of Mt Holland (cannot find Holland Track) access road to Kundana Mining Lease - 30km NW (10km W & 22km N) of Kalgoorlie*	10000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	15/11/2000	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Hampton Hill Station, 16km ESE of Boulder b/w Boorara Mine Site & Golden Ridge	500	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	2/04/2002	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	2	grt eastern hwy 1 km kal side of mungarie industrial area	0	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	20/09/2002	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	2	50 km nth of kalgoorlie on main hwy nth of Mt Vethers homestead	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	5/02/2004	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	23.2km south of T intersection of Coolgardie Norseman Rd	0	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/01/2006	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Bullabulling	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	13/12/2006	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Bullabulling	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	18/01/2007	TFAUNA	Certain	Opportunistic sighting	Day sighting	2	Bullabulling	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	29/05/2007	TFAUNA	Certain	Opportunistic sighting		1	Burra Rock Road, 11.2km north of DEC Burra Rock Reserve boundary sign	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	22/08/2007	TFAUNA	Certain	Opportunistic sighting		1	Victoria Rock Rd, about 15km south of Coolgardie	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	16/01/2008	TFAUNA	Certain	Opportunistic sighting	Dusk sighting	1	Great Eastern Hwy, 40.5km west of Coolgardie	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	25/06/2008	TFAUNA	Certain	Opportunistic sighting	Day sighting	2	Bullabulling pastoral lease, 10km west of the Bullabulling Pub and 2 kms south of the highway	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/11/2008	TFAUNA	Certain	Opportunistic sighting		1		1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	5/03/2009	TFAUNA	Certain	Opportunistic sighting		1	about 3km south of Burra Rock Reserve along Burra Rock Road	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	14/07/2009	TFAUNA	Certain	Opportunistic sighting		2	Jaurdie Hills Rd, 100m north of crest	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	14/10/2009	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Bullabulling, road from Bullabulling to Stewart	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	14/10/2009	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	on road from Bullabulling to Stuart sighting, off Great Eastern Highway	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	10/11/2009	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	North of Mount Burges	500	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	10/11/2009	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	north of Mt Burgess	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	24/05/2010	TFAUNA	Certain	Opportunistic sighting	Dead	1	9km N of Kambalda T intersection along Goldfields Hwy	10000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	13/09/2010	TFAUNA	Certain	Opportunistic sighting		1	Great Eastern Hwy, 130km E of Southern Cross, near unnamed gravel road	10000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	8/10/2010	TFAUNA	Certain	Opportunistic sighting		1	5km along pipeline access road off Cave Rocks mine haul rd	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	22/10/2010	TFAUNA	Certain	Opportunistic sighting	Sighting	1	Vic Rock Road	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	25/11/2010	TFAUNA	Certain	Opportunistic sighting		1	Burra Rock Nature Reserve, next to camping area	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	10/02/2011	TFAUNA	Certain	Opportunistic sighting		2	Burra Rock camping ground	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	4/08/2011	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Yallan Timber Reserve	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	4/08/2011	TFAUNA	Certain	Opportunistic sighting	Secondary sign		Yallan Timber Reserve	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	18/09/2011	TFAUNA	Certain	Survey				1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	18/09/2011	TFAUNA	Certain	Survey				1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	27/09/2011	TFAUNA	Certain	Opportunistic sighting	Day sighting	1		1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	Malleefowl	BIRD	Threatened - Vulnerable	VU	VU	3/02/2012	FAUNASURVEY	Certain	Survey		1	Kalgoorlie, Goldfields, Mt Martin	100	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	Malleefowl	BIRD	Threatened - Vulnerable	VU	VU	2/06/2012	FAUNASURVEY	Certain	Survey	Unknown	1	Kalgoorlie Region, Goldfields, Jubilee mine	100	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	Malleefowl	BIRD	Threatened - Vulnerable	VU	VU	2/06/2012	FAUNASURVEY	Certain	Survey	Unknown	1	Kalgoorlie Region, Goldfields, Jubilee mine	100	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	Malleefowl	BIRD	Threatened - Vulnerable	VU	VU	2/06/2012	FAUNASURVEY	Certain	Survey	Unknown	1	Kalgoorlie Region, Goldfields, Jubilee mine	100	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	Malleefowl	BIRD	Threatened - Vulnerable	VU	VU	2/06/2012	FAUNASURVEY	Certain	Survey	Unknown	1	Kalgoorlie Region, Goldfields, Jubilee mine	100	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	Malleefowl	BIRD	Threatened - Vulnerable	VU	VU	2/06/2012	FAUNASURVEY	Certain	Survey	Unknown	1	Kalgoorlie Region, Goldfields, Jubilee mine	10000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	9/07/2012	TFAUNA	Certain	Opportunistic sighting	Day sighting	2	Just off cave hill road in Widgiemooltha close to one of Focus Minerals small operations.	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	18/07/2012	TFAUNA	Certain	Opportunistic sighting		4	Borefields on Focus owned mine lease, near bore 8	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	22/12/2012	TFAUNA	Certain	Opportunistic sighting	Sighting	1	Goldfield HWY	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	15/04/2013	TFAUNA	Certain	Opportunistic sighting	Dead	1	48km West of Coolgardie, No 8 pump Denardi Station, Great Eastern Highway	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	23/04/2013	TFAUNA	Moderately certain	Opportunistic sighting	Day sighting	1	~10km east of Bullabulling (40km east of Coolgardie) on Great Eastern Highway	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	16/05/2013	TFAUNA	Moderately certain	Opportunistic sighting	Night sighting	1	Out the front of Pevnaty Crib room on active haul road. A highly disturbed area.	1000	Megapodiidae	Leipoa	ocellata

Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	17/07/2017	TFAUNA	Very Certain (photo, specimen, expert)	Opportunistic sighting	Dusk sighting	1	50m E of the S/W corner gate of Karamindie State Forest, where the gully crosses the track	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	9/09/2017	TFAUNA	Moderately certain	Opportunistic sighting	Day sighting	1	Karamindie State Forest No. 8	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	24/10/2017	TFAUNA	Very Certain (photo, specimen, expert)	Monitoring	Remote camera	1	Scahill Rimber Reserve, on track south of reserve	50	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	3/11/2017	TFAUNA	Very Certain (photo, specimen, expert)	Monitoring	Remote camera	1	Scahill Rimber Reserve, on track south of reserve	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	21/03/2018	TFAUNA	Very Certain (photo, specimen, expert)	Opportunistic sighting	Secondary sign		1.7km S of Karamindie State Forest on Hampton Location 53	10000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	17/04/2018	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Old woodline track running SW away from Scahill Timber Reserve	500	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	19/04/2018	TFAUNA	Very Certain (photo, specimen, expert)	Monitoring	Remote camera	2	3.5km S of Scahill Timber Reserve, Londonderry	50	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	3/07/2018	TFAUNA	Very Certain (photo, specimen, expert)	Opportunistic sighting	Day sighting		West north-west of Kalgoorlie about 20km	1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	20/03/2019	TFAUNA	Certain	Opportunistic sighting	Dusk sighting	1		10000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	31/10/2019	TFAUNA	Certain	Opportunistic sighting	Sighting	1	Mungari turnoff from Great Eastern HWY heading South	50	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU		TFAUNA	Certain	Opportunistic sighting	Secondary sign			1000	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	Malleefowl	BIRD	Threatened - Vulnerable	VU	VU		WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Kalgoorlie	0	Megapodiidae	Leipoa	ocellata
Leipoa ocellata	Malleefowl	BIRD	Threatened - Vulnerable	VU	VU		WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Kalgoorlie	0	Megapodiidae	Leipoa	ocellata
Plegadis falcinellus	Glossy ibis	BIRD	Specially Protected - migratory	MI	MI	31/12/1981	BIRDATLAS1					KARLKURLA	18000	Threskiornithidae	Plegadis	falcinellus
Thinornis rubricollis	Hooded Plover	BIRD	Priority	P4	MI	1/01/1992	TFAUNA	Certain	Survey	Sighting		Arrow Lake	50000	Charadriidae	Thinornis	rubricollis
Tringa brevipes	Grey-tailed tattler	BIRD	Priority	P4	MI	29/09/2017	BIRDATA					Lake Douglas	0	Scolopacidae	Tringa	brevipes
Tringa glareola	Wood sandpiper	BIRD	Specially Protected - migratory	MI	MI	30/11/1980	BIRDATLAS1					KARLKURLA	18000	Scolopacidae	Tringa	glareola
Tringa glareola	Wood sandpiper	BIRD	Specially Protected - migratory	MI	MI	3/11/2005	BIRDATLAS2					Kalgoorlie Sewerage overflow ponds	100	Scolopacidae	Tringa	glareola
Tringa glareola	Wood sandpiper	BIRD	Specially Protected - migratory	MI	MI	3/11/2005	BIRDATLAS2					Kalgoorlie Sewerage outlet	100	Scolopacidae	Tringa	glareola
Tringa nebularia	Common greenshank	BIRD	Specially Protected - migratory	MI	MI	25/11/1980	BIRDATLAS1					KANOWNA	18000	Scolopacidae	Tringa	nebularia
Tringa nebularia	Common greenshank	BIRD	Specially Protected - migratory	MI	MI	31/01/2001	BIRDATLAS2					Kopai Lake	100	Scolopacidae	Tringa	nebularia
Tringa nebularia	Common greenshank	BIRD	Specially Protected - migratory	MI	MI	26/02/2006	BIRDATLAS2					Young River Station Lake	100	Scolopacidae	Tringa	nebularia
Tringa nebularia	Common greenshank	BIRD	Specially Protected - migratory	MI	MI	1/01/2013	BIRDATA					Coolgardie Gorge wetland	0	Scolopacidae	Tringa	nebularia

NatureMap Species Report

Created By Guest user on 02/01/2021

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 121° 09' 59" E, 30° 57' 17" S
Buffer 40km
Group By Family

Family	Species	Records
Acanthizidae	9	377
Accipitridae	8	36
Actinopodidae	1	4
Aegothelidae	1	2
Agamidae	11	123
Anatidae	11	228
Anhingidae	1	2
Araneidae	8	22
Ardeidae	3	23
Artamidae	3	19
Barychelidae	1	1
Boidae	1	3
Bothriuridae	1	1
Branchipodidae	1	11
Burramyidae	1	10
Buthidae	1	1
Cacatuidae	1	22
Campephagidae	2	60
Caprimulgidae	1	1
Casuariidae	1	22
Charadriidae	4	20
Cheluidae	1	1
Columbidae	4	178
Corvidae	3	205
Cracticidae	4	309
Cuculidae	3	12
Cyprinidae	1	1
Cyzicidae	1	1
Daphniidae	1	5
Dasyuridae	4	26
Desidae	1	1
Dicaeidae	1	19
Dicruridae	3	241
Diplodactylidae	8	29
Dytiscidae	1	1
Elapidae	14	78
Estrilidae	1	12
Falconidae	4	38
Felidae	1	1
Gekkonidae	5	75
Gnaphosidae	1	1
Halcyonidae	2	4
Hersiliidae	1	1
Hirundinidae	4	85
Hydrophilidae	2	3
Hylidae	1	1
Idiopidae	1	2
Lamponidae	2	7
Laridae	1	2
Leporidae	1	1
Limnadiidae	1	1
Limnodynastidae	3	31
Lycaenidae	3	23
Lycosidae	3	7
Macropodidae	1	2
Maluridae	3	68
Megapodiidae	1	42
Meliphagidae	10	795
Meropidae	1	23
Motacillidae	1	2
Muridae	4	17
Myobatrachidae	1	21
Myrmecobiidae	1	1
Nemesiidae	2	4
Neosittidae	2	4
Nicodamidae	1	6
Ostracoda	1	1
Otididae	1	1
Oxyopidae	3	12
Pachycephalidae	5	169
Pardalotidae	3	153
Petroicidae	5	58
Phalacrocoracidae	2	11
Phasianidae	1	1
Pholcidae	1	1

Podargidae	1	2
Podicipedidae	2	50
Pomatostomidae	2	46
Psittacidae	10	53
Pygopodidae	3	6
Rallidae	3	27
Recurvirostridae	4	16
Salticidae	4	15
Scincidae	22	106
Scolopacidae	8	15
Scolopendridae	3	6
Sparassidae	2	14
Sternophoridae	1	1
Tachyglossidae	1	1
Theraphosidae	1	3
Theridiidae	1	9
Threskiornithidae	2	10
Thylacomyidae	1	2
Triopsidae	1	4
Trochanteriidae	2	4
Turnicidae	1	1
Tytonidae	1	1
Urodacidae	3	3
Varanidae	3	6
Vespertilionidae	6	92
Zodariidae	1	1
Zosteropidae	1	26
TOTAL	298	4302

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
Acanthizidae				
1.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
2.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
3.	24265 <i>Acanthiza uropygialis</i> (Chestnut-rumped Thornbill)			
4.	25528 <i>Aphelocephala leucopsis</i> (Southern Whiteface)			
5.	24266 <i>Aphelocephala leucopsis</i> subsp. <i>castaneiventris</i> (Southern Whiteface)			
6.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
7.	34001 <i>Hylacola cauta</i> subsp. <i>whitlocki</i> (Shy Groundwren)			
8.	24278 <i>Pyrrholaemus brunneus</i> (Redthroat)			
9.	30948 <i>Smicronis brevirostris</i> (Weebill)			
Accipitridae				
10.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
11.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
12.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
13.	24289 <i>Circus assimilis</i> (Spotted Harrier)			
14.	<i>Elanus axillaris</i>			
15.	24290 <i>Elanus caeruleus</i> subsp. <i>axillaris</i> (Australian Black-shouldered Kite)			
16.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
17.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
Actinopodidae				
18.	<i>Missulena occatoria</i>			
Aegothelidae				
19.	25544 <i>Aegotheles cristatus</i> (Australian Owlet-nightjar)			
Agamidae				
20.	24871 <i>Ctenophorus cristatus</i> (Bicycle Dragon)			
21.	24873 <i>Ctenophorus fordi</i> (Mallee Sand Dragon)			
22.	24874 <i>Ctenophorus isolepis</i> subsp. <i>citrus</i> (Yellow Military Dragon)			
23.	24882 <i>Ctenophorus nuchalis</i> (Central Netted Dragon)			
24.	24886 <i>Ctenophorus reticulatus</i> (Western Netted Dragon)			
25.	24888 <i>Ctenophorus salinarum</i> (Salt Pan Dragon)			
26.	24889 <i>Ctenophorus scutulatus</i> (Lozenge-marked Dragon)			
27.	24904 <i>Moloch horridus</i> (Thorny Devil)			
28.	24907 <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
29.	30814 <i>Tympanocryptis cephalus</i> (Pebble Dragon)			
30.	39408 <i>Tympanocryptis lineata</i> (Lined Earless Dragon)			
Anatidae				
31.	24312 <i>Anas gracilis</i> (Grey Teal)			
32.	24313 <i>Anas platyrhynchos</i> (Mallard)			
33.	24315 <i>Anas rhynchos</i> (Australasian Shoveler)			
34.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
35.	24318 <i>Aythya australis</i> (Hardhead)			
36.	24319 <i>Biziura lobata</i> (Musk Duck)			
37.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
38.	24322 <i>Cygnus atratus</i> (Black Swan)			
39.	24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
40.	24329 <i>Stictonetta naevosa</i> (Freckled Duck)			
41.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
Anhingidae				
42.	47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)			
Araneidae				
43.	<i>Argiope protensa</i>			
44.	<i>Argiope trifasciata</i>			
45.	<i>Austracantha minax</i>			
46.	<i>Backbourkia heroine</i>			
47.	<i>Celaenia excavata</i>			
48.	<i>Cyrtophora parnasia</i>			
49.	<i>Eriophora biapicata</i>			
50.	<i>Nephila edulis</i>			
Ardeidae				
51.	41324 <i>Ardea modesta</i> (great egret, white egret)			
52.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
53.	<i>Egretta novaehollandiae</i>			
Artamidae				

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
54.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
55.	24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)			
56.	24356 <i>Artamus personatus</i> (Masked Woodswallow)			
Barychelidae				
57.	<i>Idiomata blackwallii</i>			
Boidae				
58.	25240 <i>Morelia spilota subsp. imbricata</i> (Carpet Python)			
Bothriuridae				
59.	<i>Cercophonius michaelsoni</i>			
Branchipodidae				
60.	<i>Parartemia</i> sp.			
Burramyidae				
61.	24086 <i>Cercartetus concinnus</i> (Western Pygmy-possum, Mundarda)			
Buthidae				
62.	<i>Isometroides vescus</i>			
Cacatuidae				
63.	<i>Eolophus roseicapillus</i>			
Campephagidae				
64.	24361 <i>Coracina maxima</i> (Ground Cuckoo-shrike)			
65.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
Caprimulgidae				
66.	24368 <i>Eurostopodus argus</i> (Spotted Nightjar)			
Casuariidae				
67.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
Charadriidae				
68.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
69.	47937 <i>Elseya melanops</i> (Black-fronted Dotterel)			
70.	24379 <i>Erythrogonys cinctus</i> (Red-kneed Dotterel)			
71.	24386 <i>Vanellus tricolor</i> (Banded Lapwing)			
Cheluidae				
72.	43380 <i>Chelodina colliei</i> (South-western Snake-necked Turtle)			
Columbidae				
73.	24399 <i>Columba livia</i> (Domestic Pigeon)	Y		
74.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
75.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
76.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
Corvidae				
77.	24416 <i>Corvus bennetti</i> (Little Crow)			
78.	25592 <i>Corvus coronoides</i> (Australian Raven)			
79.	25593 <i>Corvus orru</i> (Torresian Crow)			
Cracticidae				
80.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
81.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
82.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
83.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
Cuculidae				
84.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
85.	24431 <i>Chrysococcyx basalis</i> (Horsfield's Bronze Cuckoo)			
86.	24434 <i>Chrysococcyx osculans</i> (Black-eared Cuckoo)			
Cyprinidae				
87.	<i>Carassius auratus</i>			
Cyzicidae				
88.	<i>Ozestheria packardii</i>			
Daphniidae				
89.	<i>Daphnia carinata</i>			
Dasyuridae				
90.	24096 <i>Ningai yvonneae</i> (Southern Ningai)			
91.	24108 <i>Sminthopsis crassicaudata</i> (Fat-tailed Dunnart)			
92.	24109 <i>Sminthopsis dolichura</i> (Little long-tailed Dunnart)			
93.	24111 <i>Sminthopsis gilberti</i> (Gilbert's Dunnart)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Desidae				
94.	<i>Corasoides australis</i>			
Dicaeidae				
95.	25607 <i>Dicaeum hirundinaceum</i> (Mistletoebird)			
Dicruridae				
96.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
97.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			
98.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
Diplodactylidae				
99.	25469 <i>Diplodactylus granariensis</i>			
100.	24929 <i>Diplodactylus granariensis</i> subsp. <i>granariensis</i>			
101.	24940 <i>Diplodactylus pulcher</i>			
102.	42408 <i>Hesperoedura reticulata</i>			
103.	30935 <i>Lucasium maini</i>			
104.	24982 <i>Rhynchoedura ornata</i> (Western Beaked Gecko)			
105.	24923 <i>Strophurus assimilis</i> (Goldfields Spiny-tailed Gecko)			
106.	24927 <i>Strophurus elderi</i>			
Dytiscidae				
107.	<i>Allodessus bistrigatus</i>			
Elapidae				
108.	25243 <i>Acanthophis pyrrhus</i> (Desert Death Adder)			
109.	42380 <i>Brachyurophis fasciolatus</i> subsp. <i>fasciolatus</i> (Narrow-banded Shovel-nosed Snake)			
110.	42381 <i>Brachyurophis semifasciatus</i> (Southern Shovel-nosed Snake)			
111.	25247 <i>Demansia psammophis</i> subsp. <i>psammophis</i> (Yellow-faced Whipsnake)			
112.	25301 <i>Furina ornata</i> (Moon Snake)			
113.	25248 <i>Neelaps bimaculatus</i> (Black-naped Snake)			
114.	25253 <i>Parasuta gouldii</i>			
115.	25254 <i>Parasuta monachus</i>			
116.	25261 <i>Pseudechis australis</i> (Mulga Snake)			
117.	25259 <i>Pseudonaja affinis</i> subsp. <i>affinis</i> (Dugite)			
118.	42416 <i>Pseudonaja mengdeni</i> (Western Brown Snake)			
119.	25263 <i>Pseudonaja modesta</i> (Ringed Brown Snake)			
120.	25266 <i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
121.	25269 <i>Suta fasciata</i> (Rosen's Snake)			
Estrilidae				
122.	30870 <i>Taeniopygia guttata</i> (Zebra Finch)			
Falconidae				
123.	25621 <i>Falco berigora</i> (Brown Falcon)			
124.	24471 <i>Falco berigora</i> subsp. <i>berigora</i> (Brown Falcon)			
125.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
126.	25623 <i>Falco longipennis</i> (Australian Hobby)			
Felidae				
127.	24041 <i>Felis catus</i> (Cat)	Y		
Gekkonidae				
128.	24957 <i>Gehyra purpurascens</i>			
129.	24959 <i>Gehyra variegata</i>			
130.	25232 <i>Hemidactylus frenatus</i> (Asian House Gecko)	Y		
131.	24961 <i>Heteronotia binoei</i> (Bynoe's Gecko)			
132.	24983 <i>Underwoodisaurus milii</i> (Barking Gecko)			
Gnaphosidae				
133.	<i>Hemicloea sublimbata</i>			
Halcyonidae				
134.	42351 <i>Todiramphus pyrrhopygius</i> (Red-backed Kingfisher)			
135.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
Hersiliidae				
136.	<i>Tamopsis circumvidens</i>			
Hirundinidae				
137.	47909 <i>Cheramoeca leucosterna</i> (White-backed Swallow)			
138.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
139.	48060 <i>Petrochelidon ariel</i> (Fairy Martin)			
140.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
Hydrophilidae				
141.	<i>Berosus nutans</i>			

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142.	<i>Enochrus elongatulus</i>			
Hylidae				
143.	25388 <i>Litoria moorei</i> (Motorbike Frog)			
Idiopidae				
144.	<i>Anidiops villosus</i>			
Lamponidae				
145.	<i>Lampona cylindrata</i>			
146.	<i>Lamponina scutata</i>			
Laridae				
147.	<i>Chroicocephalus novaehollandiae</i>			
Leporidae				
148.	24085 <i>Oryctolagus cuniculus</i> (Rabbit)	Y		
Limnadiidae				
149.	<i>Paralimnadia</i> sp. (Goldfields)			Y
Limnodynastidae				
150.	25425 <i>Neobatrachus kunapalari</i> (Kunapalari Frog)			
151.	25426 <i>Neobatrachus pelobatoides</i> (Humming Frog)			
152.	25427 <i>Neobatrachus sutor</i> (Shoemaker Frog)			
Lycaenidae				
153.	33979 <i>Jalmenus aridus</i> (inland hairstreak, desert blue butterfly)		P1	Y
154.	<i>Jalmenus icilius</i>			Y
155.	33987 <i>Ogyris subterrestris</i> subsp. <i>petrina</i> (Arid Bronze Azure Butterfly)		T	
Lycosidae				
156.	<i>Hoggicosa forresti</i>			
157.	<i>Lycosa ariadnae</i>			
158.	<i>Tasmanicosa leuckartii</i>			
Macropodidae				
159.	24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo)			
Maluridae				
160.	25652 <i>Malurus leucopterus</i> (White-winged Fairy-wren)			
161.	24551 <i>Malurus pulcherrimus</i> (Blue-breasted Fairy-wren)			
162.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
Megapodiidae				
163.	24557 <i>Leipoa ocellata</i> (Malleefowl)		T	
Meliphagidae				
164.	24559 <i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
165.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
166.	24567 <i>Epthianura albifrons</i> (White-fronted Chat)			
167.	24570 <i>Epthianura tricolor</i> (Crimson Chat)			
168.	25659 <i>Lichenostomus leucotis</i> (White-eared Honeyeater)			
169.	24576 <i>Lichenostomus leucotis</i> subsp. <i>novaenorcae</i> (White-eared Honeyeater)			
170.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
171.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
172.	25663 <i>Melithreptus brevirostris</i> (Brown-headed Honeyeater)			
173.	42344 <i>Purnella albifrons</i> (White-fronted Honeyeater)			
Meropidae				
174.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)			
Motacillidae				
175.	24599 <i>Anthus australis</i> subsp. <i>australis</i> (Australian Pipit)			
Muridae				
176.	24223 <i>Mus musculus</i> (House Mouse)	Y		
177.	24229 <i>Notomys mitchellii</i> (Mitchell's Hopping-mouse)			
178.	24232 <i>Pseudomys bolami</i> (Bolam's Mouse)			
179.	24237 <i>Pseudomys hermannsburgensis</i> (Sandy Inland Mouse)			
Myobatrachidae				
180.	25434 <i>Pseudophryne occidentalis</i> (Western Toadlet)			
Myrmecobiidae				
181.	24146 <i>Myrmecobius fasciatus</i> (Numbat, Walpurti)		T	
Nemesiidae				
182.	<i>Aname armigera</i>			
183.	<i>Aname mainae</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Neosittidae				
184.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
185.	24606 <i>Daphoenositta chrysoptera</i> subsp. <i>pileata</i> (Varied Sittella, Black-capped Sittella)			
Nicodamidae				
186.	<i>Nicodamus mainae</i>			
Ostracoda				
187.	<i>Ostracoda</i> (unident.)			
Otididae				
188.	24610 <i>Ardeotis australis</i> (Australian Bustard)			
Oxyopidae				
189.	<i>Oxyopes amoenus</i>			
190.	<i>Oxyopes dingo</i>			
191.	<i>Oxyopes variabilis</i>			
Pachycephalidae				
192.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
193.	24618 <i>Oreoica gutturalis</i> (Crested Bellbird)			
194.	34011 <i>Oreoica gutturalis</i> subsp. <i>gutturalis</i> (Crested Bellbird (southern))			
195.	24619 <i>Pachycephala inornata</i> (Gilbert's Whistler)			
196.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
Pardalotidae				
197.	25681 <i>Pardalotus punctatus</i> (Spotted Pardalote)			
198.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
199.	24630 <i>Pardalotus striatus</i> subsp. <i>westraliensis</i> (Striated Pardalote)			
Petroicidae				
200.	24650 <i>Drymodes brunneopygia</i> (Southern Scrub-robin)			
201.	24651 <i>Eopsaltria australis</i> subsp. <i>griseogularis</i> (Western Yellow Robin)			
202.	25693 <i>Microeca fascinans</i> (Jacky Winter)			
203.	24654 <i>Microeca fascinans</i> subsp. <i>assimilis</i> (Jacky Winter)			
204.	24659 <i>Petroica goodenovii</i> (Red-capped Robin)			
Phalacrocoracidae				
205.	<i>Microcarbo melanoleucos</i>			
206.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
Phasianidae				
207.	24671 <i>Coturnix pectoralis</i> (Stubble Quail)			
Pholcidae				
208.	<i>Trichocyclops balladong</i>			
Podargidae				
209.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
Podicipedidae				
210.	24681 <i>Polyocephalus polyocephalus</i> (Hoary-headed Grebe)			
211.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
Pomatostomidae				
212.	24683 <i>Pomatostomus superciliosus</i> (White-browed Babbler)			
213.	34013 <i>Pomatostomus superciliosus</i> subsp. <i>ashbyi</i> (White-browed Babbler (western wheatbelt))			
Psittacidae				
214.	<i>Barnardius zonarius</i>			
215.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
216.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)			T
217.	24736 <i>Melopsittacus undulatus</i> (Budgerigar)			
218.	24742 <i>Nymphicus hollandicus</i> (Cockatiel)			
219.	25720 <i>Platycercus icterotis</i> (Western Rosella)			
220.	24748 <i>Platycercus varius</i> (Mulga Parrot)			
221.	25721 <i>Platycercus zonarius</i> (Australian Ringneck, Ring-necked Parrot)			
222.	24751 <i>Platycercus zonarius</i> subsp. <i>zonarius</i> (Port Lincoln Parrot)			
223.	30854 <i>Polytelis anthopeplus</i> subsp. <i>westralis</i> (Regent Parrot)			
Pygopodidae				
224.	24995 <i>Delma australis</i>			
225.	25008 <i>Pygopus lepidopodus</i> (Common Scaly Foot)			
226.	25009 <i>Pygopus nigriceps</i>			

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Rallidae				
227.	25727 <i>Fulica atra</i> (Eurasian Coot)			
228.	24769 <i>Porzana fluminea</i> (Australian Spotted Crane)			
229.	48141 <i>Tribonyx ventralis</i> (Black-tailed Native-hen)			
Recurvirostridae				
230.	24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
231.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
232.	24775 <i>Himantopus himantopus</i> subsp. <i>leucocephalus</i> (Black-winged Stilt)			
233.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
Salticidae				
234.	<i>Afraflacilla stridulator</i>			
235.	<i>Holoplatys kalgoorlie</i>			Y
236.	<i>Holoplatys planissima</i>			
237.	<i>Sandalodes scopifer</i>			
Scincidae				
238.	30893 <i>Cryptoblepharus buchananii</i>			
239.	25026 <i>Ctenotus atlas</i>			
240.	25052 <i>Ctenotus leonhardii</i>			
241.	25074 <i>Ctenotus schomburgkii</i>			
242.	25465 <i>Ctenotus uber</i> (Spotted Ctenotus)			
243.	25080 <i>Ctenotus uber</i> subsp. <i>uber</i> (Spotted Ctenotus)			
244.	25089 <i>Cyclodomorphus melanops</i> subsp. <i>elongatus</i> (Slender Blue-tongue)			
245.	25092 <i>Egernia depressa</i> (Southern Pygmy Spiny-tailed Skink)			
246.	25094 <i>Egernia formosa</i>			
247.	25104 <i>Egernia richardi</i>			
248.	25109 <i>Eremiascincus richardsonii</i> (Broad-banded Sand Swimmer)			
249.	25115 <i>Hemiergis initialis</i> subsp. <i>initialis</i>			
250.	<i>Lerista kingi</i>			
251.	25155 <i>Lerista muelleri</i>			
252.	25162 <i>Lerista picturata</i>			
253.	42411 <i>Lerista timida</i>			
254.	41411 <i>Liopholis inornata</i> (Desert Skink)			
255.	25184 <i>Menetia greyii</i>			
256.	25188 <i>Morethia adelaidensis</i>			
257.	25190 <i>Morethia butleri</i>			
258.	25203 <i>Tiliqua occipitalis</i> (Western Bluetongue)			
259.	25207 <i>Tiliqua rugosa</i> subsp. <i>rugosa</i>			
Scolopacidae				
260.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
261.	24779 <i>Calidris acuminata</i> (Sharp-tailed Sandpiper)		IA	
262.	24780 <i>Calidris alba</i> (Sanderling)		IA	
263.	24784 <i>Calidris ferruginea</i> (Curlew Sandpiper)		T	
264.	24788 <i>Calidris ruficollis</i> (Red-necked Stint)		IA	
265.	24803 <i>Tringa brevipes</i> (Grey-tailed Tattler)		P4	
266.	24806 <i>Tringa glareola</i> (Wood Sandpiper)		IA	
267.	24808 <i>Tringa nebularia</i> (Common Greenshank, greenshank)		IA	
Scolopendridae				
268.	<i>Cormocephalus bungalbinensis</i>			
269.	<i>Scolopendra laeta</i>			
270.	<i>Scolopendra morsitans</i>			
Sparassidae				
271.	<i>Isopeda magna</i>			
272.	<i>Isopedella saundersi</i>			
Sternophoridae				
273.	<i>Afrosterophorus hirsti</i>			Y
Tachyglossidae				
274.	24207 <i>Tachyglossus aculeatus</i> (Short-beaked Echidna)			
Theraphosidae				
275.	<i>Selenotholus foelschei</i>			
Theridiidae				
276.	<i>Latrodectus hasseltii</i>			
Threskiornithidae				
277.	24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
278.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Thylacomyidae				
279.	24168 <i>Macrotis lagotis</i> (Bilby, Dalgyte, Ninu)		T	
Triopsidae				
280.	39407 <i>Triops australiensis</i> (Shield Shrimp)			
Trochanteriidae				
281.	<i>Corimaethes campestris</i>			
282.	<i>Fissarena castanea</i>			
Turnicidae				
283.	24851 <i>Turnix velox</i> (Little Button-quail)			
Tytonidae				
284.	24852 <i>Tyto alba subsp. delicatula</i> (Barn Owl)			
Urodacidae				
285.	<i>Urodacus armatus</i>			
286.	<i>Urodacus hoplurus</i>			
287.	<i>Urodacus yaschenkoi</i>			
Varanidae				
288.	25211 <i>Varanus caudolineatus</i>			
289.	25218 <i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
290.	25526 <i>Varanus tristis</i> (Racehorse Monitor)			
Vespertilionidae				
291.	24186 <i>Chalinolobus gouldii</i> (Gould's Wattled Bat)			
292.	24187 <i>Chalinolobus morio</i> (Chocolate Wattled Bat)			
293.	24194 <i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)			
294.	24199 <i>Scotorepens balstoni</i> (Inland Broad-nosed Bat)			
295.	24202 <i>Vespadelus baverstocki</i> (Inland Forest Bat)			
296.	24206 <i>Vespadelus regulus</i> (Southern Forest Bat)			
Zodariidae				
297.	<i>Storena sinuosa</i>			
Zosteropidae				
298.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silvereye)			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

¹ For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.



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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 17/01/21 12:16:31

[Summary](#)

[Details](#)

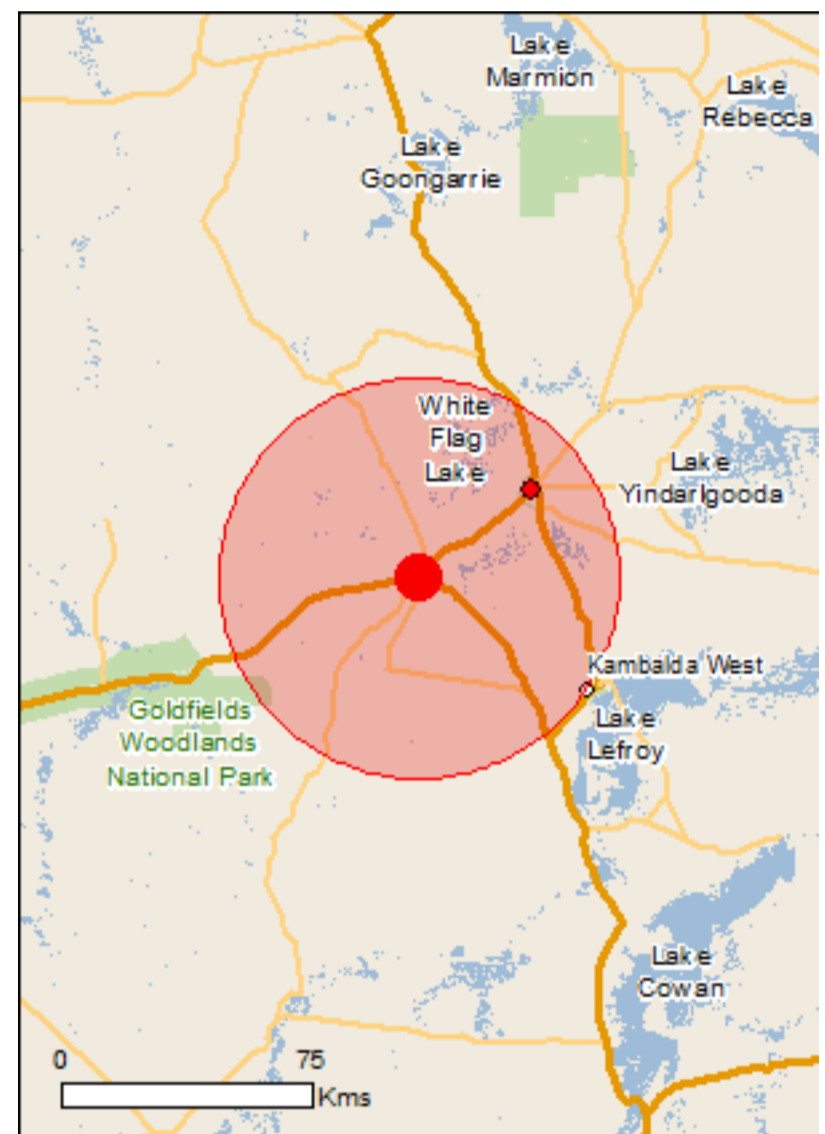
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

[Coordinates](#)

Buffer: 60.0Km



Summary

Matters of National Environmental 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:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	10
Listed Migratory Species:	7

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 environment anywhere.

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 Land:	4
Commonwealth Heritage Places:	None
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	12
Regional Forest Agreements:	None
Invasive Species:	16
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

National Heritage Properties		[Resource Information]
Name	State	Status
Historic		
Goldfields Water Supply Scheme, Western Australia	WA	Listed place

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence

Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area

Insects		
Ogyris subterrestris petrina Arid Bronze Azure [77743]	Critically Endangered	Species or species habitat may occur within area

Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area

Plants		
Gastrolobium graniticum Granite Poison [14872]	Endangered	Species or species habitat known to occur within area
Ricinocarpos brevis [82879]	Endangered	Species or species habitat may occur within area
Tecticornia flabelliformis Bead Glasswort [82664]	Vulnerable	Species or species habitat may occur within area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat may occur within area

Listed Migratory Species	[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.	

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [\[Resource Information \]](#)

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.

Name
Commonwealth Land - Defence - AIRTC KALGOORLIE Defence - KALGOORLIE RIFLE RANGE Defence - KALGOORLIE TRAINING DEPOT

Listed Marine Species [\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Burra	WA
Credo	WA
Goldfields Woodlands	WA
Goldfields Woodlands	WA
Kalgoorlie Arboretum	WA
Kambalda	WA
Kangaroo Hills Timber Reserve	WA
Kurrawang	WA
Lakeside Timber Reserve	WA
Scahill Timber Reserve	WA
Victoria Rock	WA
Yallari Timber Reserve	WA

Invasive Species [[Resource Information](#)]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species

Name	Status	Type of Presence
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		habitat likely to occur within area Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Carrichtera annua Ward's Weed [9511]		Species or species habitat likely to occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Cylindropuntia spp. Prickly Pears [85131]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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.

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

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-30.95476 121.16582

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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Appendix 3: Fauna Habitat Assessments

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA1			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 23 November 2020	Easting: 328526		S	SE	SW
Quadrat Size: 50 x 50	Northing:6577936		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:		Average Height (M)	Cover				
	Acacia Shrubland	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. clelandiorum</i>		10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Acacia, Melaleuca</i>		5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>		1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species				Notes						
FAUNA RECORDED										
Birds				Mammals			Reptiles			
Striated Pardalote				Kangaroo scats			Goanna diggings			

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA2			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 23 November 2020	Easting: 328586		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6577702		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland								
Acacia Shrubland								
Riverine Woodland	Overstorey	<i>E. clelandiorum</i>	10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Acacia, Melaleuca</i>	5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
---------------	----------------	----------------	-----------	---------------

LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
--------------------------	--------------	-------------	-------------	------------

Notes

Notes

(general)

DISTURBANCE

(cattle)

	0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
--	------------	-------------	-----------	-----------	--	------------	-------------	-----------	-----------	--

Notes					Notes					
exploration										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds			Mammals			Reptiles				
Rainbow Bee-eater			Kangaroo scats			Goanna diggings				

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA3			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 23 November 2020	Easting: 328400		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6578059		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
--------------	------	------------	------	---------------	------

VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland								
Acacia Shrubland								
Riverine Woodland	Overstorey	<i>E. clelandiorum</i> , <i>E. griffithsii</i>	10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Acacia</i> , <i>Melaleuca</i>	5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
---------------	----------------	----------------	-----------	---------------

LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
--------------------------	--------------	-------------	-------------	------------

Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
------------	-------------	-----------	-----------	--	------------	-------------	-----------	-----------	--

Notes					Notes					
exploration										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds				Mammals			Reptiles			
Grey Shrike-thrush				Kangaroo scats & tracks			Goanna diggings			
Crested Bellbird										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA4			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 24 November 2020	Easting: 327283		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6575995		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:	Average Height (M)	Cover				
	Acacia Shrubland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. clelandiorum</i>	10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Acacia</i>	5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
rubbish, tracks										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
								Goanna diggings		

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA5			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 24 November 2020	Easting: 327258		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6575566		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:	Average Height (M)	Cover				
	Acacia Shrubland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. clelandiorum</i> , <i>E. torquata</i>	10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Acacia</i>	5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds			Mammals			Reptiles				
Brown-headed Honeyeater			Cattle scats			Goanna diggings				
Striated Pardalote										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA5			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 24 November 2020	Easting: 327826		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6574946		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other: Drainageline		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland			10	0	1	2	3	
Riverine Woodland	Overstorey	<i>E. clelandiorum</i> , <i>E. torquata</i>		<5%	<20%	20-60%	60-100%	
Other Grassland	Midstorey	<i>Acacia</i>		<5%	<20%	20-60%	60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	<5%	<20%	20-60%	60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Weebill								Goanna diggings		
Striated Pardalote										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA7			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 24 November 2020	Easting: 327126		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6574768		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland								
Acacia Shrubland								
Riverine Woodland	Overstorey	<i>E. clelandiorum</i> , <i>E. torquata</i>	10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Acacia</i>	5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
tracks, exploration										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Striated Pardalote								Goanna diggings		

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA8			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 24 November 2020	Easting: 327713		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6574478		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland			10					
Acacia Shrubland				0 <5%	1 <20%	2 20-60%	3 60-100%	
Riverine Woodland	Overstorey	<i>E. clelandiorum</i> , <i>E. torquata</i> , <i>E. campase</i>		0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Acacia</i>		0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i> , <i>yellow pea</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

	0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
Notes					Notes					
tracks, exploration										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Presence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals					Reptiles
					Kangaroo scats and scrape					Goanna diggings

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA9			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 24 November 2020	Easting: 327027		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6574385		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland								
Acacia Shrubland								
Riverine Woodland	Overstorey	<i>E. clelandiorum</i>	10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Acacia</i>	5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila, yellow pea</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
tracks, exploration, firing range disturbance, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds				Mammals			Reptiles			
Red-capped Robin				Kangaroo scats						
				cow scats						

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA10			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 24 November 2020	Easting: 326878		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6573953		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland			16	0	1	2	3	
Acacia Shrubland				<5%	<20%	20-60%	60-100%	
Riverine Woodland	Overstorey	<i>E. salmonophoia</i>		0	1	2	3	
Other Grassland	Midstorey			<5%	<20%	20-60%	60-100%	
Euc Woodland	Ground Cover	<i>Eremophila, Senna</i>	1	0	1	2	3	
				<5%	<20%	20-60%	60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	1 <1 year	2 1-3 Yr	3 4-5 Yr	4 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks, exploration, previous clearing, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds			Mammals				Reptiles			
Red-backed Kingfisher			Kangaroo scats							
			cow scats							

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA11			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 326185		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6572378		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland								
Acacia Shrubland								
Riverine Woodland	Overstorey	<i>E. salmonophoia</i>	16	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey			0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila, Senna</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	1 <1 year	2 1-3 Yr	3 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks, exploration, previous clearing, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Red Wattlebird					Kangaroo scats					
Raven					Goats					
Australia Ringneck										
Crested Pigeon										
Wedgetail Eagle										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA12			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 327220		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6572751		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:	Average Height (M)	Cover				
	Acacia Shrubland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. salmonophoia</i> , <i>E. campase</i>	16	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey			0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks,previous clearing										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds				Mammals			Reptiles			
Weebill				Kangaroo scats						
Raven										
Currawong										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA13			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 327200		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6572560		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:		Average Height (M)	Cover				
	Acacia Shrubland	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. clevelandiorum</i>		16	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey				0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>		1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks,previous clearing										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds				Mammals			Reptiles			
Weebill				Kangaroo scats & tracks						
Striated Pardalote										
Brown Honeyeater										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA14			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 327237		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6570is		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland			16	0	1	2	3	
Acacia Shrubland				<5%	<20%	20-60%	60-100%	
Riverine Woodland	Overstorey	<i>E. salmonophoia</i>		0	1	2	3	
Other Grassland	Midstorey	<i>Acacia</i>		<5%	<20%	20-60%	60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0	1	2	3	
				<5%	<20%	20-60%	60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks,previous clearing, exploration										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Rufous Whistler					Kangaroo scats & tracks					
Striated Pardalote										
Babbler										
Crested Bellbird										
Grey Shrike-thrush										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA15			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 326451		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6571247		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:		Average Height (M)	Cover				
	Acacia Shrubland	Stratum			Scattered Plants	Sparse	Moderate	Thick	
	Riverine Woodland	Overstorey	<i>E. campaspe</i>		5	0 <5%	1 <20%	2 20-60%	3 60-100%
Other Grassland	Midstorey				0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila, mixed low shrubs</i>		1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes

Notes

tracks,previous clearing, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Brown Honeyeater										
Chestnut-rumped Thornbill										
Currawong										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA16			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 326260		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6571038		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland			5	0	1	2	3	
Acacia Shrubland				<5%	<20%	20-60%	60-100%	
Riverine Woodland	Overstorey	<i>E. campaspe</i>		0	1	2	3	
Other Grassland	Midstorey			<5%	<20%	20-60%	60-100%	
Euc Woodland	Ground Cover	<i>Eremophila, mixed low shrubs</i>	1	0	1	2	3	
				<5%	<20%	20-60%	60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	1 <1 year	2 1-3 Yr	3 4-5 Yr	4 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
tracks,previous clearing, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA17			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 325336		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6569174		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland								
Acacia Shrubland								
Riverine Woodland	Overstorey	<i>E. salmonophoia</i>	12	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey			0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>green low shrub, eremophila</i>	<1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
tracks,previous clearing, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Brown Honeyeater										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA18			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 324823		S	SE	SW
Quadrat Size: 50 x 50	Northing: 656968		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Hummock Grassland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. salmonophoia, E. campaspe</i>	10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Mixed Acacia</i>	4	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds				Mammals			Reptiles			
Striared Pardalote										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA19			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 324740		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6569615		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:	Average Height (M)	Cover				
	Acacia Shrubland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. clelandiorum</i> , <i>E. campaspe</i> , <i>E. torquata</i>	10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	Mixed Acacia	4	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

	0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
Notes					Notes					
tracks, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Presence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals				Reptiles	
Striated Pardalote					Kangaroo scats					
Brown Honeyeater										
Raven										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA20			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 324626		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6569495		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:	Average Height (M)	Cover				
	Acacia Shrubland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey		10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	Mixed Acacia	5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	low shrubs	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Thornbill										
Raven										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA20			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 324685		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6572425		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:	Average Height (M)	Cover				
	Acacia Shrubland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey		10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	Mixed Acacia	5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	Low shrubs	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
tracks, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Great shrike-thrush								Goanna burrows		

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA18			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 324790		S	SE	SW
Quadrat Size: 50 x 50	Northing:6570467		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:	Average Height (M)	Cover				
	Acacia Shrubland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. salmonopholia</i> , <i>E. campaspe</i>	12	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Mixed Acacia</i>	4	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Striated Pardalote					Kangaroo tracks			Goanna diggings		
Brown Honeyeater										
Weebill										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA23			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 324737		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6570291		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other: drainageline		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland			10	0	1	2	3	
Acacia Shrubland				<5%	<20%	20-60%	60-100%	
Riverine Woodland	Overstorey	<i>E. clelandiorum, torquata</i> , <i>E.</i>	10	0	1	2	3	
Other Grassland	Midstorey	<i>Acacia</i>	2.5	<5%	<20%	20-60%	60-100%	
Euc Woodland	Ground Cover	<i>Eremophila, red flower</i>	1	0	1	2	3	
				<5%	<20%	20-60%	60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
tracks, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Striated Pardalote					Kangaroo tracks			Gehyra variegata		
								Goanna tracks		

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA24			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 325773		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6570856		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other: drainageline		Average Height (M)	Cover				
	Hummock Grassland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. clelandiorum, salmonophoa, campaspe</i>	10	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Mixed Acacia</i>	2	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

	0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
Notes					Notes					
tracks, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Presence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Brown Honeyeater										
Currawong										
Striated Pardalote										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA25			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 326679		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6570964		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other: drainageline		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland								
Acacia Shrubland								
Riverine Woodland	Overstorey	<i>E. salmonophoia, E. clelandiorum</i>	12	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Acacia</i>	2.5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila, red flower</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
tracks, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Brown Honeyeater										
Currawong								Goanna diggings		

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA26			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 326495		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6570760		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	rock
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VEGETATION

Vegetation	Other: drainageline		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland								
Acacia Shrubland								
Riverine Woodland	Overstorey	<i>E. campaspe</i>	5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey			0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	<1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA27			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 324719		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6571591		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	rock
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VEGETATION

Vegetation	Other: drainageline		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland								
Acacia Shrubland								
Riverine Woodland	Overstorey	<i>E. clelandiorum, E. torquata</i>	8	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Acacia</i>	2	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Low shrubs</i>	<1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
tracks, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Striated Pardalote										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA28			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 25 November 2020	Easting: 325773		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6570856		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	rock
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VEGETATION

Vegetation	Other: drainageline		Average Height (M)	Cover				
	Hummock Grassland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. campaspe</i>	6	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey	<i>Acacia</i>	1.5	0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Low shrubs</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks, exploration, rubbish										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA29			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 26 November 2020	Easting: 326181		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6571442		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:	Average Height (M)	Cover				
	Acacia Shrubland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. salmonopholia</i>	16	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey			0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
tracks, exploration, rubbish, possibly previously cleared										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Magpie										
Western Wattlebird										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA30			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 26 November 2020	Easting: 326056		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6572028		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:	Average Height (M)	Cover				
	Acacia Shrubland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. salmonopholia</i>	16	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey			0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
tracks, exploration, rubbish, possibly previously cleared										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Western Wattlebird										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA31			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 26 November 2020	Easting: 325340		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6572483		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:		Average Height (M)	Cover			
	Acacia Shrubland	Stratum			Scattered Plants	Sparse	Moderate	Thick
Riverine Woodland	Overstorey	<i>E. salmonopholia</i>		16	0 <5%	1 <20%	2 20-60%	3 60-100%
Other Grassland	Midstorey				0 <5%	1 <20%	2 20-60%	3 60-100%
Euc Woodland	Ground Cover	<i>Eremophila, Senna</i>		1	0 <5%	1 <20%	2 20-60%	3 60-100%

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	1 <1 year	2 1-3 Yr	3 4-5 Yr	4 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks, exploration, rubbish, possibly previously cleared										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
					Kangaroo tracks					
Western Wattlebird										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA32			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 26 November 2020	Easting: 325375		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6571473		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:	Average Height (M)	Cover				
	Acacia Shrubland	Stratum		Scattered Plants	Sparse	Moderate	Thick	
Riverine Woodland	Overstorey	<i>E. salmonopholia</i>	12	0 <5%	1 <20%	2 20-60%	3 60-100%	
Other Grassland	Midstorey			0 <5%	1 <20%	2 20-60%	3 60-100%	
Euc Woodland	Ground Cover	<i>Senna</i>	<1	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	
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Notes					Notes					
tracks, exploration, rubbish, possibly previously cleared										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Australian Ringneck										
Western Wattlebird										

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA33			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 26 November 2020	Easting: 325300		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6572287		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Other:		Average Height (M)	Cover				
	Stratum			Scattered Plants	Sparse	Moderate	Thick	
Hummock Grassland			16	0	1	2	3	
Acacia Shrubland				<5%	<20%	20-60%	60-100%	
Riverine Woodland	Overstorey	<i>E. salmonophoa</i>		0	1	2	3	
Other Grassland	Midstorey			<5%	<20%	20-60%	60-100%	
Euc Woodland	Ground Cover	<i>Eremophila</i>	1	0	1	2	3	
				<5%	<20%	20-60%	60-100%	

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks, exploration, rubbish, possibly previously cleared										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		

FAUNA HABITAT ASSESSMENT SHEET

(Goldfields)

Location: Coolgardie		Site Number: HA34			
Project Number: FMR 001		Aspect	N	NE	NW
Date: 26 November 2020	Easting: 325630		S	SE	SW
Quadrat Size: 50 x 50	Northing: 6571492		E	W	N/A



Soil Texture	sand	sandy-loam	loam	cracking clay	clay
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VEGETATION

Vegetation	Hummock Grassland	Other:	Average Height (M)	Cover			
	Acacia Shrubland	Stratum		Scattered Plants	Sparse	Moderate	Thick
Riverine Woodland	Overstorey	<i>E. salmonopholia</i>	12	0 <5%	1 <20%	2 20-60%	3 60-100%
Other Grassland	Midstorey			0 <5%	1 <20%	2 20-60%	3 60-100%
Euc Woodland	Ground Cover	<i>Eremophila, Senna</i>	<1	0 <5%	1 <20%	2 20-60%	3 60-100%

CONDITION

5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded
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LAST FIRE

0 Completely Degraded	0 <1 year	1 1-3 Yr	2 4-5 Yr	3 >5 Yr
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Notes

Notes

(general)

DISTURBANCE

(cattle)

0 heavy	1 medium	2 mild	3 none	0 heavy	1 medium	2 mild	3 none
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Notes					Notes					
tracks, exploration, rubbish, possibly previously cleared										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	3 60-100%	Hummock Grass	0 <5%	1 <20%	2 20-60%	3 60-100%	
Rock	0 <5%	1 <20%	2 20-60%	3 60-100%	Other Grass	0 <5%	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	1 <20%	2 20-60%	3 60-100%	Herbs	0 <5%	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	0 <5%	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	3 Sand	Peeling Bark	0 none	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	3 70-100%	Large Hollows	0 none	1 rare	2 moderate	3 common	
Exfoliating Slabs	0 none	1 0-30%	2 30-70%	3 70-100%	Small Hollows	0 none	1 rare	2 moderate	3 common	
Rock Crevices	0 none	1 0-30%	2 30-70%	3 70-100%	Water Prescence	0 none	1 rare	2 moderate	3 common	
Boulders	0 none	1 0-30%	2 30-70%	3 70-100%	Distance to Water	0 >5km	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		NO		Termite Mounds	0 none	1 rare	2 moderate	3 common	
Caves	Absent	Present			Woody Debris	0 none	1 rare	2 moderate	3 common	
CONSERVATION SIGNIFICANT FAUNA										
Species					Notes					
FAUNA RECORDED										
Birds					Mammals			Reptiles		
Australian Ringneck										



Appendix 4: Fauna Species List

AMPHIBIAN SPECIES RECORDED IN THE REGION

Key: EPBC Act = Environmental Protection and Biodiversity Conservation Act 1999, BC Act = Biodiversity Conservation Act 2016 (IUCN Threat categories), DBCA = Department of Biodiversity, Conservation and Attractions Priority Code, A = EPBC Protected Matters search, B = Listed in Naturemap, C = DBCA Threatened Fauna Database, D = Current Field Survey.

Note: For Definitions of Conservation Codes see Appendix 1.

AMPHIBIANS		Conservation Codes			A	B	C	D
Family and Scientific Name	Common Name	EPBC Act	BC Act	DBCA				
LIMNODYNASTIDAE								
<i>Neobatrachus kunapalari</i>	Kunapalari Frog					X		
<i>Neobatrachus pelobatoides</i>	Humming Frog					X		
<i>Neobatrachus sutor</i>	Shoemaker Frog					X		
MYOBATRACHIDAE								
<i>Pseudophryne occidentalis</i>	Western Toadlet					X		
HYLIDAE								
<i>Litoria moorei</i>	Motorbike Frog					X		

REPTILIAN SPECIES RECORDED IN THE REGION

Key: EPBC Act = Environmental Protection and Biodiversity Conservation Act 1999, BC Act = Biodiversity Conservation Act 2016 (IUCN Threat categories), DBCA = Department of Biodiversity, Conservation and Attractions Priority Code, A = EPBC Protected Matters search, B = Listed in Naturemap, C = DBCA Threatened Fauna Database, D = Current Field Survey.

Note: For Definitions of Conservation Codes see Appendix 1.

REPTILES	Family and Scientific Name	Common Name	Conservation Codes			A	B	C	D
			EPBC Act	BC Act	DBCA				
CHELUIDAE									
	<i>Chelodina colliei</i>	South-western Snake-necked Turtle					X		
DIPLODACTYLIDAE									
	<i>Crenadactylus ocellatus</i>	South-western Clawless Gecko							X
	<i>Diplodactylus granariensis</i>	Western Stone Gecko					X		
	<i>Diplodactylus pulcher</i>	Pretty Gecko					X		
	<i>Hesperoedura reticulata</i>	Reticulated Velvet Gecko					X		
	<i>Lucasium maini</i>	Mains's Ground Gecko					X		
	<i>Rhynchoedura ornata</i>	Western Beaked Gecko					X		
	<i>Strophurus assimilis</i>	Goldfields Spiny-tailed Gecko					X		
	<i>Strophurus elderi</i>	Jewelled Gecko					X		
GEKKONIDAE									
	<i>Gehyra purpurascens</i>	Purple Dtella					X		
	<i>Gehyra variegata</i>	Tree Dtella					X		X
	* <i>Hemidactylus frenatus</i>	Asian House Gecko				X	X		
	<i>Heteronotia binoei</i>	Bynoe's Gecko					X		X
	<i>Underwoodisaurus milii</i>	Barking Gecko					X		
PYGOPODIDAE									
	<i>Delma australis</i>	Marble-faced Delma					X		
	<i>Pygopus lepidopodus</i>	Common Scaly Foot					X		X
	<i>Pygopus nigriceps</i>	Western Hooded Saly-foot					X		
SCINCIDAE									
	<i>Cryptoblepharus buchananii</i>	Buchanan's Snake-eyed Skink					X		
	<i>Ctenotus atlas</i>	Southern Spinifex Ctenotus					X		
	<i>Ctenotus leonhardii</i>	Common Desert Ctenotus					X		

<i>Ctenotus schomburgkii</i>	Barred Wedge-snouted Ctenotus					X		
<i>Ctenotus uber</i>	Spotted Ctenotus					X		
<i>Cyclodomorphus melanops</i>	Slender Blue-tongue					X		
<i>Egernia depressa</i>	Southern Pygmy Spiny-tailed Skink					X		
<i>Egernia formosa</i>	Goldfields Crevice-skink					X		
<i>Egernia richardi</i>	Richards Crevice-skink					X		
<i>Eremiascincus richardsonii</i>	Broad-banded Sand Swimmer					X		
<i>Hemiergis initialis</i>	Western Earless Skink					X		
<i>Lerista kingi</i>	King's Three-toed Slider					X		
<i>Lerista muelleri</i>	Muller's Three-toed Slider					X		
<i>Lerista picturata</i>	Southern Robust Slider					X		
<i>Lerista timida</i>	Dwarf Three-toed Slider					X		
<i>Liopholis inornata</i>	Desert Skink					X		
<i>Menetia greyii</i>	Common Dwarf Skink					X		
<i>Morethia adalaidensis</i>	Saltbush Morethia					X		
<i>Morethia butleri</i>	Woodland Darl-flecked Morethia					X		
<i>Tiliqua occipitalis</i>	Western Bluetongue					X		
<i>Tiliqua rugosa</i>	Shingleback					X		X
AGAMIDAE								
<i>Ctenophorus sp.</i>	<i>Ctenophorus sp.</i>							X
<i>Ctenophorus cristatus</i>	Bicycle Dragon					X		
<i>Ctenophorus fordi</i>	Mallee Sand Dragon					X		
<i>Ctenophorus isolepis citrinus</i>	Yellow Military Dragon					X		
<i>Ctenophorus nuchalis</i>	Central Netted Dragon					X		
<i>Ctenophorus reticulatus</i>	Western Netted Dragon					X		
<i>Ctenophorus salinarum</i>	Salt Pan Dragon					X		
<i>Ctenophorus scutulatus</i>	Lozenge-marked Dragon					X		
<i>Pogona minor minor</i>	Dwarf Bearded Dragon					X		
<i>Moloch horridus</i>	Thorny Devil					X		
<i>Tympanocryptis cephalus</i>	Pebble Dragon					X		
<i>Tympanocryptis lineata</i>	Lined Earless Dragon					X		
VARANIDAE								
<i>Varanus caudolineatus</i>	Stripe-tailed Monitor					X		
<i>Varanus gouldii</i>	Sand Monitor					X		X

<i>Varanus tristis</i>	Racehorse Monitor					X		
BOIDAE								
<i>Morelia spilota imbricata</i>	Carpet Python					X		
ELAPIDAE								
<i>Acanthophis pyrrhus</i>	Desert Death Adder					X		
<i>Brachyuropis fasciolatus</i>	Narrow-banded Shovel-nosed Snake					X		
<i>Brachyuropis semifasciatus</i>	Southern Shovel-nosed Snake					X		
<i>Demansia psammophis</i>	Yellow-faced Whipsnake					X		
<i>Furina ornata</i>	Moon Snake					X		
<i>Neelaps bimaculatus</i>	Black-naped Snake					X		
<i>Parasuta gouldii</i>	Gould's Hooded Snake					X		
<i>Parasuta monachus</i>	Monk Snake					X		
<i>Pseudechis australis</i>	Mulga Snake					X		
<i>Pseudonaja affinis</i>	Dugite					X		
<i>Pseudonaja mengdeni</i>	Gwardar					X		
<i>Pseudonaja modesta</i>	Ringed Brown Snake					X		
<i>Simoselaps bertholdi</i>	Jan's Banded Snake					X		
<i>Suta fasciata</i>	Rosen's Snake					X		

AVIAN SPECIES RECORDED IN THE REGION

Key: EPBC Act = Environmental Protection and Biodiversity Conservation Act 1999, BC Act = Biodiversity Conservation Act 2016 (IUCN Threat categories), DBCA = Department of Biodiversity, Conservation and Attractions Priority Code, A = EPBC Protected Matters search, B = Listed in Naturemap, C = DBCA Threatened Fauna Database, D = Current Field Survey. * = Non endemic or introduced species/pest.

Note: For Definitions of Conservation Codes see Appendix 1.

BIRDS	Family and Scientific Name	Common Name	Conservation Codes			A	B	C	D
			EPBC Act	BC Act	DBCA				
CASUARIIDAE									
	<i>Dromaius novaehollandiae</i>	Emu					X		X
MEGAPODIIDAE									
	<i>Leipoa ocellata</i>	Malleefowl	Vu	Vu		X	X	X	
PHASIANIDAE									
	<i>Coturnix pectoralis</i>	Stubble Quail					X		
ANATIDAE									
	<i>Biziura lobata</i>	Musk Duck					X		
	<i>Stictonetta naevosa</i>	Freckled Duck					X		
	<i>Cygnus atratus</i>	Black Swan					X		
	<i>Tadorna tadornoides</i>	Australian Shelduck					X		
	<i>Chenonetta jubata</i>	Australian Wood Duck					X		
	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck					X		
	<i>Anas rhynchotis</i>	Australasian Shoveler					X		
	<i>Anas gracilis</i>	Grey Teal					X		
	<i>Anas platyrhynchos</i>	Mallard					X		
	<i>Anas superciliosa</i>	Pacific Black Duck					X		
	<i>Aythya australis</i>	Hardhead					X		
PODICIPEDIDAE									
	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe					X		
	<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe					X		
COLUMBIDAE									
	* <i>Columba livia</i>	Rock Pigeon				x	X		
	* <i>Streptopelia chinensis</i>	Spotted Turtle-Dove				X			
	* <i>Streptopelia senegalensis</i>	Laughing Turtle-Dove				X	X		

<i>Phaps chalcoptera</i>	Common Bronzewing					X		
<i>Ocyphaps lophotes</i>	Crested Pigeon					X		
PODARGIDAE								
<i>Podargus strigoides</i>	Tawny Frogmouth					X		
CAPRIMULGIDAE								
<i>Eurostopodus argus</i>	Spotted Nightjar					X		
AEGOTHELIDAE								
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar					X		
APODIDAE								
<i>Apus pacificus</i>	Fork-tailed Swift	MiMa			X			
ANHINGIDAE								
<i>Anhinga novaehollandiae</i>	Australasian Darter					X		
PHALACROCORACIDAE								
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant					X		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant					X		
ARDEIDAE								
<i>Ardea pacifica</i>	White-necked Heron					X		
<i>Ardea modesta</i>	Great Egret				X	X		
<i>Ardea ibis</i>	Cattle Egret				X			
<i>Egretta novaehollandiae</i>	White-faced Heron					X		
THRESKIORNITHIDAE								
<i>Plegadis falcinellus</i>	Glossy Ibis	MiMa					X	
<i>Threskiornis spinicollis</i>	Straw-necked Ibis					X		
<i>Platalea flavipes</i>	Yellow-billed Spoonbill					X		
ACCIPITRIDAE								
<i>Elanus axillaris</i>	Black-shouldered Kite					X		
<i>Haliastur spheurnus</i>	Whistling Kite					X		
<i>Accipiter fasciatus</i>	Brown Goshawk					X		
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk					X		
<i>Circus assimilis</i>	Spotted Harrier					X		
<i>Aquila audax</i>	Wedge-tailed Eagle					X		X
<i>Hieraaetus morphnoides</i>	Little Eagle					X		
FALCONIDAE								
<i>Falco cenchroides</i>	Nankeen Kestrel					X		

<i>Falco berigora</i>	Brown Falcon					X		X
<i>Falco longipennis</i>	Australian Hobby					X		
<i>Falco hypoleucos</i>	Grey Falcon	Vu			X			
RALLIDAE								
<i>Porzana fluminea</i>	Australian Spotted Crake					X		
<i>Tribonyx ventralis</i>	Black-tailed Native-hen					X		
<i>Fulica atra</i>	Eurasian Coot					X		
OTDIDDAE								
<i>Ardeotis australis</i>	Australian Bustard					X		
RECURVIROSTRIDAE								
<i>Himantopus himantopus</i>	Black-winged Stilt					X		
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet					X		
<i>Cladorhynchus leucocephalus</i>	Banded Stilt					X		
CHARADRIIDAE								
<i>Charadrius ruficapillus</i>	Red-capped Plover					X		
<i>Euseyonis melanops</i>	Black-fronted Dotterel					X		
<i>Thinornis rubricollis</i>	Hooded Plover			P4	X		X	
<i>Erythrogonys cinctus</i>	Red-kneed Dotterel					X		
<i>Vanellus tricolor</i>	Banded Lapwing					X		
SCOLOPACIDAE								
<i>Actitis hypoleucos</i>	Common Sandpiper	MiMa	Mi			X	X	X
<i>Tringa brevipes</i>	Grey-tailed Tattler	MiMa	Mi	P4			X	X
<i>Tringa nebularia</i>	Common Greenshank	MiMa	Mi			X	X	X
<i>Tringa glareola</i>	Wood Sandpiper	MiMa	Mi				X	X
<i>Calidris alba</i>	Sanderling	MiMa	Mi				X	X
<i>Calidris ruficollis</i>	Red-necked Stint	MiMa	Mi				X	X
<i>Calidris melanotos</i>	Pectoral Sandpiper	MiMa				X		
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	MiMa	Mi			X	X	X
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR,MiMa	Mi			X	X	X
TURNICADAE								
<i>Turnix velox</i>	Little Button-quail						X	
LARIDAE								
<i>Chroicocephalus novaehollandiae</i>	Silver Gull						X	
CACATUIDAE								

<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	En	En			X	X	
<i>Eolophus roseicapillus</i>	Galah					x		
<i>Cacatua sanguinea</i>	Little Corella					X		
<i>Nymphicus hollandicus</i>	Cockatiel					X		
PSITTACIDAE								
<i>Polytelis anthopeplus</i>	Regent Parrot					X		
<i>Platycercus icterotis</i>	Western Rosella					X		
<i>Platycercus zonarius</i>	Australian Ringneck					X		X
<i>Psephotus varius</i>	Mulga Parrot				X	X		
<i>Melopsittacus undulatus</i>	Budgerigar					X		
CUCULIDAE								
<i>Chrysococcyx basalis</i>	Horsfield's Bronze Cuckoo					X		
<i>Chalcites osculans</i>	Black-eared Cuckoo				X	X		
<i>Cacomantis pallidus</i>	Pallid Cuckoo					X		
TYTONIDAE								
<i>Tyto alba</i>	Barn Owl					X		
HALCYONIDAE								
<i>Todiramphus pyrrophygius</i>	Red-backed Kingfisher					X		X
<i>Todiramphus sanctus</i>	Sacred Kingfisher					X		
MEROPIDAE								
<i>Merops ornatus</i>	Rainbow Bee-eater	Ma				X	X	X
MALURIDAE								
<i>Malurus splendens</i>	Splendid Fairy-wren					X		X
<i>Malurus leucopterus</i>	White-winged Fairy-wren					X		X
<i>Malurus pulcherrimus</i>	Blue-breasted Fairy-wren					X		
ACANTHIZIDAE								
<i>Hylacola cauta</i>	Shy Heathwren					X		
<i>Pyrrholaemus brunneus</i>	Redthroat					X		
<i>Smicromis brevirostris</i>	Weebill					X		X
<i>Gerygone fusca</i>	Western Gerygone					X		X
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill					X		
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill					X		X
<i>Acanthiza apicalis</i>	Inland Thornbill					X		X
<i>Aphelocephala leucopsis</i>	Southern Whiteface					X		

PARDALOTIDAE								
<i>Pardalotus punctatus</i>	Spotted Pardalote						X	
<i>Pardalotus striatus</i>	Striated Pardalote						X	X
MELIPHAGIDAE								
<i>Lichenostomus leucotis</i>	White-eared Honeyeater						X	
<i>Purnella albifrons</i>	White-fronted Honeyeater						X	
<i>Manorina flavigula</i>	Yellow-throated Miner						X	X
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater						X	X
<i>Anthochaera lunulata</i>	Western Wattlebird							X
<i>Anthochaera carunculata</i>	Red Wattlebird						X	
<i>Epthianura tricolor</i>	Crimson Chat						X	
<i>Epthianura albifrons</i>	White-fronted Chat						X	
<i>Lichmera indistincta</i>	Brown Honeyeater						X	X
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater						X	X
POMATOSTOMIDAE								
<i>Pomatostomus superciliosus</i>	White-browed Babbler						X	X
NEOSITTIDAE								
<i>Daphoenositta chrysoptera</i>	Varied Sittella						X	
CAMPEPHAGIDAE								
<i>Coracina maxima</i>	Ground Cuckoo-shrike						X	
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike						X	X
PACHYCEPHALIDAE								
<i>Pachycephala inornata</i>	Gilbert's Whistler						X	
<i>Pachycephala rufiventris</i>	Rufous Whistler						X	X
<i>Colluricincla harmonica</i>	Grey Shrike-thrush						X	X
<i>Oreoica gutturalis</i>	Crested Bellbird						X	X
ARTAMIDAE								
<i>Artamus personatus</i>	Masked Woodswallow						X	
<i>Artamus cinereus</i>	Black-faced Woodswallow						X	
<i>Artamus cyanopterus</i>	Dusky Woodswallow						X	
<i>Cracticus torquatus</i>	Grey Butcherbird						X	
<i>Cracticus nigrogularis</i>	Pied Butcherbird						X	X
<i>Cracticus tibicen</i>	Australian Magpie						X	X
<i>Strepera versicolor</i>	Grey Currawong						X	X

RHIPIDURIDAE								
<i>Rhipidura albiscapa</i>	Grey Fantail						X	
<i>Rhipidura leucophrys</i>	Willie Wagtail						X	
CORVIDAE								
<i>Corvus coronoides</i>	Australian Raven						X	X
<i>Corvus bennetti</i>	Little Crow						X	
<i>Corvus orru</i>	Torresian Crow						X	
MONARCHIDAE								
<i>Grallina cyanoleuca</i>	Magpie-Lark						X	
PETROICIDAE								
<i>Microeca fascians</i>	Jacky Winter						X	X
<i>Petroica goodenovii</i>	Red-capped Robin						X	X
<i>Eopsaltria australis griseogularis</i>	Western Yellow Robin						X	
<i>Drymodes brunneopygia</i>	Southern Scrub-robin						X	
TIMALIIDAE								
<i>Zosterops lateralis</i>	Silvereye						X	
HIRUNDINIDAE								
<i>Cheramoeca leucosterna</i>	White-backed Swallow						X	
<i>Hirundo neoxena</i>	Welcome Swallow						X	
<i>Petrochelidon ariel</i>	Fairy Martin						X	
<i>Petrochelidon nigricans</i>	Tree Martin						X	X
NECTARINIIDAE								
<i>Dicaeum hirundinaceam</i>	Mistletoebird						X	
ESTRILDIDAE								
<i>Taeniopygia guttata</i>	Zebra Finch						X	
MOTACILLIDAE								
<i>Anthus novaeseelandiae</i>	Australasian Pipit						X	
MOTACILLIDAE								
<i>Motacilla cinerea</i>	Grey Wagtail	MiMa					X	

MAMMALIAN SPECIES RECORDED IN THE REGION

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Note: For Definitions of Conservation Codes see Appendix 1.

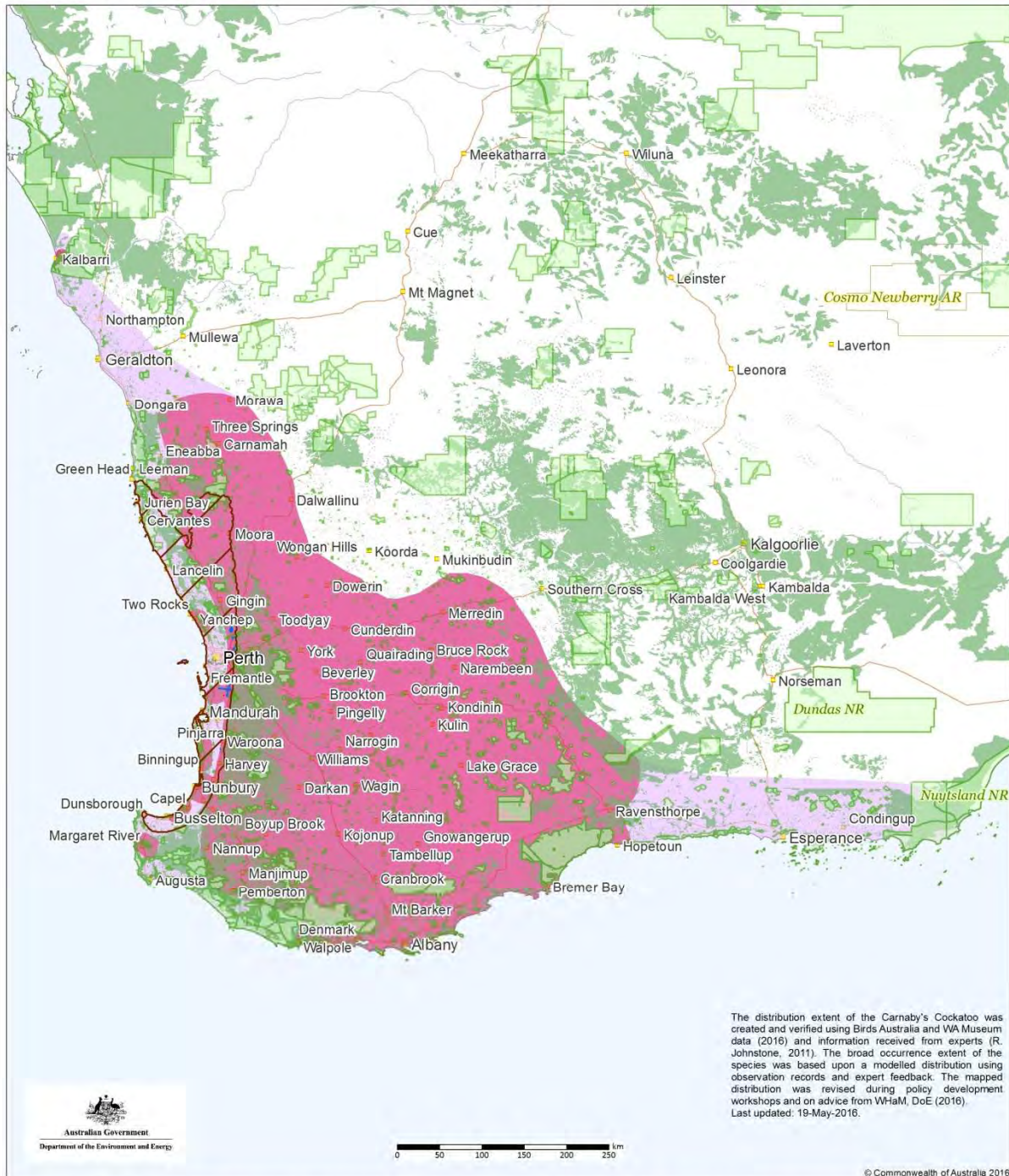
MAMMALS		Conservation Codes			A	B	C	D
Family and Scientific Name	Common Name	EPBC Act	BC Act	DBCA				
TACHYGLOSSIDAE								
<i>Short-beaked Echidna</i>	Tachyglossus aculeatus					X		
DASYURIDAE								
<i>Dasyurus geoffroi</i>	Chuditch (Western Quoll)	Vu	Vu		X			
<i>Ningau i yvonneae</i>	Southern Ningau i					X		
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart					X		
<i>Sminthopsis dolichura</i>	Little long-tailed Dunnart					X		
<i>Sminthopsis gilberti</i>	Gilbert's Dunnart					X		
MYRMECOBIIDAE								
<i>Myrmecobius fasciatus</i>	Numbat	En	En			X		
THYLACOMYIDAE								
<i>Macrotis lagotis</i>	Bilby	Vu	Vu			X		
BURRAMYIDAE								
<i>Cercartetus concinnus</i>	Western Pygmy-possum					X		
MACROPODIDAE								
<i>Macropus fuliginosus</i>	Western Grey Kangaroo					X		X
VESPERTILIONIDAE								
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat					X		
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat					X		
<i>Chalinolobus morio</i>	Chocolate Wattled Bat					X		
<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat					X		
<i>Vespadelus baverstocki</i>	Inland Forest Bat					X		
<i>Vespadelus regulus</i>	Southern Forest Bat					X		
MURIDAE								
<i>Notomys mitchellii</i>	Mitchell's Hopping-mouse					X		
<i>Pseudomys bolami</i>	Bolam's Mouse					X		

<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse					X		
* <i>Mus musculus</i>	House Mouse				X	X		
CANIDAE								
* <i>Canis lupus familiaris</i>	Domestic Dog				X			
* <i>Vulpes vulpes</i>	Red Fox				X			
FELIDAE								
* <i>Felis catus</i>	Feral Cat				X	X		
LEPORIDAE								
* <i>Oryctolagus cuniculus</i>	European Rabbit				X	X		X
EQUIDAE								
<i>Equus asinus</i>	Donkey				X			
<i>Equus caballus</i>	Horse				X			
BOVIDAE								
* <i>Bos taurus</i>	European Cattle				X			X
* <i>Capra hircus</i>	Goat				X			



Appendix 5: Carnaby's Black Cockatoo Distribution Map (DEE)

Map 3: Modelled distribution for Carnaby's Cockatoo (*Calyptorhynchus latirostris*)



INDICATIVE MAP ONLY: For the latest departmental information, please refer to the Protected Matters Search Tool and the Species Profiles & Threats Database at <http://www.environment.gov.au/biodiversity/threatened/index.html>

Produced by:
Environmental Resources Information Network 2016

Contextual data source:
National Vegetation Information System (NVIS 4.2) 2016
Interim Biogeographic Regionalisation for Australia (IBRA) version 7 2012
Collaborative Australian Protected Area Database (CAPAD) 2014
Geoscience Australia GEODATA TOPO 250K Topographic Data Series 3 2006

Projection: Geographic
Datum: GDA94

Conservation Areas
Jarrah, Kam, Mann, Salmon Gum, Wandoo, Banksia, Grevillea, Dryandra and Hakea (NVIS 4.2)

Species
Breeding Range
Non-breeding Range

Ecological Communities
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain
Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain
Banksia Woodlands of the Swan Coastal Plain

Cities & Towns
Roads (sealed)
Roads (unsealed)
State Border
Major Rivers
Lakes/Reservoirs
Non-perennial Lakes

© Commonwealth of Australia 2016

Appendix D

Hydrogeological Studies Groundwater Modelling 2021



AquaGeo Pty Ltd
18 Mildura Road
Perth
WA 6025
13 May 2021

Focus Minerals Limited
Level 2, 159 Adelaide Terrace
East Perth WA 6004
PO Box 3233,
East Perth WA 6892
21 January 2020

Dear Alex and Gemma

Hydrogeological Studies Groundwater Modelling -Coolgardie Feasibility Tasks (2021)-Focus Minerals

1. Focus Minerals Requirements

Focus Minerals (FML) is currently exploring across its Coolgardie tenement package and has identified several potential resources which it is intending to bring to feasibility stage. As part of this feasibility work, groundwater studies will be required. Two previous work packages from AquaGeo detailed the Frequency Domain Electromagnetics geophysical traverses above GreenField's Pit and a provided a Scope of Work for Construction and Position of Monitoring Bores for the CGO Project.

2. Background

Focus Minerals Ltd (FML) owns the Coolgardie Gold Operations (CGO), which includes over 210 square km of leases and includes the Three Mile Hill (TMH) gold treatment plant in the Coolgardie region of Western Australia (Figure 1).

FML suspended mining at the CGO, placing it into Care and Maintenance on 31 August 2013. The CGO remains in Care and Maintenance to date.

3. Coolgardie Climate

The climate of the Coolgardie region is described as arid non-seasonal to semi-arid Mediterranean. This is characterised as an arid climate with cool winters and hot, dry summers.



The long-term mean maximum and minimum temperatures recorded at the Kalgoorlie-Boulder Airport Station for January are 36.6°C and 29.9°C respectively and for July are 20.2°C and 13.9°C respectively. The records also indicate that rainfalls are irregular and most rain falls during summer and early winter months (January to March and May to June). In the summer months, heavy falls are generally associated with the passage of the remnants of cyclones, or thunderstorms.

The average annual rainfall of 264.9 mm is exceeded by the average annual evaporation rate of approximately 2,640 mm by a factor of almost 10 to 1.

Evaporation exceeds rainfall in all months of the year, with June having the lowest daily evaporation and January having the highest daily evaporation.

Groundwater Recharge from rainfall into the fractured rock aquifers that make up the deposits of CGO is expected to be very low due to the high evaporation rate.

4. Hydrogeology

The greenstone rocks in the Kalgoorlie 1:250,000 sheet area, which includes Coolgardie area are described as generally hosting local aquifers containing saline to hypersaline groundwater (Kern, 1995). Groundwater storage is limited to secondary porosity present in discrete, local-scale fractures. The identification of aquifer boundaries during test pumping in adjacent deposits demonstrates the limited areal extent of the aquifers. Based on the limited interconnectivity of the aquifer zone (Kern, 1995), aquifer recharge is likely to be local.

The fractured bedrock is characterized by secondary permeability resulting from tectonic and decompression fracturing enhanced by chemical dissolution along fracture lines. Fractured-bedrock aquifers occur more commonly in mafic, ultramafic, and granitic rocks than in sedimentary or felsic volcanic and volcanoclastic rocks. Open fractures occur up to a depth of 125 m along major faults and shear zones (Kern, 1995)

4.1 CGO Hydrogeology Data Availability

The hydrogeology of CGO operations is well described for the Bonnie Vale palaeochannel aquifer borefields (Nine Mile Dam Borefield and Roger Springs Borefield). For the mining area the aquifers are mainly fractured rock and generally poorly described.

Some hydrogeological information exists on previously mined areas such as Bayleys Mine, Tindal's Mine and Greenfields Pit. This is mainly related to dewatering operations at Bayley's Mine, Tindal's Mine and the Greenfields Pit.

Groundwater at Bayley's, Tindals and Greenfields is contained in fractured and deeply-weathered-bedrock aquifers. Bedrock in this area generally comprises mafic and ultramafic rocks of Archaean age.



4.3 Greenfields Mine Area

The Greenfields Pit is located to the northeast of the TMH treatment plant. There are production and monitoring bores in the vicinity of the Greenfields Pit. The monitoring bores are for the adjacent Tailings Storage Facility (currently under Care and Maintenance), managed under a separate DWER (former 'Department of Environment Regulation (DER)') license (Environmental Licence L8249/2008/2).

Greenfields Pit was historically used to store water from Bayley's Mine. The pit water previously comprised a mixture of surface run-off and groundwater seepage. In 1995, groundwater inflow to the Greenfields Pit was estimated to be about 190 kL/d (Rockwater, 2010). Rockwater 2010 reported the pit floor extends to a depth of between 100 to 106 m and the total pit volume is estimated to be about 2,300,000 kL. This figure is excessive and definitely wrong and will need to be recalculated once the elevation of the pit water level is known. At this stage there is no access to measure the level due to slope failures.

Upon recommissioning of the processing plant in December 2009, water was abstracted from the Greenfields Pit for use as process water at a rate of approximately 100 kL/day. After this water abstraction ceased in April 2010, survey levels showed there to be 9,900 kL of water remaining. Based on this our calculation is that dewatering occurred for approximately 244 days at 100kl/day gives a volume of 24,400kl abstracted would mean that the abstraction rate was below the recorded potential inflow rate of 190kL/day during mining in 1995 so the water level should remain constant with 9900kL of water in the pit.

As of October 2012, the water abstracted (recorded as approximately 4,000 kL) had emptied the stored water in the Greenfields Pit (CGO Groundwater Monitoring Report 2019).

Water has accumulated in the Greenfields Pit through rainfall and surface runoff since the CGO was put under care and maintenance in August 2013. Due to instability issues no water abstraction or water monitoring has occurred at the Greenfields Pit. For modelling purposes it is assumed that there is 9900kL of water stored in the pit as the higher figure.

4.4 Tindal's Mine and Brilliant Open Pit - GWL 160936 (3)

Water from the Tindal's underground operations was primarily used underground. Excess water from the operations was discharged into Brilliant open pit via HDPE piping in a V- drain. There are no monitoring bores at Tindal's mine or Brilliant open pit.

The underground Tindals and Cyanide mines which formed part of the Tindals' Complex had very low yields associated with their underground mining. Tindals was recorded as having a groundwater elevation of 190mbgl with an inflow of 6-8l/s and Cyanide Underground was recorded as having a water level of 120mbgl with an inflow of 6-8l/s. This is relatively negligible seepage and mean that Alicia and Dreadnought Deposits possibly will have little water infiltration associated with them depending on what depth they are mined.

4.4 General Aquifer Parameters

There is no record of aquifer parameters for any of the CGO Feasibility deposits. This may be due to the low volumes of water encountered and the simple dewatering. Data has been extrapolated from aquifer



studies done to the MacPhersons Reward Deposits (Rockwater, 2017) adjacent to CGO to the southeast and utilized in the groundwater model.

5 Coolgardie Feasibility Projects Modeling

The general objective for Hydrogeological studies across the Coolgardie Project is to bring the project to feasibility level to aid future mining design and approval applications.

The following projects are detailed as needing feasibility studies. The following hydrogeological information has been provided for the projects.

- 1) Greenfields Project -This has existing groundwater monitoring from bores in the vicinity which mainly monitor Three Mile Hill TSF however no monitoring of the pit water level has been done since 2013. There is some information on the previous dewatering and infiltration rates. A pit shell has been provided as a dxf file. A groundwater model has been completed. Groundwater Levels for the Three Mile Hill TSF area are available.
- 2) Bonnievale Project – No Hydrogeological Information is available. A dxf of the proposed underground mine has been provided. There is no access to the existing shafts due to instability and no water levels are available. No groundwater model has been completed as there is a lack of parameters and water levels.
- 3) CNX Project – No Hydrogeological Information is available. There is access to the existing pit water levels and to exploration bores surrounding the pit. From this a groundwater elevation has been calculated. CNX dxf files for the pit have been provided along with a preliminary mining schedule. A groundwater model has been completed.
- 4) Brilliant Project – No Hydrogeological Information is available. Access is available to the pit which is dry. Adjacent exploration bores have been dipped and local water levels estimated. A DXF of the proposed pit has been provided. A groundwater model has been completed.
- 5) Alicia Project – Limited hydrogeological information relating to the old Tindals (Empress and Tindals underground) has been located. No DXF for the mine pit has been provided
- 6) Big Blow / Happy Jack Project – No Hydrogeological Information. No DXF for the mine pit has been provided.
- 7) Dreadnought Project – No Hydrogeological Information. No DXF for the mine pit has been provided.

Assumptions have been made on the aquifer parameters for all pits as there is no detailed hydrogeological parameters and, in some cases, no recorded water levels. More detailed drilling and aquifer testing will be required to firm up parameters for each deposit.

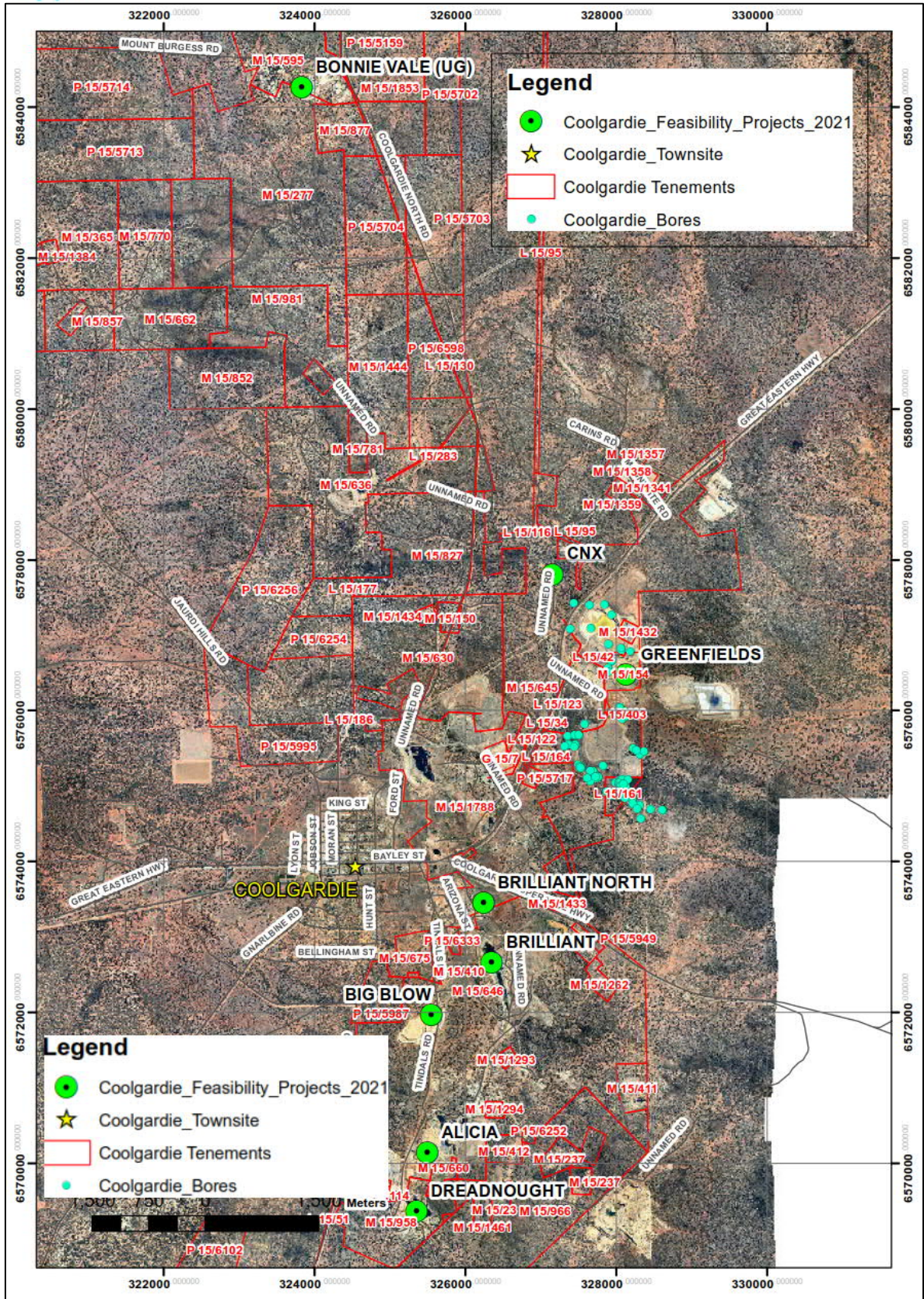


Figure 1 Coolgardie Feasibility Projects

5.1 CNX Pit Modeling

The CNX Deposit (formerly Caledonia North Extended) is immediately north-west along strike and contiguous with the Three Mile Hill open-cut mine. The deposit was last mined in 1992 as a shallow 30-35m deep and 270m long north-west striking pit. There are no records of water flows during mining.



Figure CNX Existing Pit with Shallow Water

Assumptions have been made on the aquifer parameters for this pit as there is no detailed hydrogeological parameters. More detailed drilling and aquifer testing will be required to firm up parameters for each deposit.

Measurement of an inclined bore near the CNX pit shows the water level is at approximately 399m AHD. Measurement of the pit water level is at 397m AHD which is probably drawn down due to evaporation.

AquaGeo was supplied a mine timeline that mining will take two years and extract down to a depth of 90mbgl.

A simple groundwater model was constructed for the CNX Pit.

The model shows for Year 1 dewatering will start slowly through sump pumping and then occur at an increasing rate of up to 150kL/day to draw the pit down below 373m AHD. Approximately 32000kL of water will be dewatered over this period. At the end of Year 1 the excavated base of pit is anticipated to be around 373m AHD.

As depth increases the flow of water into the pit will increase. At the end of Year 2 the base of the pit is anticipated to be below 328mAHD. Approximately 135050kL (370kL/day) will have to be dewatered in the second year to get to base of pit.

It is estimated that CNX can be dewatered by pumping relatively small volumes of water from in-pit sumps. The dewatering pumping rates will, however, be dependent on if fractures are intersected and the extent of these fractures.

Recent drilling has encountered a fault zone with larger volumes of water (Pers.Comm. Alex Aaltonen) but the extent of the fault zone and the transmissivity of the aquifer is not known. Further investigations will be required. A monitoring bore is planned for CNX pit and a production bore should be drilled in the high yielding fault zone to determine if there will be a more significant volume of water.

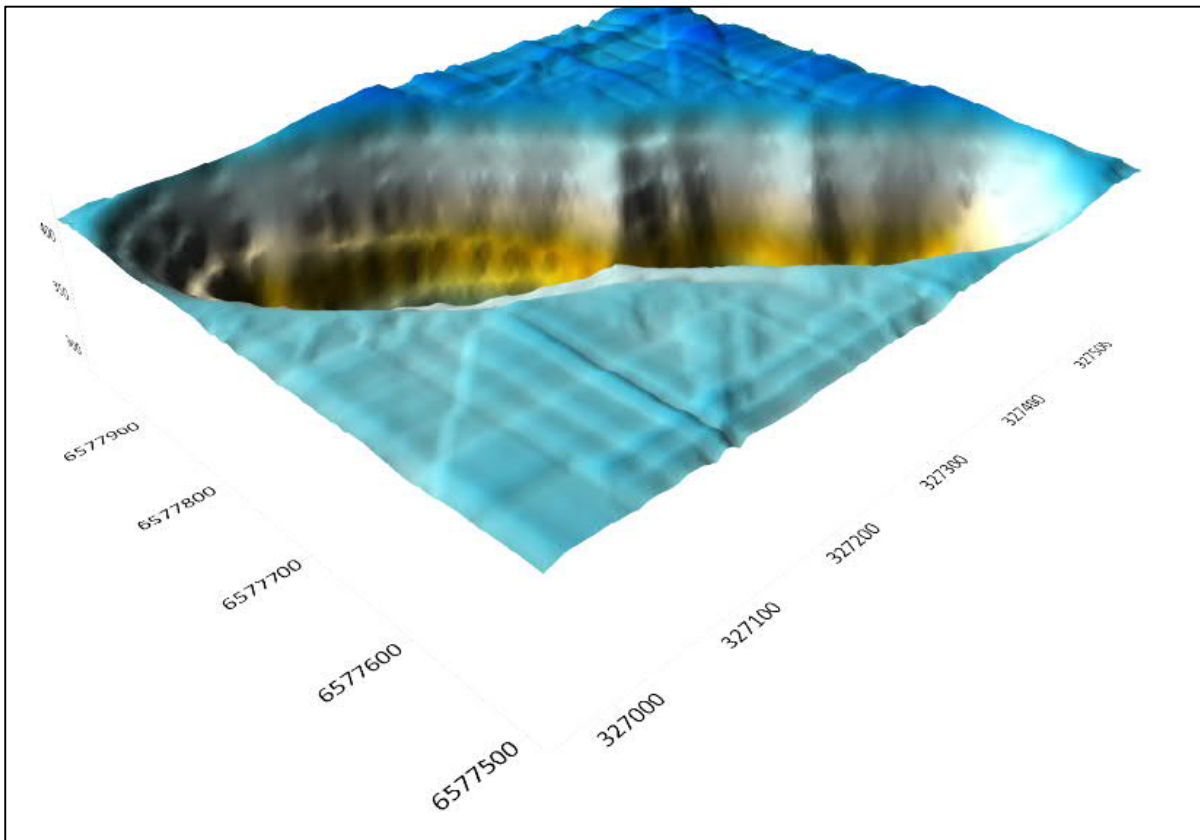


Figure 2 CNX Pit Topography for Groundwater Model

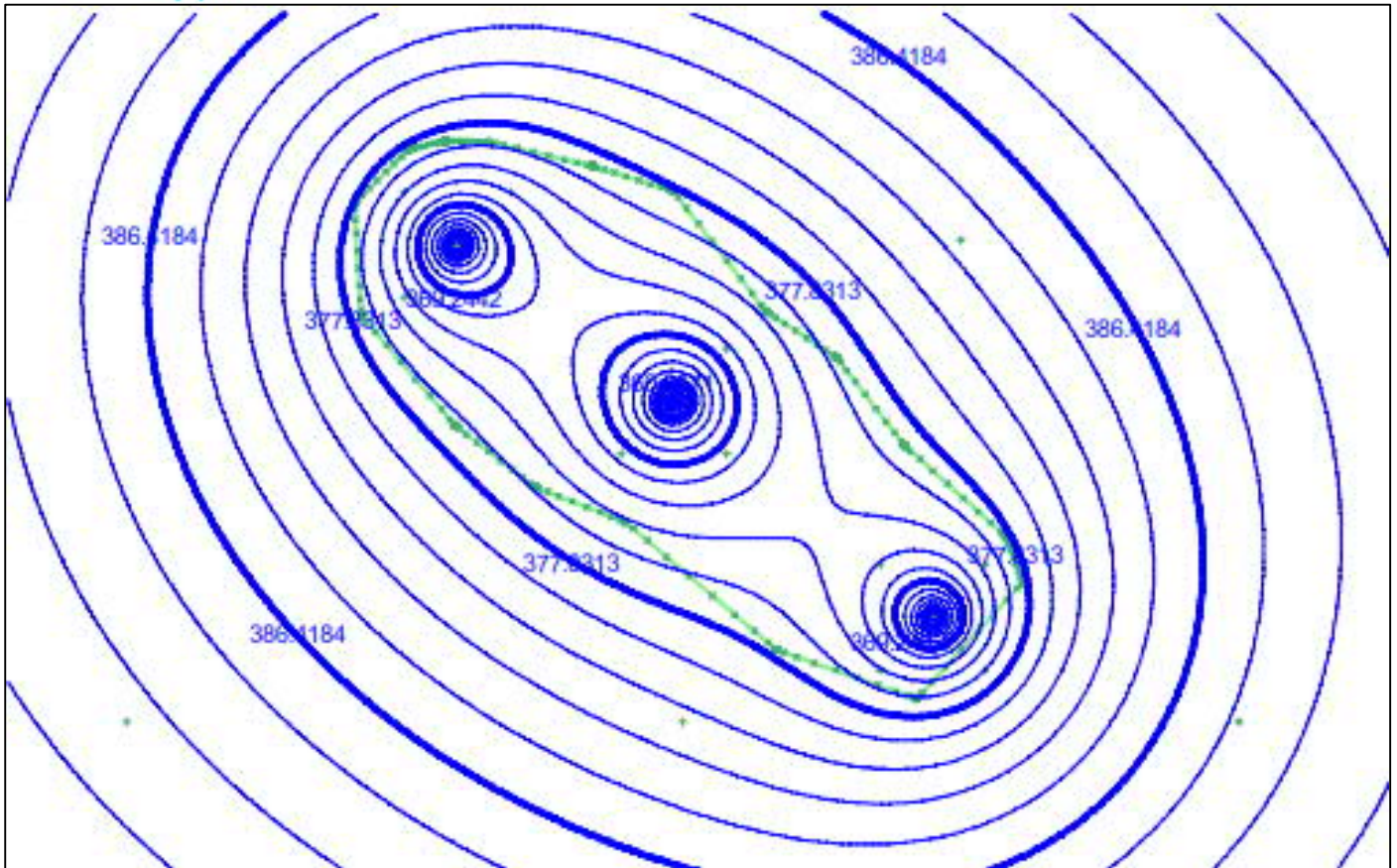


Figure 3 CNX Pit Drawdown Contours at end of Year 1

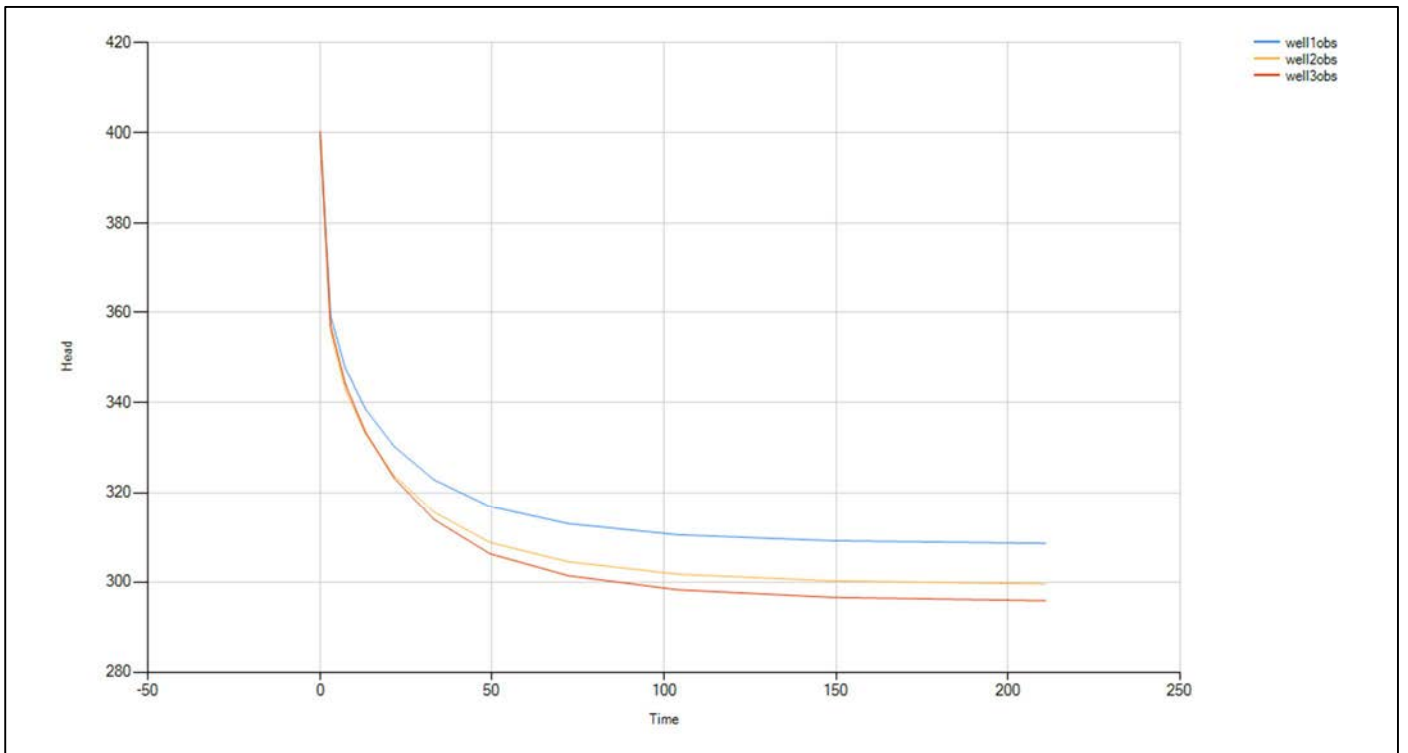


Figure 4 CNX In-Pit Dewatering Observation Points showing Drawdown (Year 1)

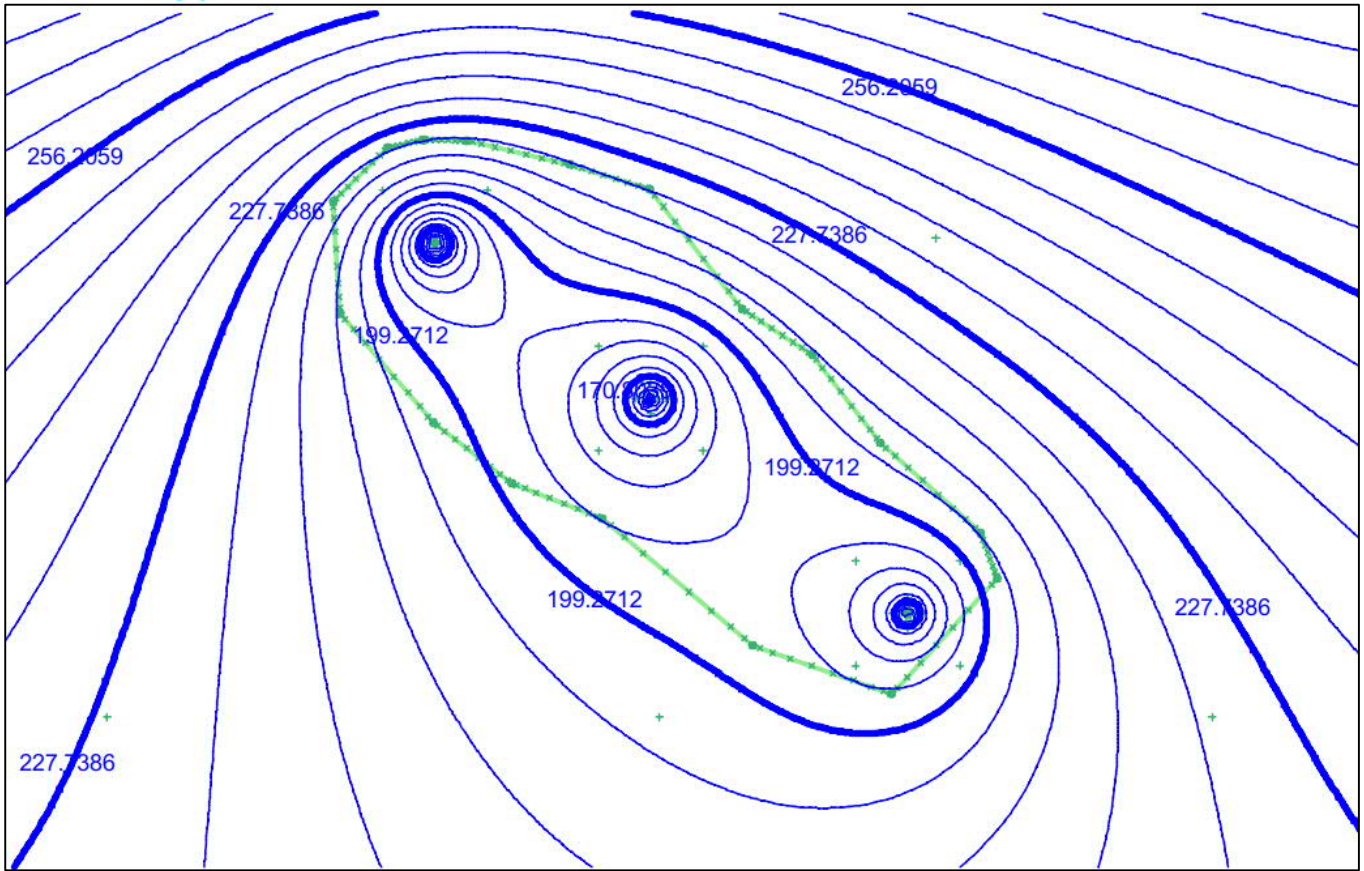


Figure 5 CNX Pit Contour drawdown Plot end of Year 2 Mining

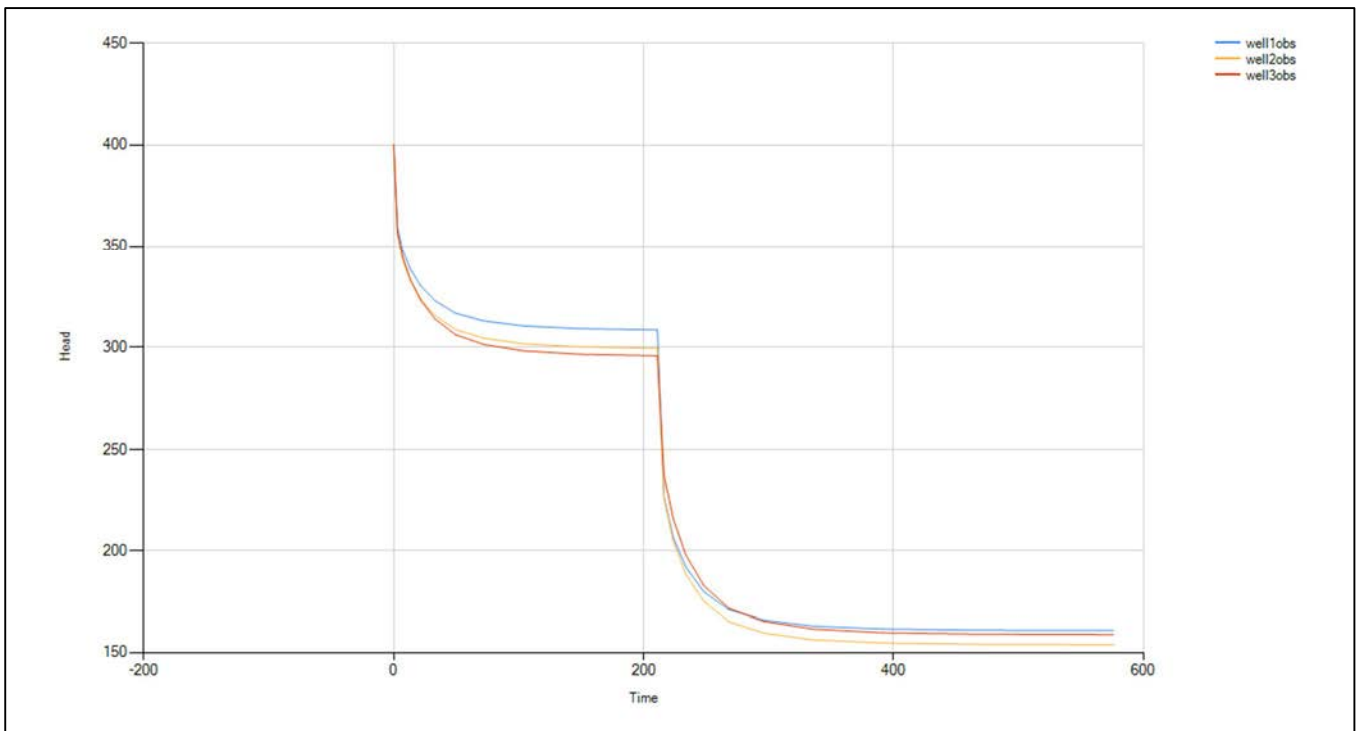


Figure 6 CNX In Pit Observation Points showing Drawdown (Year 1 and Year 2)

5.2 Brilliant Open Pit Modeling

Brilliant Open Pit geology consists of vertically inclined Mafic Greenmount sill adjacent to Feldspar Porphyry and Brilliant Komatiite (Figure 7).

Aquifer parameters have been estimated from hydrogeological studies on adjacent mine sites and volumes and drawdowns must be seen as estimates. The geology appears to be intersected by a structure (possibly a fault) cutting through the centre of the deposit. This could alter the hydrogeological properties of the pit significantly changing the necessary abstraction volumes and should be investigated at a later stage through drilling and testing a targeted abstraction bore. The volumes calculated below are not significant and can probably be managed by in-pit-sump pumping.

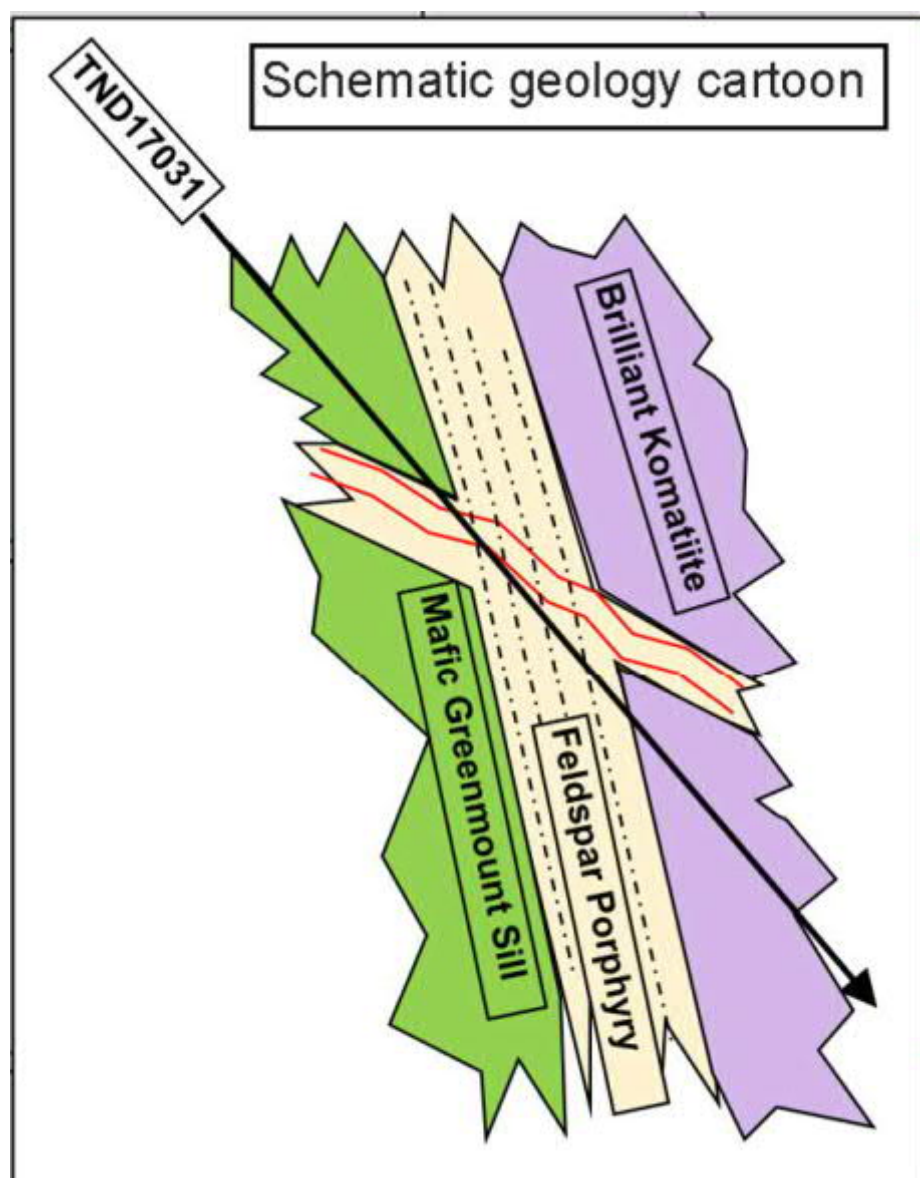


Figure 7 Schematic Geology Cartoon -Brilliant Pit(2020 Coolgardie PFS)



Figure 8 Brilliant Open Pit

The PFS for Brilliant Open Pit shows the mining will take place over 60 months (3 years). The current mine pit has a top elevation around 470mAHD and a base elevation at approximately 395mAHD.

The static water level measured around Brilliant Pit in inclined bores shows that the water level is around 372mAHD. This appears to be approximately 10m below the lowest elevation of Brilliant Pit at present.

A model was constructed using aquifer parameters which have been estimated from hydrogeological studies on adjacent mine sites and volumes and drawdowns must be seen as estimates. Based on 60 Production Months to Mine Brilliant (2020 Coolgardie PFS) an assumption has been made that Year 1 of production (assuming approximately 54m depth advance per year) would be mainly cutbacks and dry mining above 372m (water level) with limited dewatering mainly aimed at surface runoff and minor seepage.

As mining progresses in Year 2 down to a depth of 317m the dewatering volumes are estimated to be 180kl/day (65700kl/annum).

For Year 2 of production (Year 1 of dewatering) the drawdown at the pit will be 317m (Figure 9).

A higher rate will be required as the pit becomes deeper. For Year 3 of production, the modeling shows that for a rate of 360kl/day (131,400kl/annum) there is drawdown to the base of Brilliant Pit based on the mine plan (Figure 11, 12 and 13).

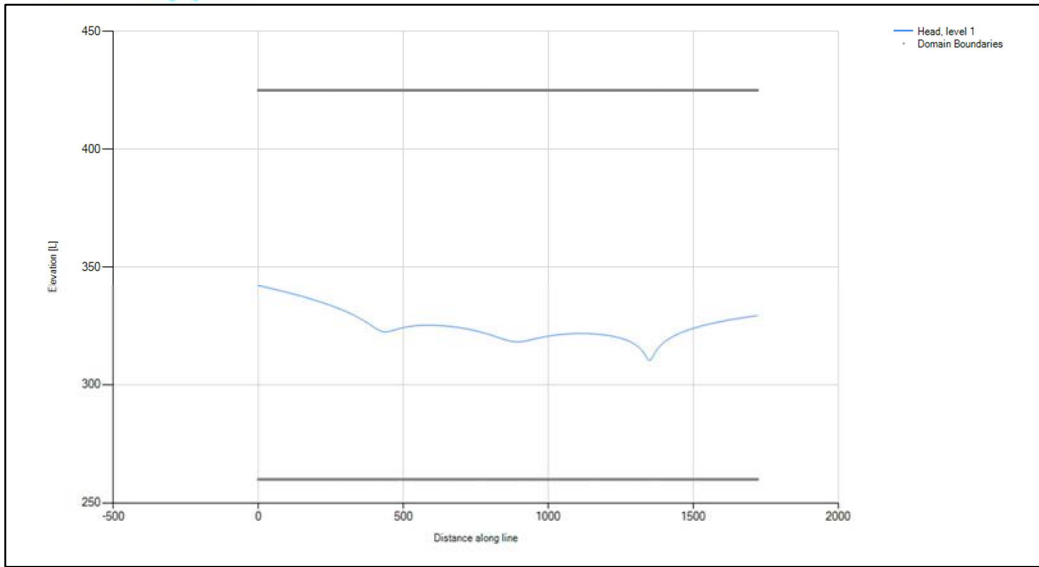


Figure 9 Transect across Brilliant Open Pit plot of drawdown end of Year 2 (year 1 dewatering) at 180kl/day (65700kl/annum)

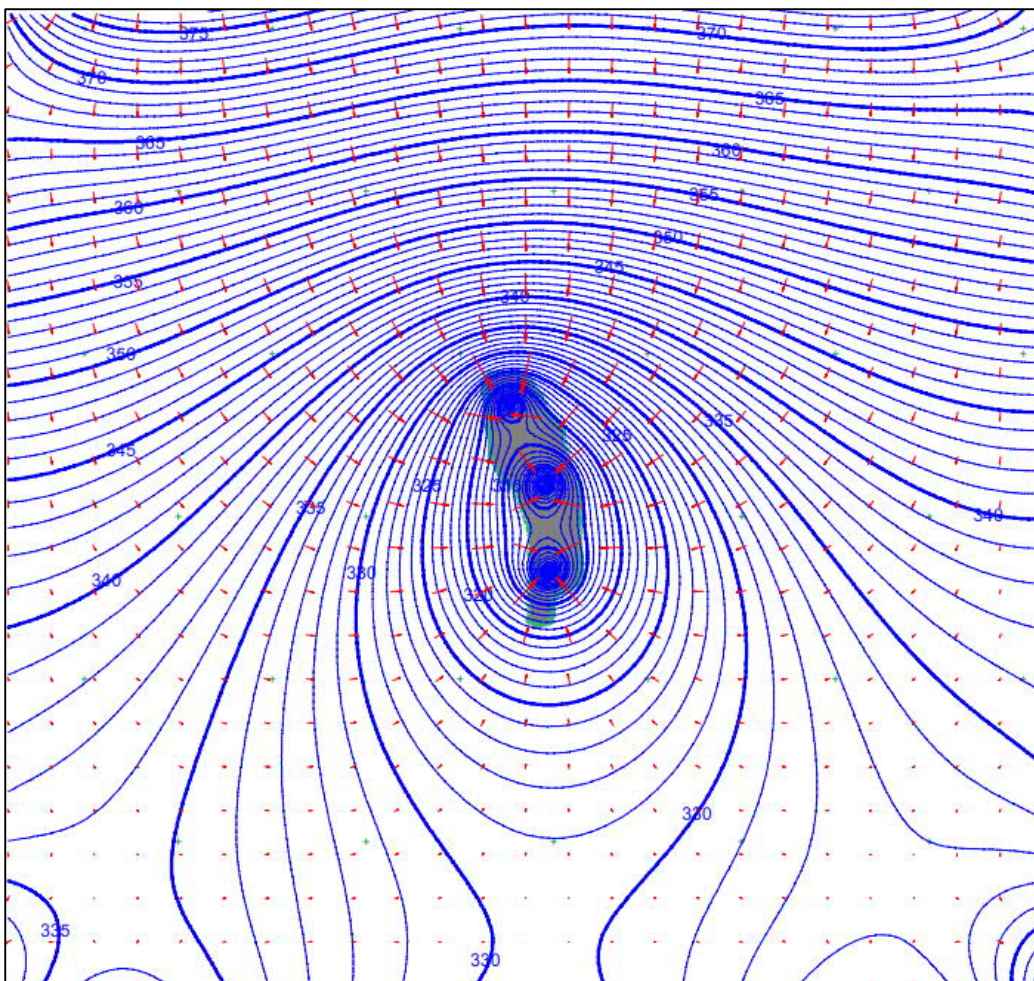


Figure 10 Contour plot showing drawdown to 317m at end of year 2 (year 1 dewatering) at 180kl/day (65700kl/annum).

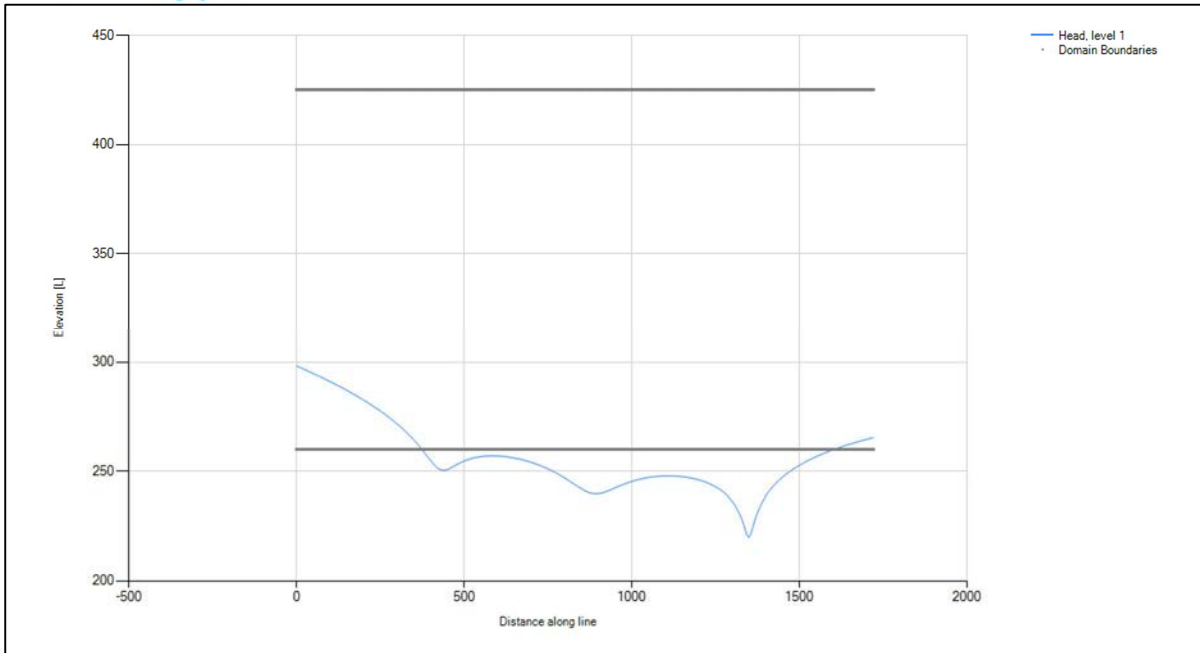


Figure 11 Transect across Brilliant Open Pit plot of drawdown at end of year 3 (year 2 dewatering) at 360kL/day (131,400kL/annum). Base of pit is at lower black line elevation.

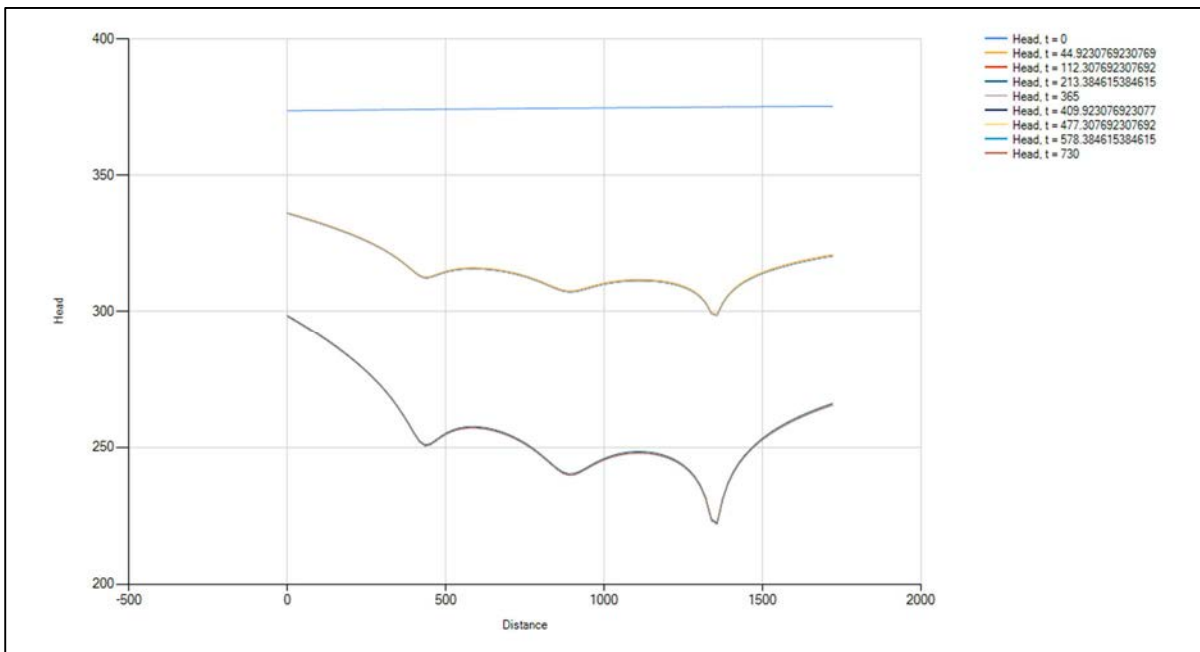


Figure 12 Transect across Brilliant Open Pit plot of drawdown at end of year1 mining (blue line), year 2 mining (brown line) (year 1 dewatering) and Year 3 mining (year 2 dewatering)

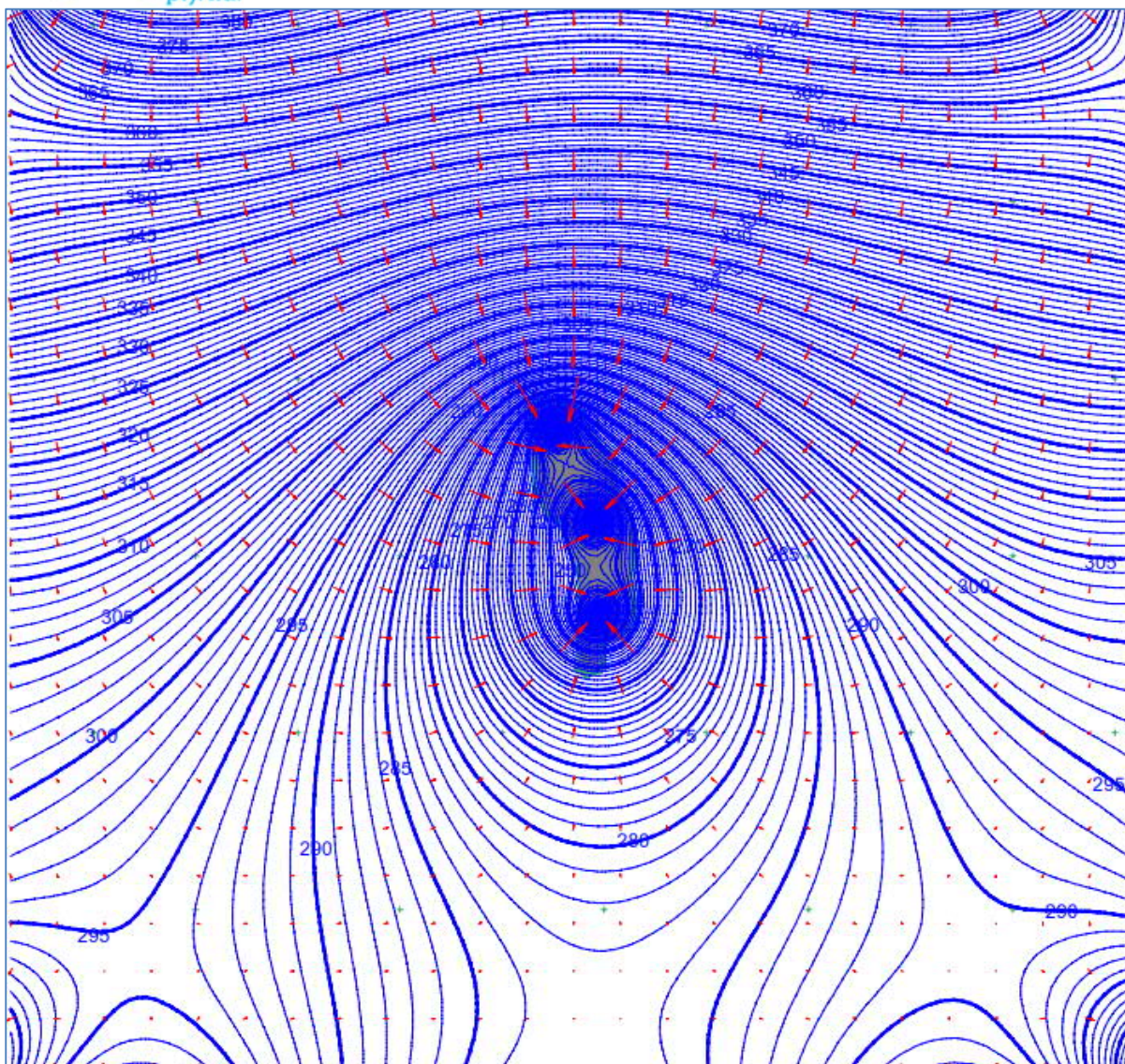


Figure 13 Contour plot of drawdown at Brilliant Open Pit at end of year 3 (year 2 dewatering) at 360kL/day (131,400kL/annum)

5.3 Greenfields Open Pit Modeling

The Greenfields Open Pit (OP) Gold Deposit is located 3.8km north-east of the Coolgardie township and 400m east of Focus' Three Mile Hill processing plant (Figure 1).

Greenfields was mined by Focus for a short period in 2013. However, mining indicated major reconciliation variance between resource and mined/milled production and mining was stopped.

Historically dewatering was licensed for a maximum of 200,000kL/annum for abstraction from Greenfields Pit.



Figure 14 Greenfields Pit showing water in pit and slumping of Pit Wall on Northern Side

No recent water levels have been taken for Greenfields Pit as there is no access to the pit. The deeper aquifer is not monitored around Greenfields Pit by any of the monitoring bores which were installed mainly to monitor the shallower TSF water levels.

Water levels around Greenfields Pit have been strongly influenced by mounding due to tailings discharge at Three Mile Hill TSF. In 2013 during operations, the static water level was recorded at 416m which is believed to be caused by mounding. There has also been a recorded increase in water level up 58m at the adjacent Three Mile Hill monitoring Bores during 2010.

Recent dipping of the Three Mile Hill monitoring bores shows an elevated groundwater level in monitoring bores from between 390-400mAHD. This water is assumed to form a fairly shallow water body which is leaking into Greenfields Pit and has caused slope instability. From a dewatering perspective this could be managed through interception bores, cut-off trenches, horizontal drains or cut off walls specifically to ensure the North Wall stability.



Our assessment is that the present water level is probably around 385m depth naturally in the aquifer surrounding the pit and may be drawn down in the pit slightly due to evaporation.

Greenfields Pit was historically used to store water from Bayley's Mine. The pit water previously comprised a mixture of surface run-off and groundwater seepage. In 1995, groundwater inflow to the Greenfields Pit was estimated to be about 190 kL/d (Rockwater, 2010). Rockwater, 2010 reported the pit floor extends to a depth of between 100 to 106 m and the total pit volume is estimated to be about 2,300,000 kL. This figure is excessive and will need to be recalculated once the elevation of the pit is known.

Upon recommissioning of the processing plant in December 2009, water was abstracted from the Greenfields Pit for use as process water at a rate of approximately 100 kL/day. After this water abstraction ceased in April 2010, survey levels showed there to be 9,900 kL of water remaining. Based on this our calculation is that dewatering occurred for approximately 244 days at 100kl/day gives a volume of 24,400kl abstracted would mean that the abstraction rate was below the recorded potential inflow rate of 190kL/day during mining in 1995 so the water level should remain constant with 9900kL of water in the pit.

As of October 2012, the water abstracted (recorded as approximately 4,000 kL) had emptied the stored water in the Greenfields Pit (CGO Groundwater Monitoring Report 2019).

Water has accumulated in the Greenfields Pit through rainfall and surface runoff since the CGO was put under care and maintenance in August 2013. Due to instability issues no water abstraction or water monitoring has occurred at the Greenfields Pit.

For modelling purposes it is assumed that there is 9900kL of water stored in the pit as the higher figure.

Assumptions for the pit for the preliminary groundwater model are as follows based on the information provided. The starter pit has a maximum depth elevation of 285mAHD. On completion the final pit depth elevation will be 245mAHD.

The model was calibrated to abstract 190kL/day (69350kL/annum) as per previous mining records for the Year 1. The pit and surrounding water drew down to the base of starter pit 285mAHD and the abstraction level remained there. This model was then used to calculate the drawdown to 245mAHD (final pit depth) over the second year. To achieve this the abstraction had to increase to 310kL/day (113150 kL/annum).

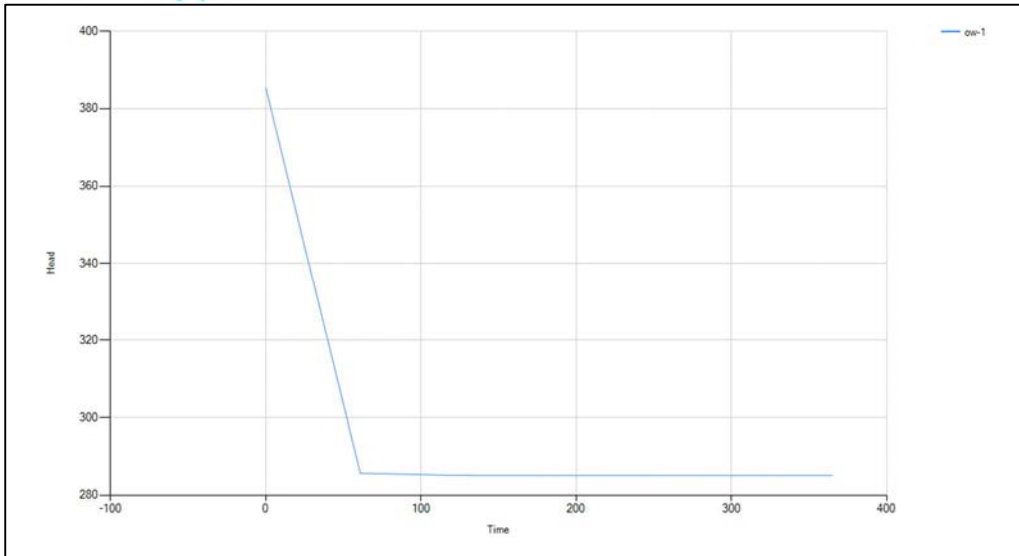
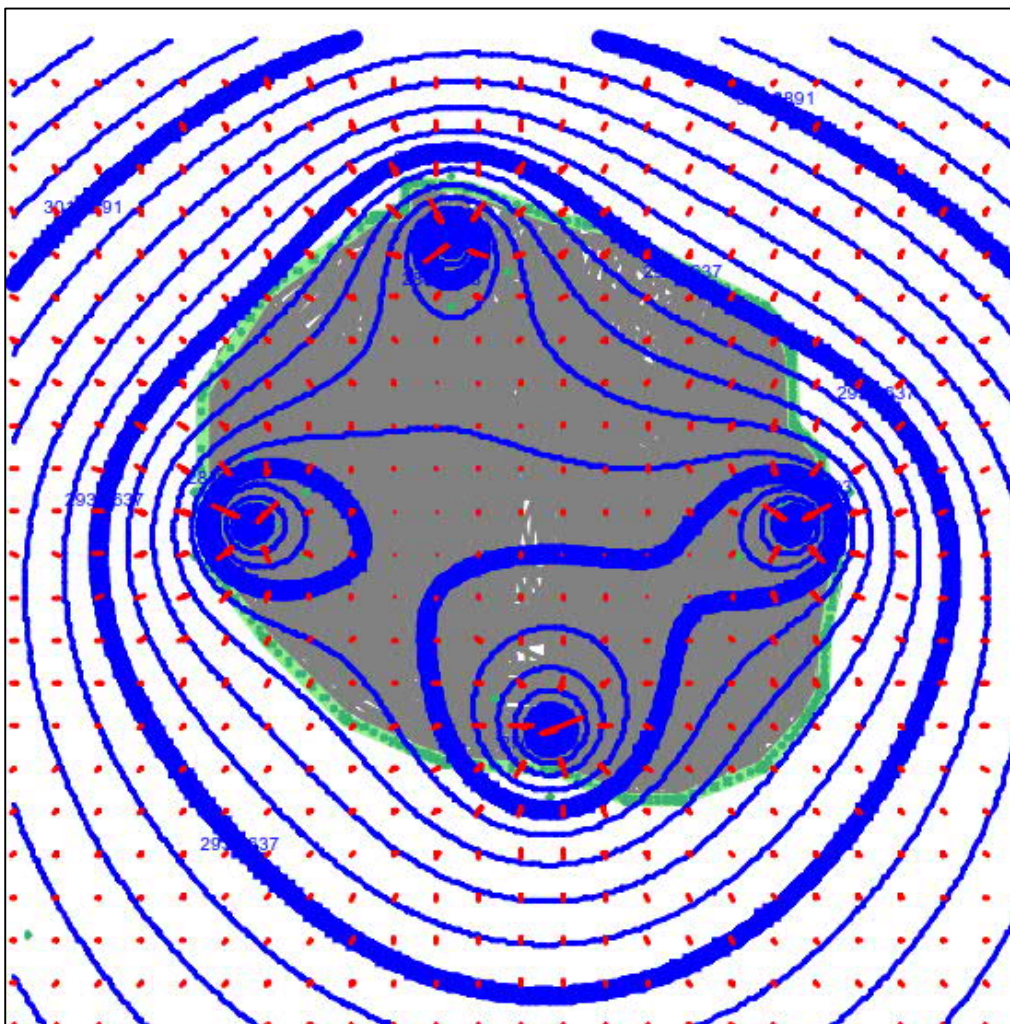


Figure 15 Greenfields Open Pit water level draws down in 60 days at 190kl/day and then remains constant for first year (69350kL/annum)



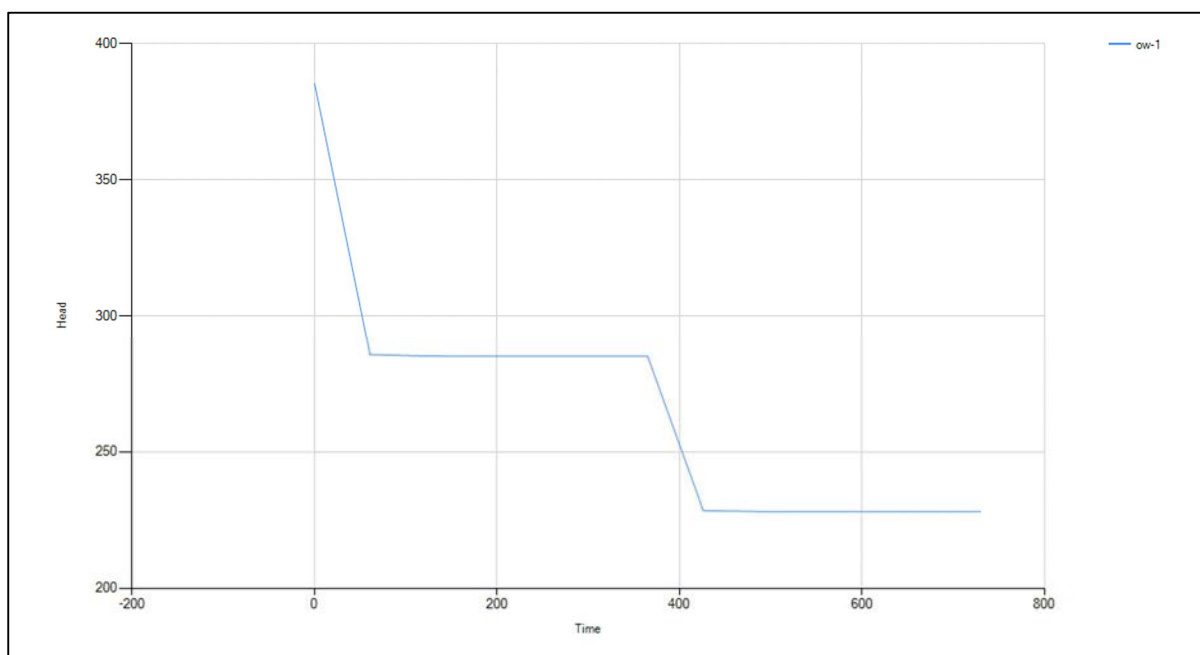


Figure 17 Greenfields Open Pit water level draws down in two years at 190kl/day (Year 1) and 310kL/day (Year 2)

5.4 Bonnievale Project

No hydrogeological Information is available. A dxf shaft design of the proposed underground mine has been provided. There is no access to the existing shafts due to instability and no water levels were able to be taken. No groundwater model has been completed as there is a lack of parameters and water levels. A monitoring bore is being drilled at Bonnievale. This has been discussed as being angled to intersect the shaft and establish the shaft water level.

If the existing shaft can be accessed, it is proposed a pump test inside the shaft is undertaken to establish the drawdown and the hydrogeological parameters of Bonnievale. Bonnievale is well known as a historical flooding underground mine and requires a specific more detailed field groundwater investigation to understand the hydrogeology and dewatering of the underground mine.

The closest underground mine for which there is groundwater data is available is the Bayley's Mine to the south of Bonnievale. Historical dewatering at Bayley's mine suggest a relatively low abstraction of 8l/s.

5.5 Alicia, Big Blow Deposit, Dreadnought Deposits

The open pit Alicia deposit is located south of Tindal's and immediately east and subparallel to the Empress deposit. No significant mining has occurred at Alicia to date. Big Blow occurs to the North of Alicia deposit and Dreadnought to the south. Big Blow was mined by Focus Minerals in 2013 to a depth of around 375mAHD.



Figure 18 Big Blow Mine Pit showing no indication of water

No dxf pit design was provided for Alicia, Big Blow or Dreadnought. Groundwater Levels in the vicinity of these deposits range from 375-345mAHD. Based on the depth of recent exploration drilling bores the Alicia Pit is estimated to be around a maximum of 76m depth which would only require approximately 20m of dewatering. The existing Big Blow Mine in the Exploration Update Kalgoorlie Gold Project shows a base elevation of the pit around 375m and no sign of any groundwater.

The underground Tindal's and Cyanide mines which formed part of the Tindals' Complex had very low yields associated with their underground mining. Tindal's was recorded as having a groundwater elevation of 190mbgl with an inflow of 6-8l/s and Cyanide Underground was recorded as having a water level of 120mbgl with an inflow of 6-8l/s. This is relatively negligible seepage and mean that Alicia, Big Blow and Dreadnought Deposits possibly will have little water infiltration associated with them depending on what depth they are mined.

Based on these relatively low abstraction rates recorded in the vicinity, if water is encountered in the Alicia, Big Blow or Dreadnought open pits, dewatering should occur easily at relatively low volumes with in-pit sumps.



6 Impact of Dewatering on Other Groundwater Users and Groundwater Dependant Ecosystems (GDE's)

Dewatering of the CGO deposits is very unlikely to adversely impact any other groundwater user. The fractured rock aquifers of the CGO project appear to have low hydraulic conductivities, consequently the cone of depression resulting from dewatering is likely to be steep-sided and to be limited to a few hundred metres from the dewatering operations.

The depth to water ranges from at least 30 m (bgl) to 45 m (bgl) and aquifer are generally saline. It is therefore, very unlikely that the aquifer supports any groundwater dependant ecosystems (GDE) near the dewatering operations.

7. Conclusions and Recommendations

- 1) A program of monitoring bore installation will be done in June 2021 which will provide information on groundwater levels and airlift yields.
- 2) Final Pit designs for Alicia, Big Blow and Dreadnought will need to be assessed to determine if they are above the water table.
- 3) Bonnievale will require additional hydrogeological investigation to determine dewatering rates.
- 4) There is no hydrogeological testing undertaken for any of the deposits at CGO. The assessment has been done on hydrogeological parameters derived from adjacent mines and using historical dewatering data. This means the modelling is an indication of possible dewatering and drawdown rates. Where particular faults/fractures have been identified from mineral exploration drilling that have potential to be preferential flow paths for significant groundwater, these will require further drilling and aquifer testing and remodeling of the data before mining occurs.

If you have any questions or require additional clarification in the please contact me.

Kind regards

A handwritten signature in blue ink, appearing to read 'Bradley van Blomestein', is written over a light blue grid background.

Bradley van Blomestein
Principal Hydrogeologist
AquaGeo Pty Ltd
Mob: 0438932852
Email: brad@aquageo.com.au

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As discussed throughout the project only surface geophysical surveys were run. All data requires drilling/excavation to confirm results.

This report has been prepared with particular attention to our Client's instructions and the relevant features of the subject site. AquaGeo Pty Ltd accepts no liability whatsoever for:

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3. the Client's implementation, or application, of the strategies recommended in this report

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Appendix E

Surface and Groundwater Management Plan 2012

Focus Minerals Limited; Coolgardie Operations



**SURFACE AND GROUNDWATER
MANAGEMENT PLAN**

**GREENFIELDS OPEN PIT MINING ACTIVITIES
M 15/154, M15/645 and M15/1432
April 2012**

Aimee Snowsill
4/4/2012

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1.0 Introduction

Focus Minerals is an ASX listed company with a substantial tenement holdings in the Coolgardie area. Focus Minerals has undergone significant recent growth with the refurbishment of the Three Mile Hill processing plant and an aggressive exploration programme furthering its existing resources. Focus Minerals currently operates the Tindal's underground mine, which has a current mine life of 2012/13 for the current resource. Additionally, Focus Minerals operates The Mount underground mine and three open cut mines Empress, Dreadnought and Big Blow. Further plans are for the recommencement of the Greenfields open pit in the near future.

This report details the commitments that Focus Minerals Ltd (FML) is making in regards to surface and groundwater in the vicinity of the Greenfields open pit. By determining a suitable drainage system for the Greenfields open pit through a management plan in relation to licenced activities; dewatering for mineral processing.

FML has submitted a mining proposal for the re-commencement of Greenfields open pit mining (located approximately 5 kilometers from the township of Coolgardie).

The proposed Greenfields open pit is located on Mining Lease M15/154 and the current designed waste rock landform is located on M15/154, M15/1432 and M15/645. The Greenfields pit is currently approximately 100m deep (295RL). A dewatering licence exists for the Greenfields pit; GWL160936.

2.0 Surface Water

The area of concern is the Greenfield open pit where surface water from the hill to the north of the pit drains down to the south of the proposed and current pit, to enter a water course at the base of the old and current FMR tailings dam. The drainage from around the Three Mile Hill processing plant is drained into a treatment water pond because the flow of water is interrupted by an elevated roadway, leading to the FMR ROM pad.

The existing Greenfields open pit is located in a low area but drainage runs past the pit, to drain into ephemeral channels running to Brown Lake. Surface drainage has been highly modified in this area over time as a result of previous mining, installation of water transfer pipelines and roads. Figure 1 shows the current surface water flow paths including existing surface water management infrastructure.

During open pit operation excavators, dozers and dump trucks will be used to excavate the pit. As the amount of machinery usage is low and it is anticipated that the existing roads (to be built up and maintained) should be suffice for the proposed activities, water draining into the pit will be channeled alongside the roads and follow the natural drainage to the south. There will be a substantial bund surrounding the pit, at 5m from the crest, which will effectively shed any water flow into the drainage channels indicated.

Mining is planned for 24 hour operation initially, then decreasing to day shift only after the first few months. The water collected and pumped out of the pit will be used for mineral ore processing for the processing plant located less than 200m away.

2.1 Hydrology of the area

The existing pit to be cut back currently holds water that is pumped out for re-use. The water is surface run-off predominantly from rainfall events combined with groundwater seepage. The water is relatively neutral to alkaline in nature and saline (41,000mg/L TDS). Since the last water quality analysis the salinity has increased, this may be due to recent seepage of tailings water from the TMH in-pit TSF. Historically the Greenfields open pit has been used for water storage as it acts as a sink rather than source. The volume of water held in the Greenfields pit is less than 100kL.

There are no surface water bodies within the proposed project area, however numerous ephemeral salt lakes are present within the surrounding area. Significant water bodies in the area include Brown Lake, Red Lake, White Lake and Douglas Lake; all are located in excess of 4km to the northeast of the proposal area and will not be affected as a result of this proposal.

The Greenfields pit currently holds about 50 kL of water. This has resulted from:

- Direct collection of rainwater into the pit.
- Inflow of surface water after rainfall events from the localised catchment area.
- Inflow from natural aquifer located about 380 metres below ground level.
- Inflow of seepage from the adjacent Three Mile Hill Inpit TSF. This is located north west and up-gradient of Greenfields pit.
- Inflow of seepage from the adjacent Greenfields TSF currently owned and operated by FMR. This is located immediately east of the Greenfields pit.

2.1.1 Drainage

Greenfields open pit activities will be primarily neighboring processing plants, FMR investments employees and FML colleagues, zoned as industrial premises. A very low seepage rate has been noted for natural groundwater drainage into the open pit.

In September 2011 tailings water from the active TSF to the north of Greenfields open pit, owned and operated by FML, leaked on surface into the pit, management of the TSF has now decreased the size of the decant pool and stopped tailings water from flowing into the pit. Ongoing management as per the operating manual for the newly constructed TSF will ensure no future detrimental impact from tailings water seepage.

Water delivery and extraction route management procedure will be reviewed if needed. With the future extensions/expansion of the cut back of Greenfields pit the existing drainage path may need to be relocated. If a difference exists from the prescribed premise as per the DEC licence (8429/2008/1), with the alteration of discharge pipework and drainage channel then a works approval will be required. Refer to 2.1.1 below, Division 3; section 53(2)(b) Prescribed premises, restrictions as to changes to etc.

2.1.2 Regulations

Under the *Environmental Protection (Unauthorised Discharge) Regulations 2004*

Schedule 1 — Materials that must not be discharged into the environment

Compounds or solutions of cyanide, chromium, cadmium, lead, arsenic, mercury, nickel, zinc or copper
Petrol, diesel or other hydrocarbon

Under the *Environmental Protection Act 1986*;

Division 3 — Prescribed premises, works approvals and licences

52. Changing premises to become prescribed premises requires approval

The occupier of any premises who carries out any work on or in relation to the premises which causes the premises to become, or to become capable of being, prescribed premises commits an offence unless he does so in accordance with a works approval.

[Section 52 amended by No. 54 of 2003 s. 70.]

53. Prescribed premises, restrictions as to changes to etc.

(1) Subject to this Act, the occupier of any prescribed premises who, if to do so may cause an emission, or alter the nature or volume of the waste, noise, odour or electromagnetic radiation emitted, from the prescribed premises —

(a) alters the method of operation of any trade, or of any process used in any trade, carried on at the prescribed premises; or

(b) constructs, installs or alters any equipment on the prescribed premises for —

(i) the storage, handling, transport or treatment of waste prior to, and for the purpose of, the discharge of waste; or

(ii) the control of noise, odour or electromagnetic radiation prior to, and for the purpose of, the emission or transmission of noise, odour or electromagnetic radiation, into the environment; or

(c) alters the type of materials or products used or produced in any trade carried on at the prescribed premises; or

(d) alters the type of fuel used in any fuel burning equipment or industrial plant in any trade carried on at the prescribed premises; or

(e) installs, alters or replaces any fuel burning equipment or industrial plant on the prescribed premises or carries out any work on the prescribed premises which is the beginning of, or any subsequent step in, that installation, alteration, replacement or carrying out,

commits an offence unless he does so —

- (f) in accordance with —
- (i) a works approval; or
- (ii) a licence; or
- (iii) a requirement contained in a closure notice or an environmental protection notice, as the case requires; or
- (g) only in the course of and for the purpose of general maintenance required to maintain the efficient operation of any pollution control equipment or procedure.

(2) Subject to this Act, the occupier of any prescribed premises who in or on the prescribed premises —

(a) carries out any work which is the beginning of, or any subsequent step in, any work referred to in subsection (1)(a) to (e) if the completion of the alteration, construction, installation or replacement concerned might cause an emission, or alter the nature or volume of the waste, noise, odour or electromagnetic radiation emitted, from the prescribed premises; or

(b) constructs, relocates or alters any discharge or emission pipe, channel or chimney through which waste is or may be discharged into the environment from the prescribed premises or carries out any work which is the beginning of, or any subsequent step in, any such construction, relocation or alteration,

commits an offence unless he does so —

- (c) in accordance with —
- (i) a works approval; or
- (ii) a licence; or
- (iii) a requirement contained in a closure notice or an environmental protection notice, as the case requires; or
- (d) only in the course of and for the purpose of general maintenance required to maintain the efficient operation of any pollution control equipment or procedure.

[Section 53 amended by No. 54 of 2003 s. 40 and 71.]

In order to ensure the safe channeling of ground and surface water, Focus Minerals will develop the following plan:

- Ensure all companies who are contracted to work by Focus Minerals are aware of, and understand the *Environmental Protection Regulations 1987*;
- Construction activities must be restricted to the already established roads and tracks;
- Monitor the in pit water levels and extraction during construction and as per the GWL160936 and Groundwater Operating Strategy;
- Inspect the integrity of the pipeline and drainage channels going in and out of the pit on a regular basis to ensure no spills and therefore no discharge into the surrounding environment.
- Appropriate drain control measurements such as containment, channeling and collection of water;

- Upon completion of an activity, progressive rehabilitation will be conducted not to destroy any drainage ways;
- Climate station installation to monitor weather conditions such as wind direction and speed, precipitation, air temperature and humidity;

3.0 Groundwater

The local groundwater systems in the Coolgardie area present as sub-vertical, disconnected fractured rock aquifer.

The Greenfields pit lies within the Roe Paleodrainage system. The closest major aquifer is 2.5km to the south-east and is a Wollubar sandstone occurring in the Hannan Paleochannel (Rockwater, 2010). Groundwater in the region is either saline or hyper saline, there are no known sources of freshwater.

The original groundwater level in the Greenfields pit is unrecorded. However, within the region the depth to groundwater is up to 55m in some mafic or ultramafic fractured rock aquifers (Rockwater, 2010). Water level data collected in 2009 from the nearest water monitoring bores approximately 300m north and south from the pit, recorded a groundwater levels of approximately 371 and 391 mAHD (10 to 30m below the pit crest). The nearest monitoring bore east of the Greenfields pit on FMR tenements reportedly recorded a SWL of 11m on average(m BRP) (Outback Ecology, 2011).

Bores located in the vicinity of the Greenfields pit show TDS to range between 9,400 to 83,800 mg/L (Rockwater, 2010).

Two bores constructed in the Greenfields pit, which were test-pumped in 1989, produced yields of between 216 and 430m³/day, indicating permeability is moderately low and the aquifers near the pit have limited lateral extent (Rockwater, 2000). Two faults; the Keele fault and the Shelton fault are geological features that may act as a transmissive feature between Greenfields and other water sources.

Previous hydrogeological studies have identified that the Greenfields pit is a sink and water that has accumulated within the pit is not being transferred to adjacent aquifers. Saline and hypersaline water seepage from the Greenfields pit is expected to be of very limited extent (Rockwater, 2010). Leakage from the Greenfields Pit may occur locally in areas of higher permeability, such as faulted or fracture zones, however, this would only occur when the water level in the pit is greater than the water table in the surrounding rocks.

FML has an extensive groundwater monitoring program in place for the adjacent Three Mile Hill in-pit TSF. Monitoring has shown that seepage is occurring from the TSF. An in-pit dewatering pump was installed in November 2011 North of the Greenfields pit. This dewatering pump is intercepting seepage prior to it entering Greenfields pit. In addition, the decant pool is managed in such a way to keep the amount of pooled water down. The TSF pool size level will allow the beach areas to dry out and therefore reduced the amount of water reporting to the south end of the TSF therefore reducing the risk

of seepage. All water reclaimed off the TSF will be stored in the process water dam on site that is used for processing of the run of mine material.

These practical measures will prevent or minimise any detrimental impact of surface water and or groundwater water in and around the Greenfields open pit.

4.0 References

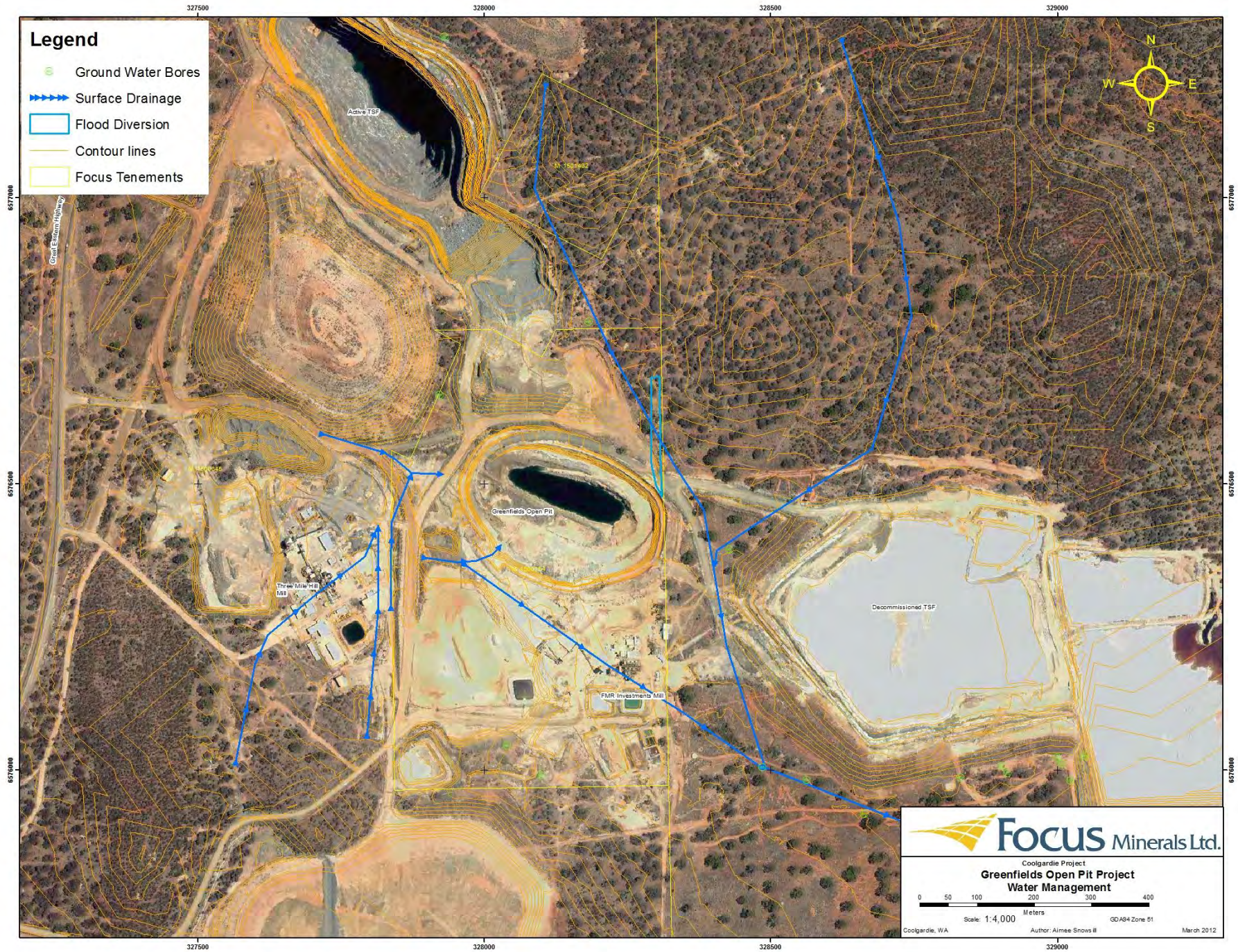
Environmental Protection Act 1986

Environmental Protection Regulations 1987

Environmental Protection (Unauthorised Discharge) Regulations 2004

Department of Environment and Conservation; DEC licence: 8429/2008/1

5.0 Map of Surface Water Drainage





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