20 July 2026

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RE: Native Vegetation Clearing Permit Amendment Application CPS 10870

Focus Operations Pty Ltd (Focus), a wholly owned subsidiary of Focus Minerals Ltd, is proposing to cutback the existing CNX open pit, expand waste rock landforms and add additional low-grade stockpiles. To support development Focus are seeking a Native Vegetation Clearing Permit amendment within the same permit area, for clearing of up to 150 ha within the permit application area of 227 ha for the purpose of mineral production and associated activities.

This letter provides context for proposed clearing and includes an assessment against the ten clearing Principles, as defined under Schedule 5 of the EP Act. The proposed clearing is unlikely to be at variance with any clearing principle.

Included within the application are:

- 01. A completed NVCP amendment application form (NV-F04);
- 02. A scaled map of the permit amendment area;
- 03. Shapefile of the amended clearing permit area;
- 04. Supporting information document;
- 05. Records associate with clearing to meet conditions of CPS 10870; and
- 06. Authorisation to lodge on behalf of Focus Operations Pty Ltd.

If you have any queries, please contact me on 0437 849 147 or via email tsmith@focusminerals.com.au .

Yours sincerely,

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1. Proposed Activities

Focus Operations Pty Ltd (Focus) is proposing to extend the CNX Project (the Project), which encompasses a cutback on the existing CNX open pit, addition of CNX north pit with additional support infrastructure such as waste rock landform and low-grade ore stockpiles, to extract gold ore for processing at the nearby Three Mile Hill (TMH) mill.

Focus will require clearing to be conducted to commence the CNX cutback and associated surface infrastructure. Clearing is required for supporting mine activities including:

- Waste rock landforms (WRL);
- Run-of-mine (ROM) pad;
- Roads;
- Low-grade ore stockpiles
- Mine water ponds (MWP);
- Dewatering pipelines;
- Topsoil stockpiles;
- Surface water diversion channels or drains; and
- Other ancillary infrastructure.

A Mining Development and Closure Proposal for the Project will be submitted to Department of Mines, Petroleum and Exploration (DMPE) in conjunction with other supporting approvals required under applicable legislation prior to commencement of activities.

Focus is seeking to amend the permit to achieve the following:

- Seeking to extend the duration of the clearing permit to 5 years from the issue date of the revised permit.
- Seeking to amend permit condition 10(a) to increase the time period to from 'Within two weeks…' to 'Within four weeks…'.
- Seeking to increase the area permitted to be cleared from 'not more than 120 hectares' to 'not more than 150 hectares'.
- Clearing Area Permit Plan - Figure 1: Map of the boundary of the area within which clearing may occur - has the wrong CPS number on it. Change from 'CPS 6182/3' to 'CPS 10870/_'.

1.1 Location

The Project is located approximately 2km northeast of the gazetted town site of Coolgardie, which is 40 km southwest of Kalgoorlie-Boulder in the Eastern Goldfields region of Western Australia. The Project is situated within the Shire of Coolgardie local government area and accessed via Focus' network of private haul roads. The Project forms part of a broader tenement package covering the Coolgardie Gold Operations (CGO) owned wholly by Focus and its subsidiaries. The Project regional location is shown in Regional location.

The Project requires clearing on four tenements within CGO as detailed in Table 1 below.

Table 1: Tenement details

Tenement ID	Holder 1	Holder 2	Area (ha)	Expiry
L15/95	Focus Minerals Ltd	Focus Operations Pty Ltd	55.00	28/03/2029
M15/630	Focus Minerals Ltd	Focus Operations Pty Ltd	297.45	04/02/2035
M15/645	Focus Minerals Ltd	Focus Operations Pty Ltd	721.60	25/03/2035
M15/827	Focus Minerals Ltd	Focus Operations Pty Ltd	259.65	11/06/2030

1.2 Disturbance Envelope

Focus is requesting a total allowable clearing area of 150 ha within a disturbance envelope of 227 ha as depicted in Figure 2 and Figure 3 (Note: proposed infrastructure layout is indicative only and may change as approved Mining Development and Closure Proposal flexibility allows).



Figure 1: Regional location

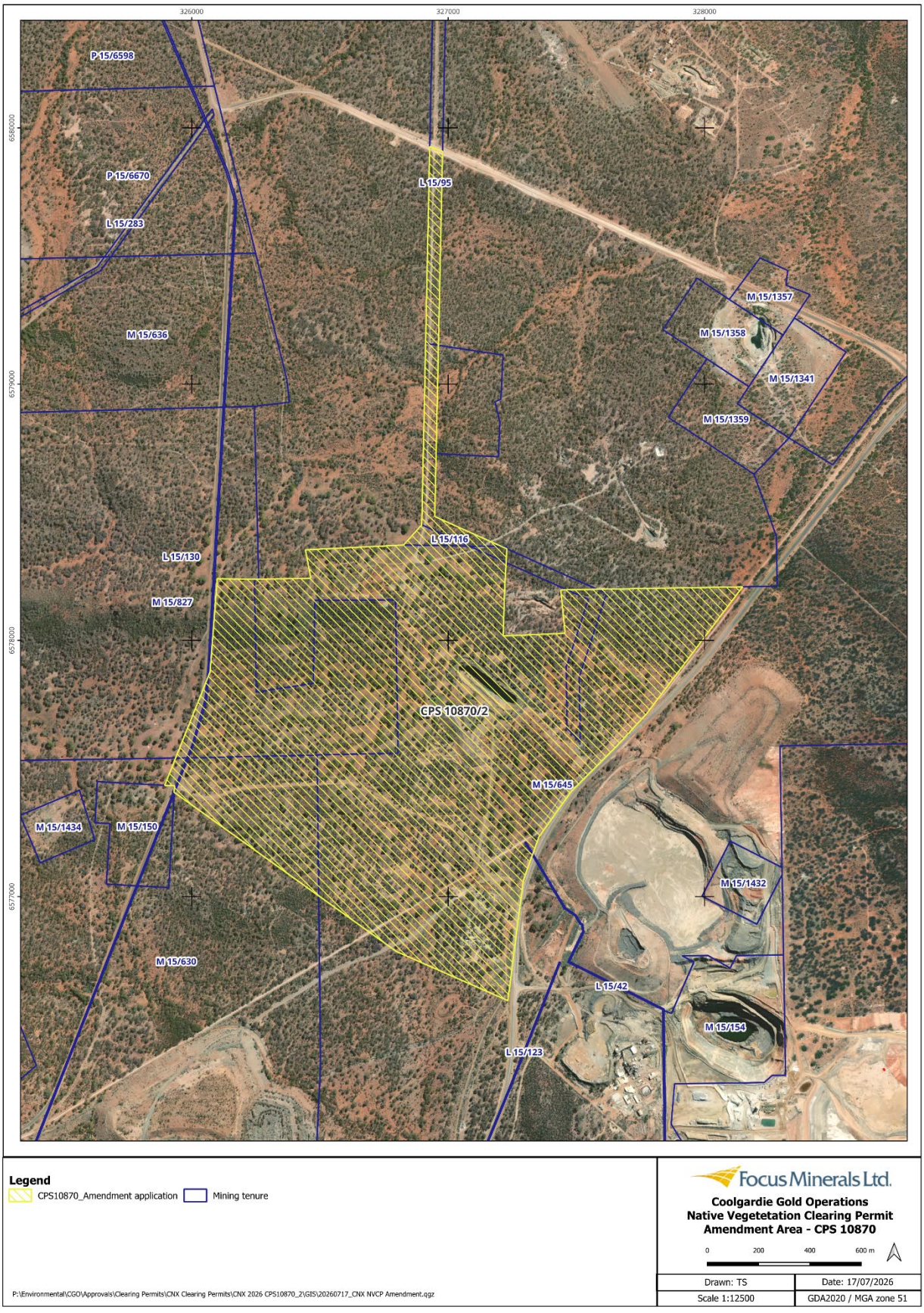


Figure 2: CPS 10870 permit area

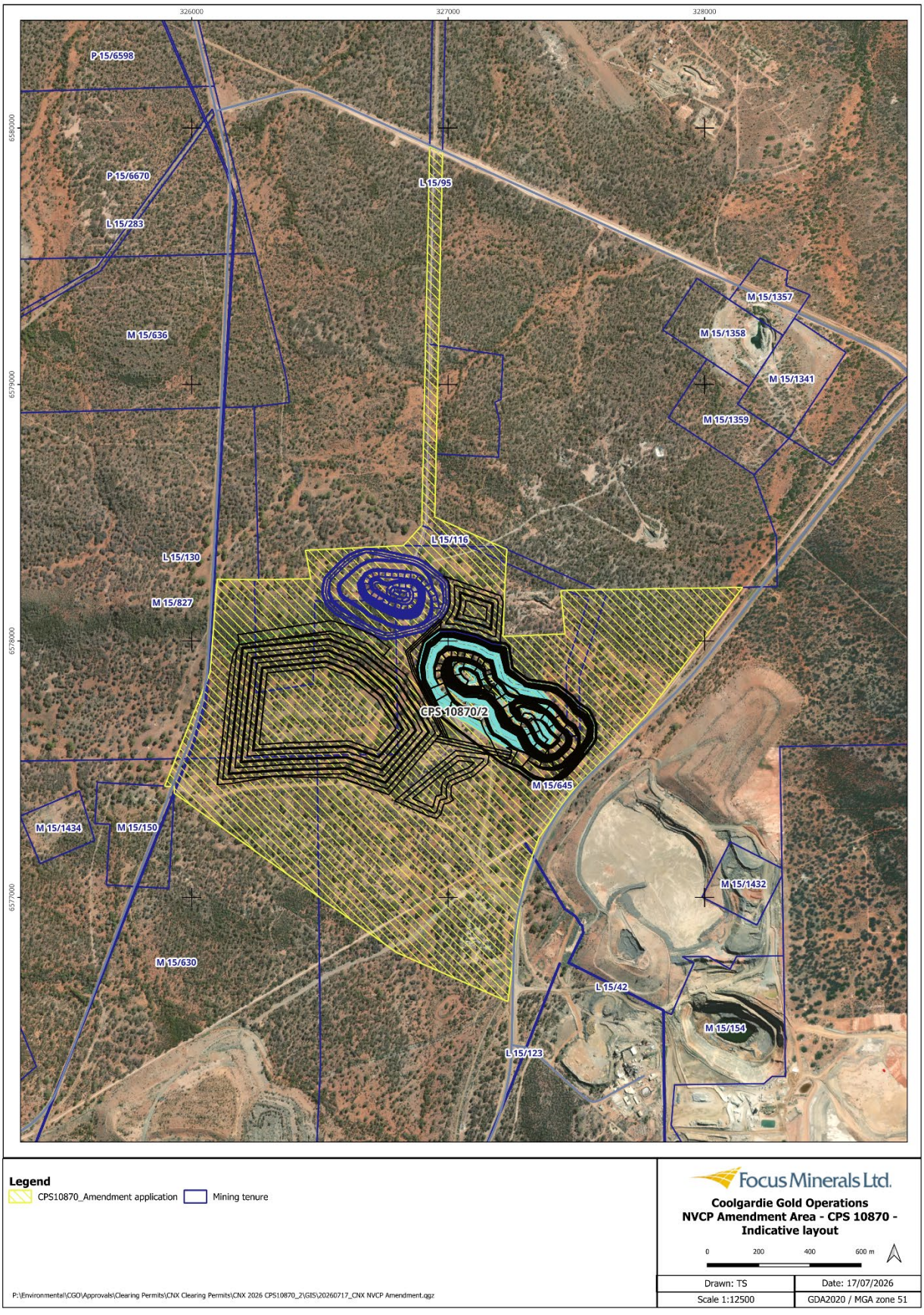


Figure 3: Indicative site plan

2. Environmental Setting

2.1 Climate

Climate of the Eastern Goldfields subregion is characterised as an arid to semi-arid climate of hot summers and mild winters with annual rainfall of approximately 200 - 300 mm (Beard, 1990; Cowan, 2001). Climate data from Coolgardie's weather station is presented in Figure 4 below.

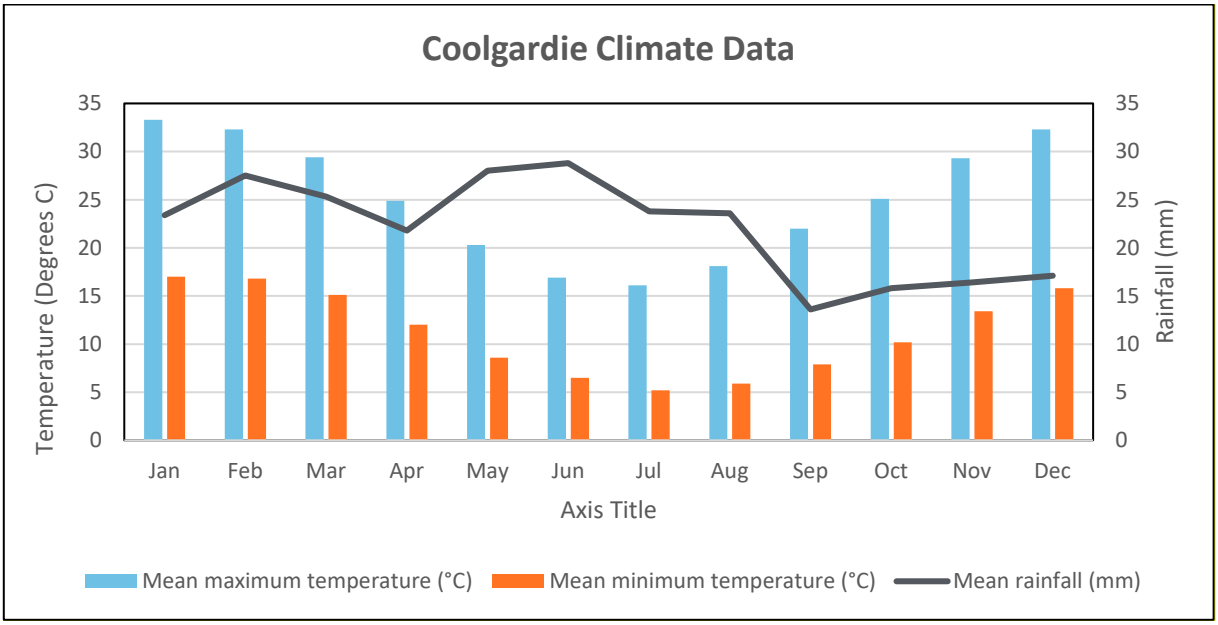


Figure 4: Coolgardie climate data (source: Bureau of Meteorology)

Average long-term annual rainfall is exceeded by average annual evaporation rate (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.

Annual exceedance probability (AEP) is defined as chance that an extreme rainfall event will occur in any given year. Based on AEP calculations by BoM, there is a 1 in 100 (1%) chance that the Project area will receive 50 mm of rain in a 1-hour period, 160 mm for a 24-hour period and 207 mm for a 72-hour period based on AEP calculations (BoM, 2023).

Wind conditions from Kalgoorlie-Boulder airport weather station (#12038) show that morning wind conditions are predominantly easterlies, north-easterlies, and south-easterlies averaging between 12 and 17 km/hr. Afternoon wind direction is variable, and predominantly westerlies, easterlies and south-easterlies averaging between 13 and 18 km / hr.

2.2 Landscape

2.2.1 Bioregion

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 (IBRA 2010).

The Project occurs within the Coolgardie bioregion and the Eastern Goldfields subregion (COO3). The Eastern Goldfields subregion lies on 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. 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).

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 graninulites of the Fraser Range.

2.2.2 Soils

The Coolgardie Goldfields are dominated by calcareous earths that cover much of the plains and greenstone areas. Within CGO, surface soils tend to comprise red, moist, and well graded sands and sand gravels with traces of silt and clay. The underlying geology is of gneisses and granites eroded into a flat plane covered with tertiary soils and with scattered exposures of bedrock.

The Project area lies entirely within the BB5 land system, as classified by the soil landscapes and land mapping system provided from DPIRD. BB5 is characterised by rocky ranges and hills of greenstones with basic igneous rocks as well as sandplains with brown calcareous loams.

2.2.2.1 Soil Characterisation

360 Environmental (2021) were commissioned by Focus to complete a Phase 1 acid metalliferous drainage (AMD) material characterisation study of waste rock and physical characteristics, erosion potential and baseline growth medium attributes of soils to support the CNX Project. Accordingly, six soil samples from two soil horizons were collected from the top 1 m from surface, in conjunction with the drilling program to collect deeper waste samples.

Surface soil sample sites were chosen based upon analysis of CNX drilling program weathered profile and the review of known soil landscape mapping which indicates minimal variability in the soil profile across the site. Based on this review, and given the consistency of the surficial soils across larger the Coolgardie Project area, the six samples were collected from surface locations as follows:

- Transported materials (red sandy clays) – Three sites (21CNDD004, 21CNRC010, and 21CNRC007)

- Saprolitic clays (chemically weathered bedrock) – Three sites (20CNRC001, 21CNRD050, and 21CNRC032).

Location of the six soil samples is depicted below in Figure 5, alongside the locations of the waste characterisation drill holes in the study.

Surface soil samples were collected using dedicated sampling equipment to create a test pit to a depth of 1 metre below ground level (mbgl) from undisturbed ground in close proximity to the nominated drillhole collar location. A minimum 1 kg sample was placed directly into a soil bag for transport to the laboratory under Chain of Custody (COC) to SGS Laboratories in Perth, WA.

2.2.2.2 Soil pH, EC, Alkalinity and Acidity

A summary of physiochemical properties are shown below in Table 2.

Table 2. Summary of physiochemical property results

Soil Unit	pH	EC (µS/cm)	Acidity (mg/L)	Alkalinity (mg/L)
Transported material	8.9 – 9.7	1,100 – 3,800	<25	270 - 590
Saprolitic clay	8.3	21 - 35	<25	29 - 39

Based on the physicochemical property testing the following conclusions are drawn:

- The pH of both transported material and saprolitic clay is alkaline. The optimal pH range for most plants is between 5.5 and 7.0, however, locally adapted plant communities may thrive at pH values outside this range.
- EC of transported material is relatively high compared to saprolitic clay. Transported materials are considered saline (> 400 mS/cm) whereas saprolitic clay exhibits an EC suitable for topsoil growth medium. Saline transported materials may not be suitable as a growth medium; however, it is noted that exceptions exist within the Kalgoorlie region where salt tolerant species are present. The saprolitic clays in contrast exhibit a low salinity suitable for use as a topsoil material.
- Consistent with reported pH, both soil types do not report any inherent acidity. The transported material exhibits a reasonably elevated alkalinity compared to the saprolitic clay.

2.2.2.3 Particle Size Distribution, Bulk Density, Aggregate Stability and Porosity

The below Table 3 summarises the results of two samples from the particle size distribution (PSD), bulk density, Emerson aggregate stability testing and porosity. Due to other analysed characteristics of 21CNRC001 more closely meeting characteristics of transported material, it is concluded that as part of this preliminary investigation the physical properties of the saprolitic clay has not been evaluated.

Table 3. Physical soil property results summary

Sample ID	PSD (% w/w)				Bulk Density (kg/m³)	Emerson Class	Porosity (%)
	<63 µm	63 µm – 212 µm	212 µm – 2 mm	>2 mm			
21CNDD004	76	15	7	2	1,200	4	6
21CNRC001	70	17	8	5	1,220	4	6

There is minimal variation in physical characteristic between the two analysed soil samples from within the transported material, with the following conclusions drawn:

- Based on the PSD results, the soil texture can be described as a silty clay with minor sands and gravels. PSD is the primary component affecting soil erodibility. Based on the high proportion of clays and silts in the soils, the wind erodibility rating is low with >30% soil mass exhibiting aggregates >850 µm. The higher proportion of clays and silts, however, suggests the material is more highly susceptible to water erodibility.
- Bulk density is an indicator of soil compaction, which affects infiltration, rooting depth, water holding capacity, soil porosity, the availability of plant nutrients and the activity of soil microbes. With a bulk density of 1,200 kg/m³ the dominant clay and silt content is below the critical value restricting root growth [1,600 kg/m³, (McKenzie et al 2002)] and more likely to hold water. Soils that hold water (e.g. clay loams) are less subject to losses of nutrients through leaching than soils with limited water holding capacity (e.g. gravelly sands).
- Emerson aggregate testing for both soil samples was reported as *Class 4: The remoulded soil does not disperse in water*. Calcium carbonate (calcite) or calcium sulfate (gypsum) is present. Class 4 materials area categorized as not dispersive but prone to slaking. A non-dispersive soil is structurally stable that will not readily disperse into its constituent particles (clay, silt, sand) when placed in water. Dispersed soil colloids in drainage water have the potential to block pores and reduce hydraulic conductivity. Slaking refers to the partial breakdown of soil aggregates in water due to swelling of clay and rapid expulsion of air from pores spaces. Slaking is mostly due to low organic matter and may lead to temporary hard setting on a bare soil surface.
- Porosity of both soil samples was calculated at 6%, representing the difference between the soil specific gravity and the bulk density. The high porosity is reflective of the high clay content of the soils.

2.2.2.4 Cation Exchange Capacity, Total Organic Carbons and Exchangeable Cations

Cation Exchange Capacity (CEC) is a measure of the soils ability to hold cations by electrical attraction. The most abundant exchangeable cations in soil are calcium (Ca), magnesium (Mg), potassium (K), and sodium (Na). The CEC of soils varies with clay content, pH and amount of organic matter (TOC). Table 4 below summarises the CEC and exchangeable cation percentages for the two soil types.

Table 4. CEC, TOC and Exchangeable Cation results summary

Soil Unit	CEC (meq/100 g)	TOC (% w/w)	Exchangeable cations (%)			
			Ca	K	Mg	Na (ESP)
Transported material	47 - 70	0.5 – 1.2	24 – 37	0.3 – 0.6	16.2 – 24.4	15.2 – 38.8
Saprolitic clay	6.5 - 12	0.55 – 0.63	5 – 9.6	0.2 – 2.8	18.2 – 19.5	1.2 – 1.7

The transported material and saprolitic clay both exhibit low TOC (<2 %) but have notably different CEC and exchangeable cation characteristics as follows:

- The transported material exhibits a high CEC (>12 meq/100 g) indicating a high potential for water holding capacity, and nutrient retention and be less susceptible for leaching. The most abundant exchangeable cations are Ca, Na and Mg. This soil type has an ESP >15 indicating it is highly sodic. Sodicity degrades soil properties by weakening the bonds between soil particles, leading to the deterioration of the physical condition of the soils and predisposes them to hard setting when dry and being erodible when wet which also limits infiltration, drainage and plant growth. Further this soil type exhibits a Ca:Mg ratio >2 indicating a more dispersive, poorly structured soil.
- The saprolitic clay exhibits a low CEC (<12 meq/100 g) indicating a low water holding capacity, leaching and the potential for nutrient loss (which may be offset by maintaining organic matter in these soils). This material is also non-sodic exhibiting an ESP <6. The most abundant exchangeable cation by percentage is Mg however the Ca:Mg ratio is >2 indicating a poorly structured soil.

The suitability of these soils to support regrowth may be ameliorated by the addition of organic matter.

2.2.2.5 Nutrients

Plants require nutrients for growth and function, particularly phosphorus, nitrogen and sulfur for optimal photosynthesis, respiration and plant growth. Organic carbon is also an indicator of soil nutrient store and affects water retention and biological processes as it supports microfauna and microflora in the soil, however, as reported, TOC in both soils is low. Table 5 below presents a summary of the nutrient results.

Table 5. Nutrient results summary

Soil Unit	Colwell P (mg/kg)	Bioavailable Sulfur (mg/kg)	Nitrate (mg/kg)	Nitrite (mg/kg)	Ammonia (mg/kg)	TKN (mg/kg)
Preferred Levels	**>10**	**10 - 20**	**>10**			**NA**
Transported material	<1 – 7	210 – 720	1 – 51	<0.025 – 0.061	<0.5	320 – 950
Saprolitic clay	2 - 4	6 - 23	0.61 – 0.77	0.34 – 0.36	<0.5	310 - 380

The following conclusions are drawn with regards to the inherent nutrient attributes of the soils:

- Both soil types exhibit a low Colwell P (<10 mg/kg) content suggesting that additional phosphorus may be needed to ameliorate plant growth in the soils.
- Except for one transported material sample, which reported an unusually high nitrate concentration (51 mg/kg compared to all other samples less than 1.6 mg/kg), both soil types do not appear to have sufficient concentrations of nitrate, nitrite or ammonia to foster plant regrowth. However, Total Kjeldahl nitrogen (TKN) entirely reflects the presence of organic nitrogen in abundance which is beneficial for regrowth.
- Bioavailable sulfur is abundant in the transported material, grossly exceeding targets for productive soils (10 mg/kg to 20 mg/kg). In contrast, the saprolitic clay exhibits much

lower concentrations although concentrations are within (or slightly above) the ranges for moderately productive soils (6 mg/kg to 7.5 mg/kg).

2.2.2.6 Metals

Metals including aluminium, iron, and manganese were present in greatest abundance in both soil types. Table 6 presents results for key heavy metals that can impede plant growth (NSW DPI, 2004) with respect to the preferred levels and the National Environmental Protection Measure [NEPM (NEPC 2013)] ecological investigation levels (EILs) for areas of ecological significance.

Table 6. Summary of metals results

Soil Unit	Arsenic (mg/kg)	Boron (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)
EILs	**40**	**-**	**370**	**470**	**95**	**280**
Preferred Levels	**<20**	**0.5 - 4**	**2 - 50**	**<35**	**1 - 20**	**1 – 200**
Transported material	11 - 110	20 - 63	27 - 46	3 - 6	32 - 190	31 – 44
Saprolitic clay	5 - 26	<2	36 - 450	<2	6 - 7	11 - 18

The following conclusions are drawn with regards to the metals results:

- Most metals were below the EILs for areas of ecological significance except for:
  - Arsenic, chromium and nickel were each reported above EIL in one of the four samples (all in different samples).
  - Copper was reported above EIL in one saprolitic clay sample.
- Transported materials exhibited higher than preferred concentrations of arsenic (one sample), boron and nickel.
- Saprolitic clay generally exhibited concentrations below the preferred metals concentration levels except for the one elevated copper concentration of 450 mg/L.

2.2.2.7 Soil Summary

Aims of the soil characterisation program were to:

- Evaluate potential risks associated with salinity, wind erosion and water erosion; and
- Determine baseline growth medium attributes of each major soil type including nutrient status.

By characterising soils to address each of these aims, the suitability of soils for rehabilitation of the site post closure can be inferred. The soils at this site, whilst having deficiencies, are considered largely suitable for rehabilitation although will require some management to prevent slaking, ameliorate nutrient status, and potentially immobilise elevated metal concentrations.

The key issues relating to soil suitability for rehabilitation and proposed management (where required) are summarised below in Table 7.

Table 7. Summary of soil characterisation findings

Risk Indicator	Transported Materials	Saprolitic Clays
Baseline Growth Medium Characteristics		
Water holding capacity	Likely appropriate	Not assessed
Cation Exchange Capacity	High	Low
Nutrient Status	Poor – low phosphorus and nitrogen content Abundant sulfur	Poor – low phosphorus and nitrogen content Moderate sulfur content
Metal Status	Moderate – some elevated metals that may inhibit regrowth	Appropriate

The main soil unit within this project area is transported material characterised as red sandy clays associated with the 266BB5 soil unit of the Norseman Zone. Soil sampling indicates high sodicity which lends materials to being dispersive. Additionally, these soils have potential for slaking, hard setting and erosion when wet. At the same time, high bulk density and clay content support water retention, appropriate rooting and suggest the soil will be less subject to losses of nutrients through leaching than soils with limited water holding capacity (e.g. gravelly sands).

The secondary soil unit of the saprolitic clays exhibits a moderate salinity and low sodicity.

Transported material is highly dispersive due to both high clay content and high sodicity. The water holding capacity of clay is, however, typically higher than other soil types and if dispersion risks can be controlled should support rehabilitation success in an otherwise arid climate.

Nitrogen, phosphorous and organic carbon (TOC) are below their desirable levels. However, the concentration of these nutrients fluctuates with soil and weather conditions over very short periods of time.

All these soils are considered alkaline. Local plant species are expected to be adapted to this soil pH and should be considered in species selection for rehabilitation.

Analysis of baseline growth medium attributes indicates that other than water holding capacity, the soils are not of a type that will readily support rehabilitation. Use of halophytic plants endemic to the area will likely be required. Rehabilitation may also need to incorporate addition of ameliorants to address deficiencies.

Analysis of baseline growth medium attributes indicates that other than water holding capacity, both soils are not of a type that will readily support rehabilitation without further mitigation, i.e. use of halophytic plants endemic to the area will likely be required. Rehabilitation may also need to incorporate addition of ameliorants to address deficiencies in nutrients.

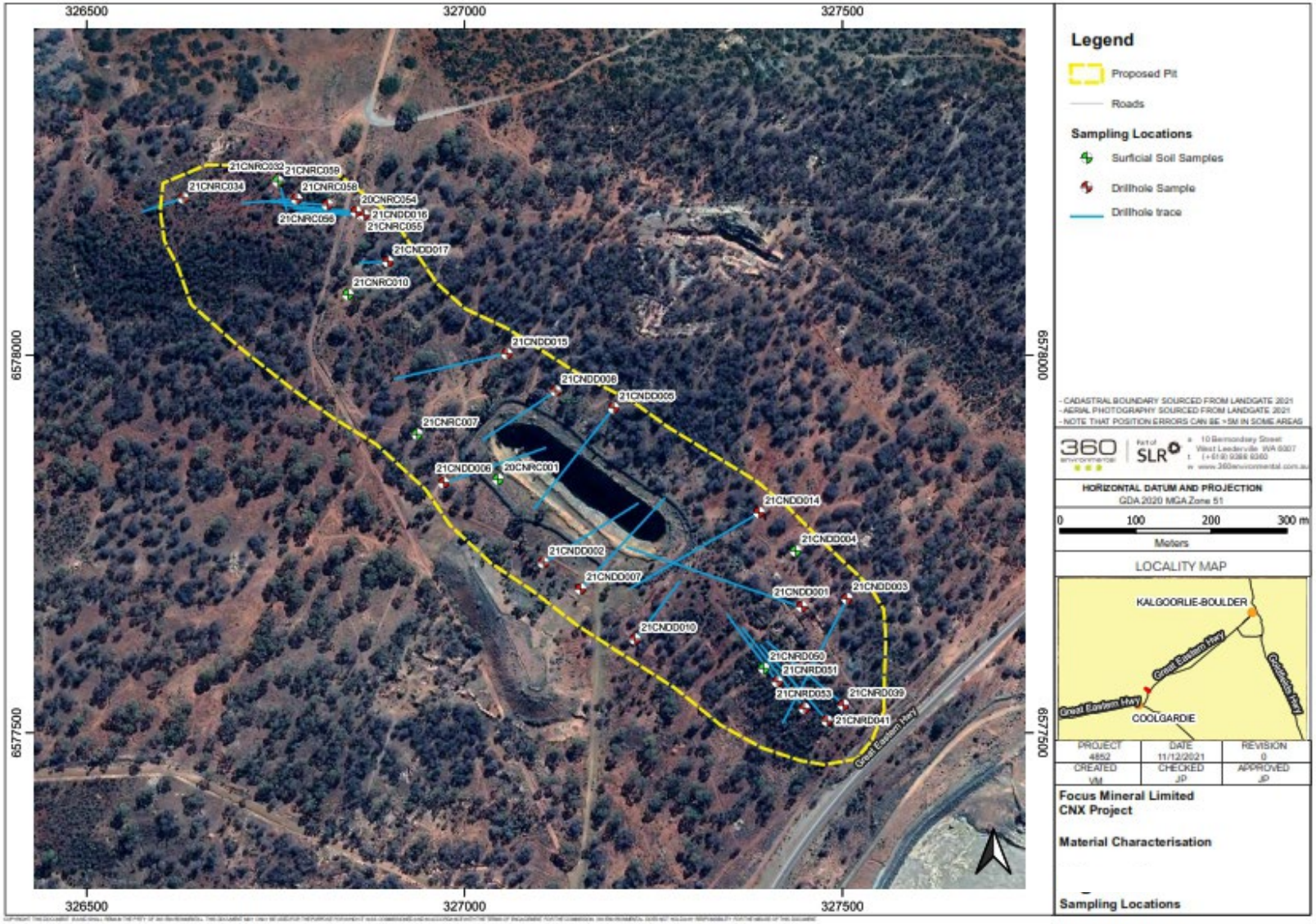


Figure 5: Soil landscape & sampling locations (360 Environmental, 2021)

2.3 Biodiversity

2.3.1 Biological Surveys

Native vegetation clearing is required to facilitate development of the Project. To support this, multiple biological surveys have been undertaken over the wider Coolgardie Operations Project area, with a summary detailed in Table 8 below. Surveys include both desktop and field assessments to determine likelihood of significant vegetation flora and fauna within the Project area. Biodiversity survey areas are shown in Figure 6. Relevant biological surveys IBSA/ISA numbers are provided in column five.

Table 8: Biological surveys

Survey title	Fieldwork date	Limitations identified	Author / reference	IBSA/ISA Number
Coolgardie *Camponotus* sp. nr. *terebrans* Targeted Survey	December 2021	None identified	360 Environmental	**ISA-0001270**
Desktop assessment for subterranean fauna for the Coolgardie Gold Project – Alicia, Big Blow, Bonnievale, Brilliant, CNX, Greenfields and Happy Jack Deposit Areas, Coolgardie, Western Australia	May 2022	N/A	Invertebrate Solutions Pty Ltd	**NA – DWER correspondence - not a survey, is desk-top only and does not meet requirements of an ISA listing**
CNX Three Mile Hill Coolgardie Gold Project – Biological Surveys	October 2021	None identified	360 Environmental	**IBSA-2023-0524**

2.3.2 Vegetation

The Project is located within the Coolgardie Botanical District of the Southwestern Interzone (Beard 1990). This district is comprised primarily of eucalypt woodlands that become more open with an increase in calcareous soils, and an understorey of bluebush and salt bush becomes more evident. The dominant families and genera include the *Mimosaceae* (*Acacia* spp.), *Myrtaceae* (*Eucalyptus* spp.), *Chenopodiaceae* (*Atriplex* spp. and *Maireana* spp.) and *Myoporaceae* (*Eremophila* spp.).

Pre-European vegetation association dataset (DPIRD, 2019) indicates that the Project area is located within one vegetation association. Areas retaining less than 30% of their pre-European vegetation extent generally experience exponentially accelerated species loss, while areas with less than 10% are considered "endangered" (EPA, 2000). All vegetation associations within the disturbance envelope retain > 95% of their pre-European extent. Development within the disturbance envelope will not significantly reduce the extent of pre-European vegetation associations or increase risk of loss. Vegetation association descriptions are detailed in Table 9 below and shown in Figure 7.

Table 9: Pre-European vegetation associations

Vegetation association	Structural description	Floristic description
Coolgardie 9	Woodland Other	Wheatbelt; York gum, salmon gum etc. (*E. loxophleba, E. salmonophloia*). Goldfields; gimlet, redwood etc. (*E. salubris, E. oleosa*). Riverine; rivergum (*E. camaldulensis*). Tropical; messmate, woolybush.

2.3.2.1 Vegetation Communities

Vegetation assessments were undertaken via establishment of strategically placed areas to ensure all distinct vegetation communities were characterised. Four vegetation communities were mapped within the 360 Environmental (2022) survey. Vegetation communities within the Project area are described in Table 10 below.

Table 10: Vegetation communities

Survey Area	Name	Landscape position	Community description
360 Environmental (2022)	EsppEiiSaa	Plains, low hills	*Eucalyptus salmonophloia* mid isolated trees over a mosaic of *E. celastroides*, *E. clelandiorum*, and *E. torquata* low open woodland over *Eremophila interstans* subsp. *interstans* (*Eremophila parvifolia* subsp. *auricampi*) mid isolated shrubs over *Senna artemisioides* subsp. *artemisioides*, *S. artemisioides* subsp. *filifola*, and *Atriplex vesicaria* low open shrubland.
	EsEiiAv	Plains	*Eucalyptus salmonophloia* mid open woodland over *Eremophila intertans* subsp. *interstans* (*Eremophila parvifolia* subsp. *auricampi*, *Senna artemisioides* subsp. *filifola*) tall to mid isolated shrubs over *Atriplex vesicaria* low open shrubland.
	AcEoaDl	Rocky hills	*Acacia collegialis (A. acuminata)* tall shrubland over *Eremophila oldfieldii* subsp. *angustifolia, E. georgei, A. tetragonophylla (Senna artemisioides* subsp. *filifolia, Exocarpos aphyllus)* mid shrubland over *Dodonea lobulata (Atriplex vesicaria, Ptilotus obovatus* var. *obovatus)* low shrubland.
	EtEaEpa	Plains, lower slopes of rocky hills	*Eucalyptus torquata* low open woodland over *Exocarpos aphyllus* mid isolated shrubs over *Eremophila parvifolia* subsp. *auricampi, Westringia rigida*, and *Scaevola spinescens* (*Olearia muelleri*) low open shrubland.
	Cleared	Plains	Cleared or historically cleared areas including mine pits and borrow pits (often filled with water), bitumen roads, and dirt tracks. Some of these areas were showing signs of revegetation. With occasional *Eucalyptus griffithsii*, *Atriplex vesicaria*, *Maireana* spp., and assorted weed species.

2.3.2.2 Vegetation Condition

Some areas within the Project area have been subjected to medium to high level disturbances, including historical small and large scale mine excavations, makeshift tracks, cattle grazing, with weeds and litter also evident. As such, vegetation condition within the overall survey area was predominantly rated Excellent and ranged to Completely Degraded (where all vegetation had been completely cleared) according to the scale given in Keighery (1994).

As surveyed areas encompassed numerous project areas, the below table presents the vegetation condition areas representative of vegetation within the CNX clearing envelope area boundary only, as vegetation outside of the boundary will not be affected.

Vegetation condition is shown below in Figure 8.

Table 11: Vegetation condition

Survey Area	Vegetation Condition	Area (ha)	% of total
360 Environmental (2022)	Excellent	99.88	43.92
	Very Good	85.65	37.66
	Good	20.52	9.02
	Completely Degraded	21.39	9.41
	Total	**227.44**	**100**

*Numbers have been rounded to two decimal places for simplicity of data

2.3.2.3 Significant vegetation

Desktop searches identified no threatened or priority ecological community within 50 km of the Project area.

The nearest Environmentally Sensitive Area (ESA) is the Rowles Lagoon Conservation Park, located approximately 62km north-west of the Survey Area.

The project area is not located within any listed conservation areas. The nearest conservation area is Kangaroo Hills Timber Reserve, which is situated approximately 6 km southwest of the Project.

Nearby ESAs are shown below in Figure 9.

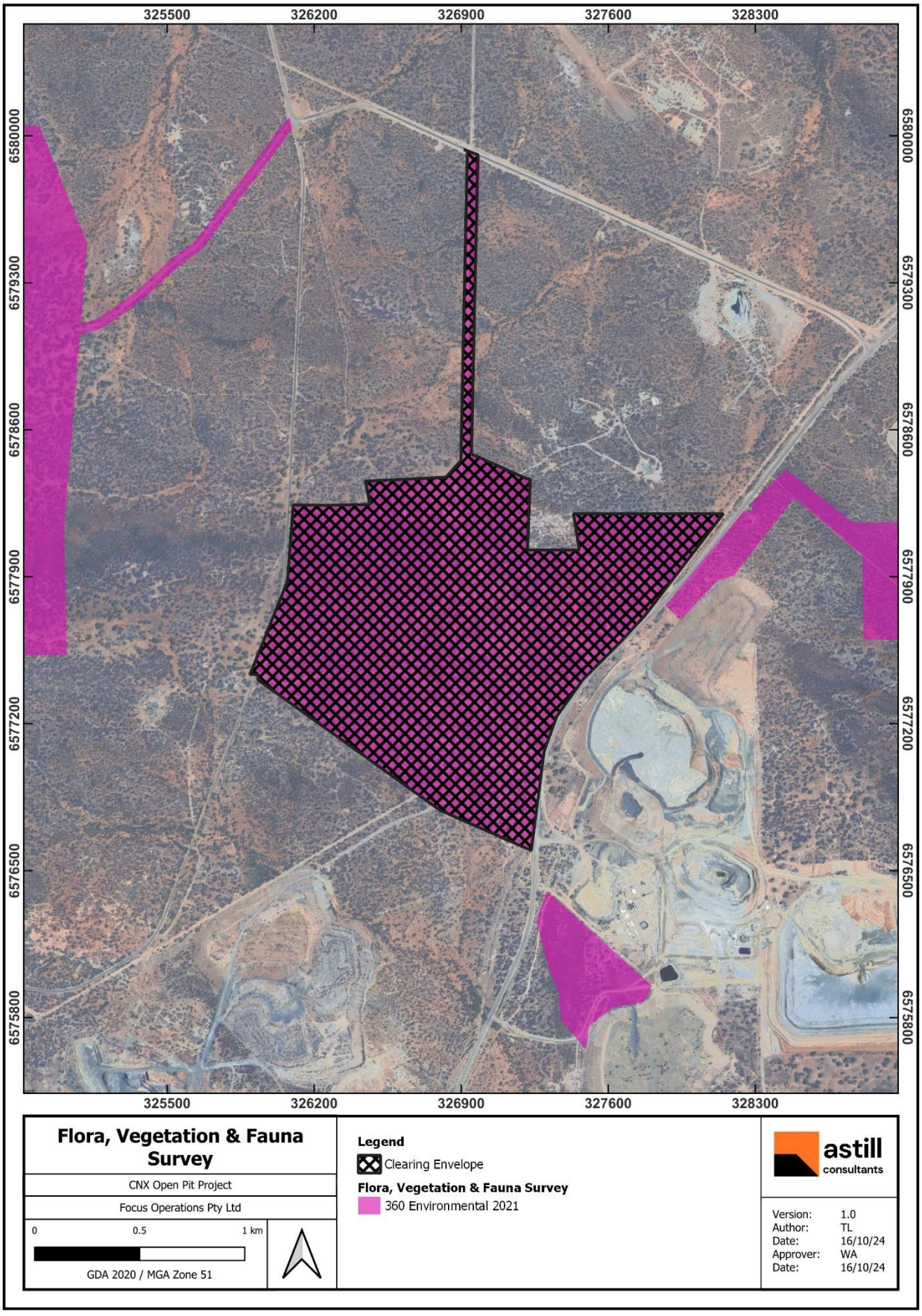


Figure 6. Flora, Vegetation & Fauna Survey Area



Figure 7: Pre-European vegetation associations

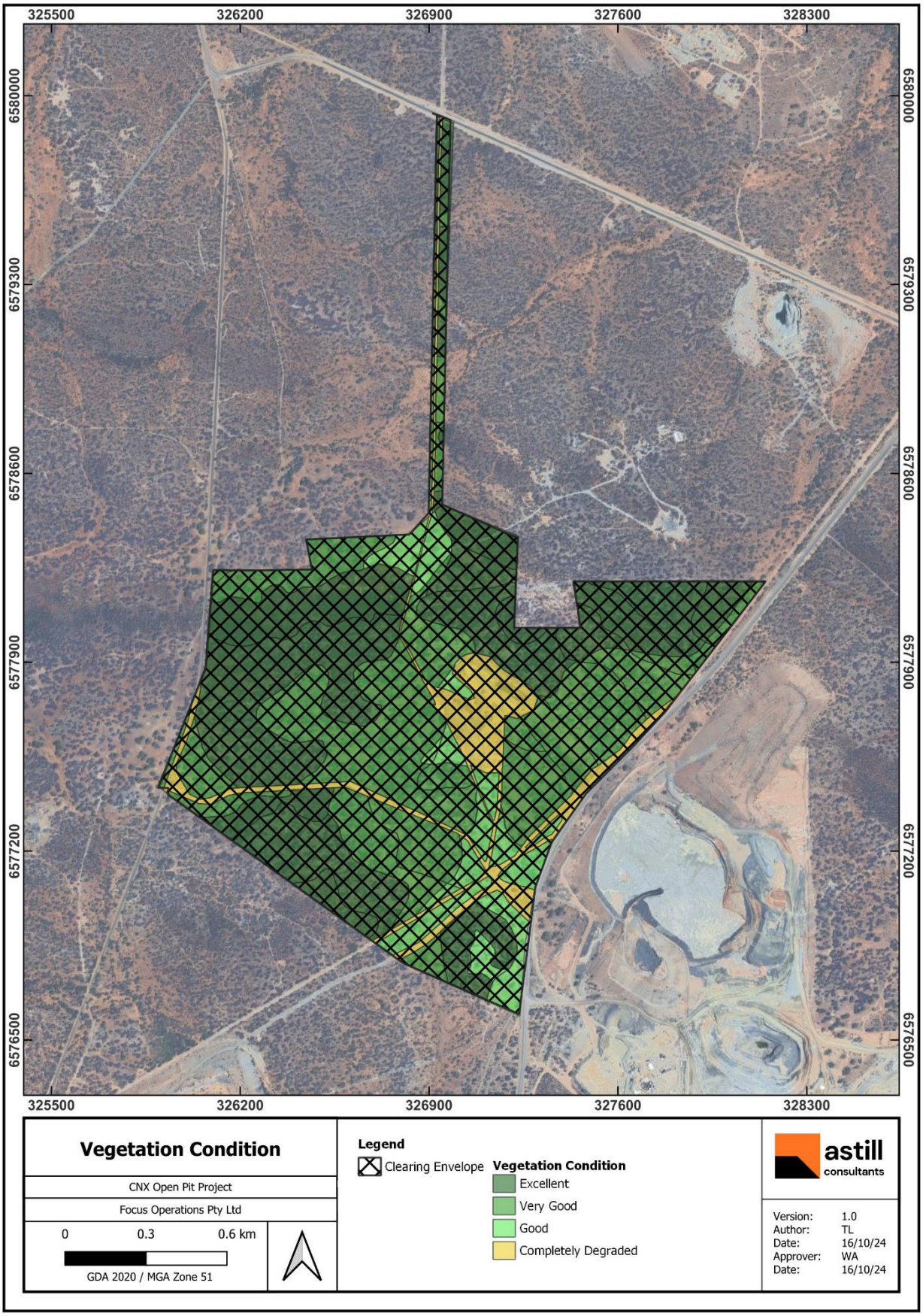


Figure 8: Vegetation condition

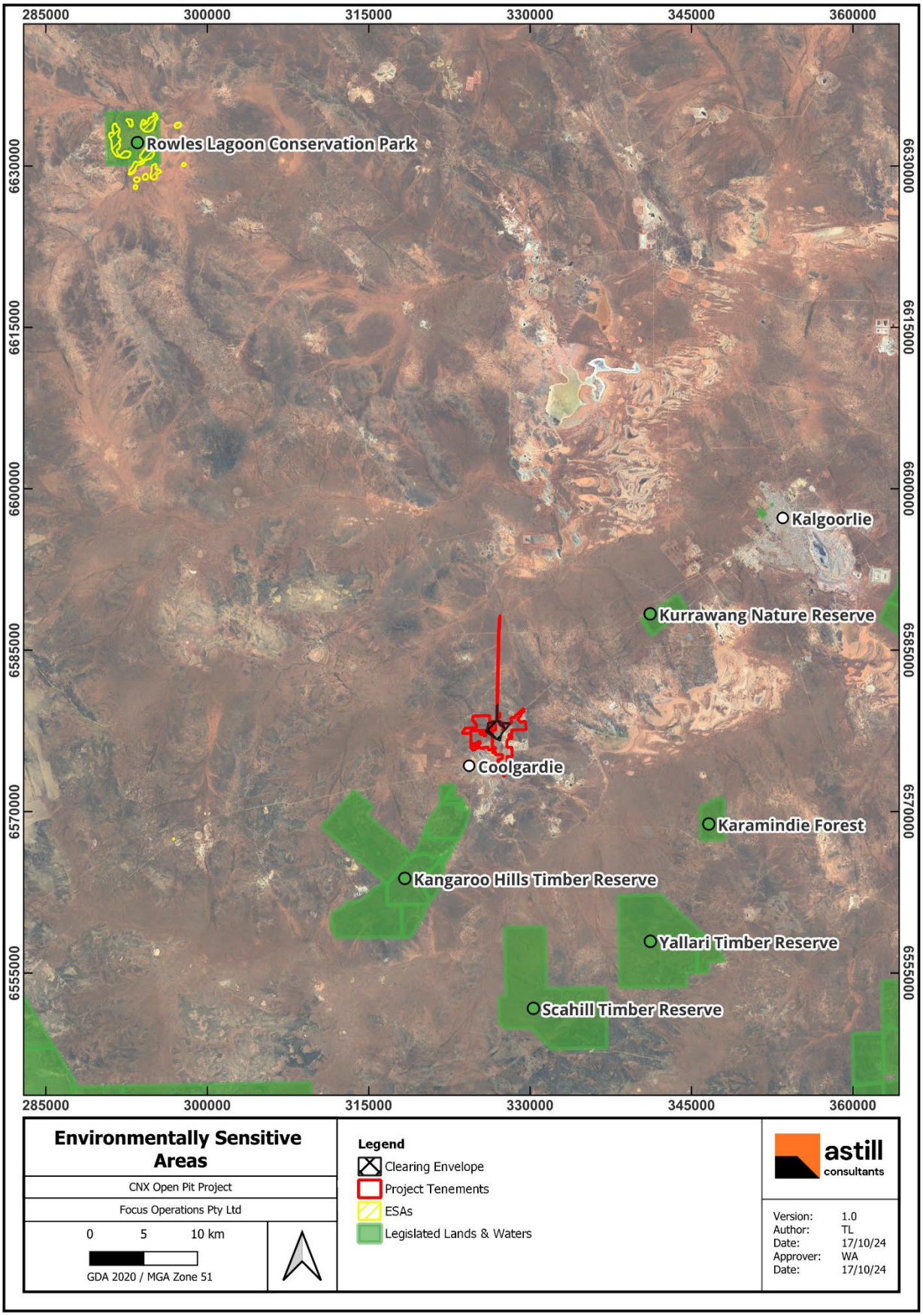


Figure 9: Environmentally sensitive areas

2.3.3 Flora

360 Environmental (2022) surveyed a broader area including Bonnievale, Brilliant, CNX, Three Mile Hill, Lady Loch, Perseverance, Dreadnought and Alicia project areas and, accordingly, the larger number of taxa identified (149) includes species from outside the Project area that is the focus of this application. Dominant families included Chenopodiaceae (26 taxa) and Myrtaceae (15 taxa). The most dominant genera were *Eucalyptus* (12 taxa) and *Eremophila* (10 taxa).

The suite of flora taxa recorded during the surveys is considered typical for the area (Beard 1990). A summary of the flora survey is presented in Table 12 below.

Table 12: Flora abundance

Survey	Species number (field search)				
	Total	Genera	Families	Unidentified	Dominant families
360 Environmental (2022)*	149	78	35	18	*Chenopodiaceae* (26 taxa) *Myrtaceae* (15 taxa)

*includes areas outside of the Project area within broader CGO survey area

2.3.3.1 Threatened and Priority Flora

Based on database searches, a total of 90 flora species of conservation significance had possibility of occurring within 50 km of the Project area, comprising of three Threatened taxa, 27 Priority 1, 14 Priority 2, 40 Priority 3, and six Priority 4 species. (360 Environmental, 2022).

No Threatened (Declared Rare) or Priority Flora or Ecological Communities (TECs or PECs) were recorded during field surveys of the Project area.

Eighteen taxa could not be identified to species level because they were sterile at the time of survey during the 360 Environmental survey. None of the unknown flora taxa were analogous to Threatened or Priority flora taxa identified by the database searches as likely to occur within the survey area, nor were they representative of flora of other significance.

One Priority taxon was recorded within the Survey Area. A population consisting of approximately 10 individuals of *Austrostipa blackii* (P3) was recorded in quadrat C1Q01. This taxon is a tufted, perennial, grass, typically growing up to 1 m high that flowers between September and November. ***At the time of the field survey, this species was listed as a Priority 3, but has since been downgraded in status to "Not Threatened."***

Therefore, there are no Threatened or Priority species in the clearing area.

2.3.3.2 Introduced Flora

A total of four introduced flora species were recorded in the 360 Environmental (2022) survey of CNX project area. A summary of introduced flora identified within the survey area are provided in Table 13 below.

Table 13: Introduced flora

Survey Area	Species name	Common name	WoNS
360 Environmental (2022)	*Carrichtera annua*	Ward's Weed	No
	Centaurea melitensis	Maltese Cockspur	No
	Nicotiana glauca	Tree Tobacco	No
	Rumex vesicaria	Ruby Dock	No

2.3.4 Fauna

Fauna surveys over the Project area have included basic fauna assessments (previously known as Level 1 Fauna Assessments), targeted survey for *Camponotus* sp. nr. *Terebrans* (also *Jalmenus aridus*), and a subterranean fauna desktop review. Fauna surveys have demonstrated that most fauna identified during field observations are common and widespread, with fauna abundance by taxa summarised in Table 14 below.

Table 14: Fauna abundance

Survey	Species number (desktop search)	Species number (field search)				
		Total	Amphibians	Birds	Mammals	Reptiles
360 Environmental (2022)*	311	61	0	42	10	9

*includes areas outside of the Project area within broader CGO survey area

2.3.4.1 Fauna habitat

Broad fauna habitats have been mapped in the Project area and described in each biological survey. Fauna habitats are considered relatively common and representative of the local area and are widespread through the region. Fauna habitats with example images are summarised in Table 15 below.

Table 15: Fauna habitats

Survey	Habitat type	Description	Example image
360 Environmental (2022)	Eucalyptus woodland	Mixed *Eucalyptus* sp. woodlands over *Acacia* sp. *dodonaea* sp. *Eremophila* sp. or *Melaleuca* sp. mixed shrublands. Peeling bark, woody debris, leaf litter and hollow logs were observed throughout this habitat type. These microhabitat features provide shelter for small reptiles and mammals. The canopy of trees provides shelter and foraging habitat for birds.	

Survey	Habitat type	Description	Example image
	Acacia Shrubland	*Eucalyptus griffithsii* low open woodland over *Acacia hemiteles* and *Dodonaea stenozyga* (*A. jennerae*, *Alyxia buxifolia*) mid shrubland over *Senna artemisioides* subsp. *filifola* and *Atriplex vesicaria* (*Olearia muelleri*) low open shrubland. Hollow logs, leaf litter, and peeling bark are present throughout this habitat type. These microhabitat features provide shelter and foraging opportunities for small reptiles, birds, and mammals. Conservation significant fauna such as the Malleefowl (*Leipoa ocellata*) and the Western Quoll, Chuditch (*Dasyurus geoffroii fortis*) may use this habitat. Habitat condition varied from disturbed to very good. Evidence of disturbance includes previous mining activity, vehicle tracks, litter, and the presence of introduced fauna.	
	Rocky slopes	*Acacia collegialis* (*A. acuminata*) tall shrubland over *Eremophila oldfieldii* subsp. *angustifolia*, *E. georgei*, *Acacia tetragonophylla* (*Senna artemisioides* subsp. *filifolia*, *Exocarpos aphyllus*) mid shrubland over *Dodonaea lobulata* (*Atriplex vesicaria*, *Ptilotus obovatus* var. *obovatus*) low shrubland. Leaf litter, peeling bark, rock crevices, and woody debris provide shelter for small reptiles and mammals. Shrublands provide shelter and foraging habitat for birds, reptiles and mammals.	
	Disturbed areas	Cleared or historically cleared areas including mine pits and borrow pits (often filled with water), bitumen roads, and dirt tracks. .	

2.3.4.2 Significant fauna

Based on combined desktop and field assessments across surveys, an assessment was carried out on likelihood of significant fauna species occurring in the Project area. A scat was recorded during the survey, initial classification was Western Quoll, however this has since been revised as unlikely by the company conducting the survey (see Appendix C) and the scat has been

classified as 'unidentified' due to limited scope to complete genetic testing. Malleefowl were not recorded during this survey, however they have been listed as a high likelihood of occurring in the area when considering habitat types noted in the field. No Malleefowl have since been detected in pre-clearance surveys. No Southern Whiteface (A*phelocephala leucopsis*) has since been detected in pre-clearance surveys (see Appendix E).

It should be noted that while habitats onsite are considered possibly suitable, some or all may be marginal in extent/quality and therefore fauna species considered as possibly occurring may in fact only visit the area for short periods as infrequent vagrants. A summary of significant fauna likelihood is detailed in Table 16 below.

Table 16: Significant fauna likelihood

Species name	Common name	Conservation status		Assessment	Likelihood
		EPBC Act	BC Act		
Leipoa ocellata	Malleefowl	VU	VU	Recent records within 1km of the survey area. Suitable habitat present, unburned mallee and woodland with abundant litter and low scrub.	High
Apus pacificus	Pacific Swift (Fork-tailed Swift)	MI, MA	IA	Three records within 100km of the survey area. Species may fly over the survey area as it covers a wide range of airspace over varied habitat.	Low
Dasyurus geoffroii fortis	Chuditch	VU	VU	Some suitable habitat present – mallee shrubland. Unidentified scat collected during survey, not genetically tested to confirm ID. SLR have advised Chuditch would not occur within the survey area. Further assessments are being completed via camera trap surveys to confirm utilisation of habitat. See Appendix C.	Low
Jalmenus aridus	Inland Hairstreak		P1	Nearest record 7 km SE of the survey area. Suitable habitat present within the survey area however none found during conduct of survey. See Appendix D.	Medium
Ogyris subterrestris petrina	Arid Bronze Azure Butterfly	CR	CR	No recent records. Suitable habitat present, i.e. smooth barked *Eucalyptus* sp. However no ants present at conduct of *Campanotus sp. nr. Terrebrans* survey, see Appendix B.	Low
Falco hypoleucos	Grey Falcon	VU	VU	No recent nearby records. Some records within 100km of the survey area. Preferred nesting habitat absent. May use survey area for hunting.	Low
Calyptorhynchus latirostris	Carnaby's Cockatoo	EN	EN	This species was recorded 30km NE of the survey area in Kalgoorlie. However, these records occur well outside the known distribution of the species and likely represent a vagrant occurrence of the taxon.	Low

Species name	Common name	Conservation status		Assessment	Likelihood
		EPBC Act	BC Act		
Thinornis cucullatus	Hooded Plover (Hooded Dotterel)	MA	P4	Closest record 42km NE of the survey area. No suitable habitat within the survey area.	Low
Motacilla cinerea	Grey Wagtail	MI, MA	IA	Survey area is well outside the distribution of this species. Some suitable habitat present in parts, i.e. water bodies.	Low
Pezoporus occidentalis	Night Parrot	EN	CR	No records within 100km of the survey area. No suitable habitat within the survey area.	Low
Actitis hypoleucos	Common Sandpiper	MI, MA	IA	Three recent records within the survey area. Some suitable habitat present, i.e. interior wetlands – narrow muddy edges of billabongs.	Previously recorded
Calidris acuminata	Sharp-tailed Sandpiper	MI, MA	IA	Nearest record 15km NW of the survey area. Suitable habitat present, i.e. water bodies.	Medium
Calidris alba	Sanderling	MI, MA	IA	Nearest record in Kalgoorlie. No suitable habitat within the survey area.	Low
Calidris ferruginea	Curlew Sandpiper	CR, MI, MA	CR, IA	Nearest record 15km NW of survey area. Suitable habitat within the survey area, i.e. around lakes, dams.	Medium
Calidris melanotos	Pectoral Sandpiper	MI, MA	IA	Survey area is well outside the distribution of this species area. Some suitable habitat present in parts, i.e. inland water bodies.	Low
Calidris ruficollis	Red-necked Stint	MI, MA	IA	Nearest record 15km NW of survey area. No suitable habitat within the survey area, i.e. mudflats.	Low
Tringa brevipes	Grey-tailed Tattler	MI, MA	IA, P4	Nearest record 20km NE of survey area. No suitable habitat within the survey area, i.e. coastal.	Low
Tringa glareola	Wood Sandpiper	MI, MA	IA	Nearest record 30km NE of the survey area. Suitable habitat within the survey area, i.e. freshwater wetlands.	Medium
Tringa nebularia	Common Greenshank	MI, MA	IA	Recent record within the survey area. Suitable habitat within the survey areas, i.e. temporary inland wetlands.	Previously recorded
Plegadis falcinellus	Glossy Ibis	MI, MA	IA	Only record 27km NE of the survey area in Kalgoorlie. Some suitable habitat present, i.e. temporary wetlands.	Medium
Myrmecobius fasciatus	Numbat	EN	EN	No nearby records. Some suitable habitat is present, i.,e. eucalypts and wandoo woodland. The only natural population exist well outside the survey area in the far north of WA.	Low
Macrotis lagotis	Bilby	VU	VU	No nearby records. No suitable habitat present.	Low

*Conservation Status: State – Listed under Biodiversity Conservation Act 2016 or Department of Biodiversity, Conservation and Attractions Conservation List, Federal – Listed under Environmental Protection and Biodiversity Conservation Act 1999. CR – Critically Endangered, EN – Endangered, VU – Vulnerable, IA/MI – Migratory, MA – Marine, P – Listed as Priority by DBCA.

2.3.4.3 Short Range Endemics

Habitat types in the Project area are regionally common and with a high degree of habitat connectivity, and therefore it is unlikely that any short-range endemic (SRE) species is restricted to the Project area.

2.3.4.4 Subterranean fauna

Invertebrate Solutions (2021) undertook a desktop assessment for subterranean fauna (stygofauna and troglofauna) for CGO, including the Project area. A combination of regional information, geological, hydrogeological and database searchers were used to inform likelihood of subterranean fauna in the project area. This assessment concluded that there was little habitat for subterranean fauna present due to lack of fracturing in fine-grained geological units (Invertebrate Solutions, 2021).

2.3.4.5 Introduced fauna

Introduced fauna are widely established within the regional area. A total of seven introduced fauna species were recorded within the 360 Environmental (2022) survey area. A summary of introduced fauna is in Table 17 below.

Table 17: Introduced fauna

Survey Area	Species Name	Common Name
360 Environmental (2022)	*Capra hircus*	Goat
	Bos primigenius taurus	European Cattle
	Canis familiaris	Dog
	Vulpes vulpes	Red fox
	Equus caballus	Horse
	Felis catus	Cat
	Oryctolagus cuniculus	Rabbit

2.4 Hydrology

There are no surface water resources within the study area. The site is within the Salt Lake Basin of the Western Plateau division. The study area is in the Lake Lefroy catchment and Raeside-Ponton catchment. A minor non-perennial watercourse flows through the site from west to east. Local-scale ephemeral drainage around the Project area is shown below in Figure 10.

Significant water bodies in the regional vicinity of the project include Brown Lake (7.5 km east), Red Lake (12.5 km northeast), White Flag Lake (28 km northeast) and recreational Lake Douglas (20 km northeast). Clearing within watercourses would be likely to have minor impacts to these ephemeral drainage lines, however, clearing at CNX will not impact any of these surface water bodies.

Drainage diversion infrastructure will be installed to ensure that flood risks to the Project at a local scale are mitigated whilst preserving natural flow paths.

Regional surface hydrology drainage is shown below in Figure 11.

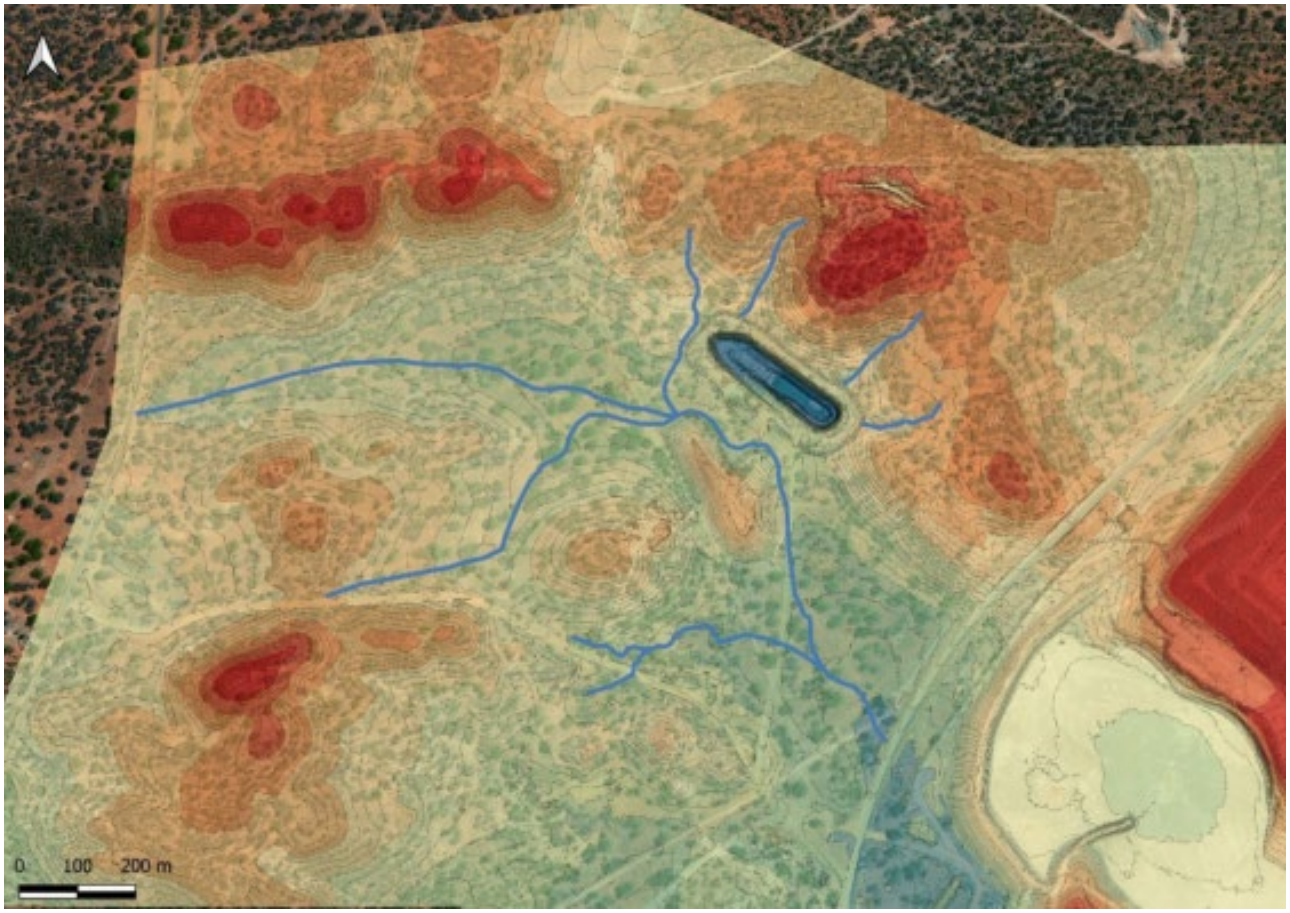


Figure 10. Local scale drainage around the CNX project area, as modelled by 360 Environmental (2023)

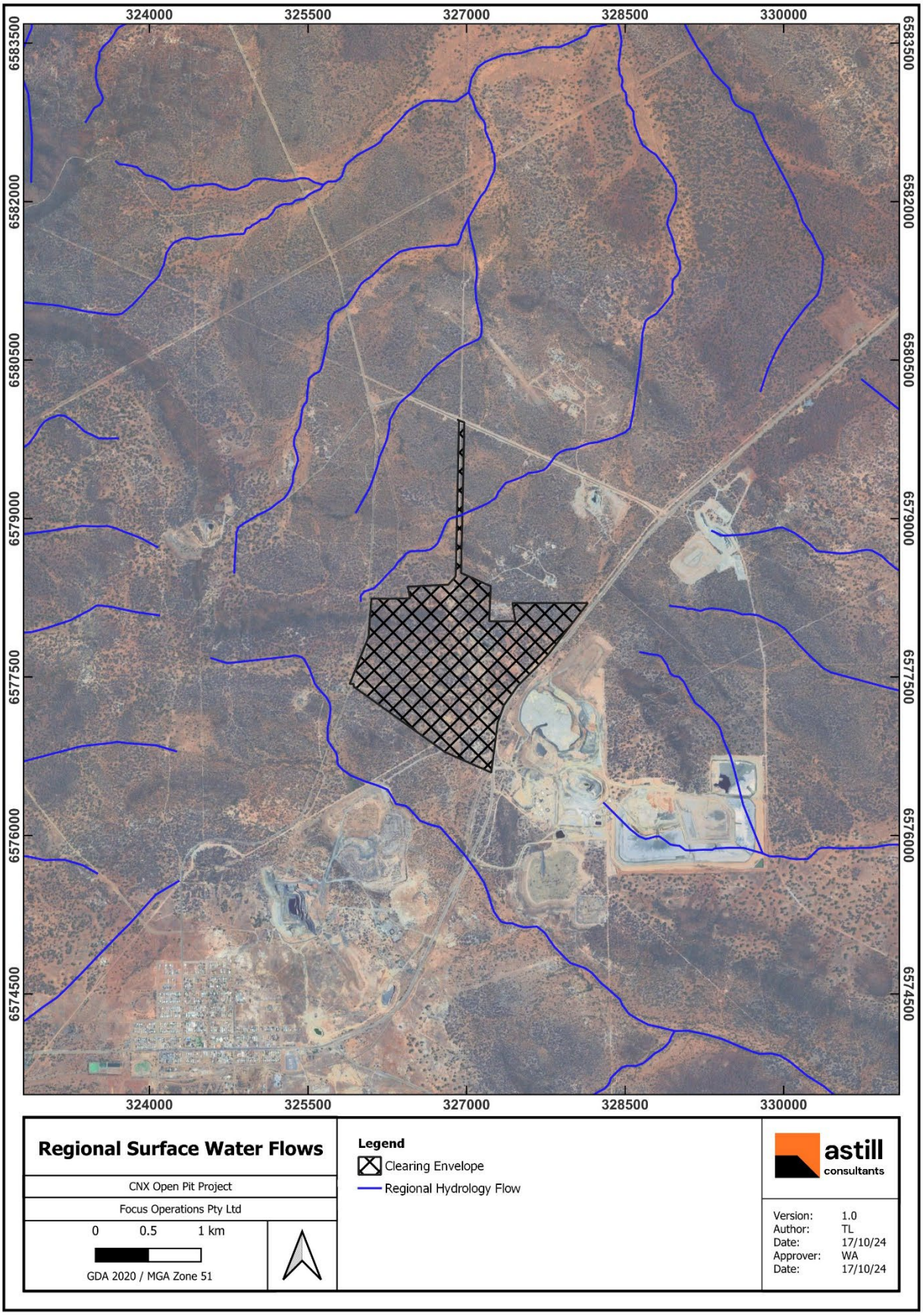


Figure 11: Regional surface water hydrology

2.5 Hydrogeology

The greenstone rocks in the 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. Based on limited interconnectivity of the aquifers, recharge is likely to be local (Kern, 1995).

Groundwater levels in the project area are highly variable, ranging from 5 to 35 metres, and TDS ranges between 30,000 to 151,000 mg / L, which is considered hypersaline. Groundwater has limited use outside of mining and negligible hydrogeological impacts are anticipated to occur from clearing activities.

2.6 Heritage

2.6.1 Native Title

There is no Native Title Determination across the Project area.

There is one registered Native Title claim over the Project area, Marlinyu Ghoorlie Claim (WC2017/007). Focus is currently negotiating an agreement with the Marlinyu Ghoorlie Native Title Claimant group.

2.6.2 Aboriginal Heritage

A search of DPLH Aboriginal Cultural Heritage Inquiry System (ACHIS) in October 2024 identified that one Registered Aboriginal Site interacts with the disturbance envelope as do two Lodged places, but their boundaries are not located within the clearing envelope as confirmed by internal on-ground surveys coordinated by Focus with relevant Traditional Owners.

Table 18. Registered and Lodged Aboriginal Heritage Places on DPLH ACHIS database

DPLH Place ID	Status	Name	Comment
32761	Lodged	Roundhead/Ngumarn	Women's only site Intersects tenement M15/630
3009	Registered	Kurkutjutana	Intersects southern portion of tenement M15/645 and is not located within the clearing permit disturbance envelope
39398	Lodged	NCA-03	Burial place Intersects southern portion of tenement M15/645 and is not located within the clearing permit disturbance envelope

Table 19. Aboriginal Heritage Surveys undertaken by Focus

Year	Company	Report	Survey Type	Representatives	Comment
August 2022	R & E. O'Connor	Aboriginal Heritage Surveys of Bonnievale, Patricia Jean and CNX Haul Road	Archaeological and ethnographic	Brandon Spurling, Adam Graham, Jaseah Hodder, Graham Stokes, Mary Strickland, Anne Joyce Nudding, Elizabeth Sambo, Marcia Coleman, Gina Sambo	Aboriginal heritage considerations not deemed an impediment on proposed CNX Haul Road
July 2022	Terra Rosa Consulting	Archaeological and ethnographic work area clearance heritage survey of the Tindals, Bonnievale and Patricia Jean project areas with Marlinyu Ghoorlie Traditional Owners	Archaeological and ethnographic	Lorna Watene, Corey Logan, Shahnece Kearing, Ranjol Kearing, Juaneesa Champion, Annetta Coleman, Cindy Sambo, Shane Champion, Alex Champion, Tessa Sambo, Samantha Tucker, Billie Logan, Brian Champion Snr, Henry (Richard) Dimer, Darren Indich, Betty Logan, Maxine Dimer, Norma Dimer, Shirley Trott, and Angus Reynolds and Declan Gammon (TR)	CNX haul road section cleared to proceed
October 2021	Terra Rosa Consulting	An archaeological and ethnographic work area clearance heritage survey of Three Mile Hill/CNX and P15/5987 and a work program clearance heritage survey of Kangaroo Hills Timber Reserve	Archaeological and ethnographic	Sean Dimer, Nathan Tucker, Robert Trott-Dann, Jasceitta Champion, Serina Indich (Kickett), Dellie Champion, Fiona Blaszkiewicz, and Ben Fordyce and Lilia Alpers (TR)	CNX main survey area cleared to proceed
October 2021	R & E. O'Connor	Aboriginal Heritage surveys of Focus Minerals Limited 2021 – Designated areas and drill targets	Archaeological and ethnographic	Brandon Spurling, Adam Graham, Graham Stokes, Marj Strickland, Joyce Nudding, Albert Nudding, Trevor Donaldson, Jayden Donaldson, Brooke Donaldson, Elizabeth Sambo, Lonnie Coleman, Tessa Sambo, Gina Sambo, Poyana Coleman	Aboriginal heritage considerations not deemed an impediment at CNX project area

Based on the above information, and confidential surveys and correspondence maintained by Focus, it is determined that the clearing envelope will not interact with any of these Aboriginal heritage sites and mining activities will not impact on heritage values.

Focus continues to maintain engagement with traditional owners and Native Title claimants on a regular basis, with intent to foster a robust relationship built on mutual respect and understanding for both parties to continue to work together alongside mining operations.

2.6.3 European Heritage

A search of State Heritage Office inHerit database in October 2024 showed one Statutory Heritage Listing in vicinity of the Project, Carins Camp (Place number: 7442), located approximately 700m southwest of the disturbance area boundary.

Focus is aware of the camp location, and it will not be impacted by clearing or mining activities associated with the CNX project.

The location of Carins Camp, and DPLH Registered and Lodged boundaries are shown below in Figure 12.

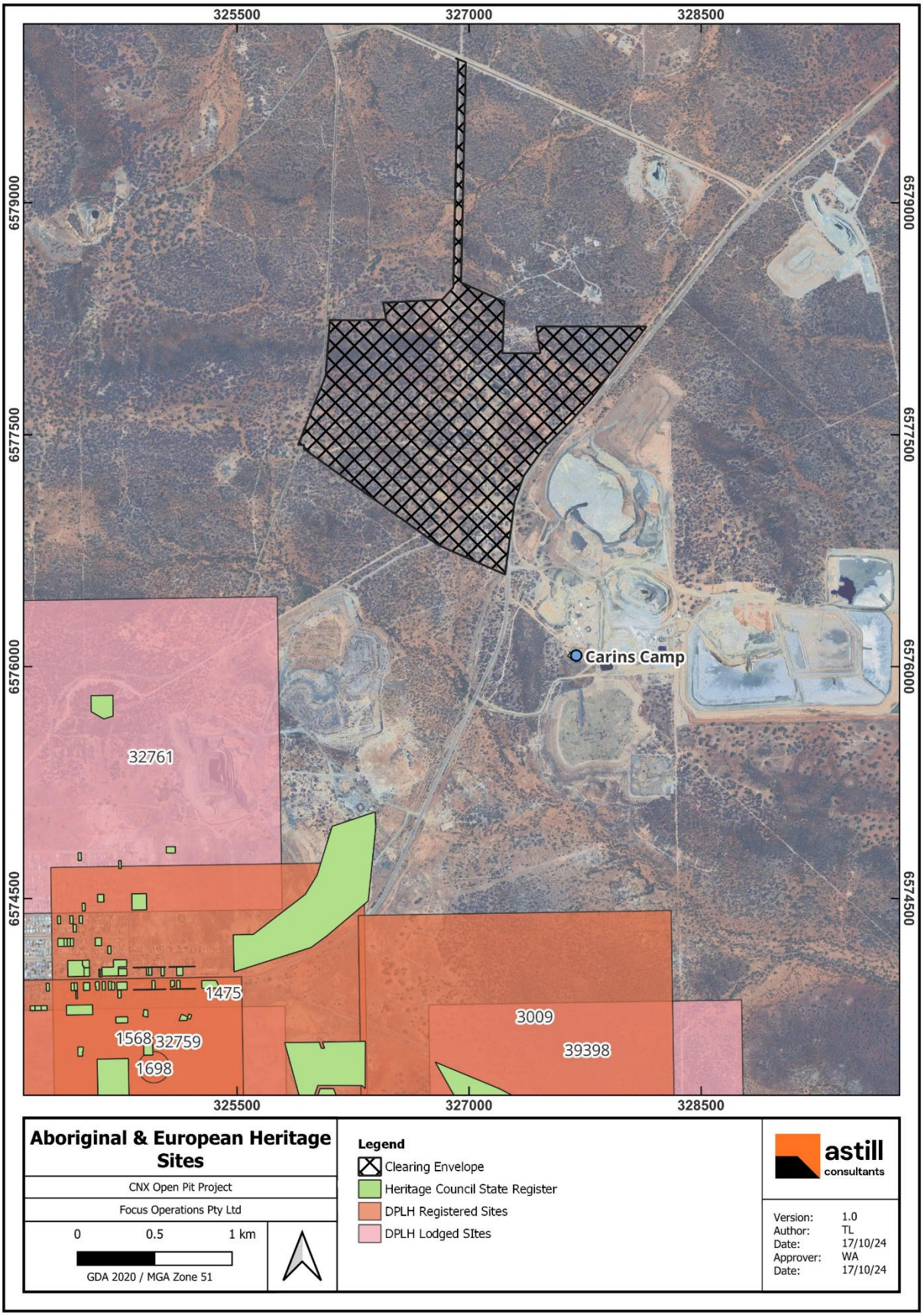


Figure 12: Heritage sites

3. Assessment Against Clearing Principles

An assessment against each of the ten clearing principles as defined under Schedule 5 of the *EP Act* demonstrates that the proposed clearing is unlikely to be at variance with any of principles as outlined in Table 20 below.

Table 20: Clearing principles assessment

Clearing principle	Assessment	Outcome
a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	The Eastern Goldfields subregion is rich and diverse in its flora; however, most species (excluding Priority species) are wide ranging and usually occur in at least one, and often several, adjoining subregions (Cowan, 2001). The Project area is not considered to comprise a high level of biological diversity as vegetation is typical of the surrounding region. The vegetation within the Project area has been impacted by historical and recent disturbances, reducing vegetation quality.	Unlikely to be at variance to this 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.	Conservation significant species considered to be potentially present in the area include Malleefowl. No active or inactive nests were identified within the Project area. Malleefowl have a wide range, and habitat present is analogous to the surrounding area and is not considered to be significant for this species. One scat was found during a fauna survey, originally thought to be Chuditch, upon further advise has now been classified as unidentified.	Unlikely to be at variance to this principle.
c) Native vegetation should not be cleared if it includes or is necessary for the continued existence of rare flora.	No Threatened (Declared Rare) or Priority flora species were recorded in the Project area during any of the vegetation and flora surveys.	Unlikely to be at variance to this 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.	There are no known TECs or PECs located within a 50 km radius of the Project area. No vegetation analogous to TECs or PECs were recorded in any of the vegetation and flora surveys.	Not at variance to this 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	The Project area includes pre-European vegetation association Coolgardie 9 with remaining extents of 97.78% remaining across the Coolgardie Bioregion. The clearing represents a minor portion of vegetation in an area well connected to surrounding vegetation.	Not at variance to this 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.	There are no permanent watercourses or wetlands in the Project area. Minor ephemeral surface water flow paths exist through the Project area, however vegetation associated with these are not distinct to these areas and are not considered riparian vegetation.	Unlikely to be at variance to this principle

g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The disturbance envelope contains a significant proportion of historic mining disturbance and newer exploration disturbance, and following completion of the Project activities will be rehabilitated in accordance with an approved MCP.	Unlikely to be at variance to this 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.	There are no conservation areas or DBCA-managed lands in the Project area. The nearest ESA is Rowles Lagoon, located approximately 62 km northwest, and the nearest conservation area is Kangaroo Hills Timber Reserve, located 6km southwest located adjacent to the project, but not within the boundary.	Not at variance to this 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.	There are no permanent surface water features in the Project area. Groundwater in the region is hypersaline and has limited uses outside of the mining industry. Groundwater recharge is slow and will not be impacted by clearing activities.	Unlikely to be at variance to this principle
j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	The climate is semi-arid with an average annual rainfall under 300 mm. Catchment areas are small and defined by hills to the south and north of the Project area. Ephemeral drainage lines in the Project area are likely to only flow as shallow overland flow. Drainage diversion infrastructure will be installed to ensure that flood risks to the Project are mitigated whilst preserving natural surface water flow paths.	Unlikely to be at variance to this principle

4. Clearance Mitigation Hierarchy

4.1 Avoidance

4.1.1 Design

The mine site layout will be designed to prioritise use of previously disturbed areas, in preference to clearance of native vegetation. The indicative disturbance areas within this application target the previously cleared locations (pit, waste dump, access tracks and historic exploration activities) to reduce the size and scale of new clearing.

Clearing areas will be kept to the minimum required for mine activities and undertaken progressively as required.

4.1.2 Process

Prior to any clearing, a surface disturbance permit (FML-ENV-FORM-02) will be authorised by Focus' environmental department to ensure clearing is coordinated and able to be undertaken under a clearing permit or valid clearing exemption (i.e., Regulation 20 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*).

4.1.3 Methodology

Proposed clearing will be demarcated by a surveyor using high visibility tape / survey pegs to ensure clear visual boundaries for operators prior to clearing commencement or alternatively a spotter with handheld GPS will guide clearing. A toolbox meeting will be held between the supervisor and clearing operator to ensure awareness of clearing areas and any areas to be avoided.

Vegetation will be cleared by mechanical clearing. Equipment required to undertake and support clearing activities may include a combination of:

- Dozer;
- Loader;
- Excavator;
- Water Cart; and
- Service Vehicles.

Where practicable raised blade clearing will be used. Where this is not practicable, topsoil will be stripped to 200 mm depth and stockpiled for use in rehabilitation, along with removed vegetation.

Once clearing has been completed, surveyors will complete a pickup of cleared areas and provide the data to the environmental department for their records and external reporting obligations.

4.2 Mitigation

An Environmental Management Plan (EMP) for CGO is in force and subject to continuous improvement. This EMP outlines the Environmental Management System (EMS) and management strategies and procedures for key environmental areas including those that related to clearing activities (i.e. air quality, fauna, land and soils, vegetation, and weeds). Applicable management measures are summarised below.

4.2.1 Air quality

Dust is generated from clearing activities, topsoil stripping and spreading. Excessive dust can increase local particulate levels, impacting surrounding vegetation and sensitive receptors.

The following management measures will be implemented to mitigate air quality impacts:

- Weather conditions are monitored, and dust impacts are assessed during clearing;
- Topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled during periods of high winds; and
- Water carts are available and utilised for wetting down of soils as required.

4.2.2 Land and soils

Land and soils may be impacted by clearing activities including minor hydrocarbon spills and poor topsoil stripping and handling practises. These impacts may have long term effects on rehabilitation performance.

The following management measures will be implemented to conserve land and soil resources:

- Regular inspections and maintenance of machinery including daily pre-starts;
- Spill kits closely available during clearing activities;
- Stripping topsoil to a maximum depth of up to 200 mm;
- Topsoil stripping to be undertaken as close as possible to commencement of activities; and
- Soils to be paddock-dumped into stockpiles of no greater than 2 m in height and have adequate distance between them to create a series of mounds and troughs.

4.2.3 Fauna

Fauna impacts (vehicle strike) during clearing activities may result in injury or death of native fauna or livestock. Whilst not all incidents are avoidable, impacts can be minimised.

The following management measures will be implemented to reduce the risk to fauna:

- Mallefowl exclusion zone to ensure nesting habitat preserved;
- Speed limits will be signed and enforced;
- Any injury or death of fauna will be recorded and investigated;
- Access to food wastes will be minimised by ensuring effective storage and disposal, thereby deterring invasive fauna species; and

- Personnel are prohibited from direct contact with fauna, including feeding.

4.2.4 Vegetation

Vegetation clearing can be minimised through design controls and ensuring that clearing only occurs as required.

The following management measures will be implemented to minimise vegetation clearing:

- Utilising existing disturbances where possible for mine infrastructure;
- Choosing paths of least resistance through vegetation when siting roads and other linear infrastructure (where practicable); and
- Retention of canopy trees where possible.

4.2.5 Weeds

Activities which disturb land and soils including clearing have the potential to create favourable conditions for weed infestation. Weeds can be difficult to eradicate once introduced and prevention of weed infestation has long term benefits for rehabilitation outcomes.

The following management measures will be implemented to manage weed impacts:

- All vehicles and equipment arriving on site will be free of soil, seeds, and vegetative matter;
- Movement of vehicles and equipment will be restricted to areas to be cleared; and
- Weed spray programs may be implemented on a seasonal basis to eradicate identified weed infestations.

4.2.6 Rehabilitation

Rehabilitation of cleared areas will occur in accordance with the CGO Mine Closure Plan (MCP) which will be revised to include the Project and will be submitted in accordance with the Approvals Statement for this Project.

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6. Appendices

Appendix A: Proof of ownership

Appendix B: Biological surveys

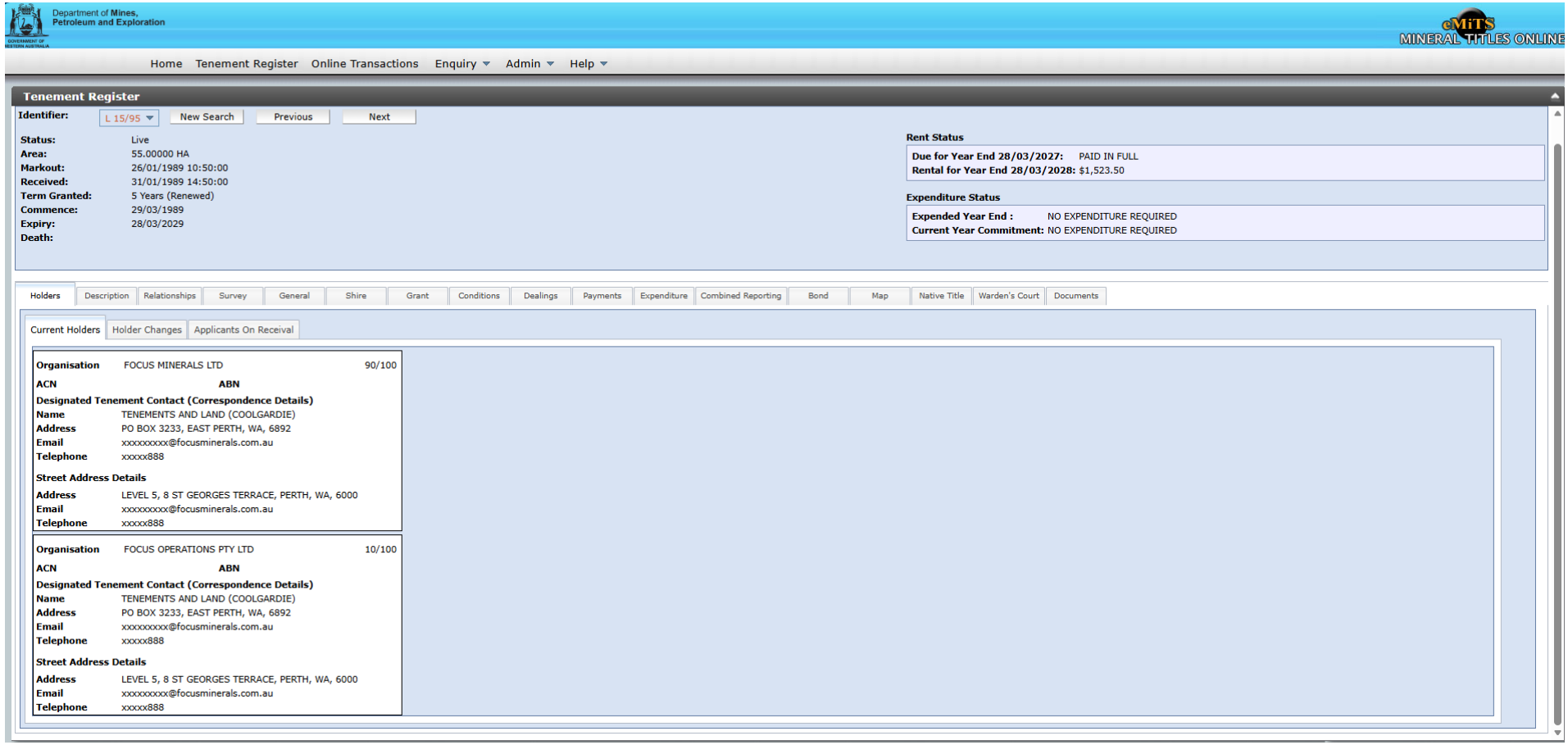
1. CNX Three Mile Hill - Coolgardie Gold Project Biological Surveys (360 Environmental 2022)
2. Coolgardie *Camponotus* sp. nr. *terebrans* Targeted Survey (360 Environmental, May 2022)
3. Desktop assessment for subterranean fauna for the Coolgardie Gold Project – Alicia, Big Blow, Bonnievale, Brilliant, CNX, Greenfields and Happy Jack Deposit Areas, Coolgardie, Western Australia (Invertebrate Solutions, May 2022).

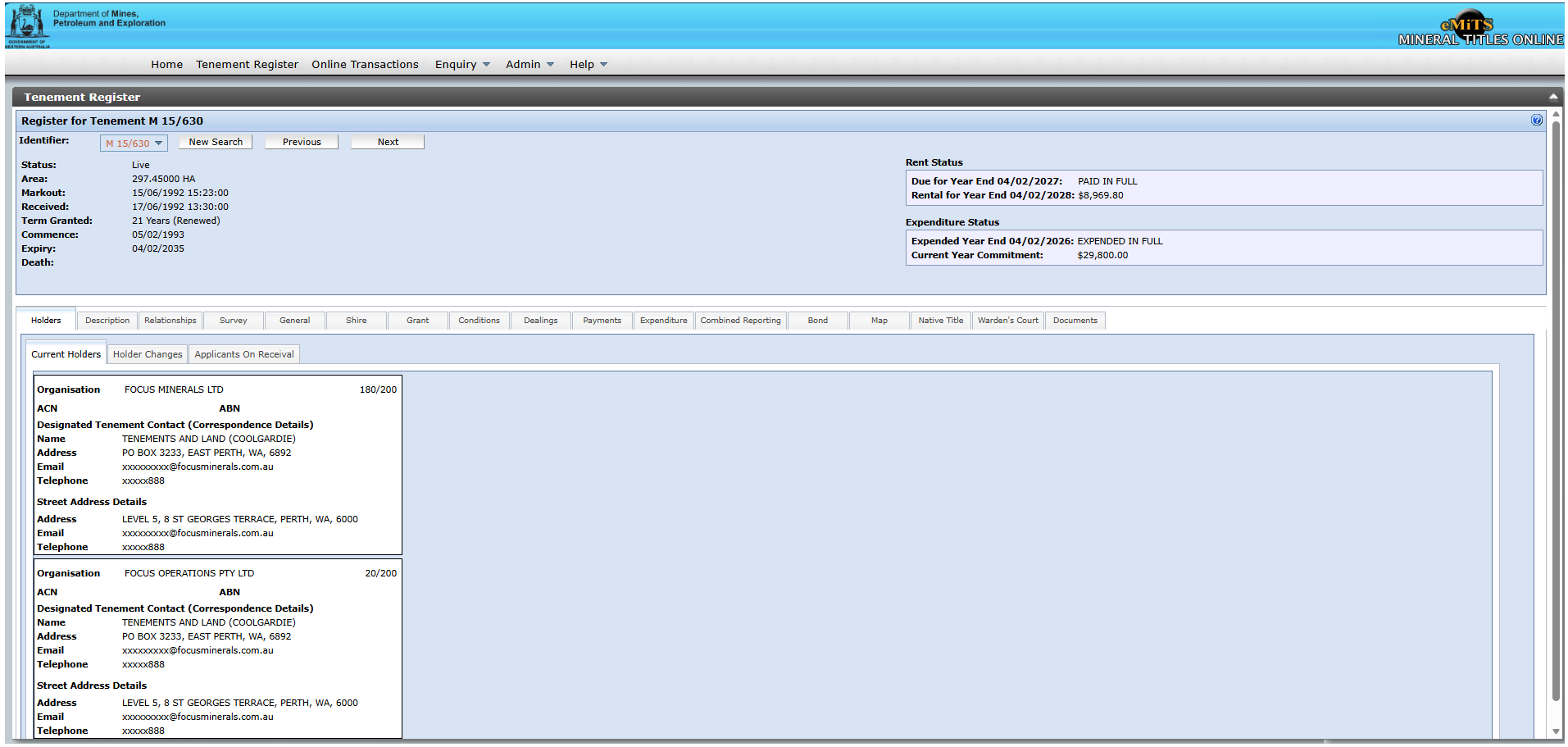
Appendix C: Addendum – *Dasyurus geoffroii*

Appendix D: Addendum – *Jalmenus aridus*

Appendix E: Pre-clearance surveys completed to meet conditions of CPS 10870/1

Appendix A: Proof of ownership





Department of Mines, Petroleum and Exploration

eMITS MINERAL TITLES ONLINE

Home | Tenement Register | Online Transactions | Enquiry | Admin | Help

Tenement Register

Register for Tenement M 15/630

Identifier: M 15/630 | New Search | Previous | Next

Status:	Live
Area:	297.45000 HA
Markout:	15/06/1992 15:23:00
Received:	17/06/1992 13:30:00
Term Granted:	21 Years (Renewed)
Commence:	05/02/1993
Expiry:	04/02/2035
Death:	

Rent Status

Due for Year End 04/02/2027: PAID IN FULL
Rental for Year End 04/02/2028: $8,969.80

Expenditure Status

Expended Year End 04/02/2026: EXPENDED IN FULL
Current Year Commitment: $29,800.00

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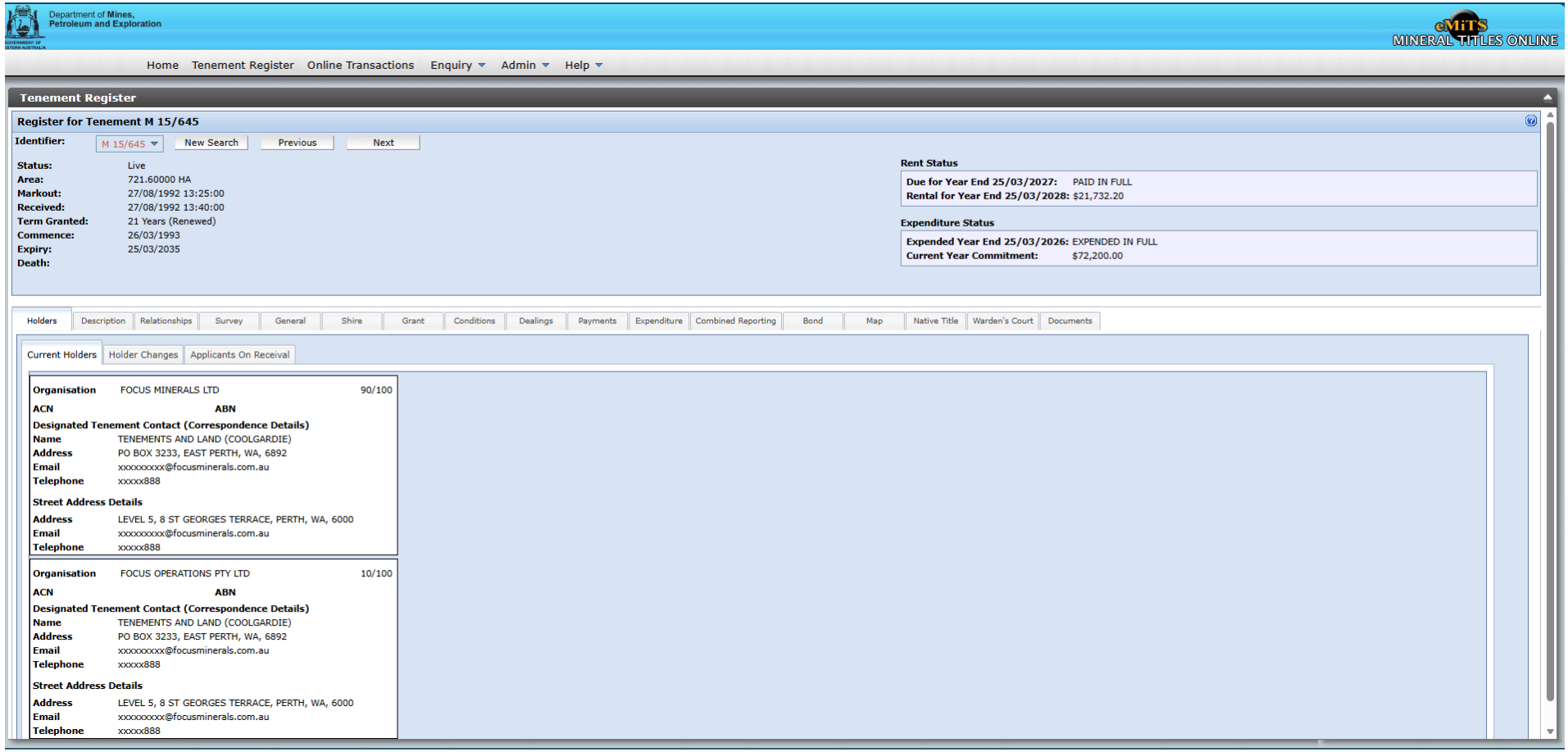
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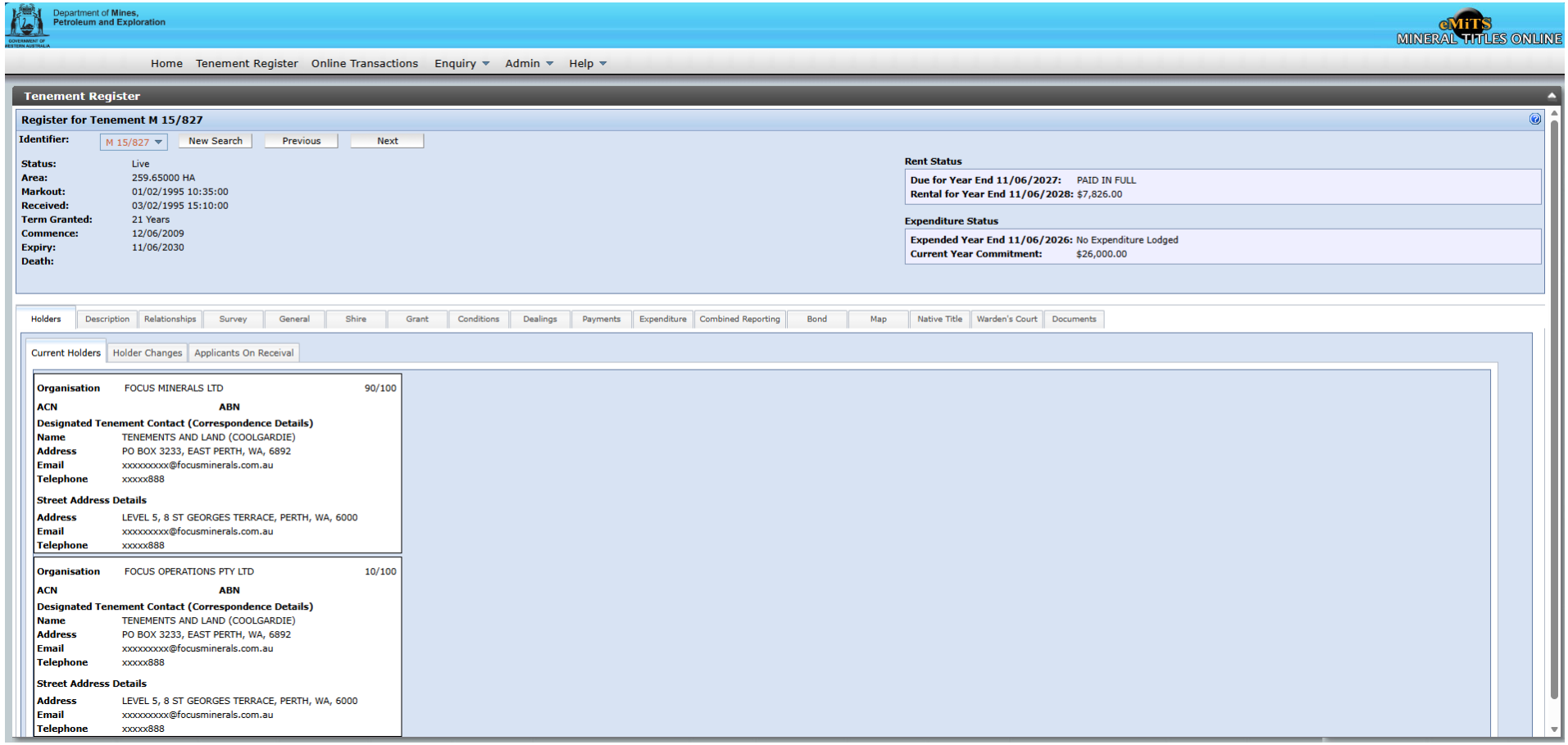
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ACN **ABN**
Designated Tenement Contact (Correspondence Details)
Name TENEMENTS AND LAND (COOLGARDIE)
Address PO BOX 3233, EAST PERTH, WA, 6892
Email xxxxxxxxx@focusminerals.com.au
Telephone xxxxx888

Street Address Details
Address LEVEL 5, 8 ST GEORGES TERRACE, PERTH, WA, 6000
Email xxxxxxxxx@focusminerals.com.au
Telephone xxxxx888

Organisation FOCUS OPERATIONS PTY LTD 20/200
ACN **ABN**
Designated Tenement Contact (Correspondence Details)
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Email xxxxxxxxx@focusminerals.com.au
Telephone xxxxx888

Street Address Details
Address LEVEL 5, 8 ST GEORGES TERRACE, PERTH, WA, 6000
Email xxxxxxxxx@focusminerals.com.au
Telephone xxxxx888


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MINERAL TITLES ONLINE
Home
Tenement Register
Online Transactions
Enquiry
Admin
Help
Tenement Register
Register for Tenement M 15/645
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M 15/645
New Search
Previous
Next
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Expended Year End 25/03/2026: EXPENDED IN FULL
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Grant
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Dealings
Payments
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Bond
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Native Title
Warden's Court
Documents
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Holder Changes
Applicants On Receival
Organisation FOCUS MINERALS LTD 90/100
ACN ABN
Designated Tenement Contact (Correspondence Details)
Name TENEMENTS AND LAND (COOLGARDIE)
Address PO BOX 3233, EAST PERTH, WA, 6892
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Email xxxxxxxxx@focusminerals.com.au
Telephone xxxxx888
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Home Tenement Register Online Transactions Enquiry Admin Help
Tenement Register
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Expended Year End 11/06/2026: No Expenditure Lodged
Current Year Commitment: $26,000.00
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Name TENEMENTS AND LAND (COOLGARDIE)
Address PO BOX 3233, EAST PERTH, WA, 6892
Email xxxxxxxxx@focusminerals.com.au
Telephone xxxxx888
Street Address Details
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ACN ABN
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Appendix B: Biological surveys

360 environmental | Part of SLR

CNX Three Mile Hill
Coolgardie Gold Project

Biological Surveys

Prepared for

Focus Minerals Limited

June 2022

people • planet • professional

Document Reference	Revision	Prepared by	Reviewed by	Admin Review	Submitted to Client	
					Copies	Date
4794AA_Rev0	Internal Draft	LC, JW	SC, EW, ML	LI	-	28/04/2022
4794AA_Rev1	Client Draft	360 Environmental	Focus Minerals Limited	-	1 electronic	02/05/2022
4794AA_Rev2	Final	360 Environmental	Focus Minerals Limited	LI	1 electronic	20/06/2022

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Executive Summary

Focused Mineral Limited commissioned 360 Environmental (part of SLR Consulting) to undertake a detailed flora and vegetation survey and basic vertebrate fauna and habitat survey at selected sites within the Three Mile Mine Project, Coolgardie. The Survey Area consists of four defined survey areas adjacent to the townsite of Coolgardie, Western Australia, and covers approximately 1360.72 ha.

The purpose of the assessment was to identify key biological values to inform decisions regarding the specific lease areas for proposed construction sites within the Survey Area.

Flora and Vegetation

The flora desktop assessment identified 90 conservation significant taxa occurring within 50 km of the Survey Area, including three Threatened taxa (*Gastrolobium graniticum, Tetratheca spenceri* and *Thelymitra stellata*). A pre-survey likelihood of occurrence assessment was undertaken and determined 20 taxa as having a high likelihood of occurrence, 18 taxa as having a medium likelihood of occurrence, and 51 taxa as having a low likelihood of occurrence. Following the survey, two taxa retained a high likelihood of occurrence.

The detailed flora and vegetation survey was undertaken in between the 11 - 15 October 2021 (Trip 1) and 15 - 19 November 2021 (Trip 2), with the survey recording the floristic composition and vegetation types from 74 quadrats, 22 relevés and 91 mapping notes. A total of 149 taxa were recorded from 78 genera across 35 families.

No Threatened flora taxa pursuant to the Environment Protection and Biodiversity Conservation Act 1999 and/or gazetted as Threatened pursuant to the Biodiversity and Conservation Act 2016 were recorded during the survey.

One Priority listed flora taxon was identified; a single population of *Austrostipa blackii* (P3) consisting of approximately 10 individuals was recorded within a single quadrat. The vegetation it was recorded in was heavily surveyed and no further populations were recorded.

Thirteen introduced taxa were recorded in the Survey Area, of which one, the Common Prickly Pear (**Opuntia stricta*) is listed as a Declared Pest, and a Weed of National Significance.

Ten vegetation types were described and mapped within the Survey Area. Vegetation in the Survey Area was representative of existing broad scale vegetation, as a well as soil and land system mapping for the area.

Vegetation condition ranged from Excellent to Completely Degraded with the majority considered to be in Excellent condition. Evidence of disturbance across the Survey Area included mine works, cattle grazing, vehicle tracks, weeds, and litter.

Vertebrate Fauna

The fauna desktop assessment identified 20 conservation significant species occurring within 50 km of the Coolgardie Survey Area comprising 17 bird species and 3 mammal species.

Fauna habitat mapping was undertaken based on a combination of aerial imagery, field observations and fauna habitat assessment data. Five fauna habitats were mapped within the Survey Area, of which the *Eucalyptus* Woodland and the *Acacia* Shrubland habitat types represent the most value to conservation significant fauna and overall fauna assemblage.

The basic terrestrial vertebrate fauna survey was undertaken in between the 11 – 15 October 2021 (Trip 1) and 15 – 19 November 2021 (Trip 2). This is considered suitable timing to survey for birds, mammals, reptiles, and summer breeding amphibians, but outside the optimal survey period for autumn and winter breeding amphibians. A total of 61 fauna taxa from 33 families comprising of: 42 birds from 21 families, ten mammals from seven families and nine reptiles from five families. No amphibian taxa were recorded.

One conservation significant taxon, the Western Quoll, Chuditch (*Dasyurus geoffroii fortis*) which is listed as Vulnerable under the Biodiversity Conservation Act and Environment Protection and Biodiversity Conservation Act, was recorded within the Survey Area. Chuditch scat was observed during the field survey.

Seven introduced mammal taxa were recorded during the survey, Goat (*Capra hircus*), European Cattle (*Bos primigenius taurus*), Dog/Dingo (*Canis familiaris*), Red Fox (*Vulpes vulpes*), Horse (*Equus caballus*), Cat (*Felis catus*) and Rabbit (*Oryctolagus cuniculus*).

Although outside the scope of this report, potential habitat for Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*), which is listed as Critically Endangered under the Biodiversity Conservation Act and Environment Protection and Biodiversity Conservation Act, and the Inland Hairstreak butterfly (*Jalmenus aridus*), which is listed as Priority 1 by the Department of Biodiversity, Conservation and Attractions, was observed within the Survey Area.

Abbreviations

Abbreviations used through the report are described below in Table 1.

Table 1: Abbreviations

Abbreviation	Description
BAM Act	Biosecurity and Agriculture Management Act 2007
BC Act	Biodiversity Conservation Act 2016
BoM	Bureau of Meteorology
CD	Conservation Dependent Fauna
CR	Critically Endangered
DAWE	Department of Agriculture, Water, and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DoE	Department of Environment
DP	Declared Pest
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EN	Endangered
EP Act	Environmental Protection Act 1986
EPA	Environmental Protection Authority
EPBC Act	Environment Protection Biodiversity and Conservation Act 1999
ESA	Environmentally Sensitive Area
FML	Focus Minerals Limited
GDE	Groundwater Dependent Ecosystem
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys for Assessments
MI	Migratory
MNES	Matters of National Environmental Significance
NVIS	National Vegetation Information System
OS	Other Specially Protected Fauna
P	Priority
PEC	Priority Ecological Community
PMST	Protected Matters Search Tool
T	Threatened
TEC	Threatened Ecological Community
TPFL	Threatened and Priority Flora Database
VU	Vulnerable
WAH	Western Australian Herbarium

Abbreviation	Description
WAM	Western Australian Museum
WoNS	Weeds of National Significance

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Appendix E Flora Site Data
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1 Introduction

1.1 The Project

Focus Mineral Limited (FML) commissioned 360 Environmental (part of SLR Consulting) to undertake a detailed flora, vegetation, and basic terrestrial vertebrate fauna assessment to support the environmental and planning approvals for proposed expansions to the FML mining operation in Coolgardie Western Australia (the Project).

The 1360.72 ha FML Coolgardie (the Survey Area) is located approximately 40 km southwest of Kalgoorlie in the Coolgardie bioregion of Western Australia. The Survey Area includes multiple polygons representing potential deposits, waste pits, haul roads, and associated infrastructure.

1.2 Objectives and Scope

The purpose of the biological survey was to delineate key flora, vegetation and terrestrial vertebrate fauna values within the Survey Area and identify potential environmental sensitivities that may impact The Project.

The scope of works includes:

- Undertake a desktop assessment including relevant database searches and a literature review to compile and summarise existing records of flora, vegetation, and terrestrial vertebrate fauna (including conservation significant species and communities) within the vicinity of the Survey Area
- Undertake a detailed flora and vegetation survey in accordance with EPA Technical Guidance (Environmental Protection Authority, 2016)
- Undertake targeted searching for flora of conservation significance within the Survey Area
- Undertake a basic terrestrial vertebrate fauna survey in accordance with EPA Technical Guidance (Environmental Protection Authority, 2020)
- Identify and assess conservation significant terrestrial vertebrate fauna or suitable conservation significant terrestrial vertebrate fauna habitat potentially occurring within the Survey Area
- Produce a technical report based on the findings of the above
- Supply a geospatial data package prepared in accordance with IBSA requirements.

This report presents the outcomes of the FML Coolgardie flora, vegetation, and terrestrial vertebrate fauna assessment undertaken to support the above objectives.

2 Background

2.1 Protection of Flora, Vegetation and Fauna

Western Australian flora and fauna is protected formally and informally by legislative and non-legislative measures:

Legislative measures:

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

Non-legislative measures:

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

These protection mechanisms are supported by guidance documents published by the Environmental Protection Authority (EPA) and Department of Agriculture, Water, and the Environment (DAWE):

- *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (Environmental Protection Authority, 2016)
- *Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (Environmental Protection Authority, 2020)
- *Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, 2013)
- *Survey Guidelines for Australia's Threatened Mammals* (Department of Sustainability Environment Population and Communities, 1999)
- *Survey Guidelines for Australia's Threatened Reptiles* (Department of Sustainability Environment Water Population and Communities, 2011)
- *Survey Guidelines for Australia's Threatened Birds Under the Environment Protection And Biodiversity Conservation Act 1999* (Department of the Environment Water Heritage and the Arts, 2010).

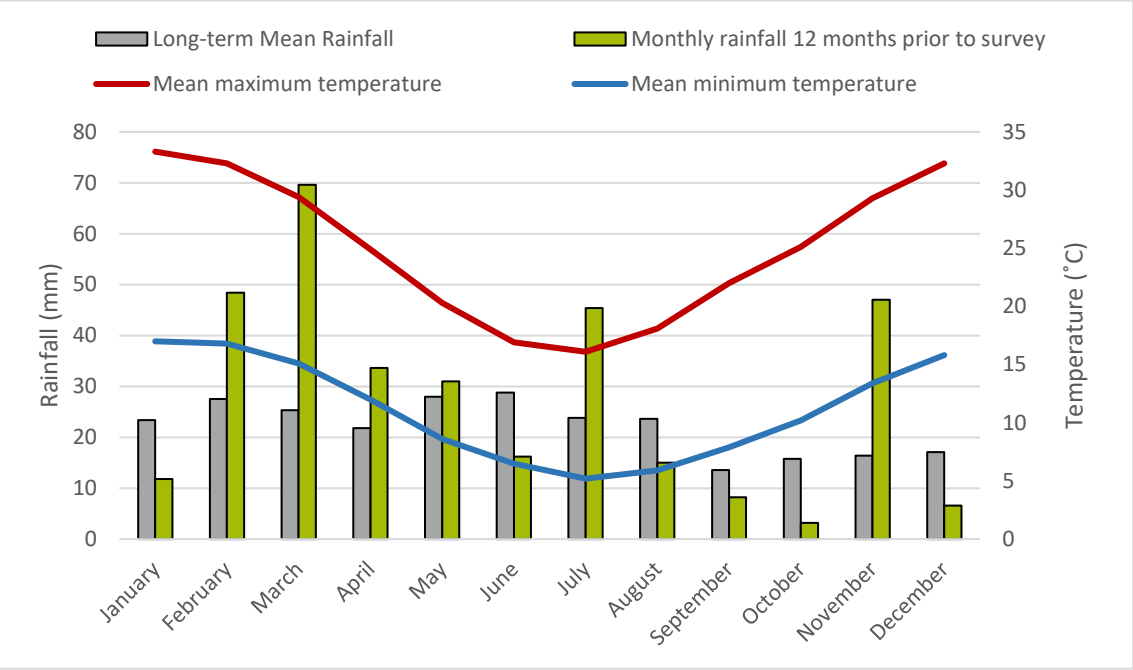
2.2 Existing Environment

2.2.1 Climate

The closest long-term Bureau of Meteorology weather station with a complete dataset is Coolgardie weather station (Station 012018) for climate data (i.e. temperature) and Koorarawalyee weather station (Station 012152) for rainfall data. The Coolgardie weather station is located approximately 75 km south of the Survey Area. Koorarawalyee weather station is located approximately 124 km southwest of the Survey Area.

The long-term mean minimum temperature for Coolgardie Weather Station ranges from 5.2˚C (July) to 16.8˚C (February) (1893 to 2020) and the long-term mean maximum temperature ranges from 16.1˚C (July) to 33.3˚C (January) (Graph 1) (Bureau of Meteorology, 2021).

The Koorarawalyee weather station recorded 336 mm of rainfall in the 12 months prior to the survey (October 2021 to November 2021), which is 66.4 mm above the long-term average of 269.6 for the same period (Bureau of Meteorology, 2021). In the three months prior to the survey (July 2021 to September 2021), 68.6 mm of rainfall was recorded, which is 7.6 mm above the long-term average of 61 mm for the same period (Bureau of Meteorology, 2021).



Graph 1: Long term and 2021 monthly weather and climate data for Coolgardie and Koorarawalyee

2.2.2 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 Survey Area occurs within the Coolgardie bioregion and Eastern Goldfield (COO3) subregion.

The Eastern Goldfield (COO3) subregion lies on the Yilgarn Cratons '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.

2.2.3 Soils and Land Systems

Soil landscapes and land system mapping of Western Australia describes broad soil and landscape characteristics from regional to local scales, ranging from 1:20,000 to 1:250,000 (Department of Primary Industries and Regional Development, 2018). The Survey Area occurs entirely within the BB5 land system, characterised by rocky ranges and hills of greenstones with basic igneous rocks as well as sandplains with brown calcareous loam (Figure 2) (Department of Primary Industries and Regional Development, 2018).

2.2.4 Hydrography

The Survey Area contains one small-permanent pool which is just south of Coolgardie-Esperance Highway, named Coolgardie Gorge. The Survey Area also contains four decommissioned deep abandoned mining pits which contain water and several minor watercourses that don't influence vegetation types present. The nearest major hydro geographical feature is a seasonally filled salt lake approximately 6 km east of the Survey area. The salt lake joins the Red, White and Douglas lakes as part of a larger interconnected salt lake system, which flows in a south westerly direction (Figure 2) (Department of Water and Environmental Regulation, 2018).

2.2.5 Broad Vegetation Types

Mapping of pre-European vegetation in Western Australia was completed on a broad scale (1:1,000,000) by Beard, (1976). These vegetation types were later refined by Shepherd, Beeston and Hopkins, (2002) resulting in 819 vegetation types.

Two broad vegetation associations are mapped over the Survey Area (Figure 3). Representation of the vegetation associations at a local, regional, and state level is shown in Table 2.

- **Coolgardie 9 –** Medium woodland; Eucalyptus woodland / Eremophila sparse shrubland. Associated species are coral gum (*Eucalyptus torquata*) and goldfields blackbutt (*E. lesouefii*)
- **Coolgardie 1294 –** Eucalyptus woodland. Wheatbelt; York gum, salmon gum etc. (*Eucalyptus loxophleba*, *E. salmonophloia*). Goldfields; gimlet, redwood etc. (*E. salubris*, *E. oleosa*). Riverine; rivergum (*E. camaldulensis*). Tropical; messmate, woolybush.

Table 2: Broad Vegetation Types within the Survey Area and their Representation at the State, Regional and Local Levels (Government of Western Australia, 2019)

System and Vegetation Association	Extent			
	Pre-European (ha)	Current (ha)	Remaining (%)	Managed in DBCA Lands (%)*
Representation across Western Australia				
9	240,509.33	235,161.94	97.78	8.07
1294	6,295.55	6,047.45	96.06	1.90
Representation across the Coolgardie Bioregion				
9	240,441.99	235,100.97	97.78	8.07
1294	6,295.55	6,047.45	96.06	1.90
Representation across the Eastern Goldfields Subregion				
9	235,047.15	229,757.07	97.75	8.26
1294	6,295.55	6,047.45	96.06	1.90
Representation across the Shire of Coolgardie				
9	166,572.37	163,720.39	98.29	9.81
1294	3,385.95	3,378.94	99.79	3.40

*as a portion of the current extent

2.2.6 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared by the Department of Water and Environmental Regulation (DWER) to prevent the degradation of important environmental values such as Threatened flora, Threatened Ecological Communities (TECs) or significant wetlands.

The Survey Area does not occur within a mapped ESA. The nearest ESA is the Rowles Lagoon Conservation Park located approximately 52 km north-west of the Survey Area (Department of Water and Environmental Regulation, 2020).

2.2.7 Conservation Areas

The Survey Area is not located within any listed conservation area (Department of Biodiversity Conservation and Attractions, 2021a). The nearest conservation area is the Kangaroo Hills Timber Reserve which is situated adjacent to the southernmost section of the Survey Area separated by Nepean Road (Figure 4).

2.2.8 Land Use

The dominant land use of the Eastern Goldfields subregion include: Unoccupied Crown Land (UCL) and Crown reserves, Grazing-Native pastures-leasehold, freehold, conservation, and Mining leases (Cowan, 2001).

The Survey Area covers sections of land classified as: mining lease, prospecting licence, and miscellaneous licence (Data WA, 2021). The Survey Area has a long history of mining activities, with extensive mine diggings including deep open pits and deep localised mine shafts.

3 Methods

3.1 Desktop Assessment

3.1.1 Literature Review

Background information on the Survey Area and surrounds was compiled prior to the field survey (see Section 3.1.1). Historical vegetation mapping (Beard, 1976; Shepherd, Beeston and Hopkins, 2002), land systems mapping (Department of Agriculture and Food WA, 2012), and the IBRA classification system (Cowan, 2001) were consulted to provide broad contextual knowledge of the vegetation units and habitat likely to be encountered within the Survey Area.

The literature review also considered a selection of biological reports detailing assessments undertaken in the region that were publicly available:

- Coolgardie Landfill - Flora, vegetation and fauna habitat assessment (Strategen Environmental, 2019)
- Fauna survey for Mungari Gold Operations Cutters Ridge Project (Phoenix Environmental Sciences, 2019)
- Flora and Vegetation Impact Assessment - Medcalf Project (Botanica Consulting, 2020)
- Level 1 Vertebrate Fauna Risk Assessment for Lot 500 Kalgoorlie West (Terrestrial Ecosystems, 2018)
- Reconnaissance Flora and Vegetation Survey for the Mt Marion Project Area (Native Vegetation Solutions, 2019)
- Reconnaissance Flora and Vegetation Survey of Lot 500 Great Eastern Highway Kalgoorlie (Native Vegetation Solutions, 2018)
- Reconnaissance Flora and Vegetation Survey of the Spargos Project - October 2020 (Native Vegetation Solutions, 2020)
- Vegetation Clearing - Fauna Assessment (Davyhurst, Callion, Waihi, Siberia, Riverina Clearance Areas) (Biostat Pty Ltd, 2020).

3.1.2 Database Searches

Database searches were undertaken to compile a list of potential flora and fauna and identify potential conservation significant flora, fauna, and ecological communities within or surrounding the Survey Areas (Table 3). In addition, an EPBC Protected Matters Search (PMST) was undertaken to identify the potential for Matters of National Environmental Significance (MNES) to occur within or surrounding the Survey Areas (Department of Agriculture Water and the Environment, 2020).

The search area for each parameter was varied to reflect distances recommended by DBCA. The search areas are herein referred to collectively as the Study Area.

Table 3 Database Searches of the Survey Area

Database Name	Date Received	Search Target	Search Area
Threatened and Priority Ecological Communities database search (Department of Biodiversity Conservation and Attractions, 2022)	7 October 2021	TECs and PECs	50 km buffer around the Survey Area
Threatened and Priority Flora (TPFL) database search (Department of Biodiversity Conservation and Attractions, 2021d)	7 October 2021	Threatened and Priority Flora	60 km buffer around the Survey Area
Western Australian Herbarium flora database search (Department of Biodiversity Conservation and Attractions, 2021e)			60 km buffer around the Survey Area
DBCA Threatened and Priority Fauna database search (Department of Biodiversity Conservation and Attractions, 2021c)	18 October 2021	Threatened and Priority Fauna	50 km buffer around Survey Area
NatureMap (Department of Biodiversity Conservation and Attractions, 2021b)	27 October 2021 (flora) 02 November 2021 (fauna)	Threatened and Priority flora and fauna, and inventory of potential flora and fauna	20 km buffer around the Survey Area (flora) 40 km buffer around Survey Area (fauna)
Protected Matters Search Tool (PMST) (Department of Agriculture Water and the Environment, 2021a)	25 October 2021	Commonwealth listed Threatened flora and fauna and TECs	50 km buffer around the Survey Area

3.1.3 Likelihood of Occurrence

Conservation significant flora and fauna species identified from the desktop assessment were assessed to determine the likelihood of their occurrence within the Survey Area, both prior to and post field survey. The assessment was completed based on the likelihood of occurrence criteria presented in Table 4.

Only species either recorded within the Survey Area or considered as having a high or medium likelihood of occurrence will be discussed in detail. Species classified as having a low likelihood of occurrence based on the above criteria will not be discussed unless a justification for this classification is required.

For fauna, taxa listed as Marine only under the EPBC Act were not included as conservation significant taxa because the Marine only listed taxa identified by the desktop assessment and field survey were common and widespread, taxa listed as Marine only do not constitute matters

of national environmental significance (MNES) under the EPBC Act, and the Survey Area does not contain any marine habitat.

Table 4 Likelihood of Occurrence Criteria

Rank	Criteria
Previously Recorded	The species has been previously recorded in the Survey Area
High (Likely to occur)	• Preferred habitat capable of supporting individuals or populations is present within the Survey Area • The survey Areas is within the taxon's known distribution • There are existing records of the species near the Survey Area (within 15 km) (flora) • There are existing records of the species near the Survey Area recorded within the last 15 years (fauna) • The species is strongly linked to a specific habitat, which is present in the Survey Area • The species has more general habitat preferences, and suitable habitat is present.
Medium (May occur)	• There is suitable (not necessarily preferred) habitat in the Survey Area, but the species is recorded infrequently in the locality • The Survey Area is within or near the taxon's known distribution • They Survey Area and surrounding area may support individuals or populations present within the Survey Area • There are existing records of the species from the locality (within 30 km for flora and 50 km for fauna), however: ○ The species is strongly linked to a specific habitat, of which only a small amount is present in the Survey Area ○ The species has more general habitat preferences, but only some suitable habitat is present.
Low (Unlikely to occur)	• No suitable habitat is present within the Survey Area, or the Survey Area is well outside the taxon's known distribution for the taxon is considered locally or regionally extinct • The Survey Area and surrounding habitat are unlikely to support individuals or populations of the taxon, however individuals may rarely occur as transients or vagrants • The species is linked to a specific habitat, which is absent from the Survey Area; or • Suitable habitat is present, however there are no existing records of the species from the locality despite reasonable previous search effort in suitable habitat; or • There is some suitable habitat in the Survey Area, however the species is very infrequently recorded in the locality.

3.2 Field Survey Effort

3.2.1 Trip 1

The biological survey was undertaken between the 11 - 15 October 2021.

The flora, vegetation and fauna survey was undertaken by Senior Botanist Jason Webb, Principal Zoologist Dr Michael Lohr and Ecologist Lachlan Crossley. The field team has over 20 years of combined experience conducting surveys of similar scope throughout Western Australia.

3.2.2 Trip 2

The biological survey was undertaken between the 15 - 19 November 2021.

The flora, vegetation and fauna survey was undertaken by Senior Botanist Jason Webb, Principal Ecologist Scott Walker and Ecologists Bridget Duncan and Lachlan Crossley. The field team has over 20 years of combined experience conducting surveys of similar scope throughout Western Australia.

The survey effort from both trips is shown in Figure 5.

3.3 Flora and Vegetation

3.3.1 Establishment of Flora Sites

Indicative flora sites were identified prior to the survey using aerial photography to estimate broad vegetation patterns within the Survey Area. The location and number of flora sites completed were adjusted on site to achieve sites most representative of the vegetation present.

Where possible, at least three flora sites were sampled for each vegetation type observed within the Survey Area. Some vegetation types that were not large enough to accommodate three flora sites had only one or two sites sampled.

Flora sites consisted of quadrats (20 m x 20 m) and relevés of approximately 400 m^2 where possible, or alternate configurations approximately equating to 400 m^2 (as required in areas such as drainage lines, gullies, and narrow ridge lines). A comprehensive record of the flora present at the time of sampling was recorded for both quadrat and relevé sites.

Flora site locations were recorded using a handheld GPS, the start and finish point of linear relevés, and the central point of circular relevés. At each flora site, the following was recorded:

- Site code
- Date and personnel
- Landform and soil description
- Relevant site descriptors including, slope, aspect, litter cover, bare ground cover and fire history
- Inventory of vascular flora including the approximate average height and percent foliar cover for each taxon recorded
- Vegetation description in accordance with the National Vegetation Information System (NVIS), Level 5 ‘association’, whereby the dominant growth form, height, cover, and species (three species) for the three traditional strata (upper, mid, and ground) are described are described

- Vegetation condition in accordance with the Southwest and Interzone Botanical Provinces/Eremaean and Northern Botanical Provinces vegetation condition scale (Environmental Protection Authority, 2016a), and evidence of disturbance (for example clearing, rubbish, feral animals, weed incursion and evidence of feral animals and dieback) where present, and
- Photograph of the vegetation occurring within the site.

A total of 74 quadrats, and 22 relevés were established within the Survey Area. An additional 91 mapping notes were completed to aid vegetation mapping delineation.

3.3.2 Opportunistic Flora

Additional flora taxa observed opportunistically around flora sites or while traversing on foot within the Survey Area were also recorded. Where populations of conservation significant flora taxa, Declared Pests (DPs) or WoNS were encountered, a GPS location and a count of the individuals present was recorded.

3.3.3 Targeted Searching

Prior to the survey conservation significant flora with the likelihood or potential to occur within the Survey Area was compiled (see section 3.1.3). Field personnel familiarised themselves with photographs, reference samples and descriptions of these taxa before conducting the survey.

The entire Survey Area was not systematically searched. Rather, targeted searching focussed on habitat suitable for Conservation Significant Flora. Furthermore, potential habitat within the proposed footprint was prioritised for targeted searching over areas outside the proposed footprint.

Personnel also actively searched for conservation significant flora species in and around flora sites, while traversing on foot within the Survey Area and in known locations or preferred habitat encountered in the Survey Area.

Where Threatened or Priority flora were encountered in the field a GPS location was taken and a count of individuals was recorded, followed by a search in the local vicinity to determine if any other individuals were present nearby and delineate population boundaries where relevant. Specimens of any potential conservation significant flora that could not be identified in the field were collected for identification and lodgement at the Western Australian Herbarium (WAH).

3.3.4 Statistical Analyses

Statistical analysis of quadrat data was undertaken in accordance with EPA guidelines for a detailed flora and vegetation survey.

3.3.4.1 Species Accumulation Curve

Species accumulation curves were plotted using Primer-E version 6.1.5. to determine the adequacy of the survey (Clarke and Gorley, 2006). The treatments comprised Sobs (Mao Tao), to reflect the number of species observed (based on a given total of species recorded), and richness estimators Chao 1, Chao 2, Jacknife 1, Bootstrap and Michaelis-Menton to estimate the total sample size of flora taxa present. Species accumulation curves for this survey were calculated using data collected from the flora sites within the Survey Area. All flora taxa, both annual and perennial, within each flora site were used in generating the species accumulation curve. Unconfirmed flora were included if they were the only species present from a Genus.

3.3.5 Taxonomy and Nomenclature

Where field identification of plant taxa was not possible, specimens were collected for identification using resources of the WAH. Identification of flora collections was completed by experienced Taxonomist Frank Obbens.

The finalised species list was cross-referenced against current flora databases and relevant taxonomic literature (Western Australian Herbarium, 2021) to determine name currency, conservation status and known distribution of each taxon. Introduced species were compared against the current BAM Act Declared Plants list the WoNS list to determine their control status (Department of Agriculture Water and the Environment, 2021b; Department of Primary Industries and Regional Development, 2021).

Any conservation significant flora taxa, including potential Threatened and Priority species, range extensions and potential new taxa were submitted to the WAH for verification and lodgement. Where relevant, Threatened and Priority Flora Report Forms (TPFRFs) were submitted to DBCA.

3.3.6 Vegetation Unit and Condition Mapping

Broad vegetation and condition mapping was conducted in the field, with boundaries delineated over aerial photography, at a scale of 1:5,000. Broad vegetation units were refined based on taxonomic identification of flora collections, statistical analysis of data collected from the quadrats and relevés, and mapping notes taken during the field survey. Vegetation condition mapping was refined based on site data and mapping notes. Finalised polygons were digitised and produced as electronic mapping data using GIS software.

3.4 Vertebrate Fauna

3.4.1 Vertebrate Fauna Habitat Assessment

Fauna habitat assessments were undertaken throughout the Survey Area to identify fauna habitat values. Habitat assessment locations are displayed in Figure 5. The following information, which has been adapted from the habitat attributes listed in the Technical Guidance (Environmental Protection Authority, 2020), was collected at each habitat assessment site using Fulcrum, a mobile data collection app:

- Site photo
- Landform
- Soil type and colour
- Rock types, surface stone cover and size classes
- Key habitat and microhabitat features including leaf litter, logs, burrows, rocky outcrops, rock crevices, hollows, water sources
- Habitat quality, fire history and evidence of disturbance
- General description of vegetation structure.

Fauna habitat mapping boundaries were delineated over aerial imagery at a scale of approximately 1:5,000 based on field observations and fauna habitat assessment data. Polygons were digitised and produced as electronic mapping data using GIS software.

3.4.2 Opportunistic Fauna Records and Active Searches

Opportunistic observations of fauna were recorded throughout the Survey Area. Observations of primary evidence (direct sightings, calls) and secondary evidence (tracks, scats, diggings etc.) were recorded. Active searches were undertaken throughout the Survey Area in microhabitats likely to contain fauna. They primarily involved raking leaf litter, peeling bark, and splitting dead wood.

3.4.3 Identification and Taxonomy

Where there was doubt on a species name (through subsequent name changes or taxonomic reviews), an effort was made to determine the current scientific name for each taxon. Taxonomy and nomenclature in this report follows the WA Museum checklist 2021 (Western Australian Museum, 2021) where relevant.

4 Results

4.1 Limitations

Limitations and constraints of the flora, vegetation and fauna survey are detailed below in Table 5

Table 5: Limitations and Constraints Associated with the Survey

Variable	Degree of Limitation	Potential Constraints on Survey Outcomes
Survey Scope	Not a constraint	The detailed flora and vegetation survey was undertaken in accordance with EPA Technical Guidance (Environmental Protection Authority, 2016) and was considered appropriate to support approvals applications. Targeted searching for flora of conservation significance was undertaken, however, systematic searches were not feasible. Rather, targeted searching focused on habitat suitable for conservation listed flora within the proposed development footprint. A basic terrestrial vertebrate fauna survey was undertaken in accordance with EPA Technical Guidance (Environmental Protection Authority, 2020) and was considered appropriate to support approvals applications.
Availability of Data	Not a constraint	All data required to complete the scope of works including regional and local contextual information was available.
Site Access	Not a constraint	The Survey Area was able to be accessed by vehicle and on foot.
Survey Intensity and Resources	Not a constraint	A total of 96 flora sites (comprising 74 quadrats and 22 relevés) were sampled across the Survey Area. An additional 91 mapping notes were undertaken to aid vegetation mapping and delineation. Sufficient time was allocated to the flora and vegetation survey, given the size and complexity of the Survey Area, and the expected level of survey intensity. The survey effort was considered adequate to assess the flora and vegetation values of the Survey Area and provide information required to support approvals applications. Eighty fauna habitat assessments were completed, and 61 fauna taxa were recorded opportunistically throughout the Survey Area. The survey effort was appropriate for a basic terrestrial vertebrate fauna survey.

Variable	Degree of Limitation	Potential Constraints on Survey Outcomes
Experience	Not a constraint	The flora and vegetation surveys were undertaken by Senior Botanist Jason Webb and Botanist Bridget Duncan, who have over 5 years combined experience conducting surveys of similar scope throughout Western Australia. Identification of flora collections was completed by experienced taxonomist Frank Obbens at the WAH. Any specimens with novel characteristics were submitted to the WAH for formal identification. The fauna survey was undertaken by Lachlan Crossley (Ecologist), Dr. Michael Lohr (Principal Zoologist) and Scott Walker (Principal Ecologist), who have 25 years of combined experience conducting fauna surveys. Fauna identification was reviewed by Dr. Michael Lohr (Principal Zoologist) and Evan Webb (Senior Zoologist), using photos of tracks and scats taken during the field survey.
Timing, weather, season	Not a constraint Partial limitation for fauna (Amphibians)	The recommended primary survey period for the region as per the EPA Technical Guidance, is September to November. Survey was conducted in October and November 2021. Rainfall was sufficient prior to the commencement of the field survey and air temperatures were slightly below average. Therefore, weather conditions were not a constraint. According to the EPA Technical Guidance, mammals do not have a preferred time of year for optimal observation. For reptiles, the guidance suggests October to December (for primary survey). As the surveys were conducted in October and November, timing was suitable for reptiles. The optimum timing for observation of amphibians is between May and August (autumn-winter breeders) and November-December (summer breeders). Therefore, the timing of the surveys was not suitable for autumn-winter breeders. The optimum time to observe birds is between September and December for most bush birds and between November and March for migratory birds. As the surveys were conducted in October and November, timing was suitable for birds.
Life Forms Sampled	Not a constraint	The Survey Area was traversed by vehicle and on foot and representative sites of all remnant vegetation were sampled. All flora species encountered within the Survey Area were recorded. A total of 145 vascular flora taxa were recorded from the Survey Area, comprising 93.8% native flora taxa and 6.2% introduced flora taxa. Of the 145 flora taxa recorded, 18 taxa (12.4%), could not be identified to species level because they were sterile at

Variable	Degree of Limitation	Potential Constraints on Survey Outcomes
		the time of the survey. This was not considered a constraint as it represented a very small portion of the flora sampled. None of the unknown flora taxa collected were analogous to Threatened or Priority flora taxa identified by the database searches as likely to occur within the Survey Area, nor were they representative of flora of other significance. The basic vertebrate fauna survey used a range of techniques to detect fauna taxa within the Survey Area. A total of 61 vertebrate fauna taxa were recorded within the Survey Area, comprising 54 confirmed native taxa and seven introduced taxa. All fauna taxa recorded were able to be identified to species level by direct or indirect observation with a high level of confidence.
Mapping Reliability	Not a constraint	Vegetation types were described and mapped based on quadrat/relevé data and additional mapping notes taken during the field survey. The number of sites and coverage of the Survey Area was considered sufficient to inform the survey. Fauna habitat mapping was based largely on vegetation mapping and there were no constraints on mapping reliability.
Disturbances (fire, flood etc.)	Not a constraint	No disturbances occurred during any of the surveys. Areas of disturbance associated with clearing, mining, rubbish, weeds, and the presence of introduced fauna were recorded but were not a constraint on the results of the survey.
Completeness	Not a constraint	The survey was considered complete for a detailed flora and vegetation survey and basic vertebrate fauna survey. All vegetation types and fauna habitats were surveyed and delineated within the Survey Area, however not all vegetation types were surveyed with three flora sites; five vegetation types were surveyed with one or two flora sites.

4.2 Flora and Vegetation

4.2.1 Literature Review

The key findings of the flora and vegetation reports reviewed are summarised in Appendix A1.

4.2.2 Database Searches

Database searches identified 90 conservation significant flora species occurring within 50 km of the Survey Area (Figure 6, Appendix B), comprising:

- Three Threatened taxa
- Twenty-seven Priority 1 taxa

- Fourteen Priority 2 taxa
- Forty Priority 3 taxa, and
- Six Priority 4 taxa.

4.2.3 Likelihood of Occurrence

The pre-survey likelihood of occurrence assessment identified that of the 90 conservation significant flora species identified by the desktop assessment:

- 20 were considered to have a high likelihood of occurrence
- 18 were considered to have a medium likelihood of occurrence
- 51 were considered to have a low likelihood of occurrence.

Following the survey, the likelihood of occurrence was re-assessed and found:

- Two taxa were considered to have a high likelihood of occurrence, due to close records and existing, contiguous habitat within the Survey Area.

The likelihood of occurrence assessment is provided in Appendix C.

4.2.4 Vegetation of Conservation Significance

Database searches did not return any listed Threatened Ecological Communities or Protected Ecological Communities within 50 km of the Survey Area.

4.2.5 Flora Composition

The survey recorded a total of 149 taxa from 78 genera across 35 families (Appendix D). The dominant families were Chenopodiaceae (26 taxa) and Myrtaceae (15 taxa). The most dominant genera were *Eucalyptus* (12 taxa) and *Eremophila* (10 taxa).

4.2.6 Flora of Conservation Significance

4.2.6.1 Threatened or Priority Flora

No Threatened flora species pursuant to the EPBC Act 1999 and/or gazetted as Threatened pursuant to the BC Act 2016 were recorded during the survey.

One Priority taxon was recorded within the Survey Area (Figure 7a, Plate 1). A population consisting of approximately 10 individuals of *Austrostipa blackii* (P3) was recorded in quadrat C1Q01. This taxon is a tufted, perennial, grass, typically growing up to 1 m high that flowers between September and November. The WAH has 41 specimens lodged with records across the Avon Wheatbelt, Coolgardie and Yalgoo bioregions (Western Australian Herbarium, 2022). The habitat descriptions for this taxon are typically mixed Eucalypt species, tall Acacia shrublands and open woodlands of *Allocasuarina dielsiana* and *Allocasuarina tessellata* (Western Australian Herbarium, 2022). *Austrostipa blackii* (P3) grows on gently inclined lower slopes of basalt with red-brown deep sandy clay loam soils (Western Australian Herbarium, 2022).



Plate 1: *Austrostipa blackii* (P3)

Within the Survey Area it was recorded within vegetation unit AcEoaDl (quadrat C1Q01), in association with *Acacia collegialis, Eremophila* spp. and *Dodonaea lobulata*. This vegetation type was sampled heavily and was not recorded at any other site.

4.2.7 Introduced Taxa

A total of 13 introduced taxa were recorded within the Survey Area, representing 8.7% of the total taxa recorded (Table 6). One taxon (**Opuntia stricta*) is a Declared Pest and listed as a WoNS (DAWE, 2021b; DPIRD, 2021). Eight individuals of **O. stricta* were recorded (Figure 8).

Three introduced taxa are unlisted under the BAM Act, which prohibits them access to Western Australia, however they are not assigned a control management category (DPIRD, 2021).

Table 6: Introduced Flora Species within the Survey Area

Species	Common Name	Status under BAM Act	WoNS
**Agave americana*	Century plant	Permitted - s11	No
**Asphodelus fistulosus*	Onion Weed	Permitted - s11	No
**Carrichtera annua*	Ward's Weed	Permitted - s11	No
**Centaurea melitensis*	Maltese Cockspur	Permitted - s11	No
**Crassula ovata*	Jade Tree	Permitted - s11	No

Species	Common Name	Status under BAM Act	WoNS
**Heliotropium europaeum*	Common Heliotrope	Permitted - s11	No
**Nicotiana glauca*	Tree Tobacco	Permitted - s11	No
**Oligocarpus calendulaceus*	-	Unlisted – s14	No
**Rumex vesicaria*	Ruby Dock	Unlisted – s14	No
**Salvia verbenaca*	Wild Sage	Permitted - s11	No
**Schinus molle* var. *areira*	-	Unlisted – s14	No
**Sonchus asper*	Rough Sowthistle	Permitted - s11	No
**Opuntia stricta*	Common Prickly Pear	Declared Pest - s22(2)	Yes

4.2.8 Unconfirmed Flora

Eighteen specimens (12.1% of the taxa recorded) could not be identified to species level because the taxa were sterile at the time of the survey (Appendix D). Of these, all but one, Malvaceae sp., were able to be identified to genus level, and two were assigned a tentative genus, ?*Enchylaena tomentosa* and ?*Pimelea* sp.

None of the unconfirmed flora taxa were analogous to Priority flora taxa identified by the database searches.

4.2.9 Vegetation Condition

The Survey Area has been subjected to medium to high level disturbances, including historical small and large scale mine excavations, makeshift tracks, cattle grazing, weeds, and litter. As such, vegetation condition with the Survey Area was predominantly Excellent, and ranged to Completely Degraded (where all vegetation had been completely cleared) (Keighery, 1994) (Table 7, Figure 7).

Table 7 Area (ha) covered by each vegetation condition category within the Survey Area

Vegetation Condition	Area (ha)	% of Survey Area
Excellent	790.6	58.1%
Very Good	327.9	21.2%
Good	78.4	5.8%
Completely Degraded	163.6	12%
Total	**1360.7**	**100**

4.2.10 Vegetation Types

Ten vegetation types were described and mapped across four broad landforms within the Survey Area (plains, rocky hills, claypan, and lake) (Table 8, Figure 8). The majority of the Survey Area was dominated by open plains with a mosaic of low *Eucalyptus* spp. (34.8%) which grew together across the plains, and Salmon Gum (*Eucalyptus salmonophloia*) open woodlands (31.4%). Small rocky hills dominated by *Acacia collegialis* shrubland also covered 13.1% of the Survey Area. While 11.5% of the Survey Area was considered to be 'Cleared', some of this was showing signs of revegetation with both native species (such as *Atriplex* and *Maireana*) and introduced (weed) species. These areas did not appear to have been intentionally revegetated.

Detailed data sheets for each flora site are provided in Appendix E.

Table 8: Vegetation Types Occurring within the Survey Area

Vegetation Unit and Description*	Local Landform	Total Area, Proportion of the Survey Area	Sites	Photograph
AcEoaDl *Acacia collegialis* (*A. acuminata*) tall shrubland over *Eremophila oldfieldii* subsp. *angustifolia*, *E. georgei*, *A. tetragonophylla* (*Senna artemisioides* subsp. *filifolia*, *Exocarpos aphyllus*) mid shrubland over *Dodonaea lobulata* (*Atriplex vesicaria, Ptilotus obovatus* var. *obovatus*) low shrubland	Rocky hills	178.5 ha 13.1%	C1Q01, C1Q04, C1Q06, C1Q09, C1Q21, C1Q25, C1Q26, C1Q28, C1Q29, C1Q30, C1R04, C2Q07, C2Q09, C2Q14, C2Q18, C2Q32, C2Q33, C2Q34, C2Q35, C2Q38, C2Q40	
Ec *Eucalyptus celastroides* low woodland	Low slopes of rocky hills	7.4 ha 0.5%	C2Q43, C2R17	

Vegetation Unit and Description*	Local Landform	Total Area, Proportion of the Survey Area	Sites	Photograph
EgAhSaf *Eucalyptus griffithsii* low open woodland over *Acacia hemiteles* and *Dodonaea stenozyga* (*A. jennerae, Alyxia buxifolia*) mid shrubland over *Senna artemisioides* subsp. *filifola* and *Atriplex vesicaria* (*Olearia muelleri*) low open shrubland	Plains	75.6 ha 5.6%	C1Q10, C1Q20, C1R13, C2Q27, C2Q29, C2Q31, C2Q41, C2Q50, C3Q01, C3Q02A, C3R01	
EooEiiDs *Eucalyptus oleosa* subsp. *oleosa* low open woodland over *Eremophila interstans* subsp. *interstans* mid isolated shrubs over *Dodonaea* stenozyga, *Eremophila glabra* subsp. *glabra*, and *Olearia muelleri* low open shrubland	Plains	11.1 ha 0.8%	C2Q11, C2Q37	

Vegetation Unit and Description*	Local Landform	Total Area, Proportion of the Survey Area	Sites	Photograph
ErMhOm *Eucalyptus* ?*ravida* low open woodland over *Melaleuca* ?*hamata* (*M. pauperiflora* subsp. *fastigiata*, *Eremophila oppositifolia* subsp. *angustifolia*) tall open shrubland over *Olearia muelleri* low isolated shrubs	Plains	4.7 ha 0.3%	C2Q02, C2Q04, C2Q06	
EsEiiAv *Eucalyptus salmonophloia* mid open woodland over *Eremophila intertans* subsp. *interstans* (*Eremophila parvifolia* subsp. *auricampi*, *Senna artemisioides* subsp. *filifola*) tall to mid isolated shrubs over Atriplex vesicaria low open shrubland	Plains	428.0 ha 31.4%	C1Q03, C1Q22, C1Q23, C1Q24, C2Q12, C2Q19, C2Q20, C2Q21, C2Q24, C2Q26, C2Q28, C2Q46, C2Q52, C2Q54	

Vegetation Unit and Description*	Local Landform	Total Area, Proportion of the Survey Area	Sites	Photograph
EsppEiiSaa *Eucalyptus salmonophloia* mid isolated trees over a mosaic of *E. celastroides, E. clelandiorum*, and *E. torquata* low open woodland over *Eremophila interstans* subsp. *interstans* (*Eremophila parvifolia* subsp. *auricampi*) mid isolated shrubs over *Senna artemisioides* subsp. *artemisioides*, *S. artemisioides* subsp. *filifola*, and *Atriplex vesicaria* low open shrubland	Plains, low hills	472.3 ha 34.8%	C1Q02, C1Q05, C1R05, C1R09, C1R10, C2Q01, C2Q03, C2Q05, C2Q08, C2Q10, C2Q13, C2Q15, C2Q16, C2Q36, C2Q39, C2Q42, C2Q45, C2R09, C3Q02, C3Q02B, C3Q06	
EtEaEpa *Eucalyptus torquata* low open woodland over *Exocarpos* aphyllus mid isolated shrubs over *Eremophila parvifolia* subsp. *auricampi*, *Westringia rigida*, and *Scaevola spinescens* (*Olearia muelleri*) low open shrubland	Plains, lower slopes of rocky hills	20.7 ha 1.5%	C1Q07, C1Q08, C1Q27, C1R01, C1R02, C1R03, C1R11	

Vegetation Unit and Description*	Local Landform	Total Area, Proportion of the Survey Area	Sites	Photograph
SI *Streptoglossa liatroides* low open herbland	Clay	0.3 ha <0.1%	C2R44	
Lake Coolgardie Gorge, natural semi-permanent pool system, with a fringe of native and introduced flora taxa including *Eucalyptus spp., *Schinus molle* var. *areira*, *Helioptropium europaeum*, and *Sonchus asper.*	Lake system	5.6 ha 0.4%	C2R07	

Vegetation Unit and Description*	Local Landform	Total Area, Proportion of the Survey Area	Sites	Photograph
Cleared Cleared or historically cleared areas including mine pits and borrow pits (often filled with water), bitumen roads, and dirt tracks. Some of these areas were showing signs of revegetation. With occasional *Eucalyptus griffithsii, Atriplex vesicaria*, *Maireana* spp., and assorted weed species.	Plains	156.9 ha 11.5%	C2Q17, C2Q25	

*Brackets indicate species that may or may not be present, but were observed as dominant/sub-dominant at some of the sites that make up the vegetation type

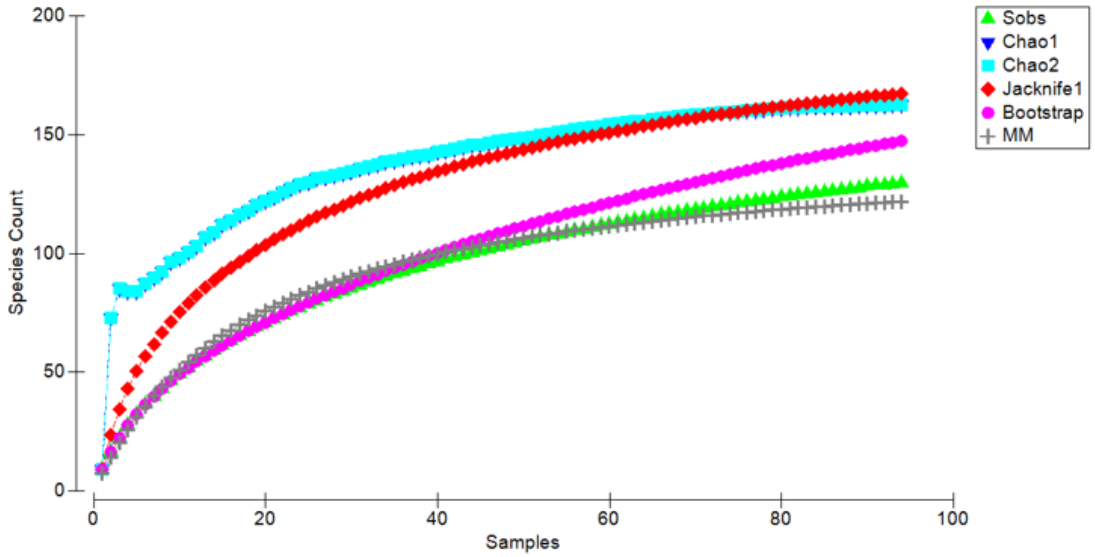
4.2.11 Groundwater Dependent Ecosystems

The Groundwater Depended Ecosystem (GDE) Atlas identified the Survey Area did not contain any GDEs (Bureau of Meteorology, 2022). The results from the flora and vegetation survey support the GDE Atlas as vegetation in the Survey Area comprised xerophytic species that are not groundwater dependent.

4.2.12 Survey Adequacy

Ninety-six flora sites (74 quadrats and 22 relevés) were sampled across the Survey Area. This was adequate to ensure sufficient coverage given the overall size of the Survey Area. Two vegetation types were sampled with only two sites, while a further two were sampled with a single site. This was due to the vegetation being highly restricted in the Survey Area.

The sample rarefaction (Mao Tau) for the Survey Area produced a smooth S_{obs} curve, steadily increasing towards asymptote indicating that the survey captured the majority of flora taxa present with the Survey Area (Graph 2).



Graph 2: Flora Species Accumulation Curve (Sample rarefaction)

Estimated species richness for the Survey Area ranged from 122.1 to 167.6, with an observed value of 130 taxa (Table 9). Richness estimators indicated that the survey was approximately 77.5% to 106.4% adequate in recording the full complement of vascular flora taxa within the Survey Area (Table 9).

The data used to produce the species accumulation curve was conservative because opportunistic species (which are not associated with a site) were not included. Unconfirmed flora taxa were included if they were the only species present from a Genus.

Table 9: Species Richness Indicators

Treatment	Expected Species Richness	Percentage Adequate
Chao 1	162.8	79.8
Chao 2	162.8	79.8
Jacknife 1	167.6	77.5
Bootstrap	147.6	88.0
Michaelis-Menton	122.14	106.4

4.3 Vertebrate Fauna

4.3.1 Desktop Assessment

The desktop assessment identified 20 conservation significant terrestrial vertebrate fauna species potentially occurring within the Survey Area, comprising 17 birds and three mammals.

Key findings of the literature review are summarized in Appendix A2. Database search results are presented in Figure 9 and Appendix B.

4.3.2 Fauna Habitat

Five broad fauna habitats were identified and mapped within the Survey Area (Figure 10). Habitat condition varied throughout the Survey Area with the most prolific forms of disturbance being previous mining activity, litter, and vehicle tracks. Other disturbances included clearing, erosion, weeds, and introduced fauna.

A description, extent within the Survey Area, and a representative photo is provided for each fauna habitat in Table 10. Small discrepancies in fauna habitat extents (i.e., not adding up to the exact area extent of the Survey Area) are due to rounding. Fauna habitat mapping is presented in Figure 10 and site sheets for each habitat assessment are shown in Appendix F.

Table 10: Fauna Habitat Types within the Survey Area

Fauna Habitat	Total Area, Proportion of the Survey Area	Habitat Description	Representative Photo
Acacia Shrublands	75.8 ha	*Eucalyptus griffithsii* low open woodland over *Acacia hemiteles* and *Dodonaea stenozyga (A. jennerae, Alyxia buxifolia)* mid shrubland over *Senna artemisioides* subsp. *filifola* and *Atriplex vesicaria (Olearia muelleri)* low open shrubland Hollow logs, leaf litter, and peeling bark are present throughout this habitat type. These microhabitat features provide shelter and foraging opportunities for small reptiles, birds, and mammals. Conservation significant fauna such as the Malleefowl (*Leipoa ocellata*) and the Western Quoll, Chuditch (*Dasyurus geoffroii fortis*) may use this habitat. Habitat condition varied from disturbed to very good. Evidence of disturbance includes previous mining activity, vehicle tracks, litter, and the presence of introduced fauna.	

Fauna Habitat	Total Area, Proportion of the Survey Area	Habitat Description	Representative Photo
Eucalyptus Woodlands	943.9 ha	Mixed *Eucalyptus* sp. woodlands over *Acacia* sp., *Dodonaea* sp., *Eremophila* sp. or *Melaleuca* sp., mixed shrublands. Peeling bark, woody debris, leaf litter and hollow logs were observed throughout this habitat type. These microhabitat features provide shelter for small reptiles and mammals. The canopy of trees provides shelter and foraging habitat for birds. Evidence of the conservation significant Western Quoll, Chuditch (*Dasyurus geoffroii fortis*) was recorded in this habitat type. The Malleefowl (*Leipoa ocellata*) may also use this habitat. Habitat condition varied from highly degraded to high quality. Evidence of disturbance includes previous mining activity, vehicle tracks, litter, and the presence of introduced fauna.	

Fauna Habitat	Total Area, Proportion of the Survey Area	Habitat Description	Representative Photo
Open Water	2.7 ha	Coolgardie Gorge was located within the Survey Area, with a fringe of introduced flora taxa including **Schinus molle* var. *areira*, **Helioptropium europaeum*, and **Sonchus asper.* Additional standing water was identified within remnant mine pits, however this may only be temporary. Microhabitats and habitat features unique to this habitat type include exfoliating rock, steep rocky crevices and water sources. Migratory birds such as the Common Sandpiper (*Actitis hypoleucos*), Sharp-tailed Sandpiper (*Calidris acuminata*), Curlew Sandpiper (*Calidris ferruginea*), Wood Sandpiper (*Tringa glareola*), Common Greenshank (*Tringa nebularia*) and Glossy Ibis (*Plegadis falcinellus*) may use these areas. Habitat condition varies from highly degraded to disturbed. Evidence of disturbance includes previous mining activity, vehicle tracks, litter, and the presence of introduced fauna.	

Fauna Habitat	Total Area, Proportion of the Survey Area	Habitat Description	Representative Photo
Rocky Slopes	178.5	*Acacia collegialis* (*A. acuminata*) tall shrubland over *Eremophila oldfieldii* subsp. *angustifolia*, *E. georgei*, *Acacia tetragonophylla* (*Senna artemisioides* subsp. *filifolia*, *Exocarpos* aphyllus) mid shrubland over *Dodonaea lobulata* (*Atriplex vesicaria, Ptilotus obovatus* var. *obovatus*) low shrubland Leaf litter, peeling bark, rock crevices, and woody debris provides shelter for small reptiles and mammals. Shrublands provide shelter and foraging habitat for birds, reptiles, and mammals. Malleefowl (*Leipoa ocellata*) may forage within this habitat, however, it is unlikely to nest in this habitat due to the rocky substrate. The Western Quoll, Chuditch (*Dasyurus geoffroii fortis*) may use this habitat. Habitat condition varies from disturbed to very good. Evidence of disturbance includes previous mining activities, vehicle tracks, litter, and the presence of introduced fauna.	

Fauna Habitat	Total Area, Proportion of the Survey Area	Habitat Description	Representative Photo
Cleared Areas	160.9 ha	Cleared or historically cleared areas including mine pits and borrow pits (often filled with water), bitumen roads, and dirt tracks. Areas of completely cleared land include vehicle access tracks and previous mining activity including mining pits. These areas have limited value as habitat for fauna. The mining pits may provide some habitat for small reptiles and mammals in the form of steep rocky crevices and isolated shrubs and grasses. Evidence of disturbance includes previous mining activity, vehicle tracks, litter, and the presence of introduced fauna.	

4.3.3 Fauna Records

The terrestrial vertebrate fauna survey recorded a total of 61 fauna taxa from 33 families. An inventory of fauna recorded during the field survey is provided in Appendix G.

Table 11: Overview of Vertebrate Fauna Species Recorded

Fauna group	Number of species	Number of families
Birds	42	21
Mammals	10	7
Reptiles	9	5
Amphibians	0	0
Total	**61**	**33**

4.3.3.1 Birds

A total of 42 avian taxa from 21 families were recorded throughout the Survey Area. The most recorded taxon was the Budgerigar (*Melopsittacus undulatus*), followed by the Australian Ringneck (*Platycercus zonarius*) and the Singing Honeyeater (*Gavicalis virescens*). The most diverse avifauna families were Meliphagidae (seven taxa) and Acanthizidae (six taxa).

4.3.3.2 Mammals

A total of three native mammals were recorded within the Survey Area. The most recorded native mammal taxon was the Western Grey Kangaroo (*Macropus fuliginosus melanops*). Seven introduced mammal taxa were recorded in the Survey Area, Goat (*Capra hircus*), European Cattle (*Bos primigenius taurus*), Dog/Dingo (*Canis familiaris*), Red fox (*Vulpes vulpes*), Horse (*Equus caballus*), Cat (*Felis catus*) and Rabbit (*Oryctolagus cuniculus*).

4.3.3.3 Reptiles

A total of nine reptilian species from five families were recorded throughout the Survey Area. The most recorded species was the Bobtail (*Tiliqua rugosa*) followed by the Bynoe's Gecko (*Heteronotia binoei*). The most diverse reptilian family was Agamidae (four taxa).

4.3.3.4 Amphibians

No amphibians were recorded during the field survey.

4.3.4 Conservation Significant Fauna

One conservation significant taxon was recorded via observation of a scat during the fauna survey, the Western Quoll, Chuditch (*Dasyurus geoffroii fortis*), which is listed Vulnerable under the BC and EPBC Act (Plate 2).



Plate 2: Scat of Western Quoll, Chuditch (*Dasyurus geoffroii fortis*)

GPS Coordinates: Latitude: -30.920324, Longitude: 121.184610. Image Source 360 Environmental.

Three conservation significant fauna taxa were assessed as having a high likelihood of occurrence within the Survey Area:

- Malleefowl (*Leipoa ocellata*), Vulnerable under the BC and EPBC Act
- Common Sandpiper (*Actitis hypoleucos*), International Agreement under the BC Act and Migratory and Marine under the EPBC Act
- Common Greenshank (*Tringa nebularia*), International Agreement under the BC Act and Migratory and Marine under the EPBC Act.

Four conservation significant taxa were assessed as having a medium likelihood of occurrence within the Survey Area:

- Sharp-tailed Sandpiper (*Calidris acuminata*), International Agreement under the BC Act and Migratory and Marine under the EPBC Act
- Curlew Sandpiper (*Calidris ferruginea*), Critically Endangered, International Agreement under the BC Act and Critically Endangered, Migratory and Marine under the EPBC Act

- Wood Sandpiper (*Tringa glareola*), International Agreement under the BC Act and Migratory and Marine under the EPBC Act
- Glossy Ibis (*Plegadis falcinellus*), International Agreement under the BC Act and Migratory and Marine under the EPBC Act.

Twelve conservation significant taxa were assessed as having a low likelihood of occurrence within the Survey Area. Further details regarding recorded and potential conservation significant fauna are provided below in Table 12.

Table 12: Conservation Significant Fauna Likelihood of Occurrence

Conservation Status: State - Listed under Biodiversity Conservation Act 2016 or Department of Biodiversity, Conservation and Attractions Conservation List, Federal - Listed under Environmental Protection and Biodiversity Conservation Act 1999. CR - Critically Endangered, EN - Endangered, VU - Vulnerable, IA/MI - Migratory, CD - Conservation Dependent fauna, OS - Other Specially Protected fauna, MA - Marine, P - Listed as Priority by DBCA.

Family	Scientific Name	Common Name	Conservation Status		Source					Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA	DBCA 15 yrs	Field Survey		
AVIAN											
Apodidae	*Apus pacificus*	Pacific Swift (Fork-tailed Swift)	IA	MI, MA		x				Low	Three records within 100 km on the Survey Area (Atlas of Living Australia, 2022a). Species may fly over the Survey Area as it covers a wide range of airspace over varied habitat (Morcombe, 2003).
Cacatuidae	*Calyptorhynchus latirostris*	Carnaby's Cockatoo	EN	EN	x		x	4		Low	This species was recorded 30 km NE of the Survey Area in Kalgoorlie (Department of Biodiversity Conservation and Attractions, 2021c). However, these records occur well outside the known distribution of the species and likely represent a vagrant occurrence of the taxon (Department of Sustainability

Family	Scientific Name	Common Name	Conservation Status		Source					Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA	DBCA 15 yrs	Field Survey		
											Environment Water Population and Communities, 2012).
Charadriidae	*Thinornis cucullatus*	Hooded Plover (Hooded Dotterel)	P4	MA			x			Low	Closest record 42 km NE of the Survey Area (Department of Biodiversity Conservation and Attractions, 2021c). No suitable habitat within the Survey Area (Menkhorst *et al.*, 2017).
Falconidae	*Falco hypoleucos*	Grey Falcon	VU	VU		x				Low	No recent nearby records. Some records within 100 km on the Survey Area (Atlas of Living Australia, 2022b). Preferred nesting habitat absent. May use Survey Area for hunting (Menkhorst *et al.*, 2017).
Megapodiidae	*Leipoa ocellata*	Malleefowl	VU	VU	x	x	x	79		High	Recent records within 1 km of the Survey Area (Department of Biodiversity Conservation and Attractions, 2021c). Recorded 40 km north of the Survey Area in 2019 (Phoenix

Family	Scientific Name	Common Name	Conservation Status		Source					Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA	DBCA 15 yrs	Field Survey		
											Environmental Sciences, 2019). Suitable habitat present, unburned mallee and woodland with abundant litter and low scrub (Morcombe, 2003)
Motacillidae	*Motacilla cinerea*	Grey Wagtail	IA	MI, MA		x				Low	Survey Area is well outside of the distribution of this species Area (Atlas of Living Australia, 2022b). Some suitable habitat present in parts i.e. water bodies (Morcombe, 2003).
Psittaculidae	*Pezoporus occidentalis*	Night Parrot	CR	EN		x				Low	No records within 100 km on the Survey Area (Atlas of Living Australia, 2022b). No suitable habitat within the Survey Area (Morcombe, 2003).
Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	IA	MI, MA	x	x	x	3		Previously Recorded	Three recent records within the Survey Area (Department of Biodiversity Conservation and Attractions, 2021c). Some suitable habitat present i.e. interior wetlands – narrow muddy edges of billabongs (Morcombe, 2003).

Family	Scientific Name	Common Name	Conservation Status		Source					Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA	DBCA 15 yrs	Field Survey		
Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper	IA	MI, MA	x	x	x	2		Medium	Nearest record 15 km NW of the Survey Area (Department of Biodiversity Conservation and Attractions, 2021c). Suitable habitat present (water bodies) (Morcombe, 2003).
Scolopacidae	*Calidris alba*	Sanderling	IA	MI, MA	x		x	1		Low	Nearest record in Kalgoorlie (Department of Biodiversity Conservation and Attractions, 2021c). No suitable habitat within the Survey Area (Menkhorst et al., 2017).
Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	CR, IA	CR, MI, MA	x	x	x	1		Medium	Nearest record 15 km NW of Survey Area (Department of Biodiversity Conservation and Attractions, 2021c). Suitable habitat within the Survey Area i.e. around lakes, dams (Morcombe, 2003).
Scolopacidae	*Calidris melanotos*	Pectoral Sandpiper	IA	MI, MA		x				Low	Survey Area is well outside of the distribution of this species Area (Atlas of Living Australia, 2022b). Some suitable habitat present in parts i.e. inland

Family	Scientific Name	Common Name	Conservation Status		Source					Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA	DBCA 15 yrs	Field Survey		
											water bodies (Morcombe, 2003).
Scolopacidae	*Calidris ruficollis*	Red-necked Stint	IA	MI, MA	x		x	1		Low	Nearest record 15 km NW of Survey Area (Department of Biodiversity Conservation and Attractions, 2021c). No suitable habitat within the Survey Area i.e., mudflats (Morcombe, 2003).
Scolopacidae	*Tringa brevipes*	Grey-tailed Tattler	IA, P4	MI, MA	x		x	1		Low	Nearest record 20 km NE of Survey Area (Department of Biodiversity Conservation and Attractions, 2021c). No suitable habitat within the Survey Area, coastal in Australia (Menkhorst et al., 2017).
Scolopacidae	*Tringa glareola*	Wood Sandpiper	IA	MI, MA	x		x			Medium	Nearest record 30 km NE of the Survey Area (Department of Biodiversity Conservation and Attractions, 2021c). Suitable habitat within the Survey Area i.e., freshwater

Family	Scientific Name	Common Name	Conservation Status		Source					Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA	DBCA 15 yrs	Field Survey		
											wetlands (Menkhorst et al., 2017).
Scolopacidae	*Tringa nebularia*	Common Greenshank	IA	MI, MA	x	x	x	2		Previously Recorded	Recent record within the Survey Area (Department of Biodiversity Conservation and Attractions, 2021c). Suitable habitat within the survey areas i.e. temporary inland wetlands (Morcombe, 2003).
Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis	IA	MI, MA			x			Medium	Only record 27 km NE of the Survey Area in Kalgoorlie (Department of Biodiversity Conservation and Attractions, 2021c). Some suitable habitat present i.e. temporary wetlands (Morcombe, 2003).
MAMMALIAN											
Dasyuridae	*Dasyurus geoffroii fortis*	Western Quoll, Chuditch	VU	VU		x	x		x	**Recorded**	A scat was found within the Survey Area during the current survey, identified to be this species. Some suitable habitat present mallee

Family	Scientific Name	Common Name	Conservation Status		Source					Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA	DBCA 15 yrs	Field Survey		
											shrubland (Van Dyck and Strahan, 2008).
Myrmecobiidae	*Myrmecobius fasciatus*	Numbat, Walpurti	EN	EN	x					Low	No nearby records (Atlas of Living Australia, 2022b). Some suitable habitat is present i.e. eucalypts and wandoo woodland (Van Dyck and Strahan, 2008). The only natural populations exist well outside the Survey Area in the far north of WA (Department of Biodiversity Conservation and Attractions, 2017b).
Thylacomyidae	*Macrotis lagotis*	Bilby, Dalgyte	VU	VU	x					Low	No nearby records (Atlas of Living Australia, 2022b). No suitable habitat is present (Van Dyck and Strahan, 2008).
INSECTS											
Lycaenidae	*Jalmenus aridus*	Inland Hairstreak	P1 (not WAM)		x		x			Medium	Nearest record 19 km NE of the Survey Area (Department of Biodiversity Conservation and Attractions, 2021c). Suitable habitat present within the Survey Area

Family	Scientific Name	Common Name	Conservation Status		Source					Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA	DBCA 15 yrs	Field Survey		
											(Williams, Williams and Lundstrom, 1998)
Lycaenidae	*Ogyris subterrestris petrina*	Arid Bronze Azure Butterfly	CR (not WAM)	CR (not WAM)	x	x	x			Medium	No recent records (Department of Biodiversity Conservation and Attractions, 2021c). Suitable habitat present (smooth bark *Eucalyptus* sp.) (Department of Biodiversity Conservation and Attractions, 2020b).

5 Discussion

5.1 Flora and Vegetation

5.1.1 Flora Composition

The suite of flora taxa recorded during the survey is considered typical for the area (Beard 1976) and aligns with the database search results obtained and with previous surveys conducted around the Survey Area.

5.1.2 Survey Adequacy

The flora and vegetation survey effort was in accordance with the scope of works, and appropriate for a detailed flora and vegetation survey in the Eastern Goldfields region.

The Survey Area was sampled with 74 quadrats, 22 relevés and an additional 91 mapping notes. Of the 10 vegetation types defined, four were not sampled with three flora sites. Vegetation types Ec and EooEiiDs were sampled with two sites only due to limited distribution of the vegetation (<1% each). Vegetation types Sl, and Lake were sampled only once due to the landforms (clay and lake) being very limited in distribution.

The inventory of vascular flora was compiled using site data and opportunistic observations made while traversing between sites and during targeted searching within the Survey Area. The entire Survey Area was not systematically searched, and therefore additional flora taxa, and records of conservation significant flora and weed species may be recorded with additional survey effort.

5.1.3 Flora of Conservation Significance

No Threatened flora species pursuant to the EPBC Act 1999 and/or gazetted as Threatened Flora pursuant to the BC Act 2016 were recorded within the Survey Area.

Ten individuals of *Austrostipa blackii* (P3) were recorded from quadrat C1Q01, within vegetation type AcEoaDl. This vegetation type was sampled heavily, and no other records of the taxon were recorded. With more intensive surveys additional individuals may be recorded, as this vegetation type and landform (rocky hills) cover 13.1% of the Survey Area.

5.1.4 Likelihood of Occurrence

Of the 90 Priority flora identified by the database searches, only one was recorded from the Survey Area (*Austrostipa blackii* (P3)). Of the remaining 89 taxa, two were considered to retain a high likelihood of occurrence following the survey:

- *Acacia websteri* (P1): A tall shrub or tree is known only from the Bencubbin and Coolgardie-Kambalda areas, and grows mostly in red loam, sand, and clay in drainage depressions among shrubland and scrub. The habitat for this taxon is present within the Survey Area, and the closest location is <1 km from the survey boundary.

- *Eremophila veronica* (P3): A record of this erect shrub to 40cm high (80cm wide) was located 500 m from the Survey Area, in vegetation similar in appearance to that within the survey boundary. The record was noted as growing with *E. salubris, A. burkittii*, and *Cylindropuntia tunicata*.

A further 18 taxa were considered to have a medium likelihood of occurrence due to presence of habitat and records within 15 km of the Survey Area boundary. The remaining taxa were considered to have a low likelihood of occurrence.

5.1.5 Introduced Flora

Thirteen weed species were recorded in the Survey Area, of which one, **Opuntia stricta* (Common Prickly Pear), is a Declared Pest and listed as a WoNS.

Weed diversity and population abundance are consistent with the region and land use (mining operations, broadacre cropping and sheep farming).

Weed species richness and abundance was greatest in previously cleared areas such as old drill pads/ excavation works and associated tracks. Weed species, particularly **Opuntia stricta* were present in relatively high abundance near Great Eastern Highway. The publicly accessible semi-pool 'Coolgardie Gorge' contained dense weed numbers along the edge and in the immediate surrounds.

5.1.6 Unconfirmed Flora

Eighteen specimens collected during the field survey were sterile and could not be confidently identified beyond genus level. None of these were analogous to Priority flora taxa identified by the database searches.

5.1.7 Vegetation Types

No vegetation representative of any TECs or PECs was recorded in the Survey Area.

Mapping reliability across the survey area was high, and the majority of the Survey Area was traversed on foot. The plains through the majority of the Survey Area showed a mosaic of different *Eucalyptus* spp. that could not be easily separated via quadrating or aerial imagery. However, *E. salmonophloia* was scattered across the majority of the plains, with *E. celastroides, E. clelandiorum*, and *E. torquate* at varying densities across the plains. This is common across the region, as underlying geology affects the vegetation on a fine scale. The Survey Area was dominated by these plains, along with rocky hills dominated by *Acacia collegialis* tall shrubs. While this vegetation type AcEoaDl rocky hills did support *Austropstipa blackii* (P3), only one population was recorded through 21 quadrats in the vegetation. As such it was not considered to be a distinctive habitat of the taxon, and not considered to be vegetation of local significance.

Coolgardie Gorge is a natural semi-pool landform present within the Survey Area, which is also a public recreation area, as such it contains many introduced (weed) taxa. The landform is limited in size, with the vegetation unique and restricted to a small radius around the semi-pool.

Numerous patches within the Survey Area were considered either recently or historically cleared. Some of these historically cleared areas contained some regrowing native and weed taxa, however, were still considered to be cleared as they were predominantly bare, and any native taxa did not represent the surrounding vegetation. One small area of claypan vegetation was recorded and sampled with a single quadrat. After recent rains, this claypan landform may contain an increased load of annual and cryptic taxa.

5.2 Vertebrate Fauna

5.2.1 Fauna Habitat

The five broad fauna habitats identified within the Survey Area are typical of the Coolgardie bioregion and consistent with habitats identified by previous studies in the region (Terrestrial Ecosystems, 2018; Phoenix Environmental Sciences, 2019; Strategen Environmental, 2019; Biostat Pty Ltd, 2020). Of the habitats within the Survey Area, the *Eucalyptus* Woodlands, *Acacia* Shrublands and Open Water habitats, particularly the semi-permanent pool at Coolgardie Gorge, represent the most value to the overall fauna assemblage within the Survey Area. The *Eucalyptus* Woodlands and the *Acacia* Shrubland habitats are valuable due to the variety of micro habitats present. Peeling bark, woody debris, leaf litter and hollow logs were observed throughout these habitat types. The dense understorey observed in these habitat types may provide refuge and shelter for a variety of mammals, reptiles, and birds. Specifically, these habitat types may provide suitable breeding and nesting habitat for the Malleefowl (*Leipoa ocellata*) and foraging habitat for the Western Quoll, Chuditch (*Dasyurus geoffroii fortis*).

The Open Water habitat provides an important water source for fauna within the Survey Area and is particularly important for water birds, including several significant species. The Open Water habitat at Coolgardie Gorge is surrounded by vegetation that provides potential foraging, roosting, and nesting habitat for a wide variety of fauna taxa. Old mine pits throughout the Survey Area may have water present, however it will be of less value to most fauna species due to a lack of surrounding vegetation.

The Rocky Slopes habitat contains crevices that may provide refuge and shelter for small fauna taxa. This habitat type generally lacks the dense understory found in the *Eucalyptus* Woodlands and the *Acacia* Shrubland habitats, making it less suitable for the Malleefowl and its slope reduces its value as Malleefowl nesting habitat.

Cleared Areas provide limited habitat value for fauna; however, some small mammals and reptiles may use the rocky crevices within the steep walls of mining pits and the low isolated shrubs occasionally found in other Cleared Areas for shelter and foraging.

The habitat condition varied widely throughout the Survey Area from highly degraded to high quality. The most common forms of disturbance included previous mining activity, litter, and vehicle tracks. Species with a limited dispersal capability may be restricted by these impacts, whilst movements of birds, larger reptiles, and mammals between surrounding habitats are unlikely to be severely impeded by these disturbances.

5.2.2 Conservation Significant Fauna

5.2.2.1 Recorded

Western Quoll, Chuditch (*Dasyurus geoffroii fortis*), Vulnerable under the BC Act and EPBC Act

The Chuditch inhabits areas dominated by sclerophyll forest or drier woodland, heath and mallee shrubland (Van Dyck and Strahan, 2008). The species is generally highly mobile and uses bush remnants as corridors (Woinarski, Burbidge and Harrison, 2014). The Chuditch is a largely nocturnal animal, feeding on a carnivorous diet of mammals, birds, lizards, and frogs. Although they have been recorded foraging during the day at particular times such as during the breeding season or when cold and wet weather restricts their nocturnal movements (Van Dyck and Strahan, 2008). Most diurnal nesting sites in sclerophyll forest consist of hollow logs or earth burrows, although bandicoot nests and hollow tree bases may be used (Van Dyck and Strahan, 2008). The Chuditch was abundant prior to European settlement, and it is now largely restricted to the south-west of Western Australia, with small numbers in the Midwest, Wheatbelt and South Coast regions (Department of Biodiversity Conservation and Attractions, 2017a).

Chuditch scat was recorded within the Survey Area. Of the habitat types present with the Survey Area the *Eucalyptus* Woodland and *Acacia* Shrubland present the most value to this species. These habitats contain mallee woodland and shrubland, which the Chuditch often inhabits as well hollow logs and tree bases which are used for denning (Van Dyck and Strahan, 2008). The suitability of these habits likely varies with the degree of disturbance which may alter prevalence of both denning sites and availability of prey.

5.2.2.2 High Likelihood

Malleefowl (*Leipoa ocellata*), Vulnerable under the BC Act and EPBC Act

The Malleefowl is found in semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and/or *Acacia*. The species nests in large mounds of dirt and leaf litter up to five metres wide and one metre tall (Menkhorst et al., 2017). Sandy substrates and abundance of leaf litter are required for breeding (Department of the Environment and Energy, 2018). Densities of the birds are generally greatest in areas of higher rainfall and on more fertile soils where there is an abundance of food plants.

The Malleefowl has recently been recorded within 1 km of the Survey Area and is therefore highly likely to use suitable habitat within the Survey Area (Department of Biodiversity Conservation and Attractions, 2022). The *Eucalyptus* Woodland and *Acacia* Shrubland habitats constitute suitable habitat for the taxon. No mounds, tracks, or other signs of the taxon observed during the field survey. When present, these signs are obvious and detectable (National Malleefowl Recovery Team, 2016). While breeding may occur in the Survey Area, it is unlikely that high densities of breeding individuals are present.

Common Sandpiper (*Actitis hypoleucos*), International Agreement under the BC Act and Migratory and Marine under the EPBC Act.

The Common Sandpiper typically feeds on mollusks and crustaceans as well as a variety of insects. It is a migratory species that uses varied coastal and interior wetlands including narrow muddy edges of billabongs, river pools, mangroves, among rocks and snags, reefs or rocky beaches (Morcombe, 2003). It migrates from mid-northern latitudes of Asia (Menkhorst *et al.*, 2017) and likely breeds in the Russian far east (Pizzey and Knight, 2001).

The Common Sandpiper was not recorded during the current field survey, however it has been recorded within the Survey Area previously (Department of Biodiversity Conservation and Attractions, 2022). The taxon may use the Open Water habitat within the Survey Area, particularly the Coolgardie Gorge for foraging and roosting.

Common Greenshank (*Tringa nebularia*), International Agreement under the BC Act and Migratory and Marine under the EPBC Act.

The Common Greenshank is a migratory species to Australia that typically breeds in Norway (BirdLife International, 2016). The species is found in a wide variety of wetlands from coastal to freshwater, where it wades in shallow water foraging for prey, often lunging or probing for fish and invertebrates (Pizzey and Knight, 2001; BirdLife International, 2016; Menkhorst *et al.*, 2017).

The Common Greenshank was not recorded during the current field survey, however, it has been recorded within the Survey Area previously (Department of Biodiversity Conservation and Attractions, 2022). The taxon may use the Open Water habitat within the Survey Area, particularly the Coolgardie Gorge for foraging and roosting.

5.2.2.3 Medium Likelihood

Sharp-tailed Sandpiper (*Calidris acuminata*), International Agreement under the BC Act and Migratory and Marine under the EPBC Act.

The Sharp-tailed Sandpiper is a small-medium migratory wader, nesting in the northern Siberian Tundra and is one of the most common shorebirds to inhabit in fresh and saline wetlands occurring inland in Australia (Menkhorst *et al.*, 2017). In Western Australia there are scattered records of the species occurring along the Nullarbor Plain and the southern areas of the Great Victoria Desert. They are widespread from Cape Arid to Carnarvon, around coastal and subcoastal plains of the Pilbara Region to south-west and east Kimberley (Pizzey and Knight,

2001). It also forages in grasslands and tidal areas. The species typically prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (Pizzey and Knight, 2001).

The Sharp-tailed Sandpiper was not recorded during the field survey. The nearest record was 15 km northwest of the Survey Area (Department of Biodiversity Conservation and Attractions, 2022). The taxon may use the Open Water habitat within the Survey Area, particularly the Coolgardie Gorge for foraging and roosting.

Curlew Sandpiper (*Calidris ferruginea*), Critically Endangered, International Agreement under the BC Act and Critically Endangered, Migratory and Marine under the EPBC Act.

The Curlew Sandpiper is a small, slim sandpiper that is most commonly found on large tidal flats, occasionally using brackish and freshwater wetland systems (Menkhorst *et al.*, 2017). They typically forage on invertebrates throughout mudflats and nearby shallow water. The species is migratory and nests in Arctic Siberia, and in Western Australia are widespread around coastal and subcoastal plains from Cape Arid to the south-west Kimberley (Pizzey and Knight, 2001).

The Curlew Sandpiper was not recorded during the field survey. The nearest record was 15 km northwest of the Survey Area (Department of Biodiversity Conservation and Attractions, 2022). The taxon may use the Open Water habitat within the Survey Area, particularly the Coolgardie Gorge for foraging and roosting.

Wood Sandpiper (*Tringa glareola*), International Agreement under the BC Act and Migratory and Marine under the EPBC Act.

The Wood Sandpiper is a small, thin wader that uses well-vegetated, shallow, freshwater wetlands such as swamps, billabongs, lakes, pools and waterholes (Menkhorst *et al.*, 2017). The species is generally associated with emergent aquatic plants or grass, and they forage on moist or dry mud at the edges of wetlands. The Wood Sandpiper is a migratory species, breeding in the subarctic Siberia with some individuals migrating to Australia (Menkhorst *et al.*, 2017). In Western Australia the species is widespread but scattered in most regions (Pizzey and Knight, 2001).

The Wood Sandpiper was not recorded during the field survey. The nearest record was 30 km northeast of the Survey Area (Department of Biodiversity Conservation and Attractions, 2022). The taxon may use the Open Water habitat within the Survey Area, particularly the Coolgardie Gorge for foraging and roosting.

Glossy Ibis (*Plegadis falcinellus*), International Agreement under the BC Act and Migratory and Marine under the EPBC Act.

The preferred foraging and breeding habitat of the Glossy Ibis includes fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation (Marchant and Higgins, 1990; del Hoyo, Elliot and Sargatal, 1992). The Glossy Ibis builds a platform nest of sticks in trees or shrubs above

water and typically nests in colonies (Pizzey and Knight, 2013). The distribution of the Glossy Ibis is generally east of the Kimberley in Western Australia and Eyre Peninsula in South Australia. The species is also known to be patchily distributed in the rest of Western Australia (Department of the Environment and Energy, 2020).

The Glossy Ibis was not recorded during the field survey, however, it has been recorded 27 km northeast of the Survey Area in Kalgoorlie (Department of Biodiversity Conservation and Attractions, 2022). The taxon may use the Open Water habitat within the Survey Area, particularly the Coolgardie Gorge for foraging and roosting.

5.3 Invertebrates

Although outside the scope of this report, two conservation significant invertebrates were identified as potentially occurring within the Survey Area.

Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*), Critically Endangered under the BC Act and EPBC Act.

Following the extirpation of the only known population in the early 1990s, the Arid Bronze Azure Butterfly (ABAB) was rediscovered at Barbalin Nature Reserve in 2006. The ABAB can only reproduce where nests of the sugar ant, *Camponotus* sp. nr. *terebrans* are present. The ants protect the larvae from predators and in return, the ants feed on secretions produced by the ABAB larvae. Unlike other species in this genus, the ABAB larva do not eat vegetation and are entirely dependent upon the host ant. The ABAB larvae require large ant colonies that are typically found at the base of many species of smooth-barked eucalypts including *Eucalyptus salubris* and *E. salmonophloia* (Department of Biodiversity Conservation and Attractions, 2020b).

The presence of multiple smooth-barked eucalypt species within the known distribution of the host ant *Camponotus* sp. nr. *terebrans* suggests that suitable habitat for the ABAB may occur within the survey area. The presence of potentially suitable ABAB habitat within the range of the host ant requires surveys to determine the presence and density of *Camponotus* sp. nr. *terebrans* colonies (Department of Biodiversity Conservation and Attractions, 2020a, 2020b). Consequently, a targeted survey for host ant colonies was conducted in Dec 2021. The results of this survey are presented in a separate report in preparation (360 Environmental 2022, in prep).

Inland Hairstreak (*Jalmenus aridus*), Priority 1 under the BC Act.

Jalmenus aridus is one of ten currently recognised species in the genus *Jalmenus*, which is found only in Australia. *Jalmenus* species feed openly on the foliage of their respective host plants, and all are attended by specific ant species. *Jalmenus aridus* is attended by the ant species *Froggattella kirbii* (Sands and New, 2002). *Jalmenus aridus* is protected by the ants from predators and parasitoids and the butterfly caterpillars reward the ants with sweet liquid produced in special organs.

The butterfly is only present in its adult form for short periods of time (perhaps only two to three weeks at a given site). Timing of adult emergence is linked to rainfall patterns, plant growth stages and other ecological conditions with most likely flight times from mid-October to mid-November.

The ant, *Froggattella kirbii* is found from near Perth to the East coast of Australia ad is associated with two known host plants. One host plant, *Senna nemophila* (*artemisioides*), is found over most of central and eastern WA while the other known host plant, *Acacia tetragonophylla,* is found almost everywhere in WA except the very far north and far south.

During the surveys, it was observed that suitable habitat was present within the Survey Area. Additional targeted surveys will be required to confirm the presence of *Jalmenus aridus* within the Survey Area.

6 Conclusion

Flora and Vegetation

- No Threatened Listed flora species pursuant to the EPBC Act 1999 and/or gazetted as Threatened/Declared Rare Flora pursuant to the BC Act 2016 were recorded
- Ten individuals of *Austrostipa blackii* (P3), were recorded in one quadrat (C1Q01)
- Thirteen introduced species were recorded during the survey, of which one, **Opuntia stricta*, is a Declared Pest and listed as a WoNS
- Ten vegetation types were mapped within the Survey Area, none of which were analogous to conservation significant ecological communities.

Vertebrate Fauna

- Five fauna habitats were mapped, of which the *Eucalyptus* Woodland, *Acacia* Shrubland, and Open Water habitat types represent the most value to conservation significant fauna and overall fauna assemblages. A naturally occurring pool at Coolgardie Gorge was of particularly value to water birds and to the overall fauna assemblage.
- One conservation significant species, the Western Quoll, Chuditch (*Dasyurus geoffroii fortis*), which is listed as Vulnerable under the BC Act and EPBC Act, was recorded within the Survey Area. Chuditch scat was observed during the field survey.
- Seven introduced species were recorded during the survey, Goat (*Capra hircus*), European Cattle (*Bos primigenius taurus*), Dog/Dingo (*Canis familiaris*), Red fox (*Vulpes vulpes*), Horse (*Equus caballus*), Cat (*Felis catus*) and Rabbit (*Oryctolagus cuniculus*).
- One significant fauna species, the Western Quoll, Chuditch (*Dasyurus geoffroii fortis*) which is listed as Vulnerable under the BC Act and EPBC Act, was recorded within the Survey Area based on a scat observed during the field survey.
- Although outside the scope of this report, potential habitat for Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*), which is listed as Critically Endangered under the BC Act and EPBC Act, and the Inland Hairstreak butterfly (*Jalmenus aridus*), which is listed as Priority 1 by the DBCA, was observed within the Survey Area.

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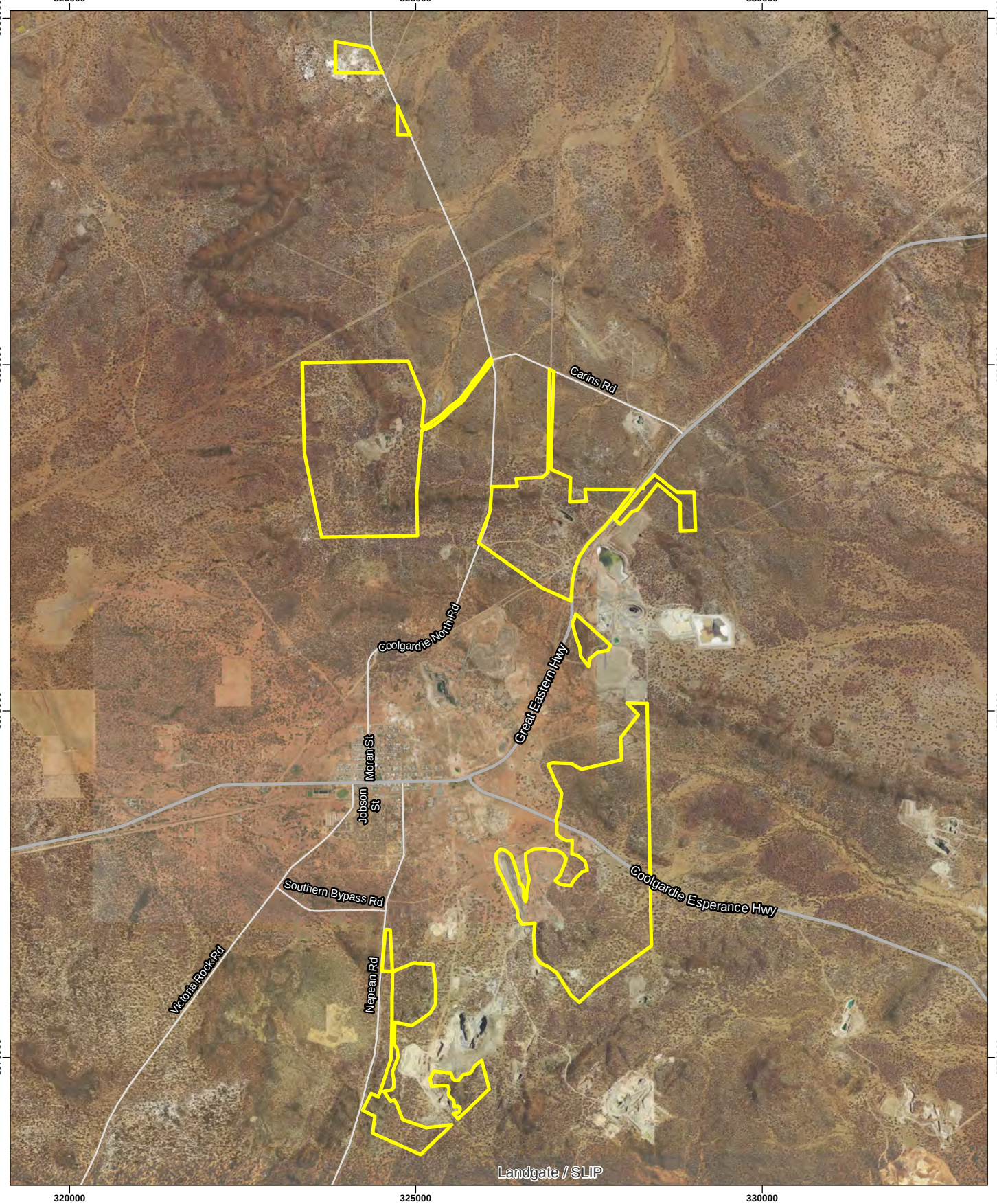
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Figures



Legend

- Survey Area
- State Road

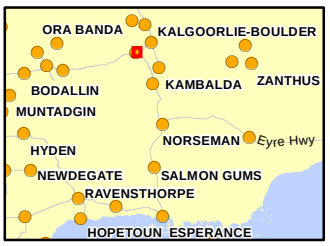
0 790 1,580 2,370 Meters

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N

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

LOCALITY MAP



Powered By SLIP ENABLER

- LOCALITY MAP SOURCED FROM LANDGATE 2022
- OTHER DATA SOURCED LANDGATE 2022
- AERIAL PHOTOGRAPHY SOURCED LANDGATE 2022
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360 environmental
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PROJECT ID	DATE
4794	21/04/2022

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 51

CREATED	CHECKED	APPROVED	REVISION
CL	NW	NW	0

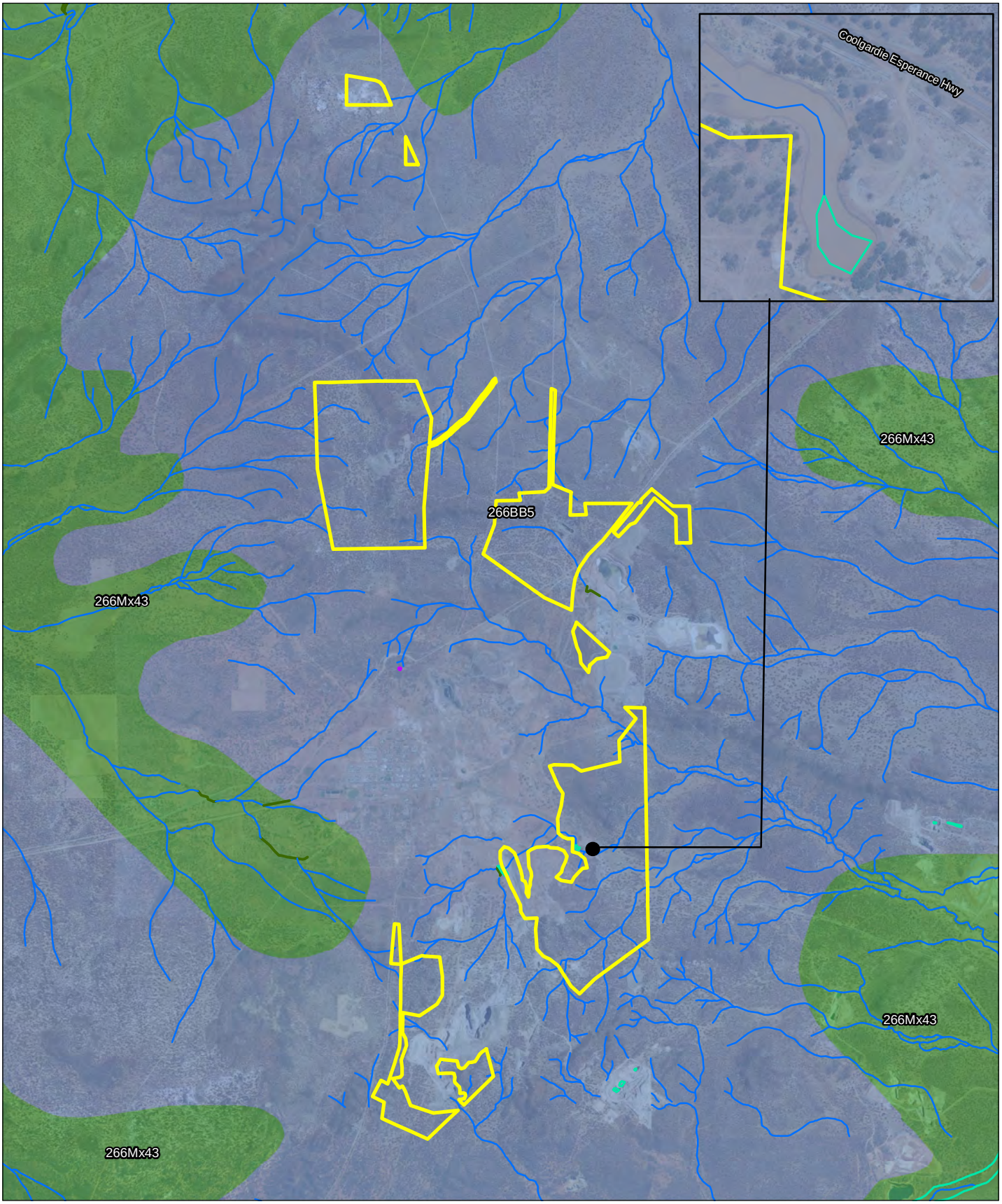
Focus Mineral Limited

CNX Three Mile Hill Coolgardie Gold Project

Figure 1
Survey Area

K:\Projects\1.0 EBS\4794 Coolgardie Biological Spring Survey\4794 F01 Survey Area.mxd

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Legend

Soil Land System

- 266BB5
- 266Mx43

Hydrography

- Watercourse - minor
- Drain - major
- Lake
- Water Reservoir
- Survey Area

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- LOCALITY MAP SOURCED FROM LANDGATE 2022
- OTHER DATA SOURCED LANDGATE 2022
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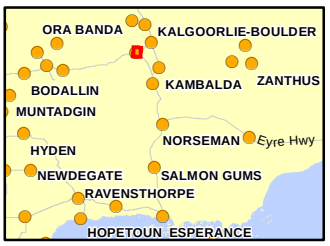
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- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS

LOCALITY MAP



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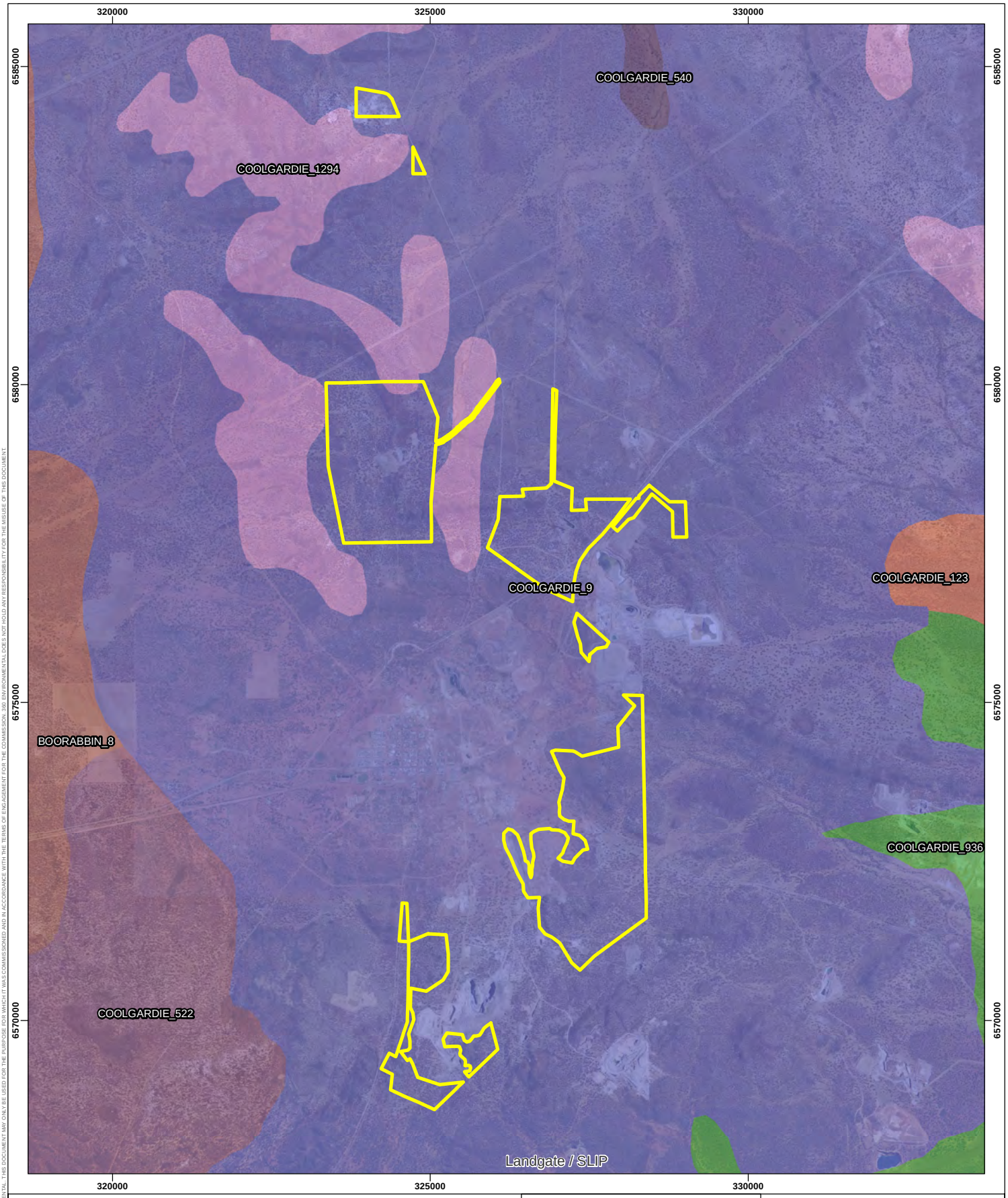
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Figure 2
Soil Landscapes and Land Systems and Hydrography

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Legend

- Survey Area

Broad Vegetation Types

- BOORABBIN_8
- COOLGARDIE_123
- COOLGARDIE_1294
- COOLGARDIE_522
- COOLGARDIE_540
- COOLGARDIE_9
- COOLGARDIE_936

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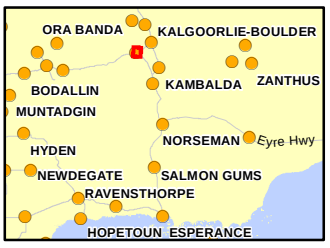
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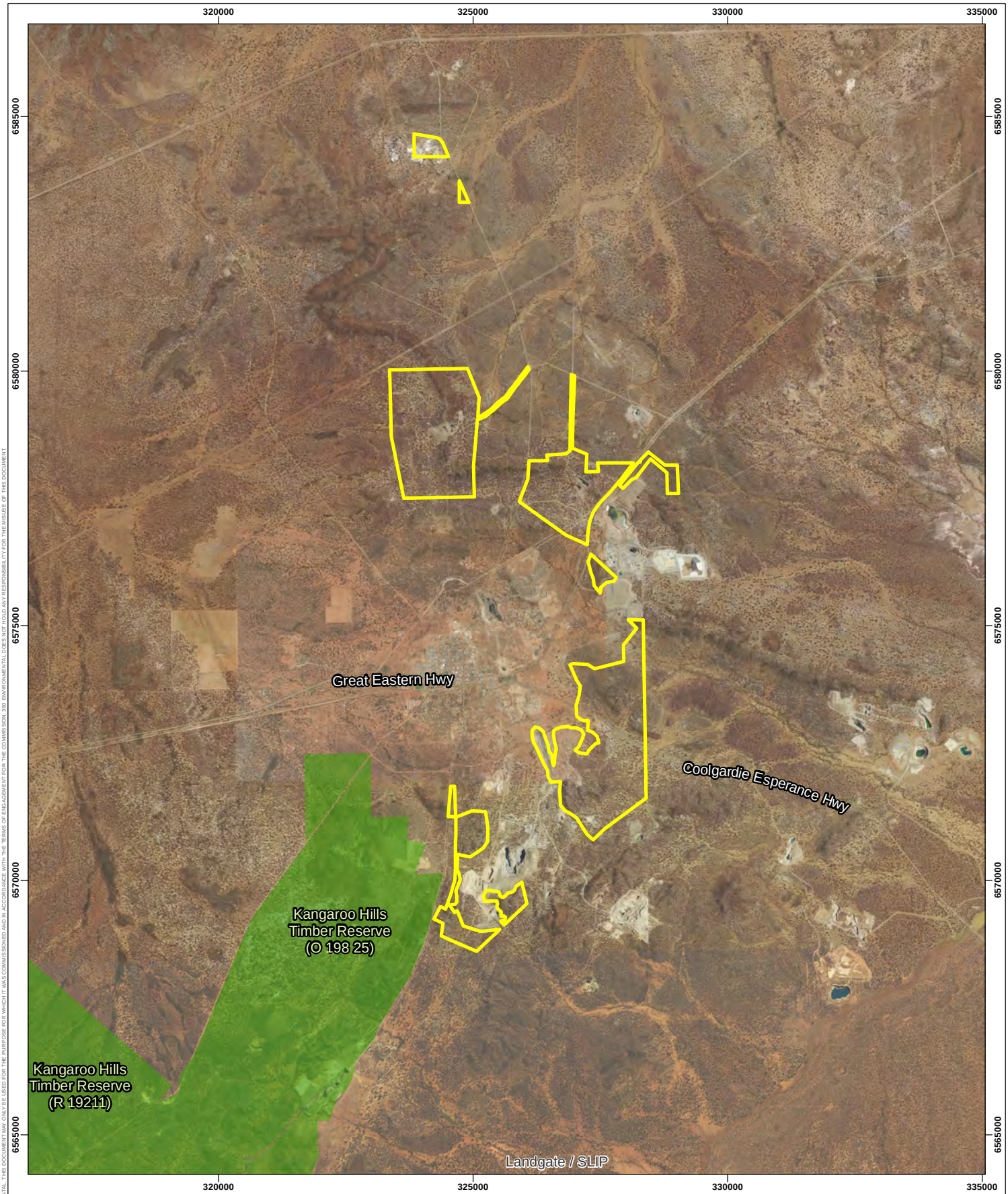
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Figure 3
Broad Vegetation Types

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Legend

- Survey Area

DBCA Managed Lands and Waters

- DBCA Managed Land

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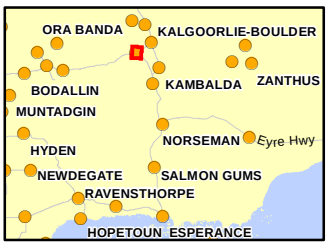
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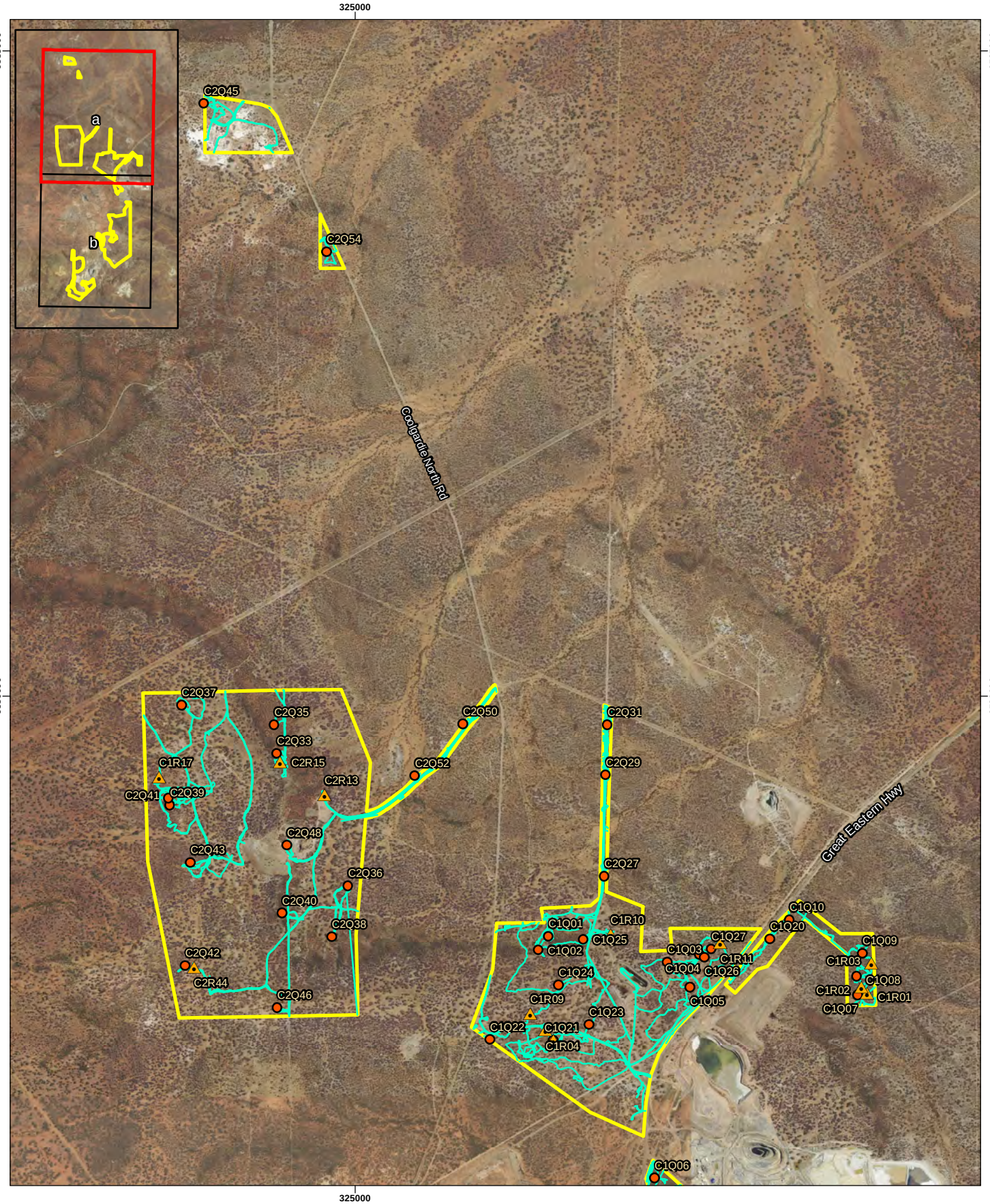
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Figure 4
Conservation Areas

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Legend

- Survey Area
- GPS Tracks

Sample Sites

- Quadrat
- Releve

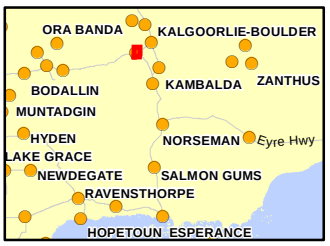
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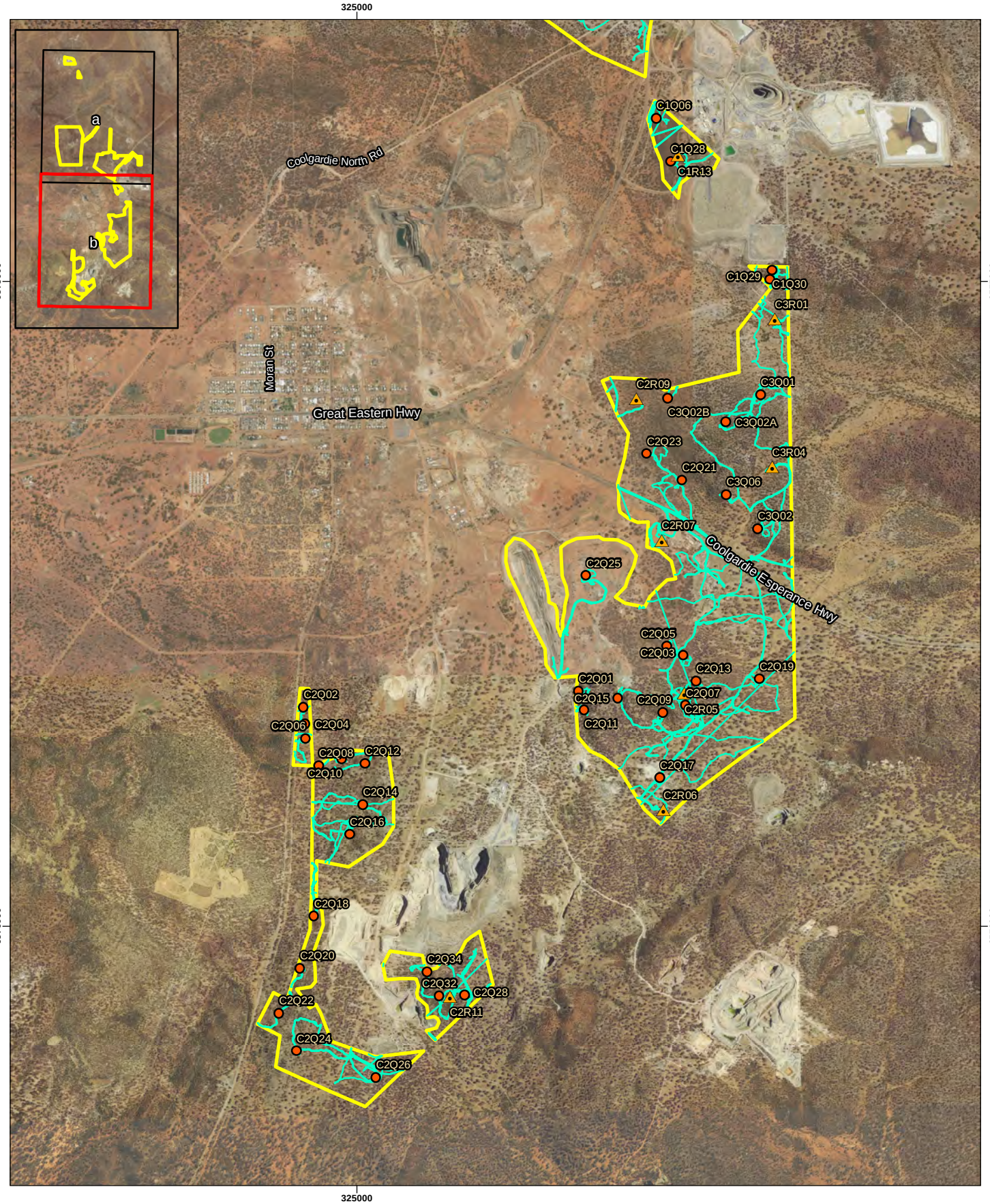
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Figure 5a
Survey Effort

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Legend

- Survey Area
- GPS Tracks

Sample Sites

- Quadrat
- Releve

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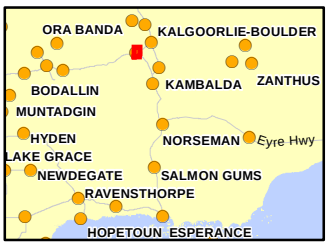
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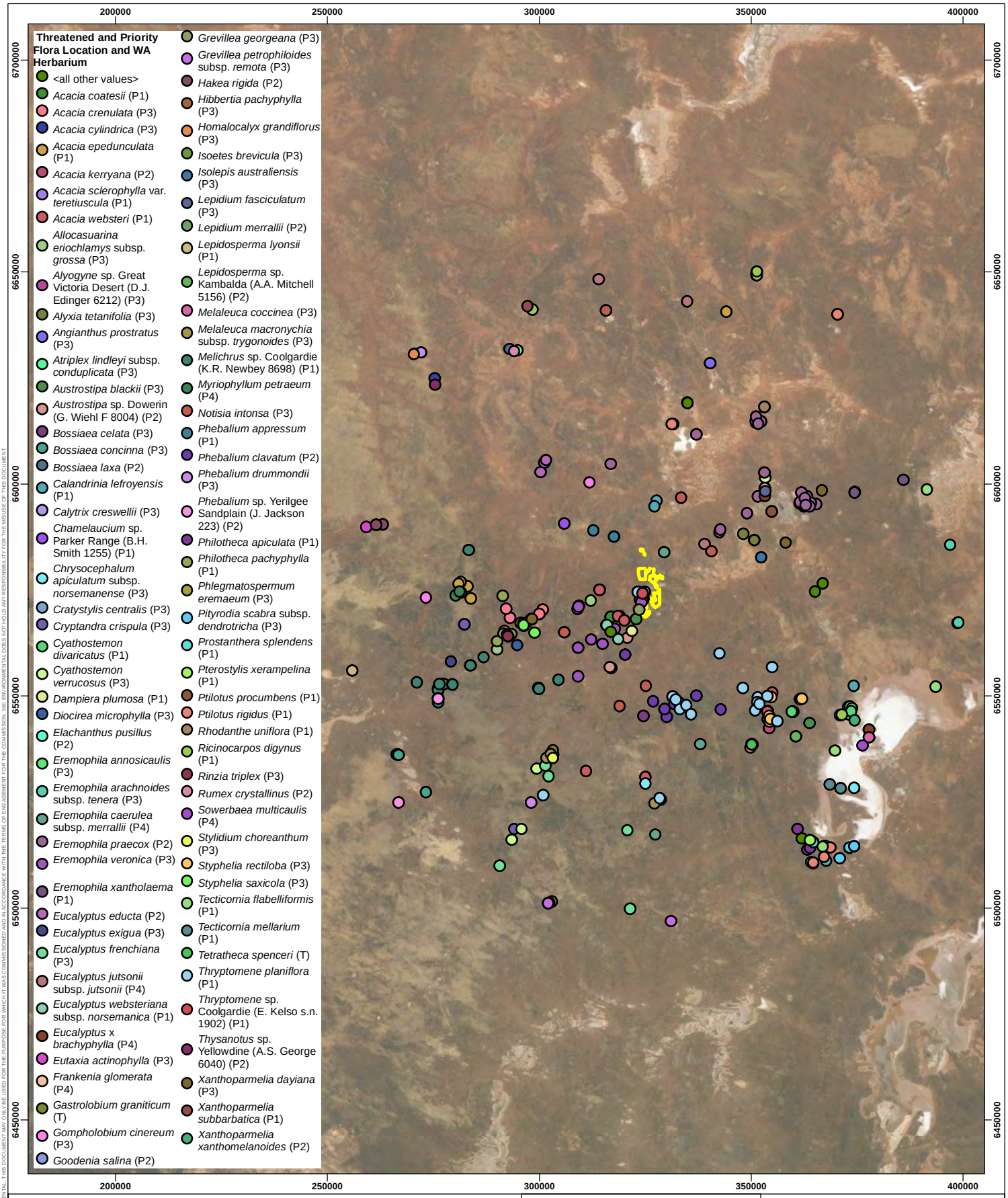
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CNX Three Mile Hill Coolgardie Gold Project

Figure 5b
Survey Effort

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Legend

Survey Area

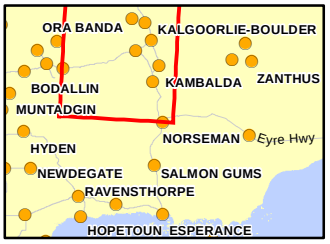
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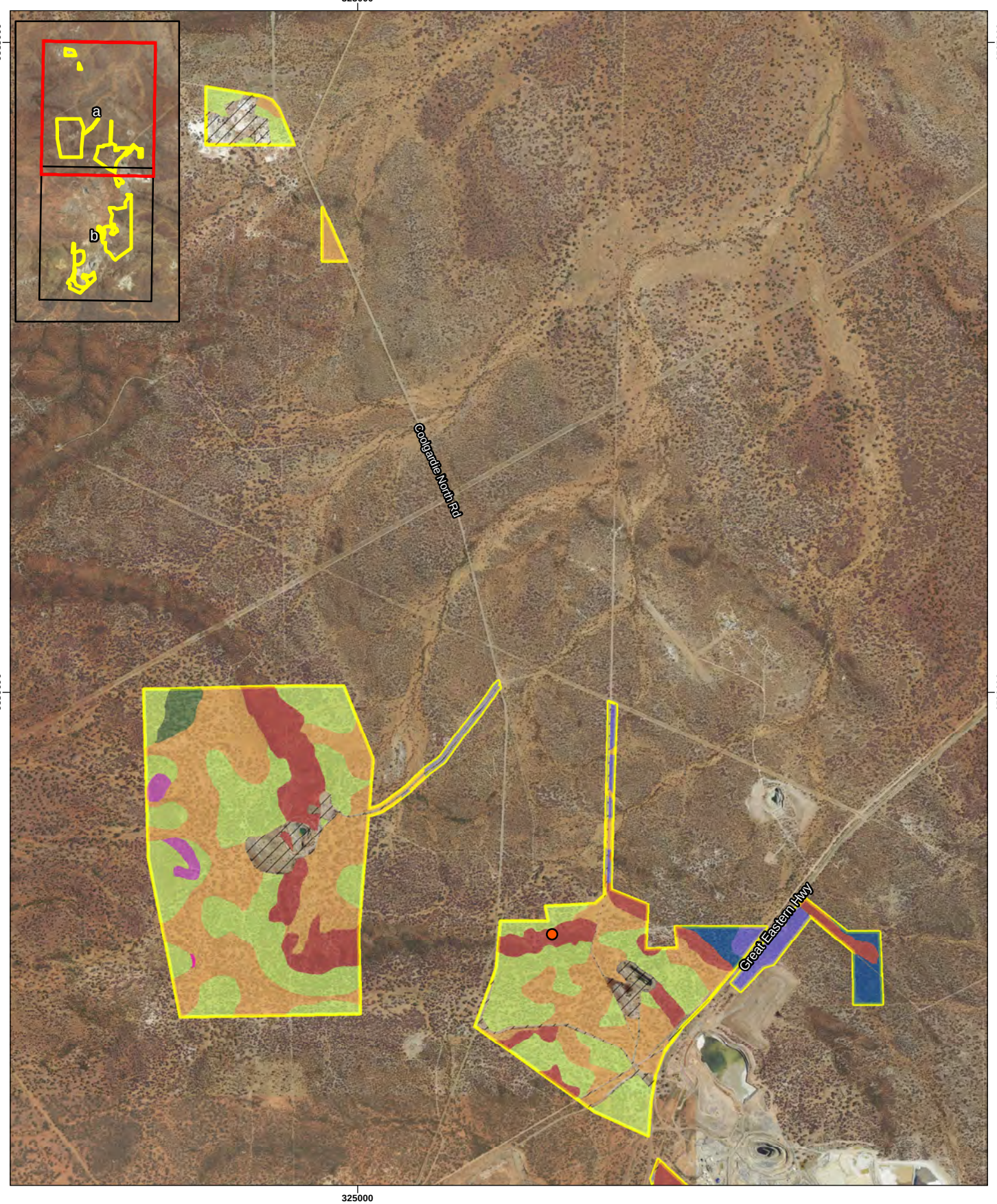
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Figure 6

DBCA Threatened and Priority Flora Locations

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Legend

- Survey Area
- *Austrostipa blackii* (P3)

Vegetation Types

- AcEoaDl
- Ec
- EgAhSaf
- EooEiiDs
- EsEiiAv
- EsppEiiSaa
- EtEaEpa
- Sl
- Cleared

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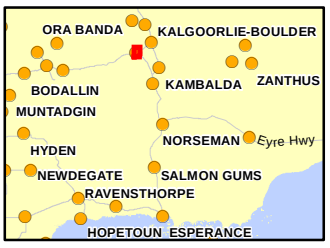
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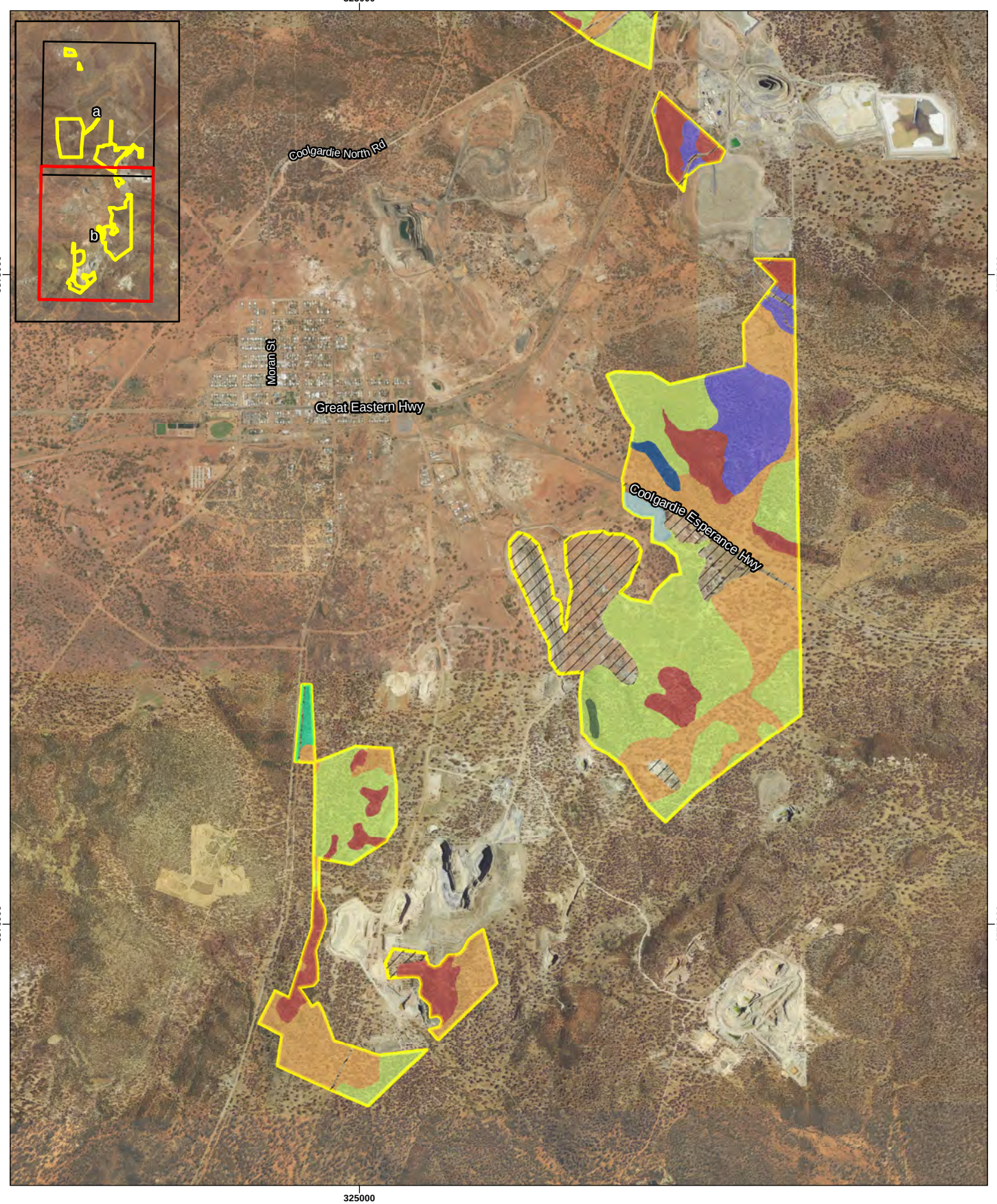
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Figure 7a
Vegetation Types

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Legend

- Survey Area

Vegetation Types

- AcEoaDl
- EgAhSaf
- EooEiiDs
- ErMhOm
- EsEiiAv
- EsppEiiSaa
- EtEaEpa
- Lake
- Cleared

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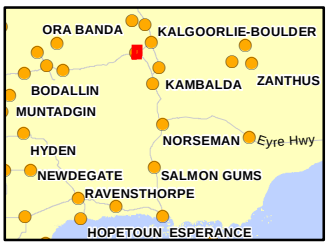
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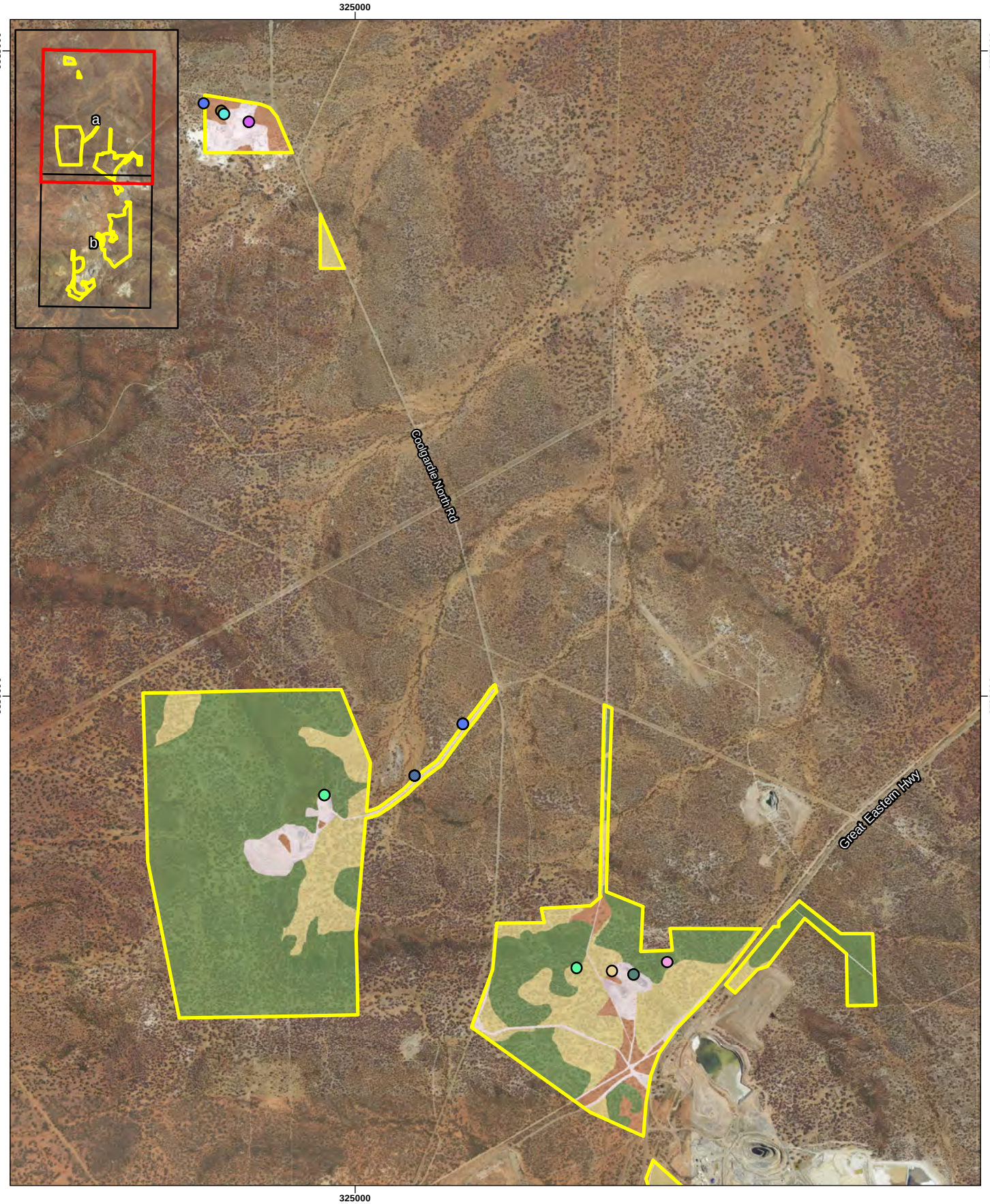
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Figure 7b
Vegetation Types

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Legend

Weed Species

- *Agave americana*
- *Carrichtera annua*
- *Centaurea melitensis*
- *Crassula ovata*
- *Nicotiana glauca*
- *Oligocarpus calendulaceus*
- *Rumex vesicarius*
- *Salvia verbenaca*
- *Schinus molle* var. *areira*

Survey Area

Vegetation Condition

- Excellent
- Very Good
- Good
- Completely Degraded

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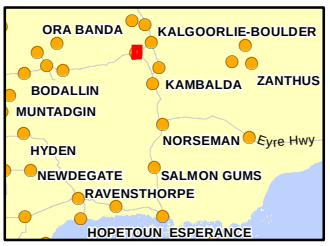
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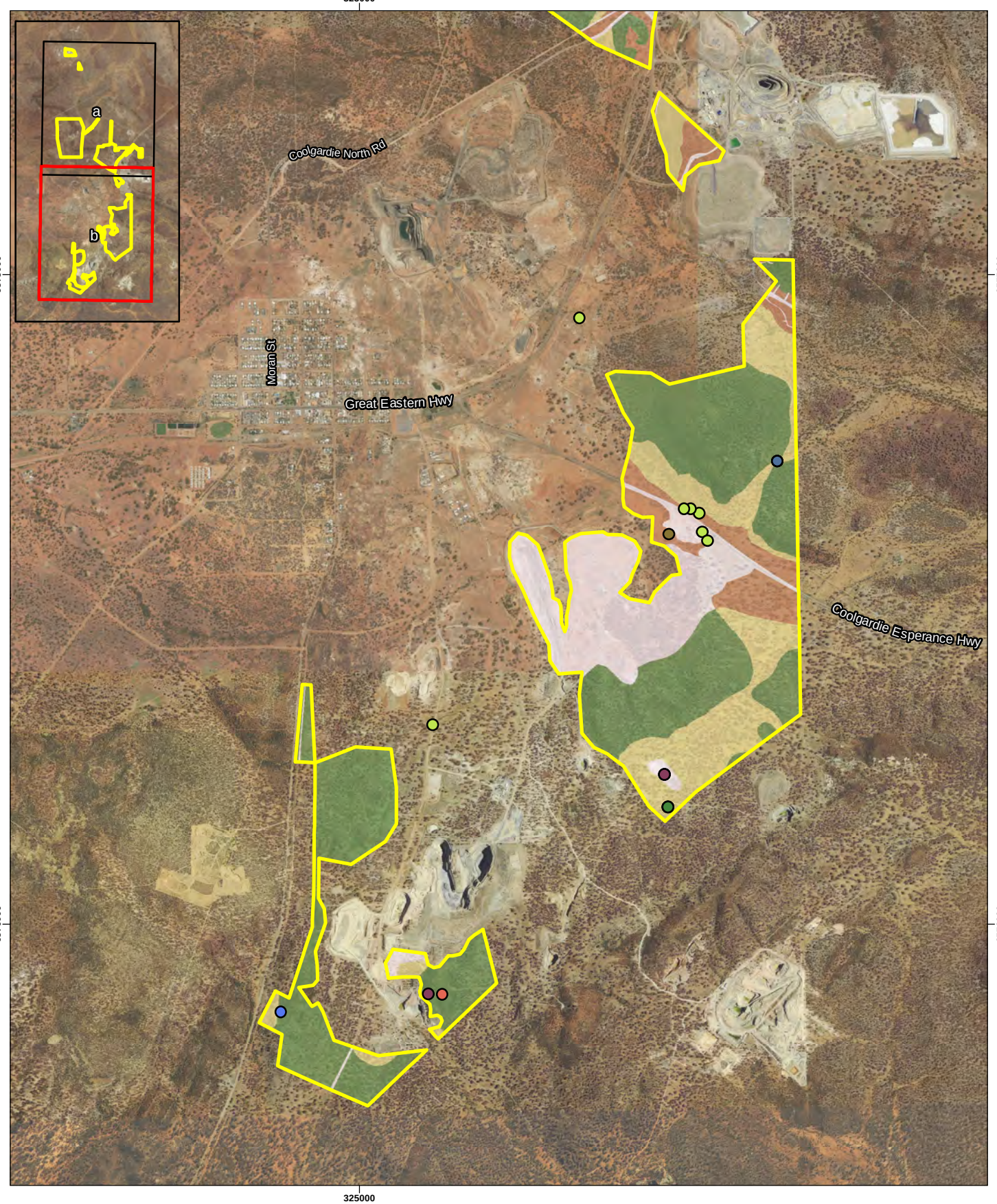
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Figure 8a
Vegetation Condition

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Legend

Weed Species

- *Asphodelus fistulosus*
- *Carrichtera annua*
- *Centaurea melitensis*
- *Euphorbia drummondii*
- *Heliotropium europaeum*
- *Oligocarpus calendulaceus*
- *Opuntia stricta*
- *Salvia verbenaca*
- *Schinus molle* var. *areira*
- *Sonchus asper*

Survey Area

Vegetation Condition

- Excellent
- Very Good
- Good
- Completely Degraded

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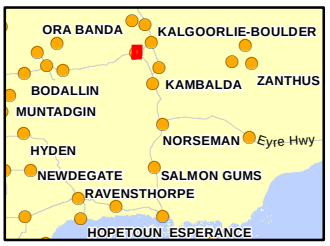
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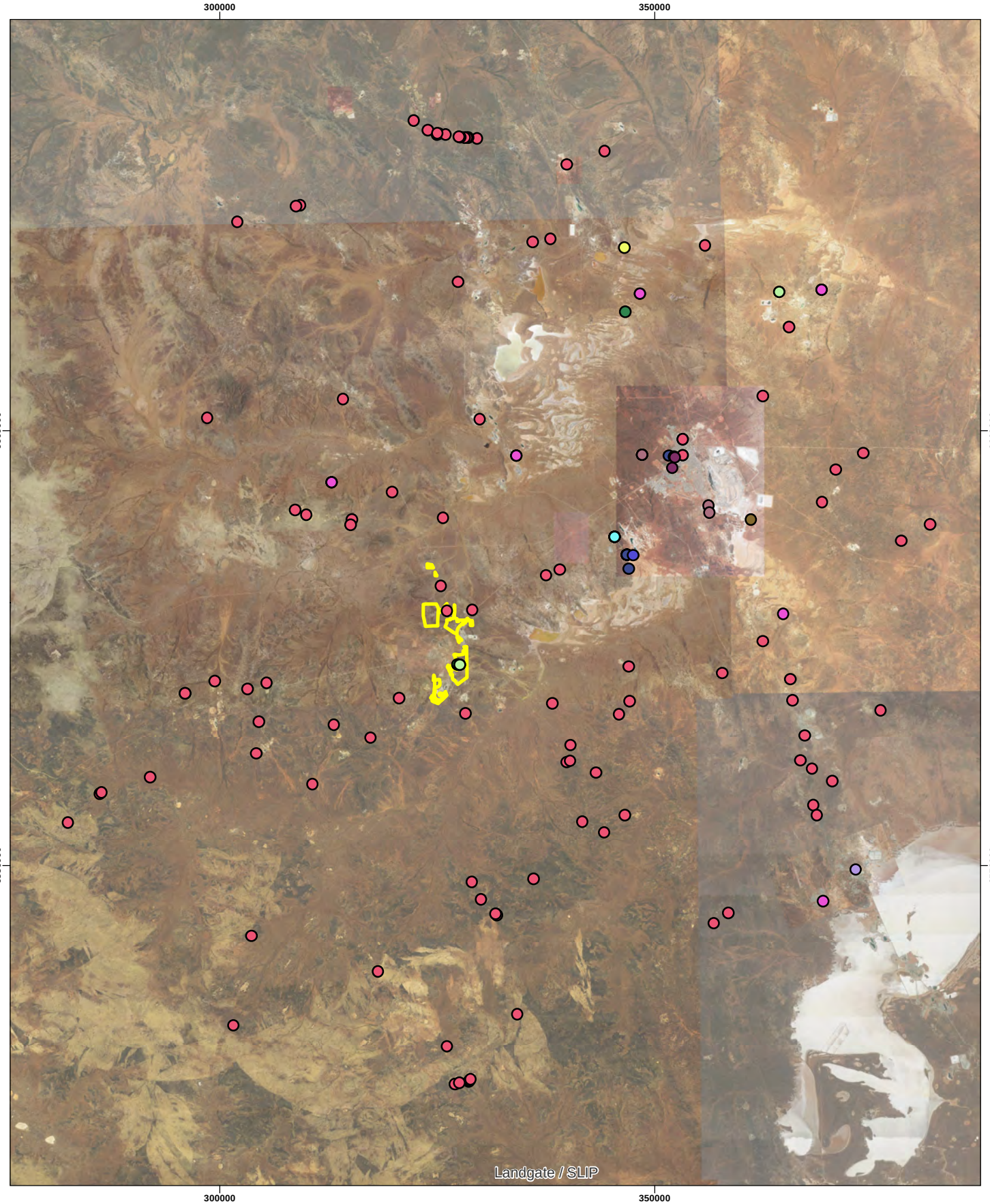
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Figure 8b
Vegetation Condition

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Legend

- Survey Area

Threatened and Priority Fauna Records

- A Fairy Shrimp (Carnavon to Kalgoorlie) (P3)
- Arid Bronze Azure Butterfly (CR)
- Carnaby's Cockatoo (EN)
- Chuditch, Western Quoll (VU)
- Common Greenshank, Greenshank (MI)
- Common Sandpiper (MI)
- Curlew Sandpiper (CR)
- Glossy Ibis (MI)
- Grey-tailed Tattler (P4)
- Hooded plover, hooded dotterel (P4)
- Inland Hairstreak, Desert Blue Butterfly (P1)
- Malleefowl (VU)
- Red-necked Stint (MI)
- Sanderling (MI)
- Sharp-tailed Sandpiper (MI)
- Wood Sandpiper (MI)

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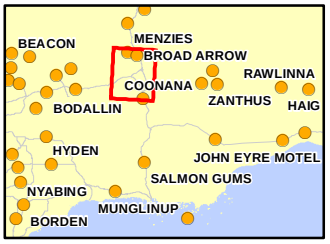
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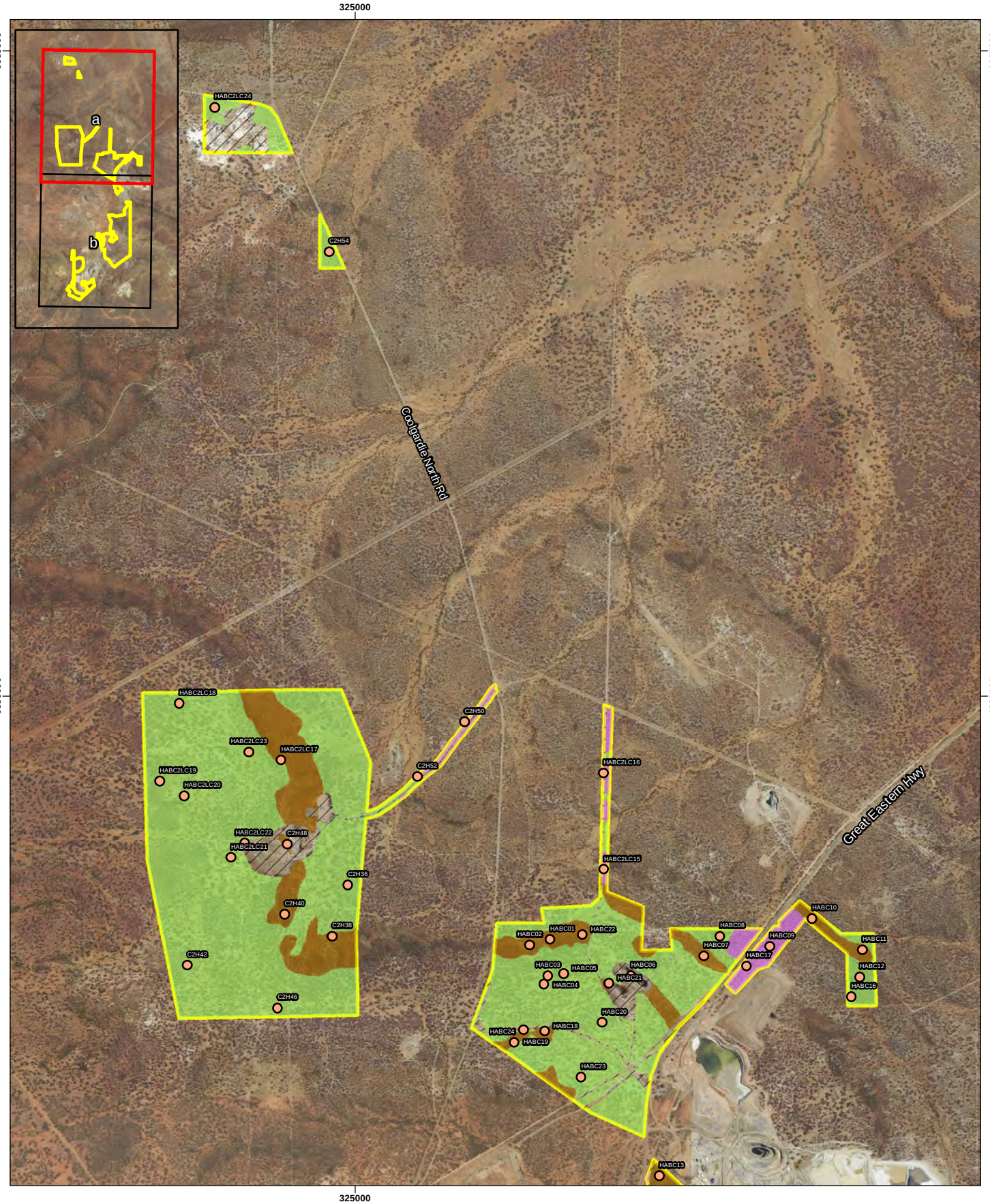
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Figure 9

DBCA Threatened and Priority Fauna Records

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Legend

- Survey Area
- Habitat Assessment Location

Fauna Habitat

- Acacia Shrubland
- Eucalyptus Woodland
- Rocky Slopes
- Cleared

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- LOCALITY MAP SOURCED FROM LANDGATE 2022
- OTHER DATA SOURCED LANDGATE 2022
- AERIAL PHOTOGRAPHY SOURCED LANDGATE 2022

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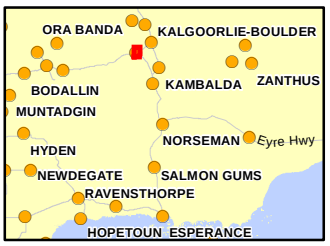
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- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS

LOCALITY MAP



360 environmental
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PROJECT ID	DATE
4794	29/04/2022

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 51

CREATED	CHECKED	APPROVED	REVISION
CL	NW	NW	0

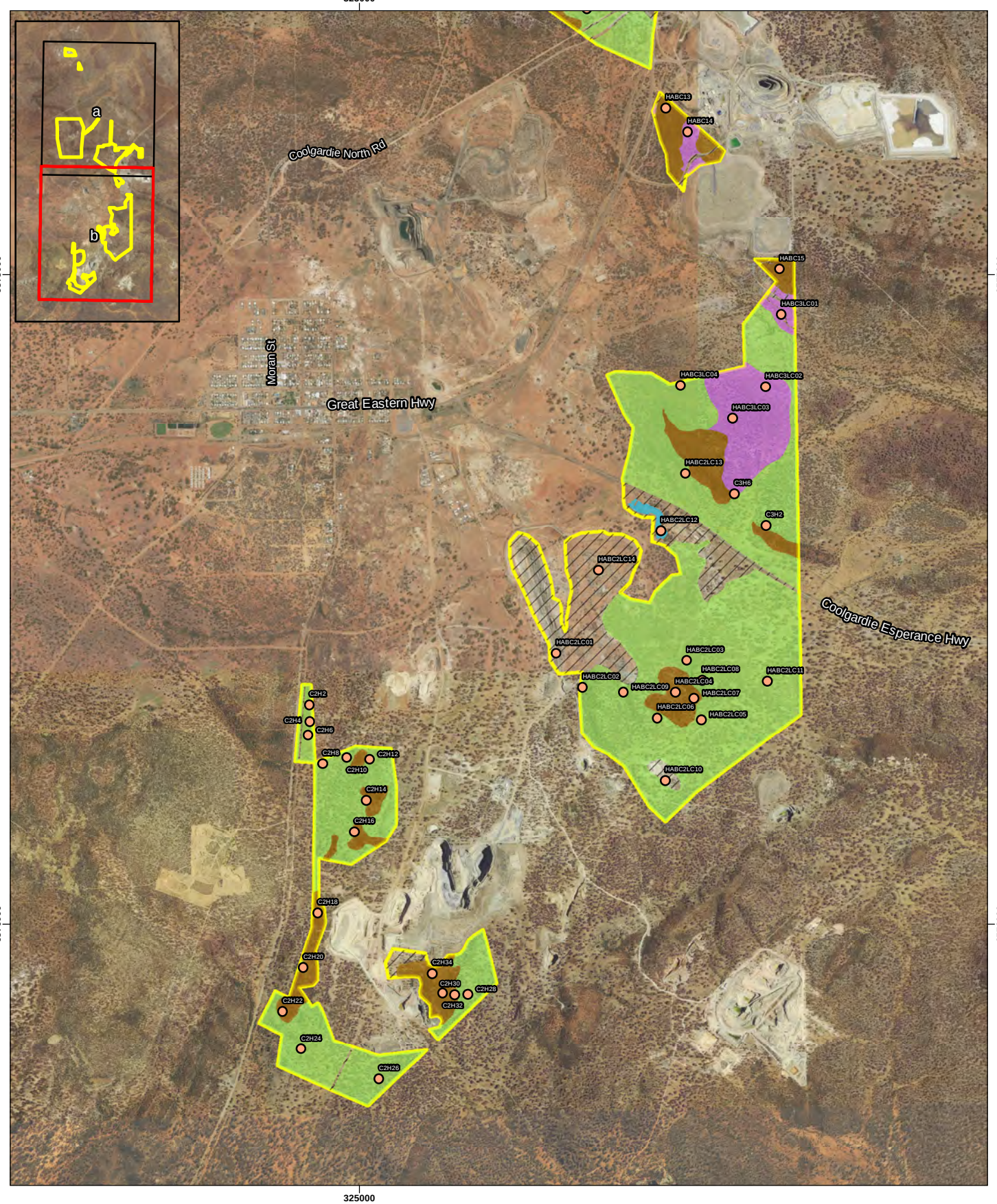
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CNX Three Mile Hill Coolgardie Gold Project

Figure 10a
Fauna Habitat

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Legend

- Survey Area
- Habitat Assessment Location

Fauna Habitat

- Acacia Shrubland
- Eucalyptus Woodland
- Open Water
- Rocky Slopes
- Cleared

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- LOCALITY MAP SOURCED FROM LANDGATE 2022
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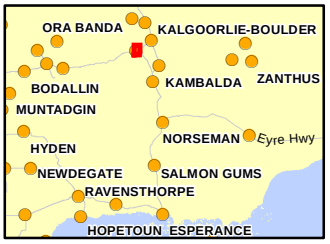
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- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS

LOCALITY MAP



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HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 51

CREATED	CHECKED	APPROVED	REVISION
CL	NW	NW	0

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Figure 10b
Fauna Habitat

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Appendices

Appendix A
Flora and Fauna Literature Review

Appendix A: Fauna Literature Review

Report	Distance to current Survey Area	Survey timing	Survey effort	Recorded conservation significant fauna	Fauna habitats
Coolgardie landfill Flora, Vegetation and Fauna Habitat Assessment (Stategen Environmental 2019)	6.4 kms ESE of Survey Area	18 December 2018	Describe fauna habitat within the Survey Area	None	Open mallee woodland to mallee woodland.
Fauna survey for Mungari Gold Operations Cutters Ridge Project (Phoenix Environmental Sciences, 2019)	40 km North of Survey Area	September 2018	Level 1 Fauna Targeted Malleefowl	Malleefowl (*Leipoa ocellata*)	Open Eucalypt woodland, shrubland, and salt lake, in addition to a small portion of existing cleared areas.
Level 1 Vertebrate Fauna Risk Assessment for Lot 500 Kalgoorlie West (Terrestrial Ecosystems, 2018)	24 km NE of Survey Area	2018	Level 1 Vertebrate Fauna	None	Open eucalypt woodland with a mixed understory of scattered shrubs and chenopods
Vegetation Clearing - Fauna Assessment (Biostat Pty Ltd, 2020)	40 km N of the Survey Area	December 2019	Level 1 Reconnaissance	None	Open woodland: Acacia, Casuarina, and Eucalypt. Chenopod shrubland, Acacia shrubland. Eucalyptus sp. mallee over spinifex Stoney/rocky hills Drainage lines Mulga woodland

Appendix B
Flora and Fauna Database Searches

Appendix B: DBCA Threatened and Priority Fauna

CLASS	SCI_NAME	COM_NAME	WA_status	EPBCstatus	YEAR	SOURCE	CERTAINTY	OBS_METHOD	OBS_TYPE	COUNT	LOCALITY	SITE
Actitis hypoleucos	Common Sandpiper	BIRD	MI	MI	2014	BIRDATA				0	coolgardie gorge	coolgardie gorge
Actitis hypoleucos	Common Sandpiper	BIRD	MI	MI	2011	BIRDATA				0	The Gorge (Coolgardie0	The Gorge (Coolgardie0
Actitis hypoleucos	Common Sandpiper	BIRD	MI	MI	2013	BIRDATA				0	Coolgardie Gorge wetland	Coolgardie Gorge wetland
Tringa nebularia	Common greenshank, greenshank	BIRD	MI	MI	2013	BIRDATA				0	Coolgardie Gorge wetland	Coolgardie Gorge wetland
Calidris acuminata	Sharp-tailed sandpiper	BIRD	MI	MI	2012	BIRDATA				0	Silver Lake	Silver Lake
Calidris alba	Sanderling	BIRD	MI	MI	2016	BIRDATA				0	Hannan Lake	Hannan Lake
Calyptorhynchus lati	Carnaby's cockatoo	BIRD	EN	EN	2016	BIRDATA				0	367 Collins	367 Collins
Calyptorhynchus lati	Carnaby's cockatoo	BIRD	EN	EN	2016	BIRDATA				0	Cape Lilac on alley	Cape Lilac on alley
Calyptorhynchus lati	Carnaby's cockatoo	BIRD	EN	EN	2017	BIRDATA				0	Piccadilly St West	Piccadilly St West
Tringa brevipes	Grey-tailed tattler	BIRD	P4	MI	2017	BIRDATA				0	Lake Douglas	Lake Douglas
Tringa nebularia	Common greenshank, greenshank	BIRD	MI	MI	1980	BIRDATLAS1				0	KANOWNA	KANOWNA
Tringa glareola	Wood sandpiper	BIRD	MI	MI	1980	BIRDATLAS1				0	KARLKURLA	KARLKURLA
Calidris acuminata	Sharp-tailed sandpiper	BIRD	MI	MI	1980	BIRDATLAS1				0	KARLKURLA	KARLKURLA
Thinornis rubricollis	Hooded plover, hooded dotterel	BIRD	P4		1980	BIRDATLAS1				0		
Tringa nebularia	Common greenshank, greenshank	BIRD	MI	MI	1980	BIRDATLAS1				0	KANOWNA	KANOWNA
Calidris acuminata	Sharp-tailed sandpiper	BIRD	MI	MI	1980	BIRDATLAS1				0	FEYSVILLE	FEYSVILLE
Calidris acuminata	Sharp-tailed sandpiper	BIRD	MI	MI	1981	BIRDATLAS1				0	KARLKURLA	KARLKURLA
Plegadis falcinellus	Glossy ibis	BIRD	MI	MI	1981	BIRDATLAS1				0	KARLKURLA	KARLKURLA
Calidris acuminata	Sharp-tailed sandpiper	BIRD	MI	MI	1981	BIRDATLAS1				0	KANOWNA	KANOWNA
Tringa nebularia	Common greenshank, greenshank	BIRD	MI	MI	2001	BIRDATLAS2				0	Kopai Lake	Kopai Lake
Calidris acuminata	Sharp-tailed sandpiper	BIRD	MI	MI	2001	BIRDATLAS2				0	Kopai Lake	Kopai Lake
Calidris acuminata	Sharp-tailed sandpiper	BIRD	MI	MI	2001	BIRDATLAS2				0	Kopai Lake	Kopai Lake
Tringa glareola	Wood sandpiper	BIRD	MI	MI	2005	BIRDATLAS2				0	Kalgoorlie Sewerage overflow ponds	Kalgoorlie Sewerage overflow ponds
Tringa glareola	Wood sandpiper	BIRD	MI	MI	2005	BIRDATLAS2				0	Kalgoorlie Sewerage outlet	Kalgoorlie Sewerage outlet
Tringa nebularia	Common greenshank, greenshank	BIRD	MI	MI	2006	BIRDATLAS2				0	Young River Station Lake	Young River Station Lake
Calidris ferruginea	curlew sandpiper	BIRD	CR	CR	2006	BIRDATLAS2				0	Young River Station Lake	Young River Station Lake
Calidris ruficollis	Red-necked stint	BIRD	MI	MI	2006	BIRDATLAS2				0	Young River Station Lake	Young River Station Lake
Calidris acuminata	Sharp-tailed sandpiper	BIRD	MI	MI	2006	BIRDATLAS2				0	Young River Station Lake	Young River Station Lake
Tringa nebularia	Common greenshank, greenshank	BIRD	MI	MI	1999	BIRDATLAS2				0	Kurnalpi Road	Kurnalpi Road
Calidris ferruginea	curlew sandpiper	BIRD	CR	CR	1999	BIRDATLAS2				0	Kurnalpi Road	Kurnalpi Road
Calidris acuminata	Sharp-tailed sandpiper	BIRD	MI	MI	1999	BIRDATLAS2				0	Kurnalpi Road	Kurnalpi Road
Leipoa ocellata	Malleefowl	BIRD	VU	VU	2012	FAUNASURVEY	Certain	Survey	Unknown	1	FEYSVILLE	Kalgoorlie, Goldfields, Mt Martin
Leipoa ocellata	Malleefowl	BIRD	VU	VU	2012	FAUNASURVEY	Certain	Survey	Unknown	1	FEYSVILLE	Kalgoorlie Region, Goldfields, Jubilee mine
Leipoa ocellata	Malleefowl	BIRD	VU	VU	2012	FAUNASURVEY	Certain	Survey	Unknown	1	FEYSVILLE	Kalgoorlie Region, Goldfields, Jubilee mine
Leipoa ocellata	Malleefowl	BIRD	VU	VU	2012	FAUNASURVEY	Certain	Survey	Unknown	1	FEYSVILLE	Kalgoorlie Region, Goldfields, Jubilee mine
Leipoa ocellata	Malleefowl	BIRD	VU	VU	2012	FAUNASURVEY	Certain	Survey	Unknown	1	FEYSVILLE	Kalgoorlie Region, Goldfields, Jubilee mine
Leipoa ocellata	Malleefowl	BIRD	VU	VU	2012	FAUNASURVEY	Certain	Survey	Unknown	1	BULONG	Hampton Hill, Bulong Mining Lease M25/333
Dasyurus geoffroii	chuditch, western quoll	MAMMAL	VU	VU	1974	TFAUNA	Certain	Opportunistic sighting	Caught or trapped	1	Kambalda East	1 mile N of Kambalda East townsite, at edge of Lake Lefroy in sandy mulga country
Leipoa ocellata	malleefowl	BIRD	VU	VU	1994	TFAUNA	Certain	Opportunistic sighting	Secondary sign	0	Bullabulling	one active nest at Bullabulling No. 8 Pumping station.
Leipoa ocellata	malleefowl	BIRD	VU	VU	1995	TFAUNA	Moderately certain	Opportunistic sighting	Day sighting	1	Londonderry	Yerilla Sandalwood Reserve
Leipoa ocellata	malleefowl	BIRD	VU	VU	2000	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Mount Burges	access road to Kundana Mining Lease - "30km NW (10km W & 22km N) of Kalgoorlie"
Branchinella denticu	a fairy shrimp (Carnavon to Kalgoorlie)	INVERTEBRATE	P3		1937	TFAUNA	Certain	Historical (written)	Caught or trapped	0	Gidgi Lake	Gidji Lake, N of Kalgoorlie
Thinornis rubricollis	hooded plover, hooded dotterel	BIRD	P4		1992	TFAUNA	Certain	Survey	Sighting	0	Arrow Lake	Arrow Lake
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1989	TFAUNA	Certain	Survey	Caught or trapped	1	Lake Douglas	Lake Douglas, 12 km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1991	TFAUNA	Certain	Survey	Caught or trapped	1	Lake Douglas	Lake Douglas, 12 km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1982	TFAUNA	Certain	Survey	Caught or trapped	2	Lake Douglas	Lake Douglas, 12 km SW of Kalgoorlie

CLASS	SCI_NAME	COM_NAME	WA_status	EPBCstatus	YEAR	SOURCE	CERTAINTY	OBS_METHOD	OBS_TYPE	COUNT	LOCALITY	SITE
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1986	TFAUNA	Certain	Survey	Caught or trapped	15	Lake Douglas	Lake Douglas, 12 km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1986	TFAUNA	Certain	Survey	Caught or trapped	4	Lake Douglas	Lake Douglas, 12 km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1991	TFAUNA	Certain	Survey	Caught or trapped	1	Lake Douglas	Lake Douglas, Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1987	TFAUNA	Certain	Survey	Caught or trapped	1	Lake Douglas	Lake Douglas, 12km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1987	TFAUNA	Certain	Survey	Caught or trapped	8	Lake Douglas	Lake Douglas, 12km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1987	TFAUNA	Certain	Survey	Caught or trapped	2	Lake Douglas	Lake Douglas, 12km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1989	TFAUNA	Certain	Survey	Caught or trapped	2	Lake Douglas	Lake Douglas, 12km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1989	TFAUNA	Certain	Survey	Caught or trapped	2	Lake Douglas	Lake Douglas, 12km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1989	TFAUNA	Certain	Survey	Caught or trapped	3	Lake Douglas	Lake Douglas, 12km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1989	TFAUNA	Certain	Survey	Caught or trapped	6	Lake Douglas	Lake Douglas, 12km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1991	TFAUNA	Certain	Survey	Caught or trapped	1	Lake Douglas	Lake Douglas, 12km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1991	TFAUNA	Certain	Survey	Caught or trapped	4	Lake Douglas	Lake Douglas, 12km SW of Kalgoorlie
Leipoa ocellata	malleefowl	BIRD	VU	VU	1985	TFAUNA	Certain	Opportunistic sighting	Sighting	2	Jaurdie Hills	Jaurdie Hills
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1911	TFAUNA	Certain	Historical (written)	Caught or trapped	1	Kalgoorlie	SW Australia, Kalgoorlie District
Jalmenus aridus	inland hairstreak, desert blue butterfly	INVERTEBRATE	P1		1985	TFAUNA	Certain	Survey	Caught or trapped	1	Lake Douglas	Lake Douglas 12 km SW of Kalgoorlie
Jalmenus aridus	inland hairstreak, desert blue butterfly	INVERTEBRATE	P1		1989	TFAUNA	Certain	Survey	Caught or trapped	1	Lake Douglas	Lake Douglas 12 km SW of Kalgoorlie
Jalmenus aridus	inland hairstreak, desert blue butterfly	INVERTEBRATE	P1		1986	TFAUNA	Certain	Survey	Caught or trapped	1	Lake Douglas	Lake Douglas 12 km SW of Kalgoorlie
Jalmenus aridus	inland hairstreak, desert blue butterfly	INVERTEBRATE	P1		1986	TFAUNA	Certain	Survey	Caught or trapped	1	Lake Douglas	Lake Douglas 12 km SW of Kalgoorlie
Ogyris subterrestris	arid bronze azure butterfly	INVERTEBRATE	CR	CR	1985	TFAUNA	Certain	Survey	Caught or trapped	1	Lake Douglas	Lake Douglas 12 km SW of Kalgoorlie
Leipoa ocellata	malleefowl	BIRD	VU	VU	2006	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Bullabulling	Bullabulling
Leipoa ocellata	malleefowl	BIRD	VU	VU	2007	TFAUNA	Certain	Opportunistic sighting	Day sighting	2	Bullabulling	Bullabulling
Leipoa ocellata	malleefowl	BIRD	VU	VU	2008	TFAUNA	Certain	Opportunistic sighting	Day sighting	2	Bullabulling	Bullabulling pastoral lease, 10km west of the Bullabulling Pub and 2 kms south of the highway
Jalmenus aridus	inland hairstreak, desert blue butterfly	INVERTEBRATE	P1		1997	TFAUNA	Certain	Survey	Caught or trapped	1	Karramindie	Lake Douglas (Douglas Lake)
Leipoa ocellata	malleefowl	BIRD	VU	VU	2009	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Mount Burges	North of Mount Burges
Leipoa ocellata	malleefowl	BIRD	VU	VU	2009	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Bullabulling	Bullabulling, road from Bullabulling to Stewart
Leipoa ocellata	malleefowl	BIRD	VU	VU	2010	TFAUNA	Certain	Opportunistic sighting	Sighting	1		Vic Rock Road
Leipoa ocellata	malleefowl	BIRD	VU	VU	2011	TFAUNA	Certain	Opportunistic sighting	Day sighting	1		Yallari Timber Reserve
Leipoa ocellata	malleefowl	BIRD	VU	VU	2011	TFAUNA	Certain	Opportunistic sighting	Secondary sign	0		Yallari Timber Reserve
Leipoa ocellata	malleefowl	BIRD	VU	VU	2011	TFAUNA	Certain	Opportunistic sighting	Day sighting	1		
Leipoa ocellata	malleefowl	BIRD	VU	VU	2009	TFAUNA	Certain	Opportunistic sighting	Day sighting	1		on road from Bullabulling to Stuart sighting, off Great Eastern Highway
Leipoa ocellata	malleefowl	BIRD	VU	VU	2009	TFAUNA	Certain	Opportunistic sighting	Day sighting	1		north of Mt Burgess
Leipoa ocellata	malleefowl	BIRD	VU	VU	2011	TFAUNA	Certain	Survey	Caught or trapped	1		gravel area just of side of the raod at Yarri and Bariick Kanowna Belle access road intersection.
Leipoa ocellata	malleefowl	BIRD	VU	VU	2012	TFAUNA	Certain	Opportunistic sighting	Day sighting	2	Coolgardie	Just off cave hill road in Widgiemooltha close to one of Focus Minerals small operations.
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Dead	1	Bullabulling	48km West of Coolgardie, No 8 pump Denardi Station, Great Eastern Highway
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Moderately certain	Opportunistic sighting	Day sighting	1	Bullabulling	~10km east if Bullabulling (40km east of Coolgardie) on Great Eastern Highway
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Moderately certain	Opportunistic sighting	Night sighting	1	Feysville	Out the front of Pevnatty Crib room on active haul road. A higly disturbed area.
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Secondary sign	0	Scahil Timber reserve	Scahil Timber reserve

CLASS	SCI_NAME	COM_NAME	WA_status	EPBCstatus	YEAR	SOURCE	CERTAINTY	OBS_METHOD	OBS_TYPE	COUNT	LOCALITY	SITE
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Burra Rock Conservation Reserve	Carpark at Burra Rock. Mound found within adjacent bush habitat.
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Ora Banda	500m before Cawse Nickel turn off on Broad Arrow-Ora Banda road, heading towards Ora Banda
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Kanowna	~5km before the Mt Pleasant Office turn off on Mt Pleasant Rd, off Menzies Highway
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Dead	1	Kanowna	3.1km north of Paddington Mill (35km north of Kalgoorlie) on Menzies Highway
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Day sighting	1		3.2km east of cawse nickel turn off on the Ora Banda - Broad Arrow Rd
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Moderately certain	Opportunistic sighting	Day sighting	1	Feysville	Woolibar Station, just south of where Woolibar creek crosses the Goldfields Highway.
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Dead	1	Kanowna	~4.45km east of Cawse Nickel turn off on the Broad Arrow- Ora Banda Rd
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Dead	1	Kanowna	~100-200m W of drilling track access road, on the Braod Arrow to Ora Banda road, Near Cawse Nickel turn off.
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Kanowna	~10km W of Menzies Hwy on Ora Banda - Broad Arrow road
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Day sighting	1		3.26km E of Cawse Nickel turn off on Broad Arrow - Ora banda Rd
Leipoa ocellata	malleefowl	BIRD	VU	VU	2014	TFAUNA	Certain	Opportunistic sighting	Day sighting	2	Burra Rock	Burra Rock, Directly west of campsite, south of old east-west track
Leipoa ocellata	malleefowl	BIRD	VU	VU	2015	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Parkeston	100m along a small track - off a major dirt road; approximately 9km NE of Kalgoorlie
Leipoa ocellata	malleefowl	BIRD	VU	VU	2015	TFAUNA	Certain	Opportunistic sighting	Day sighting	2	Bulong	10.6km SSE of Hampton Hill Station homestead
Leipoa ocellata	malleefowl	BIRD	VU	VU	2015	TFAUNA	Certain	Opportunistic sighting	Day sighting	2	Feysville	Brown Hil on Woolubar Station. Kambolda Rd, Boulder WA
Leipoa ocellata	malleefowl	BIRD	VU	VU	2016	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	Coolgardie	Coolgardie North Rd, approx. 5km N of Coolgardie
Leipoa ocellata	malleefowl	BIRD	VU	VU	2016	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	Coolgardie	Coolgardie North Rd, approx. 7km N of Coolgardie, near Bonnievale
Leipoa ocellata	malleefowl	BIRD	VU	VU	2015	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	Coolgardie	Between Burra Rocks Rd and Coolgardie-Esperance Rd, approx. 5km S of Coolgardie
Leipoa ocellata	malleefowl	BIRD	VU	VU	2016	TFAUNA	Certain	Opportunistic sighting	Dusk sighting	1	Yallari Timber Reserve	Yallari Timber Reserve, central N-S track
Leipoa ocellata	malleefowl	BIRD	VU	VU	2016	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	Mount Burges	Traveling route back from Lake Carnage (Coolgardie Nth Rd??), 10km S of Ora Banda
Leipoa ocellata	malleefowl	BIRD	VU	VU	1996	TFAUNA	Moderately certain	Opportunistic sighting	Secondary sign	0	Coolgardie	4WD Holland Track, 200km NE of Mt Holland (cannot find Holland Track)
Leipoa ocellata	malleefowl	BIRD	VU	VU	1965	TFAUNA	Moderately certain	Historical (written)	Secondary sign	0	MOUNT BURGES	12 miles North of Coolgardie
Leipoa ocellata	malleefowl	BIRD	VU	VU	1994	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	2	BULLABULLING	22 kms west of Coolgardie
Leipoa ocellata	malleefowl	BIRD	VU	VU	2004	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	KANOWNA	50 km nth of kalgoorlie on main hwy nth of Mt Vetters homestead
Leipoa ocellata	malleefowl	BIRD	VU	VU	1902	TFAUNA	Moderately certain	Opportunistic sighting	Secondary sign	0	BOORARA	Boorara
Leipoa ocellata	malleefowl	BIRD	VU	VU	2001	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	BULONG	Corsair Mine 10km E of Kalgoorlie; 1km S of Bulong Rd on graded track heading E
Leipoa ocellata	malleefowl	BIRD	VU	VU	1988	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	MOUNT BURGES	Eight Mile Rock dam
Leipoa ocellata	malleefowl	BIRD	VU	VU	2002	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	2	KARRAMINDIE	grt eastern hway 1 km kal side of mungarrie industrial area
Leipoa ocellata	malleefowl	BIRD	VU	VU	2002	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	2	BULONG	Hampton Hill Station, 16km ESE of Boulder b/w Boorara Mine Site & Golden Ridge
Leipoa ocellata	malleefowl	BIRD	VU	VU	1910	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	LAMINGTON	Kalgoorlie
Leipoa ocellata	malleefowl	BIRD	VU	VU	1991	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	BULLABULLING	Kangaroo Hills Timber Reserve
Leipoa ocellata	malleefowl	BIRD	VU	VU	1947	TFAUNA	Moderately certain	Opportunistic sighting	Secondary sign	0	LAMINGTON	PO Kalgoorlie
Leipoa ocellata	malleefowl	BIRD	VU	VU	1988	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	MOUNT BURGES	WMC sand pit Jaurdi Hills Rd
Leipoa ocellata	malleefowl	BIRD	VU	VU	1995	TFAUNA	Moderately certain	Opportunistic sighting	Sighting	1	LONDONDERRY	Yallari Timber Reserve
Leipoa ocellata	malleefowl	BIRD	VU	VU	1995	TFAUNA	Moderately certain	Opportunistic sighting	Day sighting	1	LONDONDERRY	Yerilla Sandalwood Reserve
Leipoa ocellata	malleefowl	BIRD	VU	VU	2017	TFAUNA	Very Certain (photo, spec	Opportunistic sighting	Day sighting	1	Goldfields Woodlands Conservation P	5km N of Victoria Rock, on Coolgardie Vic Rock Rd, in Goldfields Woodlands CP

CLASS	SCI_NAME	COM_NAME	WA_status	EPBCstatus	YEAR	SOURCE	CERTAINTY	OBS_METHOD	OBS_TYPE	COUNT	LOCALITY	SITE
Leipoa ocellata	malleefowl	BIRD	VU	VU	2017	TFAUNA	Very Certain (photo, spec	Monitoring	Remote camera	1	Londonderry	Scahill Rimber Reserve, on track south of reserve
Leipoa ocellata	malleefowl	BIRD	VU	VU	2017	TFAUNA	Very Certain (photo, spec	Monitoring	Remote camera	1	Londonderry	Scahill Rimber Reserve, on track south of reserve
Leipoa ocellata	malleefowl	BIRD	VU	VU	2018	TFAUNA	Very Certain (photo, spec	Opportunistic sighting	Dawn sighting	2	Kanowna	Borad Arrow-Ora Banda Rd, 3km E of Cawse Nickel turnoff
Leipoa ocellata	malleefowl	BIRD	VU	VU	2018	TFAUNA	Not sure	Opportunistic sighting	Sighting	1	Ora Banda	Norton Gold field mining lease road
Leipoa ocellata	malleefowl	BIRD	VU	VU	2017	TFAUNA	Moderately certain	Opportunistic sighting	Day sighting	1	Karramindie	Karramindie State Forest No. 8
Leipoa ocellata	malleefowl	BIRD	VU	VU	2017	TFAUNA	Very Certain (photo, spec	Opportunistic sighting	Dusk sighting	1	Karramindie	50m E of the S/W corner gate of Karramindie State Forest, where the gully crosses the track
Leipoa ocellata	malleefowl	BIRD	VU	VU	2018	TFAUNA	Very Certain (photo, spec	Opportunistic sighting	Secondary sign	0	Karramindie	1.7km S of Karramindie State Forest on Hampton Location 53
Leipoa ocellata	malleefowl	BIRD	VU	VU	2018	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Londonberry	Old woodline track running SW away from Scahill Timber Reserve
Leipoa ocellata	malleefowl	BIRD	VU	VU	2018	TFAUNA	Very Certain (photo, spec	Monitoring	Remote camera	2	Londonderry	3.5km S of Scahill Timber Reserve, Londonderry
Leipoa ocellata	malleefowl	BIRD	VU	VU	2018	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	Kanowna	Golden cities Mine Site haul road, Kanowna
Calyptorhynchus lati	Carnaby's cockatoo	BIRD	EN	EN	2018	TFAUNA	Very Certain (photo, spec	Opportunistic sighting	Day sighting	1	Sommerville	Southern corner of Hay St and Hutton St
Leipoa ocellata	malleefowl	BIRD	VU	VU	2018	TFAUNA	Very Certain (photo, spec	Opportunistic sighting	Day sighting	0	Kalgoorlie	West norh-west of Kalgoorlie about 20km
Leipoa ocellata	malleefowl	BIRD	VU	VU	2018	TFAUNA	Certain	Opportunistic sighting	Day sighting	2	Golden Cities	Goldfields mining tenure
Leipoa ocellata	malleefowl	BIRD	VU	VU	2007	TFAUNA	Certain	Opportunistic sighting		1	Coolgardie	Victoria Rock Rd, about 15km south of Coolgardie
Leipoa ocellata	malleefowl	BIRD	VU	VU	2007	TFAUNA	Certain	Opportunistic sighting		1	Kalgoorlie	Broad Arrow-Ora Banda Rd, few km east of Cawse Mine turnoff
Leipoa ocellata	malleefowl	BIRD	VU	VU	2007	TFAUNA	Certain	Opportunistic sighting		1	Coolgardie	Burra Rock Road, 11.2km north of DEC Burra Rock Reserve boundary sign
Leipoa ocellata	malleefowl	BIRD	VU	VU	2012	TFAUNA	Certain	Opportunistic sighting		4	Coolgardie	Borefields on Focus owned mine lease, near bore 8
Leipoa ocellata	malleefowl	BIRD	VU	VU	2008	TFAUNA	Certain	Opportunistic sighting		1	Kambalda	
Leipoa ocellata	malleefowl	BIRD	VU	VU	2006	TFAUNA	Certain	Opportunistic sighting		1	Coolgardie	23.2km south of T intersection of Coolgardie Norseman Rd
Leipoa ocellata	malleefowl	BIRD	VU	VU	2008	TFAUNA	Certain	Opportunistic sighting	Dusk sighting	1	Coolgardie	Great Eastern Hwy, 40.5km west of Coolgardie
Leipoa ocellata	malleefowl	BIRD	VU	VU	2009	TFAUNA	Certain	Opportunistic sighting		2	Coolgardie	Juardi Hills Rd, 100m north of crest
Leipoa ocellata	malleefowl	BIRD	VU	VU	2009	TFAUNA	Certain	Opportunistic sighting		1	Londonerry	about 3km south of Burra Rock Reserve along Burra Rock Road
Leipoa ocellata	malleefowl	BIRD	VU	VU	2010	TFAUNA	Certain	Opportunistic sighting		1	Londonberry	Burra Rock Nature Reserve, next to camping area
Leipoa ocellata	malleefowl	BIRD	VU	VU	2010	TFAUNA	Certain	Opportunistic sighting		1	Kambalda	5km along pipeline access road off Cave Rocks mine haul rd
Leipoa ocellata	malleefowl	BIRD	VU	VU	2010	TFAUNA	Certain	Opportunistic sighting	Dead	1	Kambalda	9km N of Kambalda T intersection along Goldfields Hwy
Leipoa ocellata	malleefowl	BIRD	VU	VU	2010	TFAUNA	Certain	Opportunistic sighting		1	Bullabulling	Great Eastern Hwy, 130km E of Southern Cross, near unnamed gravel road
Leipoa ocellata	malleefowl	BIRD	VU	VU	2011	TFAUNA	Certain	Opportunistic sighting		1	Ora Banda	Broad Arrow-Ora Banda Rd, approx. 5.5km from Norilsk Nickel access road toward east
Leipoa ocellata	malleefowl	BIRD	VU	VU	2011	TFAUNA	Certain	Opportunistic sighting		2	Londonderry	Burra Rock camping ground
Leipoa ocellata	malleefowl	BIRD	VU	VU	2011	TFAUNA	Certain	Survey		0	Ora Banda	
Leipoa ocellata	malleefowl	BIRD	VU	VU	2011	TFAUNA	Certain	Survey		0	Ora Banda	
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Sighting	1	Coolgardie	7km south of Coolgardie on the Victoria Rock Road
Leipoa ocellata	malleefowl	BIRD	VU	VU	0	TFAUNA	Certain	Opportunistic sighting	Secondary sign	0	Burra Rock Conservation Reserve	
Leipoa ocellata	malleefowl	BIRD	VU	VU	2012	TFAUNA	Certain	Opportunistic sighting	Sighting	1	Kalgoorlie	Goldfield HWY
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Sighting	1	Ora Banda	Between Broad Arrow and Ora Banda
Leipoa ocellata	malleefowl	BIRD	VU	VU	2013	TFAUNA	Certain	Opportunistic sighting	Sighting	1	Goldfields- Kalgoorlie/Coolgardie	Great Eastern Highway
Leipoa ocellata	malleefowl	BIRD	VU	VU	2019	TFAUNA	Certain	Opportunistic sighting	Dusk sighting	1	Arrow Lake	
Leipoa ocellata	malleefowl	BIRD	VU	VU	2019	TFAUNA	Certain	Opportunistic sighting	Sighting	1	Mungari	Mungari turnoff from Great Eastern HWY heading South
Leipoa ocellata	Malleefowl	BIRD	VU	VU	0	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	KALGOORLIE	Kalgoorlie
Leipoa ocellata	Malleefowl	BIRD	VU	VU	0	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1		Kalgoorlie

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 02/11/2021

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Species Group All Animals
Method 'By Circle'
Centre 121° 11' 12" E,30° 55' 14" S
Buffer 40km
Group By Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	297	4751
Priority 1	1	5
Priority 4	1	1
Protected under international agreement	6	13
Rare or likely to become extinct	6	67
TOTAL	**311**	**4837**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Rare or likely to become extinct					
1.	24784	*Calidris ferruginea (Curlew Sandpiper)*		T	
2.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
3.	24557	*Leipoa ocellata (Malleefowl)*		T	
4.	24168	*Macrotis lagotis (Bilby, Dalgyte, Ninu)*		T	
5.	24146	*Myrmecobius fasciatus (Numbat, Walpurti)*		T	
6.	33987	*Ogyris subterrestris subsp. petrina (Arid Bronze Azure Butterfly)*		T	
Protected under international agreement					
7.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
8.	24779	*Calidris acuminata (Sharp-tailed Sandpiper)*		IA	
9.	24780	*Calidris alba (Sanderling)*		IA	
10.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
11.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
12.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
Priority 1					
13.	33979	*Jalmenus aridus (inland hairstreak, desert blue butterfly)*		P1	Y
Priority 4					
14.	24803	*Tringa brevipes (Grey-tailed Tattler)*		P4	
Non-conservation taxon					
15.	24559	*Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*			
16.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
17.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
18.	24265	*Acanthiza uropygialis (Chestnut-rumped Thornbill)*			
19.	25243	*Acanthophis pyrrhus (Desert Death Adder)*			
20.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
21.	25536	*Accipiter fasciatus (Brown Goshawk)*			
22.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
23.		*Afraflacilla stridulator*			
24.		*Afrosternophorus hirsti*			Y
25.		*Allodessus bistrigatus*			
26.		*Aname armigera*			
27.		*Aname mainae*			
28.	24312	*Anas gracilis (Grey Teal)*			
29.	24313	*Anas platyrhynchos (Mallard)*			
30.	24315	*Anas rhynchotis (Australasian Shoveler)*			
31.	24316	*Anas superciliosa (Pacific Black Duck)*			
32.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
33.		*Anidiops villosus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
34.	24561	*Anthochaera carunculata (Red Wattlebird)*			
35.	25670	*Anthus australis (Australian Pipit)*			
36.	24599	*Anthus australis subsp. australis (Australian Pipit)*			
37.	25528	*Aphelocephala leucopsis (Southern Whiteface)*			
38.	24266	*Aphelocephala leucopsis subsp. castaneiventris (Southern Whiteface)*			
39.	24285	*Aquila audax (Wedge-tailed Eagle)*			
40.	41324	*Ardea modesta (great egret, white egret)*			
41.	24341	*Ardea pacifica (White-necked Heron)*			
42.	24610	*Ardeotis australis (Australian Bustard)*			
43.		*Argiope protensa*			
44.		*Argiope trifasciata*			
45.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
46.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
47.	24356	*Artamus personatus (Masked Woodswallow)*			
48.		*Austracantha minax*			
49.	24318	*Aythya australis (Hardhead)*			
50.		*Backobourkia heroine*			
51.		*Baiami tegenarioides*			
52.		*Barnardius zonarius*			
53.		*Berosus nutans*			
54.	24319	*Biziura lobata (Musk Duck)*			
55.	42380	*Brachyurophis fasciolatus subsp. fasciolatus (Narrow-banded Shovel-nosed Snake)*			
56.	42381	*Brachyurophis semifasciatus (Southern Shovel-nosed Snake)*			
57.	25715	*Cacatua roseicapilla (Galah)*			
58.	25716	*Cacatua sanguinea (Little Corella)*			
59.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
60.	24253	*Capra hircus (Goat)*	Y		
61.		*Carassius auratus*			
62.		*Celaenia excavata*			
63.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
64.		*Cercophonius michaelseni*			
65.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
66.	24187	*Chalinolobus morio (Chocolate Wattled Bat)*			
67.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
68.	43380	*Chelodina colliei (South-western Snake-necked Turtle)*			
69.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
70.	47909	*Cheramoeca leucosterna (White-backed Swallow)*			
71.		*Chroicocephalus novaehollandiae*			
72.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
73.	24434	*Chrysococcyx osculans (Black-eared Cuckoo)*			
74.	24289	*Circus assimilis (Spotted Harrier)*			
75.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
76.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
77.	24399	*Columba livia (Domestic Pigeon)*	Y		
78.	24361	*Coracina maxima (Ground Cuckoo-shrike)*			
79.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
80.		*Corasoides australis*			
81.		*Corimaethes campestrus*			
82.		*Cormocephalus bungalbinensis*			
83.	24416	*Corvus bennetti (Little Crow)*			
84.	25592	*Corvus coronoides (Australian Raven)*			
85.	25593	*Corvus orru (Torresian Crow)*			
86.	24671	*Coturnix pectoralis (Stubble Quail)*			
87.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
88.	25595	*Cracticus tibicen (Australian Magpie)*			
89.	25596	*Cracticus torquatus (Grey Butcherbird)*			
90.	30893	*Cryptoblepharus buchananii*			
91.	25020	*Cryptoblepharus plagiocephalus*			
92.	25458	*Ctenophorus caudicinctus (Ring-tailed Dragon)*			
93.	24871	*Ctenophorus cristatus (Bicycle Dragon)*			
94.	24873	*Ctenophorus fordi (Mallee Sand Dragon)*			
95.	24874	*Ctenophorus isolepis subsp. citrinus (Yellowy Military Dragon)*			
96.	24882	*Ctenophorus nuchalis (Central Netted Dragon)*			
97.	24886	*Ctenophorus reticulatus (Western Netted Dragon)*			
98.	24888	*Ctenophorus salinarum (Salt Pan Dragon)*			
99.	24889	*Ctenophorus scutulatus (Lozenge-marked Dragon)*			
100.	25026	*Ctenotus atlas*			
101.	25052	*Ctenotus leonhardii*			
102.	25074	*Ctenotus schomburgkii*			
103.	25465	*Ctenotus uber (Spotted Ctenotus)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
104.	25080	*Ctenotus uber subsp. uber (Spotted Ctenotus)*			
105.	25089	*Cyclodomorphus melanops subsp. elongatus (Slender Blue-tongue)*			
106.	24322	*Cygnus atratus (Black Swan)*			
107.		*Cyrtophora parnasia*			
108.		*Daphnia carinata*			
109.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
110.	24606	*Daphoenositta chrysoptera subsp. pileata (Varied Sittella, Black-capped Sitella)*			
111.	24995	*Delma australis*			
112.	25247	*Demansia psammophis subsp. psammophis (Yellow-faced Whipsnake)*			
113.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
114.	25469	*Diplodactylus granariensis*			
115.	24929	*Diplodactylus granariensis subsp. granariensis*			
116.	24940	*Diplodactylus pulcher*			
117.	24470	*Dromaius novaehollandiae (Emu)*			
118.	24650	*Drymodes brunneopygia (Southern Scrub-robin)*			
119.	25092	*Egernia depressa (Southern Pygmy Spiny-tailed Skink)*			
120.	25094	*Egernia formosa*			
121.	25104	*Egernia richardi*			
122.		*Egretta novaehollandiae*			
123.		*Elanus axillaris*			
124.	24290	*Elanus caeruleus subsp. axillaris (Australian Black-shouldered Kite)*			
125.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
126.		*Enochrus elongatulus*			
127.		*Eolophus roseicapillus*			
128.	24651	*Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*			
129.	24567	*Epthianura albifrons (White-fronted Chat)*			
130.	24570	*Epthianura tricolor (Crimson Chat)*			
131.	25109	*Eremiascincus richardsonii (Broad-banded Sand Swimmer)*			
132.		*Eriophora biapicata*			
133.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
134.	24368	*Eurostopodus argus (Spotted Nightjar)*			
135.	25621	*Falco berigora (Brown Falcon)*			
136.	24471	*Falco berigora subsp. berigora (Brown Falcon)*			
137.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
138.	25623	*Falco longipennis (Australian Hobby)*			
139.	24041	*Felis catus (Cat)*	Y		
140.		*Fissarena castanea*			
141.	25727	*Fulica atra (Eurasian Coot)*			
142.	25301	*Furina ornata (Moon Snake)*			
143.	24957	*Gehyra purpurascens*			
144.	24959	*Gehyra variegata*			
145.	25530	*Gerygone fusca (Western Gerygone)*			
146.	24443	*Grallina cyanoleuca (Magpie-lark)*			
147.	24295	*Haliastur sphenurus (Whistling Kite)*			
148.		*Hemicloea sublimbata*			
149.	25232	*Hemidactylus frenatus (Asian House Gecko)*	Y		
150.	25115	*Hemiergis initialis subsp. initialis*			
151.	42408	*Hesperoedura reticulata*			
152.	24961	*Heteronotia binoei (Bynoe's Gecko)*			
153.	47965	*Hieraaetus morphnoides (Little Eagle)*			
154.	25734	*Himantopus himantopus (Black-winged Stilt)*			
155.	24775	*Himantopus himantopus subsp. leucocephalus (Black-winged Stilt)*			
156.	24491	*Hirundo neoxena (Welcome Swallow)*			
157.		*Hoggicosa castanea*			
158.		*Hoggicosa forresti*			
159.		*Holoplatys kalgoorlie*			Y
160.		*Holoplatys planissima*			
161.	34001	*Hylacola cauta subsp. whitlocki (Shy Groundwren)*			
162.		*Idiommata blackwalli*			
163.		*Isometroides vescus*			
164.		*Isopeda magna*			
165.		*Isopedella saundersi*			
166.		*Jalmenus icilius*			Y
167.	24367	*Lalage tricolor (White-winged Triller)*			
168.		*Lampona cylindrata*			
169.		*Lamponina scutata*			
170.		*Latrodectus hasseltii*			
171.		*Lerista kingi*			
172.	25155	*Lerista muelleri*			
173.	25162	*Lerista picturata*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
174.	25172	*Lerista stictopleura*			
175.	42411	*Lerista timida*			
176.	25005	*Lialis burtonis*			
177.	25659	*Lichenostomus leucotis (White-eared Honeyeater)*			
178.	24576	*Lichenostomus leucotis subsp. novaenorciae (White-eared Honeyeater)*			
179.	25661	*Lichmera indistincta (Brown Honeyeater)*			
180.	41411	*Liopholis inornata (Desert Skink)*			
181.	25388	*Litoria moorei (Motorbike Frog)*			
182.	30935	*Lucasium maini*			
183.		*Lycosa ariadnae*			
184.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
185.	24136	*Macropus rufus (Red Kangaroo, Marlu)*			
186.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
187.	25652	*Malurus leucopterus (White-winged Fairy-wren)*			
188.	24551	*Malurus pulcherrimus (Blue-breasted Fairy-wren)*			
189.	25654	*Malurus splendens (Splendid Fairy-wren)*			
190.	24583	*Manorina flavigula (Yellow-throated Miner)*			
191.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
192.	24736	*Melopsittacus undulatus (Budgerigar)*			
193.	25184	*Menetia greyii*			
194.	24598	*Merops ornatus (Rainbow Bee-eater)*			
195.		*Microcarbo melanoleucos*			
196.	25693	*Microeca fascinans (Jacky Winter)*			
197.	24654	*Microeca fascinans subsp. assimilis (Jacky Winter)*			
198.		*Missulena occatoria*			
199.	24904	*Moloch horridus (Thorny Devil)*			
200.	25240	*Morelia spilota subsp. imbricata (Carpet Python)*			
201.	25188	*Morethia adelaidensis*			
202.	25190	*Morethia butleri*			
203.	24223	*Mus musculus (House Mouse)*	Y		
204.	25248	*Neelaps bimaculatus (Black-naped Snake)*			
205.	25425	*Neobatrachus kunapalari (Kunapalari Frog)*			
206.	25426	*Neobatrachus pelobatoides (Humming Frog)*			
207.	25427	*Neobatrachus sutor (Shoemaker Frog)*			
208.	25428	*Neobatrachus wilsmorei (Plonking Frog)*			
209.		*Nephila edulis*			
210.	24971	*Nephrurus vertebralis*			
211.		*Nicodamus mainae*			
212.	24096	*Ningaui yvonneae (Southern Ningaui)*			
213.	24229	*Notomys mitchellii (Mitchell's Hopping-mouse)*			
214.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
215.	24742	*Nymphicus hollandicus (Cockatiel)*			
216.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
217.	24618	*Oreoica gutturalis (Crested Bellbird)*			
218.	34011	*Oreoica gutturalis subsp. gutturalis (Crested Bellbird (southern))*			
219.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
220.		*Ostracoda (unident.)*			
221.		*Oxyopes amoenus*			
222.		*Oxyopes dingo*			
223.		*Oxyopes variabilis*			
224.		*Ozestheria packardi*			
225.	24619	*Pachycephala inornata (Gilbert's Whistler)*			
226.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
227.		*Parartemia sp.*			
228.	25253	*Parasuta gouldii*			
229.	25254	*Parasuta monachus*			
230.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
231.	25682	*Pardalotus striatus (Striated Pardalote)*			
232.	24630	*Pardalotus striatus subsp. westraliensis (Striated Pardalote)*			
233.	48060	*Petrochelidon ariel (Fairy Martin)*			
234.	48061	*Petrochelidon nigricans (Tree Martin)*			
235.	24659	*Petroica goodenovii (Red-capped Robin)*			
236.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
237.	24409	*Phaps chalcoptera (Common Bronzewing)*			
238.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
239.	25720	*Platycercus icterotis (Western Rosella)*			
240.	24748	*Platycercus varius (Mulga Parrot)*			
241.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
242.	24751	*Platycercus zonarius subsp. zonarius (Port Lincoln Parrot)*			
243.	25703	*Podargus strigoides (Tawny Frogmouth)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
244.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
245.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
246.	30854	*Polytelis anthopeplus subsp. westralis (Regent Parrot)*			
247.	24683	*Pomatostomus superciliosus (White-browed Babbler)*			
248.	34013	*Pomatostomus superciliosus subsp. ashbyi (White-browed Babbler (western wheatbelt))*			
249.	24769	*Porzana fluminea (Australian Spotted Crake)*			
250.	25261	*Pseudechis australis (Mulga Snake)*			
251.	24232	*Pseudomys bolami (Bolam's Mouse)*			
252.	24237	*Pseudomys hermannsburgensis (Sandy Inland Mouse)*			
253.	42416	*Pseudonaja mengdeni (Western Brown Snake)*			
254.	25263	*Pseudonaja modesta (Ringed Brown Snake)*			
255.	25434	*Pseudophryne occidentalis (Western Toadlet)*			
256.	42344	*Purnella albifrons (White-fronted Honeyeater)*			
257.	25008	*Pygopus lepidopodus (Common Scaly Foot)*			
258.	25009	*Pygopus nigriceps*			
259.	24278	*Pyrrholaemus brunneus (Redthroat)*			
260.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
261.	48096	*Rhipidura albiscapa (Grey Fantail)*			
262.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
263.	24982	*Rhynchoedura ornata (Western Beaked Gecko)*			
264.		*Sandalodes scopifer*			
265.		*Scolopendra laeta*			
266.		*Scolopendra morsitans*			
267.	24199	*Scotorepens balstoni (Inland Broad-nosed Bat)*			
268.		*Selenotholus foelschei*			
269.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
270.	30948	*Smicrornis brevirostris (Weebill)*			
271.	24108	*Sminthopsis crassicaudata (Fat-tailed Dunnart)*			
272.	24109	*Sminthopsis dolichura (Little long-tailed Dunnart)*			
273.	24111	*Sminthopsis gilberti (Gilbert's Dunnart)*			
274.	24329	*Stictonetta naevosa (Freckled Duck)*			
275.		*Storena sinuosa*			
276.	25597	*Strepera versicolor (Grey Currawong)*			
277.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
278.	24923	*Strophurus assimilis (Goldfields Spiny-tailed Gecko)*			
279.	24927	*Strophurus elderi*			
280.	25269	*Suta fasciata (Rosen's Snake)*			
281.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
282.	24207	*Tachyglossus aculeatus (Short-beaked Echidna)*			
283.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
284.	30870	*Taeniopygia guttata (Zebra Finch)*			
285.		*Tamopsis circumvidens*			
286.	24176	*Taphozous hilli (Hill's Sheathtail-bat)*			
287.		*Tasmanicosa leuckartii*			
288.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
289.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
290.	25519	*Tiliqua rugosa*			
291.	25207	*Tiliqua rugosa subsp. rugosa*			
292.	42351	*Todiramphus pyrrhopygius (Red-backed Kingfisher)*			
293.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
294.	48141	*Tribonyx ventralis (Black-tailed Native-hen)*			
295.		*Trichocyclus balladong*			
296.	39407	*Triops australiensis (Shield Shrimp)*			
297.	24851	*Turnix velox (Little Button-quail)*			
298.	30814	*Tympanocryptis cephalus (Pebble Dragon)*			
299.	39408	*Tympanocryptis lineata (Lined Earless Dragon)*			
300.	24852	*Tyto alba subsp. delicatula (Barn Owl)*			
301.	24983	*Underwoodisaurus milii (Barking Gecko)*			
302.		*Urodacus armatus*			
303.		*Urodacus hoplurus*			
304.		*Urodacus yaschenkoi*			
305.	24386	*Vanellus tricolor (Banded Lapwing)*			
306.	25211	*Varanus caudolineatus*			
307.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			
308.	25526	*Varanus tristis (Racehorse Monitor)*			
309.	24202	*Vespadelus baverstocki (Inland Forest Bat)*			
310.	24206	*Vespadelus regulus (Southern Forest Bat)*			
311.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area

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 wholely 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.

Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

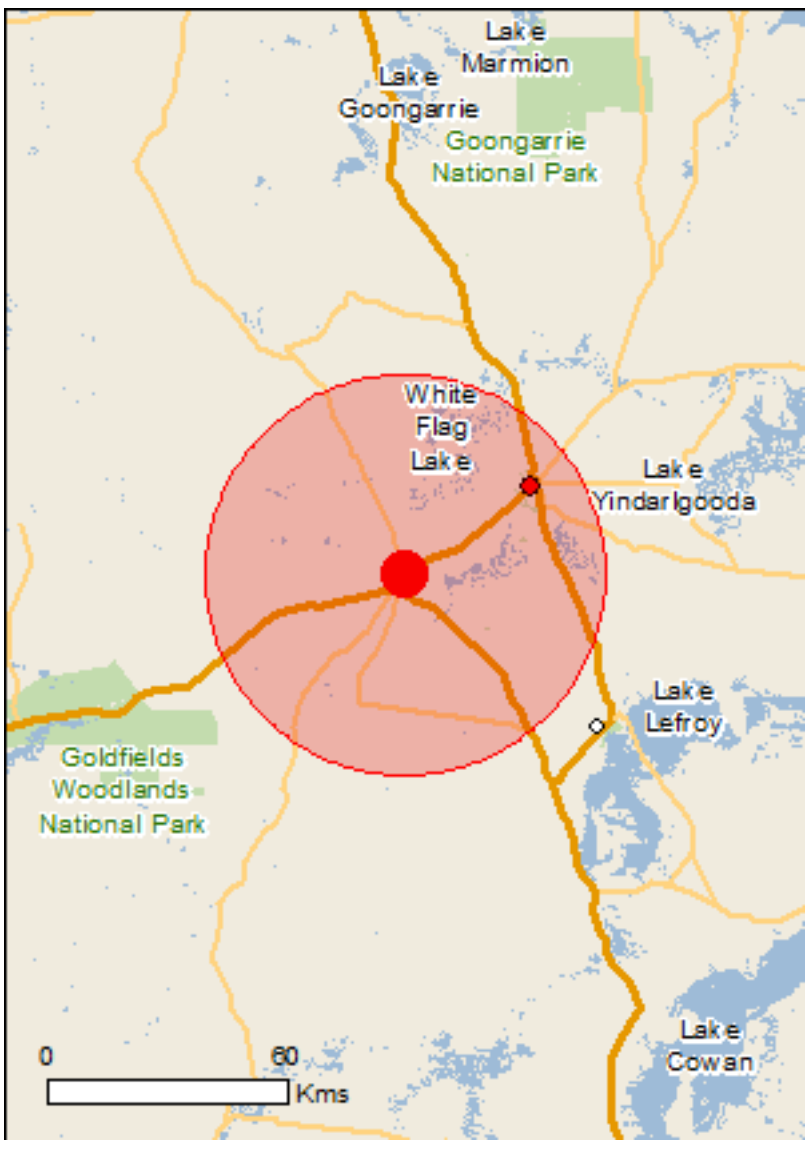
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 25/10/21 19:14:20

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

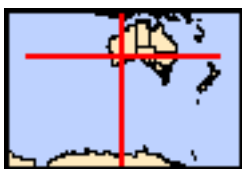
Caveat
Acknowledgements



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

Coordinates

Buffer: 50.0Km



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:	8
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:	11
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:	9
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 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
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
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		

Name	Threatened	Type of Presence
[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 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
[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

Name	Threatened	Type of Presence
		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
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 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

Name	Status	Type of Presence
		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

-30.92058 121.18644

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 C
Coolgardie Flora Likelihood Table

Appendix: Assessment of the Likelihood of Occurrence of Threatened and Priority Flora as per Desktop Assessment Database Searches surrounding the Survey Area

Distance to Nearest Record from the Survey Area is based on a distance analysis undertaken against 2021 DBCA database. High = Suitable habitat present and records less than 15 km from the Survey Area, Medium = Suitable habitat present and records between 15 km and 30 km from the Survey Area, and Low = No suitable habitat present and/or records greater than 30 km from the Survey Area, Unknown = Insufficient information available to classify . CR= Listed as Critically Endangered under the EPBC Act, EN = Listed as Endangered under the EBPC Act, VU = listed as Vulnerable under the EBPC Act. T = Threatened under the BC Act, P = Priority Listed, Ranked and Listed by the DBCA. Likelihoods are assessed both pre and post survey based on knowledge of the Survey Area, nearest known records, known flowering period of flora taxa and knowledge gained from the survey effort during ground truthing. 1: Department of the Environment (2021). SPRAT EPBC Threatened Flora in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. 2: Department of Biodiversity, Conservation and Attractions (2021). FloraBase - TheWestern Australian Flora. https://florabase.dpaw.wa.gov.au/

Species	Conservation Status		Source			Distance to Nearest Record (km)	Flowering Period	Prefered Habitat	Habitat occurs within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	PMST	DBCA						
Gastrolobium graniticum	T	EN	X	X	X	25.8	Aug to Sep.	Sand, sandy loam, granite. Margins of rock outcrops, along drainage lines.[2]	No	Medium	Low
Tetratheca spenceri	T				X	39.1	Mar	Gentle slope on duricrust breakaway.[2]	No	Low	Low
Thelymitra stellata	T	EN		X		12.8	Oct - Nov	Grows on ridges and slopes, flats, also on riverbanks and breakaways. Soil types are red, brown, yellow, or grey sandy loams clay or gravel over laterite or gravel. Dry, moist or saline conditions are tolerated.[1]	Yes	High	Medium
Acacia coatesii	P1		X			7.4	Sep	Flat to gentle slope, red sandy loam soils. [2]	Yes	High	Medium
Acacia epedunculata	P1				X	18.6	Aug - Oct	Yellow sand. Sandplains.[2]	Yes	Medium	Low
Acacia sclerophylla var. teretiuscula	P1		X			16.1	Sep - Oct	Clay and loamy soils.[2]	Yes	Medium	Low
Acacia websteri	P1		X		X	0.7	Jun	Red sand, clay or loam. Low-lying areas, flats.[2]	Yes	High	High
Calandrinia lefroyensis	P1				X	10.8	Feb or Apr or Oct - Nov	Light brown, orange or red sand, sandy loam, sandy clay loam over sediments. Fine quartz. Gentle slopes, near salt lakes or salt flats, sand dunes.[2]	Yes	High	Medium
Chamelaucium sp. Parker Range (B.H. Smith 1255)	P1				X	19	Nov or Dec	Sandplains, Mid slope. Dry, yellow sand over laterite.[2]	Yes	Medium	Low
Eremophila xantholaema	P1				X	17.7	Sep - Oct	Hilltop and slopes. Brown/orange/red very rocky loam/granite.[2]	Yes	Medium	Low
Cyathostemon divaricatus	P1				X	40.5	Jan or Jun or Aug	Hills, hillslope.[2]	Yes	Low	Low
Dampiera plumosa	P1		X			4.5	Oct	Red sandy soils.[2]	Yes	High	Medium
Eucalyptus websteriana subsp. norsemanica	P1		X			8.7	Sep to Nov	Rocky rises.[2]	Yes	High	Medium
Lepidosperma lyonsii	P1				X	70.6	Jun	Orange skeletal sandy loam with banded ironstone gravel and rock, well-drained shallow stony loam with quartz. Gentle hill slopes, upper slopes of large hill.[2]	Yes	Low	Low
Lepidosperma sp. Parker Range (N. Gibson & M. Lyons 2094)	P1		X			8.3	NA	Brown sandy loam, or clay. Gravel, laterite. Banded ironstone formations, ridges, mid-slopes.[2]	Yes	High	Medium

[1] Department of Agriculture, Water and Environment (2020) [2]Western Australian Herbarium (2020)

Species	Conservation Status		Source			Distance to Nearest Record (km)	Flowering Period	Prefered Habitat	Habitat occurs within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	PMST	DBCA						
Melichrus sp. Coolgardie (K.R. Newbey 8698)	P1				X	24.8	April or Jun or Aug - Dec	Yellow loamy sand. Sandplains.[2]	Yes	Medium	Low
Phebalium appressum	P1		X			7.8	Jul	Yellow sandplain.[2]	Yes	High	Low
Philotheca apiculata	P1				X	45.8	Aug - Nov	Stony clay loam. Rocky outcrops, hillsides.[2]	Yes	Low	Low
Philotheca pachyphylla	P1				X	31.9	May or Sep	Sand, red loam, clay loam. Sandplains, hill tops.[2]	Yes	Low	Low
Prostanthera splendens	P1				X	66.8	Aug - Oct	Stony loam, shallow soils with ironstone pebbles. Breakaways.[2]	No	Low	Low
Pterostylis xerampelina	P1				X	66.1	Sept - Oct	Granite.[2]	Yes	Low	Low
Ptilotus procumbens	P1				X	30.2	Nov	Red clay.[2]	Yes	Low	Low
Ptilotus rigidus	P1				X	30.4	Mar or May or Oct - Jan	Clay, clay loam on quartz hills and edges of salt lakes. [2]	Yes	Low	Low
Ptilotus sp. Kalgoorlie (J. Jackson & B. Moyle 260)	P1				X	36.1	NA	Quartz hills.[2]	Yes	Low	Low
Rhodanthe uniflora	P1				X	44.8	Aug - Oct	Brown earth. Open *Eucalyptus* woodland.[2]	Yes	Low	Low
Ricinocarpos digynus	P1				X	50.4	Aug	Red-brown sand-loam. Rocky hillslopes and plains.[2]	Yes	Low	Low
Tecticornia flabelliformis	P1	VU		X	X	54.8	Dec	Clay. Saline flats.[2]	Yes	Low	Low
Tecticornia mellarium	P1				X	58.4	NA	Close proximity to salt lakes and dunes.[2]	Yes	Low	Low
Thryptomene planiflora	P1		X			19.1	Jul or Aug - Sep	Brown, yellow or orange sandy loam. Lateritic gravel. Gentle hillslopes, sandplains, slight depressions.[2]	Yes	Medium	Medium
Thryptomene sp. Coolgardie (E. Kelso s.n. 1902)	P1		X			2.2	NA	NA	Unknown	Unknown	Medium
Acacia kerryana	P2				X	39.2	Oct - Dec or Jan - Feb	Granitic loamy sand, stony clayey loam or clayey sand. Low stony ridges, undulating plains.[2]	Yes	Low	Low
Austrostipa frankliniae	P2		X			8.5	Oct - Nov	Flat plain, Basalt slope. Dry brown / red loam.[2]	Yes	High	Medium
Bossiaea laxa	P2				X	43.3	May	Brown loam over deep granite. Sheltered positions around outcrops.[2]	No	Low	Low

[1] Department of Agriculture, Water and Environment (2020) [2]Western Australian Herbarium (2020)

Species	Conservation Status		Source			Distance to Nearest Record (km)	Flowering Period	Prefered Habitat	Habitat occurs within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	PMST	DBCA						
Elachanthus pusillus	P2				X	32.1	Aug - Oct	Dry brown or red-orange loam clay. Quartz, limestone, granite. Low plains, drainage flats, gentle upper slopes.[2]	Yes	Low	Low
Eremophila praecox	P2		X		X	17.2	Oct or Dec.	Red/brown sandy loam. Undulating plains.[2]	Yes	Medium	Low
Eucalyptus educta	P2				X	29.7	Apr	Shallow soils. Granite rocks.[2]	Yes	Medium	Medium
Goodenia salina	P2				X	23.9	May or Aug - Nov	Well-drained, saline, grey or brown loamy clay. Low gypseous dunes near salt pans.[2]	Yes	Medium	Low
Hakea rigida	P2		X		X	61.3	Sep to Oct.	Sandy soils, yellow sand.[2]	Yes	Low	Low
Lepidium merrallii	P2		X			2.5	NA	Clay loam.[2]	Yes	High	Medium
Lepidosperma sp. Kambalda (A.A. Mitchell 5156)	P2				X	45.2	Dec	Lower footslope of basalt hill.[2]	No	Low	Low
Phebalium clavatum	P2		X		X	10.1	Aug - Sep	Sandy soils. Sandplains.[2]	Yes	Medium	Low
Phebalium sp. Yerilgee Sandplain (J. Jackson 223)	P2				X	52.1	Aug	Yellow, orange/red sad, loam. Sandplains.[2]	Yes	Low	Low
Rumex crystallinus	P2				X	55.3	Annual	Arid & semi-arid areas.	Yes	Low	Low
Thysanotus sp. Yellowdine (A.S. George 6040)	P2				X	61.5	Mar or Dec	Yellow sand, sandy clay. Sandplains, undulating ridges.[2]	Yes	Low	Low
Acacia crenulata	P3				X	23.9	April - May or Nov	Clay, sandy clay, yellow sand.[2]	Yes	Medium	Low
Acacia cylindrica	P3				X	63.2	Aug to Oct.	Yellow/brown sand, gravelly soils. Undulating plains, flats.[2]	Yes	Low	Low
Allocasuarina eriochlamys subsp. grossa	P3		X			12.7	Jul	Stony loam, laterite clay. Granite outcrops.[2]	No	High	Low
Alyogyne sp. Great Victoria Desert (D.J. Edinger 6212)	P3				X	2.5	Aug or Dec	Orange, yellow or red sand, sandy loams. Flat plains.[2]	Yes	High	Low
Alyxia tetanifolia	P3				X	21.6	May - Jun or Nov	Sandy clay, loam, concretionary gravel. Drainage lines, near lakes.[2]	Yes	Medium	Low
Angianthus prostratus	P3				X	46.7	Jul - Sep	Red clay or loamy soils. Saline depressions.[2]	Yes	Low	Low
Atriplex lindleyi subsp. conduplicata	P3				X	55.1	NA	Crabhole plains, dry, yellow bare sandy clay, by lakes.[2]	Yes	Low	Low

[1] Department of Agriculture, Water and Environment (2020) [2]Western Australian Herbarium (2020)

Species	Conservation Status		Source			Distance to Nearest Record (km)	Flowering Period	Prefered Habitat	Habitat occurs within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	PMST	DBCA						
Austrostipa blackii	P3		X			1.7	Sep - Nov	Orange, red or brown clay loam, silty sand, sandy clay loam. Gravel, basalt. Winter wet depressions, rocky outcrops, hills sides.[2]	Yes	High	Recorded
Austrostipa turbinata	P3		X			8	Sep - Oct	Hill. Brown sandy clay.[2]	Yes	High	Medium
Bossiaea celata	P3				X	23.3	Sep - Oct	Deep sand. Open mallee.[2]	No	Medium	Low
Bossiaea concinna	P3				X	68.3	Jun - Sep	White or red sand, gravel.[2]	Yes	Low	Low
Calytrix creswellii	P3				X	69.3	Sep to Dec.	Yellow sand, sometimes with lateritic gravel. Sandplains.[2]	Yes	Low	Low
Chrysocephalum apiculatum subsp. norsemanense	P3		X			2.1	Aug - Oct	Well-drained loamy sand. Moderately exposed, gentle undulating plains, hills.[2]	Yes	High	Medium
Cratystylis centralis	P3				X	39.2	Oct	Red sandy loam with ironstone gravel. Flat plains, breakaway country.[2]	Yes	Low	Low
Cryptandra crispula	P3				X	42.7	Aug - Sep	Brown sandy clay, yellow loamy sand, red soil, pebbles. Dune ridges, hills, near salt lakes.[2]	Yes	Low	Low
Cyathostemon verrucosus	P3				X	43.9	Apr or Jul or Aug or Oct	Yellow sand, gentle undulating plain.[2]	Yes	Low	Low
Eremophila annosocaulis	P3				X	69.8	Sep	Stony, flat, sandy plain. Red sand.[2]	Yes	Low	Low
Eremophila arachnoides subsp. tenera	P3				X	71.1	Oct - Dec	Undulating plains, Saline plains, drainage, clay.[2]	Yes	Low	Low
Eremophila veronica	P3		X			0.5	Apr to May.	Stony clay, clay loam. Lateritic breakaways.[2]	No	High	High
Eucalyptus exigua	P3				X	48.7	Mar - Apr or Oct or Dec	Sandy loam, white sand. Sandplains.[2]	Yes	Low	Low
Eucalyptus frenchiana	P3				X	42.2	Oct	Brown or orange loam, sand or sandy clay. Granite. Flat plains, low undulating plains.[2]	Yes	Low	Low
Eutaxia actinophylla	P3				X	64.8	Sep to Oct.	Red-brown clay loam, red clay loam over granite, gravel. Small depressions.	Yes	Low	Low
Gompholobium cinereum	P3				X	19.9	Feb or May or Sep - Nov	Yellow sand, clayey sand, brown loam, sandy gravel, laterite. Well-drained open sites, slopes, plains, roadsides.[2]	Yes	Medium	Low
Grevillea georgeana	P3		X		X	1.1	Jan or Mar or Sep to Nov.	Stony loam/clay. Ironstone hilltops & slopes.	Yes	High	Medium

[1] Department of Agriculture, Water and Environment (2020) [2]Western Australian Herbarium (2020)

Appendix D
Inventory of Vascular Flora

Appendix: Inventory of Vascular Flora

Family	Taxon
Aizoaceae	*Carpobrotus* sp.
Amaranthaceae	*Ptilotus exaltatus*
	Ptilotus holosericeus
	Ptilotus obovatus var. *obovatus*
	Ptilotus polystachyus
Anacardiaceae	**Schinus molle* var. *areira*
Apocynaceae	*Alyxia buxifolia*
	Leichhardtia australis
	Marsdenia australis
	Vincetoxicum lineare
Asparagaceae	**Agave americana*
	Thysanotus manglesianus
Asphodelaceae	**Asphodelus fistulosus*
Asteraceae	**Centaurea melitensis*
	Chrysocephalum puteale
	Cratystylis conocephala
	Olearia muelleri
	Olearia pimeleoides
	**Oligocarpus calendulaceus*
	Rhodanthe chlorocephala subsp. *rosea*
	**Sonchus asper*
	Streptoglossa liatroides
	Vittadinia dissecta var. *hirta*
	Waitzia acuminata var. *acuminata*
Boraginaceae	*Halgania andromedifolia*
	Heliotropium curassavicum
	**Heliotropium europaeum*
Brassicaceae	**Carrichtera annua*
Cactaceae	*Opuntia stricta*
Casuarinaceae	*Allocasuarina ?huegeliana*
	Casuarina pauper
Chenopodiaceae	*Atriplex ?holocarpa*
	Atriplex ?vesicaria
	Atriplex nummularia subsp. *spathulata*
	Atriplex quadrivalvata
	Atriplex sp.
	Atriplex vesicaria
	Chenopodium curvispicatum
	Dysphania melanocarpa forma *leucocarpa*
	?Enchylaena tomentosa
	Enchylaena tomentosa var. *tomentosa*
	Maireana ?georgei
	Maireana ?marginata
	Maireana georgei
	Maireana pentatropis
	Maireana sedifolia
	Maireana tomentosa
	Maireana trichoptera
	Maireana triptera

Appendix: Inventory of Vascular Flora

Family	Taxon
Chenopodiaceae	*Osteocarpum salsuginosum*
	Rhagodia drummondii
	Salsola australis
	Sclerolaena cuneata
	Sclerolaena diacantha
	Sclerolaena fusiformis
	Sclerolaena obliquicuspis
	Tecticornia halocnemoides
Crassulaceae	**Crassula ovata*
Euphorbiaceae	**Euphorbia drummondii*
Fabaceae	*Acacia acuminata*
	Acacia collegialis
	Acacia dissona var. *dissona*
	Acacia erinacea
	Acacia hemiteles
	Acacia jennerae
	Acacia tetragonophylla
	Acacia xerophila var. *brevior*
	Senna artemisioides subsp. *artemisioides*
	Senna artemisioides subsp. *filifolia*
	Senna artemisioides subsp. x *artemisioides*
	Senna stowardii
Frankeniaceae	*Frankenia ?fecunda*
Goodeniaceae	*Goodenia havilandii*
	Goodenia pinnatifida
	Scaevola spinescens
Haloragaceae	*Haloragis trigonocarpa*
Hemerocallidaceae	*Dianella revoluta* var. *divaricata*
Lamiaceae	**Salvia verbenaca*
	Westringia rigida
Malvaceae	*Abutilon cryptopetalum*
	Hibiscus solanifolius
	Hibiscus sturtii var. *grandiflorus*
	Lawrencia repens
	Malvaceae sp.
	Sida petrophila
	Sida ?petrophila
	Calothamnus ?gracilis
	Eucalyptus ?ravida
	Eucalyptus campaspe
	Eucalyptus celastroides
	Eucalyptus clelandiorum
	Eucalyptus griffithsii
	Eucalyptus loxophleba subsp. *lissophloia*
	Eucalyptus oldfieldii
	Eucalyptus oleosa subsp. *oleosa*
	Eucalyptus salmonophloia
	Eucalyptus salubris
	Eucalyptus torquata

Appendix: Inventory of Vascular Flora

Family	Taxon
Myrtaceae	*Eucalyptus websteriana* subsp. *websteriana*
	Melaleuca ?hamata
	Melaleuca pauperiflora subsp. *fastigiata*
Pittosporaceae	*Pittosporum angustifolium*
Poaceae	*Aristida contorta*
	Austrostipa blackii (P3)
	Austrostipa platychaeta
	Austrostipa sp.
	Austrostipa trichophylla
	Chloris truncata
	Enneapogon caerulescens
	Eragrostis dielsii
	Monachather paradoxus
	Rytidosperma sp.
	Triodia desertorum
Polygonaceae	**Rumex vesicarius*
Portulacaceae	*Calandrinia baccata*
	Calandrinia eremaea
Pteridaceae	*Cheilanthes lasiophylla*
	Cheilanthes sieberi subsp. *sieberi*
Rhamnaceae	*Trymalium myrtillus* subsp. *myrtillus*
Rutaceae	*Phebalium laevigatum*
Santalaceae	*Exocarpos aphyllus*
	Santalum acuminatum
	Santalum spicatum
Sapindaceae	*Dodonaea adenophora*
	Dodonaea lobulata
	Dodonaea stenozyga
Scrophulariaceae	*Eremophila alternifolia*
	Eremophila deserti
	Eremophila forrestii
	Eremophila georgei
	Eremophila glabra subsp. *glabra*
	Eremophila interstans subsp. *interstans*
	Eremophila oldfieldii subsp. *angustifolia*
	Eremophila oppositifolia subsp. *angustifolia*
	Eremophila parvifolia subsp. *auricampi*
	Eremophila scoparia
	Myoporum platycarpum subsp. *platycarpum*
Solanaceae	*Lycium australe*
	**Nicotiana glauca*
	Nicotiana rotundifolia
	Solanum cleistogamum
	Solanum lasiophyllum
	Solanum nummularium
Thymelaeaceae	*?Pimelea* sp.
	Pimelea microcephala subsp. *microcephala*
	Pimelea spiculigera var. *thesioides*
Zygophyllaceae	*Roepera glauca*

Appendix: Inventory of Vascular Flora

Family	Taxon
Zygophyllaceae	*Roepera ovata*
	Roepera sp.

Appendix E
Flora Site Data

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q01
Location MGA 50 326500 **mE** 6578134 **mN**

Described by: JW
Date: 12/10/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Laterite, quartz



Vegetation: *Eremophila georgei tall open shrubland over Dodonaea lobulata mid open shrubland over Ptilotus obovatus var. obovatus, Sida petrophila and Vincetoxicum lineare low open herbland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Abutilon cryptopetalum	10	0.1	
Aristida contorta	10	0.1	
Austrostipa blackii (P3)	10	1	
Calandrinia eremaea	10	0.1	
Dodonaea lobulata	150	12	
Eremophila georgei	300	28	
Nicotiana rotundifolia	10	0.1	
Ptilotus obovatus var. obovatus	35	16	
Sida petrophila	25	11	
Solanum cleistogamum	10	0.1	
Solanum lasiophyllum	25	1	
Vincetoxicum lineare	10	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q02
Location MGA 50 326422 **mE** 6578029 **mN**

Described by: JW
Date: 12/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite, quartz



Vegetation: *Eucalyptus celastroides and Eucalyptus clelandiorum low woodland over Eremophila scoparia mid sparse shrubland over Atriplex sp., Atriplex vesicaria and Atriplex nummularia subsp. spathulata low open shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex nummularia subsp. spathulata	35	6	
Atriplex sp.	35	16	
Atriplex vesicaria	50	7	
Dodonaea stenozyga	25	1	
Eremophila scoparia	120	6	
Eucalyptus celastroides	500	16	
Eucalyptus clelandiorum	1000	5	
Exocarpos aphyllus	45	1	
Haloragis trigonocarpa	25	0.5	
Lycium australe	40	2	
Ptilotus holosericeus	5	0.1	
Ptilotus obovatus var. obovatus	35	1	
Roepera sp.	10	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q03
Location MGA 50 327421 **mE** 6577933 **mN**

Described by: JW
Date: 12/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite, quartz



Vegetation: *Eucalyptus campaspe low woodland over Eremophila scoparia mid sparse shrubland over Senna artemisioides subsp. x artemisioides, Atriplex sp. and Olearia muelleri low open shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex sp.	40	6	
**Carrichtera annua*	25	2	
Eremophila scoparia	140	3	
Eucalyptus campaspe	300	26	
Olearia muelleri	50	6	
Ptilotus obovatus var. obovatus	20	2	
Senna artemisioides subsp. x artemisioides	100	12	
Streptoglossa liatroides	5	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q04
Location MGA 50 327671 **mE** 6577991 **mN**

Described by: JW
Date: 12/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: N/A



Vegetation: *Exocarpos aphyllus, Eremophila oldfieldii subsp. angustifolia and Acacia tetragonophylla mid shrubland over Dodonaea lobulata mid open shrubland over Scaevola spinescens, Olearia muelleri and Eremophila alternifolia low open shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia tetragonophylla	180	6	
Dodonaea lobulata	110	12	
Eremophila alternifolia	50	1	
Eremophila oldfieldii subsp. angustifolia	200	12	
Exocarpos aphyllus	200	26	
Lycium australe	5	0.1	
Maireana georgei	18	1	
Marsdenia australis	10	1	
Olearia muelleri	45	2	
Ptilotus obovatus var. obovatus	20	1	
Scaevola spinescens	100	6	
Thysanotus manglesianus	100	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q05
Location MGA 50 327597 **mE** 6577741 **mN**

Described by: JW
Date: 12/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite, quartz



Vegetation: *Eucalyptus clelandiorum and Eucalyptus campaspe low open woodland over Eremophila scoparia and Senna artemisioides subsp. x artemisioides mid open shrubland over Cheilanthes lasiophylla and Ptilotus obovatus var. obovatus low sparse herbland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Cheilanthes lasiophylla	15	4	
Eremophila oldfieldii subsp. angustifolia	35	0.1	
Eremophila scoparia	200	20	
Eucalyptus campaspe	300	4	
Eucalyptus clelandiorum	500	5	
Maireana ?marginata	5	1	
Olearia muelleri	20	1	
Ptilotus obovatus var. obovatus	30	1	
Senna artemisioides subsp. x artemisioides	130	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q06
Location MGA 50 327323 **mE** 6576260 **mN**

Described by: JW
Date: 12/10/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Laterite, quartz



Vegetation: *Exocarpos aphyllus tall open shrubland over Dodonaea lobulata and Dodonaea adenophora low shrubland over Haloragis trigonocarpa, Thysanotus manglesianus and Ptilotus obovatus var. obovatus low open herbland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Dodonaea adenophora	100	12	
Dodonaea lobulata	90	25	
Exocarpos aphyllus	220	11	
Haloragis trigonocarpa	10	11	
Ptilotus obovatus var. obovatus	20	1	
Thysanotus manglesianus	20	2	
Waitzia acuminata var. acuminata	18	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q07
Location MGA 50 328895 **mE** 6577682 **mN**

Described by: JW
Date: 13/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite, quartz



Vegetation: *Eucalyptus torquata low woodland over Exocarpos aphyllus mid sparse shrubland over Westringia rigida, Olearia muelleri and Scaevola spinescens low shrubland*

Condition: Excellent **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eremophila parvifolia subsp. auricampi	40	5	
Eucalyptus torquata	400	12	
Exocarpos aphyllus	110	1	
Olearia muelleri	25	11	
Scaevola spinescens	40	6	
Westringia rigida	40	16	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q08
Location MGA 50 328889 **mE** 6577825 **mN**

Described by: JW
Date: 13/10/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: N/A



Vegetation: *Eucalyptus campaspe and Eucalyptus griffithsii low open woodland over Eremophila scoparia, Senna artemisioides subsp. filifolia and Exocarpos aphyllus mid shrubland over Senna artemisioides subsp. x artemisioides, Acacia erinacea and Olearia muelleri low shrubland*

Condition: Excellent **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia erinacea	40	13	
Eremophila interstans subsp. interstans	200	4	
Eremophila oldfieldii subsp. angustifolia	35	1	
Eremophila scoparia	140	23	
Eucalyptus campaspe	400	5	
Eucalyptus griffithsii	500	5	
Exocarpos aphyllus	200	8	
Lycium australe	100	0.1	
Maireana georgei	20	0.1	
Myoporum platycarpum subsp. platycarpum	100	1	
Olearia muelleri	35	3	
Santalum acuminatum	55	1	
Senna artemisioides subsp. x artemisioides	100	15	
Senna artemisioides subsp. filifolia	140	10	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q09
Location MGA 50 328932 **mE** 6578002 **mN**

Described by: JW
Date: 13/10/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Laterite



Vegetation: *Eucalyptus oleosa subsp. oleosa low open woodland over Eremophila oldfieldii subsp. angustifolia, Senna artemisioides subsp. filifolia and Trymalium myrtillus subsp. myrtillus mid shrubland over Westringia rigida, Eremophila parvifolia subsp. auricampi and Calothamnus ?gracilis low shrubland*

Condition: Excellent **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia jennerae	25	1	
Alyxia buxifolia	40	1	
Atriplex vesicaria	60	5	
Calothamnus ?gracilis	70	6	
Dodonaea stenozyga	185	5	
Eremophila oldfieldii subsp. angustifolia	200	15	
Eremophila oppositifolia subsp. angustifolia	130	5	
Eremophila parvifolia subsp. auricampi	50	12	
Eucalyptus oleosa subsp. oleosa	700	10	
Ptilotus obovatus var. obovatus	15	1	
Senna artemisioides subsp. filifolia	200	11	
Trymalium myrtillus subsp. myrtillus	140	11	
Westringia rigida	25	15	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q10
Location MGA 50 328368 **mE** 6578263 **mN**

Described by: JW
Date: 13/10/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: N/A



Vegetation: *Eucalyptus griffithsii low open woodland over Acacia jennerae, Eremophila oldfieldii subsp. angustifolia and Exocarpos aphyllus mid open shrubland over Eremophila glabra subsp. glabra, Dodonaea stenozyga and Olearia pimeleoides low shrubland*

Condition: Excellent **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia jennerae	110	10	
Aristida contorta	100	1	
Dodonaea stenozyga	100	6	
Eremophila glabra subsp. glabra	60	18	
Eremophila oldfieldii subsp. angustifolia	120	5	
Eucalyptus griffithsii	400	5	
Exocarpos aphyllus	130	5	
Olearia pimeleoides	25	6	
Ptilotus obovatus var. obovatus	10	0.1	
Santalum spicatum	180	3	
Senna artemisioides subsp. filifolia	120	5	
Westringia rigida	20	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q20
Location MGA 50 328215 **mE** 6578113 **mN**

Described by: JW
Date: 13/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite



Vegetation: *Eucalyptus griffithsii low open woodland over Eremophila oldfieldii subsp. angustifolia tall open shrubland over Eremophila interstans subsp. interstans mid open shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia jennerae	100	5	
Eremophila interstans subsp. interstans	120	15	
Eremophila oldfieldii subsp. angustifolia	300	19	
Eremophila parvifolia subsp. auricampi	45	6	
Eucalyptus griffithsii	400	2	
Maireana sedifolia	80	3	
Olearia pimeleoides	30	5	
Senna artemisioides subsp. x artemisioides	100	2	
Sida petrophila	28	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q21
Location MGA 50 326536 **mE** 6577327 **mN**

Described by: JW
Date: 13/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite



Vegetation: *Dodonaea stenozyga, Senna artemisioides subsp. filifolia and Eremophila oldfieldii subsp. angustifolia mid closed shrubland over Atriplex vesicaria low sparse shrubland over Ptilotus obovatus var. obovatus low open herbland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex vesicaria	80	5	
Dodonaea stenozyga	180	40	
Eremophila oldfieldii subsp. angustifolia	140	15	
Ptilotus obovatus var. obovatus	28	16	
Senna artemisioides subsp. filifolia	180	20	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q22
Location MGA 50 326045 **mE** 6577335 **mN**

Described by: JW
Date: 13/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite, quartz



Vegetation: *Eucalyptus salmonophloia low open woodland over Senna artemisioides subsp. x artemisioides and Senna artemisioides subsp. filifolia low sparse shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eucalyptus salmonophloia	600	5	
Senna artemisioides subsp. x artemisioides	45	6	
Senna artemisioides subsp. filifolia	35	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q23
Location MGA 50 326813 **mE** 6577450 **mN**

Described by: JW
Date: 14/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite, quartz



Vegetation: *Eucalyptus salmonophloia low woodland over Senna artemisioides subsp. x artemisioides, Senna artemisioides subsp. filifolia and Eremophila parvifolia subsp. auricampi low sparse shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eremophila parvifolia subsp. auricampi	35	1	
Eucalyptus salmonophloia	1000	19	
Senna artemisioides subsp. x artemisioides	100	2	
Senna artemisioides subsp. filifolia	75	2	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q24
Location MGA 50 326578 **mE** 6577758 **mN**

Described by: JW
Date: 14/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite, quartz



Vegetation: *Eucalyptus campaspe low woodland over Senna artemisioides subsp. x artemisioides mid sparse shrubland over Senna artemisioides subsp. filifolia low sparse shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eucalyptus campaspe	400	15	
Senna artemisioides subsp. x artemisioides	130	2	
Senna artemisioides subsp. filifolia	45	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q25
Location MGA 50 326770 **mE** 6578110 **mN**

Described by: JW
Date: 14/10/2021
Type: QUADRAT

Landform: Upper slope
Rock Type: N/A



Vegetation: *Acacia acuminata tall open shrubland over Eremophila oldfieldii subsp. angustifolia mid sparse shrubland over Sida petrophila, Solanum lasiophyllum and Dodonaea stenozyga low open shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	400	20	
Austrostipa sp.	10	1	
Dodonaea stenozyga	50	1	
Eremophila georgei	20	0.1	
Eremophila oldfieldii subsp. angustifolia	130	10	
Haloragis trigonocarpa	10	3	
Ptilotus exaltatus	30	1	
Ptilotus obovatus var. obovatus	20	1	
Senna artemisioides subsp. filifolia	30	0.1	
Sida petrophila	100	5	
Solanum lasiophyllum	30	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q26
Location MGA 50 327707 **mE** 6577970 **mN**

Described by: JW
Date: 14/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: N/A



Vegetation: *Eremophila oldfieldii subsp. angustifolia, Dodonaea lobulata and Senna artemisioides subsp. x artemisioides mid shrubland over Ptilotus obovatus var. obovatus low sparse herbland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Dodonaea lobulata	140	12	
Eremophila oldfieldii subsp. angustifolia	190	20	
Ptilotus obovatus var. obovatus	35	1	
Senna artemisioides subsp. x artemisioides	170	12	
Senna artemisioides subsp. filifolia	200	10	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q27
Location MGA 50 327762 **mE** 6578035 **mN**

Described by: JW
Date: 14/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: N/A



Vegetation: *Eucalyptus torquata low open woodland over Eremophila interstans subsp. interstans, Senna artemisioides subsp. filifolia and Olearia muelleri low sparse shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eremophila interstans subsp. interstans	50	2	
Eucalyptus torquata	500	8	
Exocarpos aphyllus	25	0.1	
Maireana tomentosa	10	1	
Olearia muelleri	35	1	
Senna artemisioides subsp. filifolia	55	2	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q28
Location MGA 50 327436 **mE** 6575925 **mN**

Described by: JW
Date: 14/10/2021
Type: QUADRAT

Landform: Gentle slope
Rock Type: Laterite



Vegetation: *Acacia acuminata tall open shrubland over Eremophila oldfieldii subsp. angustifolia mid sparse shrubland over Dodonaea stenozyga and Senna artemisioides subsp. filifolia low closed shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	300	15	
Austrostipa platychaeta	18	2	
Calandrinia baccata	10	2	
Dodonaea stenozyga	80	70	
Eremophila oldfieldii subsp. angustifolia	120	6	
Goodenia havilandii	18	1	
Haloragis trigonocarpa	18	1	
Lycium australe	10	0.1	
Maireana pentatropis	10	0.1	
Ptilotus exaltatus	25	1	
Ptilotus obovatus var. obovatus	40	1	
Senna artemisioides subsp. filifolia	100	5	
Thysanotus manglesianus	20	3	
Waitzia acuminata var. acuminata	15	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q29
Location MGA 50 328203 **mE** 6575013 **mN**

Described by: JW
Date: 14/10/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite



Vegetation: *Eucalyptus torquata low open woodland over Eremophila oldfieldii subsp. angustifolia, Senna artemisioides subsp. x artemisioides and Dodonaea stenozyga mid open shrubland over Ptilotus obovatus var. obovatus and Ptilotus exaltatus low sparse herbland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia jennerae	45	1	
Dodonaea stenozyga	150	3	
Eremophila oldfieldii subsp. angustifolia	200	6	
Eremophila parvifolia subsp. auricampi	35	3	
Eucalyptus torquata	400	5	
Olearia muelleri	25	1	
Ptilotus exaltatus	20	1	
Ptilotus obovatus var. obovatus	35	3	
Senna artemisioides subsp. x artemisioides	190	6	
Senna artemisioides subsp. filifolia	190	3	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1Q30
Location MGA 50 328220 **mE** 6575082 **mN**

Described by: JW
Date: 14/10/2021
Type: QUADRAT

Landform: Rocky plain
Rock Type: Laterite



Vegetation: *Allocasuarina ?huegeliana and Eucalyptus torquata low woodland over Santalum spicatum and Eremophila oppositifolia subsp. angustifolia mid sparse shrubland over Dodonaea stenozyga, Eremophila glabra subsp. glabra and Atriplex vesicaria low open shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Allocasuarina ?huegeliana	400	6	
Atriplex vesicaria	100	3	
Dodonaea stenozyga	80	6	
Eremophila glabra subsp. glabra	90	6	
Eremophila oppositifolia subsp. angustifolia	190	1	
Eucalyptus torquata	700	5	
Maireana pentatropis	25	0.1	
Ptilotus exaltatus	20	1	
Ptilotus obovatus var. obovatus	15	1	
Santalum spicatum	150	2	
Senna artemisioides subsp. filifolia	100	3	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1R01
Location MGA 50 328967 **mE** 6577693 **mN**

Described by: JW
Date: 13/10/2021
Type: RELEVE

Landform: Plain
Rock Type: N/A



Vegetation: *Eucalyptus torquata low open woodland over Exocarpos aphyllus tall sparse shrubland over Eremophila parvifolia subsp. auricampi, Westringia rigida and Senna artemisioides subsp. filifolia low sparse shrubland*

Condition: Excellent **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eremophila parvifolia subsp. auricampi	32	3	
Eucalyptus torquata	400	5	
Exocarpos aphyllus	220	6	
Olearia muelleri	40	1	
Senna artemisioides subsp. filifolia	35	2	
Westringia rigida	35	3	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1R02
Location MGA 50 328922 **mE** 6577745 **mN**

Described by: JW
Date: 13/10/2021
Type: RELEVE

Landform: Plain
Rock Type: N/A



Vegetation: *Eucalyptus torquata low woodland over Eremophila interstans subsp. interstans mid sparse shrubland over Senna artemisioides subsp. filifolia, Olearia muelleri and Westringia rigida low open shrubland*

Condition: Excellent **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eremophila georgei	28	0.1	
Eremophila interstans subsp. interstans	200	4	
Eucalyptus torquata	500	16	
Olearia muelleri	25	4	
Senna artemisioides subsp. filifolia	40	6	
Westringia rigida	25	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1R03
Location MGA 50 329002 **mE** 6577925 **mN**

Described by: JW
Date: 13/10/2021
Type: RELEVE

Landform: Plain
Rock Type: Laterite



Vegetation: *Eucalyptus torquata low open woodland over Eremophila alternifolia tall sparse shrubland over Dodonaea stenozyga and Eremophila oldfieldii subsp. angustifolia mid sparse shrubland*

Condition: Excellent **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia jennerae	60	2	
Dodonaea stenozyga	120	5	
Eremophila alternifolia	210	2	
Eremophila oldfieldii subsp. angustifolia	110	5	
Eucalyptus torquata	400	2	
Maireana tomentosa	25	1	
Westringia rigida	25	2	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1R04
Location MGA 50 326478 **mE** 6577408 **mN**

Described by: JW
Date: 13/10/2021
Type: RELEVE

Landform: Plain
Rock Type: Laterite, quartz



Vegetation: *Eremophila oldfieldii subsp. angustifolia tall open shrubland over Senna artemisioides subsp. x artemisioides and Senna artemisioides subsp. filifolia mid open shrubland over Ptilotus obovatus var. obovatus low open herbland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Dodonaea stenozyga	100	12	
Enchylaena tomentosa var. tomentosa	45	1	
Eremophila oldfieldii subsp. angustifolia	250	15	
Eremophila parvifolia subsp. auricampi	25	1	
Ptilotus obovatus var. obovatus	45	28	
Senna artemisioides subsp. x artemisioides	120	10	
Senna artemisioides subsp. filifolia	110	6	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1R05
Location MGA 50 326536 **mE** 6577327 **mN**

Described by: JW
Date: 13/10/2021
Type: RELEVE

Landform: Mid slope
Rock Type: N/A



Vegetation: *Eucalyptus torquata and Eucalyptus salmonophloia low woodland over Exocarpos aphyllus mid sparse shrubland over Senna artemisioides subsp. filifolia and Senna artemisioides subsp. x artemisioides low open shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eucalyptus salmonophloia	500	10	
Eucalyptus torquata	400	5	
Exocarpos aphyllus	140	2	
Senna artemisioides subsp. x artemisioides	45	1	
Senna artemisioides subsp. filifolia	90	11	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1R09
Location MGA 50 326358 **mE** 6577538 **mN**

Described by: JW
Date: 14/10/2021
Type: RELEVE

Landform: Plain
Rock Type: Laterite



Vegetation: *Eucalyptus celastroides and Eucalyptus clelandiorum low woodland over Atriplex vesicaria low sparse shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex vesicaria	40	1	
Eucalyptus celastroides	400	6	
Eucalyptus clelandiorum	400	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1R10
Location MGA 50 326982 **mE** 6578150 **mN**

Described by: JW
Date: 14/10/2021
Type: RELEVE

Landform: Undulating plain
Rock Type: N/A



Vegetation: *Eucalyptus clelandiorum low open woodland over Senna artemisioides subsp. x artemisioides, Atriplex vesicaria and Eremophila interstans subsp. interstans low open shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex vesicaria	28	1	
Eremophila interstans subsp. interstans	45	1	
Eucalyptus clelandiorum	1000	5	
Senna artemisioides subsp. x artemisioides	35	10	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1R11
Location MGA 50 327829 **mE** 6578083 **mN**

Described by: JW
Date: 14/10/2021
Type: RELEVE

Landform: Plain
Rock Type: Laterite, quartz



Vegetation: *Eucalyptus torquata mid open woodland over Eremophila interstans subsp. interstans mid open shrubland over Senna artemisioides subsp. x artemisioides, Senna artemisioides subsp. filifolia and Acacia jennerae low open shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia jennerae	10	3	
Eremophila interstans subsp. interstans	150	16	
Eucalyptus torquata	1500	5	
Olearia muelleri	35	2	
Senna artemisioides subsp. x artemisioides	40	5	
Senna artemisioides subsp. filifolia	25	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C1R13
Location MGA 50 327488 **mE** 6575973 **mN**

Described by: JW
Date: 14/10/2021
Type: RELEVE

Landform: Undulating plain
Rock Type: N/A



Vegetation: *Eucalyptus clelandiorum, Eucalyptus salmonophloia and Eucalyptus griffithsii low woodland over Eremophila interstans subsp. interstans and Eremophila oldfieldii subsp. angustifolia tall open shrubland over Atriplex nummularia subsp. spathulata and Dodonaea stenozyga low open shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex nummularia subsp. spathulata	45	11	
Dodonaea stenozyga	10	6	
Eremophila interstans subsp. interstans	220	11	
Eremophila oldfieldii subsp. angustifolia	200	10	
Eucalyptus clelandiorum	500	6	
Eucalyptus griffithsii	300	5	
Eucalyptus salmonophloia	400	6	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q01
Location MGA 50 326721 **mE** 6571821 **mN**

Described by: JW
Date: 15/11/2021
Type: QUADRAT

Landform: Scree slope drain line
Rock Type: Laterite

No photo available

Vegetation: *Eucalyptus loxophleba subsp. lissophloia and Eucalyptus campaspe low open woodland over Eremophila oldfieldii subsp. angustifolia mid sparse shrubland over Dodonaea adenophora and Olearia muelleri low sparse shrubland*
Condition: Good **Disturbance Type:** Fauna tracks/scats,Infrastructure

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Dodonaea adenophora	35	1	
Eremophila glabra subsp. glabra	5	0.1	
Eremophila oldfieldii subsp. angustifolia	130	2	
Eucalyptus campaspe	300	1	
Eucalyptus loxophleba subsp. lissophloia	300	2	
Maireana georgei	15	0.1	
Olearia muelleri	25	0.5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q02
Location MGA 50 324588 **mE** 6571695 **mN**

Described by: BD,SW
Date: 15/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Ironstone



Vegetation: *Eucalyptus salmonophloia low woodland over Melaleuca ?hamata and Eremophila oppositifolia subsp. angustifolia tall open shrubland over Olearia muelleri low sparse shrubland*

Condition: Very Good **Disturbance Type:** Litter

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	40	0.1	
Acacia hemiteles	160	1	
Enchylaena tomentosa var. tomentosa	40	0.1	
Eremophila oppositifolia subsp. angustifolia	250	4	
Eremophila parvifolia subsp. auricampi	60	0.1	
Eucalyptus salmonophloia	650	12	
Exocarpos aphyllus	150	0.5	
Melaleuca ?hamata	300	11	
Olearia muelleri	45	5	
Olearia pimeleoides	30	0.1	
Pimelea microcephala subsp. microcephala	50	0.1	
Ptilotus obovatus var. obovatus	30	0.1	
Scaevola spinescens	120	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q03
Location MGA 50 327534 **mE** 6572097 **mN**

Described by: JW
Date: 15/11/2021
Type: QUADRAT

Landform: Drainage line
Rock Type: Laterite

No photo available

Vegetation: *Atriplex ?vesicaria and Senna artemisioides subsp. x artemisioides low sparse shrubland*

Condition: Good **Disturbance Type:** Vehicle tracks

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	100	5	
Eremophila forrestii	20	0.1	
Eremophila scoparia	130	0.1	
Maireana georgei	5	0.1	
Senna artemisioides subsp. x artemisioides	60	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q04
Location MGA 50 324603 **mE** 6571566 **mN**

Described by: BD,SW
Date: 15/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Ironstone



Vegetation: *Eucalyptus ?ravida low open forest over Eremophila interstans subsp. interstans, Melaleuca ?hamata and Melaleuca pauperiflora subsp. fastigiata tall open shrubland over Triodia desertorum low sparse hummock grassland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	170	0.1	
Acacia hemiteles	140	0.1	
Atriplex nummularia subsp. spathulata	35	0.1	
Dodonaea lobulata	100	0.1	
Eremophila interstans subsp. interstans	210	11	
Eremophila oppositifolia subsp. angustifolia	110	0.1	
Eremophila parvifolia subsp. auricampi	30	0.1	
Eucalyptus ?ravida	550	35	
Exocarpos aphyllus	90	0.1	
Halgania andromedifolia	70	6	
Maireana georgei	30	0.1	
Melaleuca ?hamata	250	2	
Melaleuca pauperiflora subsp. fastigiata	350	1	
Myoporum platycarpum subsp. platycarpum	210	1	
Olearia muelleri	30	0.1	
Phebalium laevigatum	120	1	
Scaevola spinescens	45	5	
Sclerolaena fusiformis	10	0.1	
Triodia desertorum	25	2	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q05
Location MGA 50 327403 **mE** 6572169 **mN**

Described by: JW
Date: 15/11/2021
Type: QUADRAT

Landform: Scree slope minor drain No photo available
Rock Type: Laterite

Vegetation: *Eucalyptus campaspe low open woodland over Eremophila oldfieldii subsp. angustifolia tall open shrubland over Dodonaea stenozyga, Alyxia buxifolia and Eremophila glabra subsp. glabra low open shrubland*
Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Alyxia buxifolia	70	1	
Dodonaea stenozyga	90	15	
Eremophila glabra subsp. glabra	100	1	
Eremophila oldfieldii subsp. angustifolia	200	15	
Eucalyptus campaspe	200	1	
Maireana georgei	15	0.1	
Olearia muelleri	20	0.1	
Ptilotus obovatus var. obovatus	35	5	
Senna artemisioides subsp. filifolia	110	10	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q06
Location MGA 50 324605 **mE** 6571453 **mN**

Described by: BD,SW
Date: 15/11/2021
Type: QUADRAT

Landform: Low rise
Rock Type: Ironstone,Quartz



Vegetation: *Eucalyptus clelandiorum and Eucalyptus ?ravida low open woodland over Eremophila oppositifolia subsp. angustifolia and Myoporum platycarpum subsp. platycarpum mid open shrubland over Scaevola spinescens, Dodonaea lobulata and Phebalium laevigatum low open shrubland*

Condition: Good **Disturbance Type:** Litter,Historical Clearing

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	120	0.1	
Acacia tetragonophylla	150	0.1	
Atriplex nummularia subsp. spathulata	120	0.1	
Dodonaea lobulata	100	1	
Eremophila oppositifolia subsp. angustifolia	140	8	
Eremophila parvifolia subsp. auricampi	30	0.1	
Eucalyptus ?ravida	450	2	
Eucalyptus clelandiorum	700	5	
Halgania andromedifolia	100	0.1	
Maireana georgei	15	0.1	
Myoporum platycarpum subsp. platycarpum	190	4	
Olearia muelleri	30	0.5	
Phebalium laevigatum	80	1	
Ptilotus obovatus var. obovatus	30	0.1	
Scaevola spinescens	90	20	
Solanum lasiophyllum	20	0.1	
Triodia desertorum	30	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q07
Location MGA 50 327549 **mE** 6571711 **mN**

Described by: JW
Date: 15/11/2021
Type: QUADRAT

Landform: Scree slope
Rock Type: Laterite

No photo available

Vegetation: *Eremophila interstans subsp. interstans tall open shrubland over Dodonaea stenozyga, Senna artemisioides subsp. filifolia and Alyxia buxifolia mid open shrubland over Maireana georgei low sparse chenopod shrubland*
Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Alyxia buxifolia	110	1	
Cheilanthes sieberi subsp. sieberi	25	0.1	
Dodonaea stenozyga	170	5	
Eremophila interstans subsp. interstans	250	15	
Maireana georgei	15	2	
Malvaceae sp.	5	0.1	
Senna artemisioides subsp. filifolia	190	5	
Solanum cleistogamum	15	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q08
Location MGA 50 324706 **mE** 6571242 **mN**

Described by: BD,SW
Date: 15/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Ironstone,Quartz



Vegetation: *Eucalyptus clelandiorum and Eucalyptus salmonophloia mid open woodland over Eremophila interstans subsp. interstans mid sparse shrubland over Maireana trichoptera, Atriplex ?vesicaria and Sclerolaena fusiformis low sparse chenopod shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	30	1	
Atriplex nummularia subsp. spathulata	100	0.1	
Eremophila interstans subsp. interstans	160	2	
Eremophila parvifolia subsp. auricampi	40	1	
Eucalyptus clelandiorum	1100	2	
Eucalyptus salmonophloia	1100	2	
Exocarpos aphyllus	40	0.1	
Maireana georgei	15	0.1	
Maireana trichoptera	8	2	
Olearia muelleri	35	0.1	
Ptilotus obovatus var. obovatus	40	0.1	
Scaevola spinescens	80	1	
Sclerolaena diacantha	10	0.5	
Sclerolaena fusiformis	5	1	
Senna artemisioides subsp. filifolia	100	0.1	
Senna stowardii	60	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q09
Location MGA 50 327372 **mE** 6571654 **mN**

Described by: JW
Date: 15/11/2021
Type: QUADRAT

Landform: Slope
Rock Type: Laterite

No photo available

Vegetation: *Eremophila oldfieldii subsp. angustifolia tall open shrubland over Dodonaea stenozyga and Acacia acuminata mid sparse shrubland over Ptilotus obovatus var. obovatus and Cheilanthes sieberi subsp. sieberi low sparse herbland*
Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	140	2	
Cheilanthes sieberi subsp. sieberi	35	0.5	
Dodonaea stenozyga	200	10	
Eremophila oldfieldii subsp. angustifolia	250	25	
Ptilotus obovatus var. obovatus	25	10	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q10
Location MGA 50 324887 **mE** 6571294 **mN**

Described by: BD,SW
Date: 15/11/2021
Type: QUADRAT

Landform: Drainage line
Rock Type: Calcrete,Ironstone,Quartz



Vegetation: *Eucalyptus salubris low woodland over Eremophila oldfieldii subsp. angustifolia, Dodonaea lobulata and Eremophila glabra subsp. glabra mid open shrubland over Atriplex ?vesicaria low sparse chenopod shrubland*

Condition: Very Good **Disturbance Type:** Litter

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	40	3	
Atriplex nummularia subsp. spathulata	150	0.1	
Dodonaea lobulata	130	4	
Eremophila glabra subsp. glabra	150	4	
Eremophila interstans subsp. interstans	210	0.1	
Eremophila oldfieldii subsp. angustifolia	180	11	
Eremophila parvifolia subsp. auricampi	50	0.1	
Eucalyptus salubris	900	20	
Exocarpos aphyllus	150	0.1	
Maireana georgei	30	0.1	
Maireana trichoptera	10	0.1	
Olearia muelleri	35	0.1	
Ptilotus exaltatus	3	0.1	
Scaevola spinescens	100	0.1	
Sclerolaena obliquicuspis	10	0.1	
Senna artemisioides subsp. filifolia	150	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q11
Location MGA 50 326763 **mE** 6571675 **mN**

Described by: JW
Date: 15/11/2021
Type: QUADRAT

Landform: Drainage line
Rock Type: Granite,Laterite,Quartz



Vegetation: *Eucalyptus oleosa subsp. oleosa low woodland over Eremophila interstans subsp. interstans mid sparse shrubland over Dodonaea stenozyga, Acacia jennerae and Eremophila glabra subsp. glabra low sparse shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia jennerae	35	1	
Dodonaea stenozyga	38	5	
Eremophila glabra subsp. glabra	45	1	
Eremophila interstans subsp. interstans	200	1	
Eucalyptus oleosa subsp. oleosa	500	15	
Maireana georgei	20	0.1	
Olearia muelleri	40	1	
Ptilotus exaltatus	15	0.1	
Ptilotus obovatus var. obovatus	20	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q12
Location MGA 50 325065 **mE** 6571260 **mN**

Described by: BD,SW
Date: 15/11/2021
Type: QUADRAT



Landform: Mid slope
Rock Type: Ironstone,Laterite,Quartz

Vegetation: *Eucalyptus salmonophloia mid woodland over Senna artemisioides subsp. filifolia mid isolated shrubs*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eremophila interstans subsp. interstans	400	0.1	
Eremophila parvifolia subsp. auricampi	25	0.1	
Eucalyptus salmonophloia	1500	25	
Senna artemisioides subsp. filifolia	150	0.5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q13
Location MGA 50 327631 **mE** 6571898 **mN**

Described by: JW
Date: 16/11/2021
Type: QUADRAT

Landform: Ridge crest
Rock Type: Laterite



Vegetation: *Eucalyptus oldfieldii low open woodland over Dodonaea stenozyga mid sparse shrubland over Atriplex vesicaria, Senna artemisioides subsp. filifolia and Maireana pentatropis low shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex vesicaria	35	15	
Dodonaea stenozyga	110	8	
Eucalyptus oldfieldii	300	5	
Maireana pentatropis	5	5	
Olearia muelleri	20	0.1	
Ptilotus obovatus var. obovatus	15	6	
Senna artemisioides subsp. filifolia	45	15	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q14
Location MGA 50 325050 **mE** 6570941 **mN**

Described by: BD,SW
Date: 16/11/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Ironstone



Vegetation: *Acacia collegialis and Eremophila oldfieldii subsp. angustifolia tall sparse shrubland over Dodonaea lobulata and Eremophila alternifolia mid sparse shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia collegialis	400	6	
Acacia tetragonophylla	100	0.1	
Chenopodium curvispicatum	10	0.1	
Dodonaea lobulata	180	5	
Eremophila alternifolia	190	4	
Eremophila oldfieldii subsp. angustifolia	250	1	
Maireana georgei	20	0.1	
Maireana trichoptera	8	0.1	
Ptilotus obovatus var. obovatus	25	0.1	
Rhagodia drummondii	5	0.1	
Sclerolaena diacantha	5	0.1	
Sclerolaena fusiformis	10	0.1	
Sida ?petrophila	15	0.1	
Solanum lasiophyllum	10	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q15
Location MGA 50 327026 **mE** 6571767 **mN**

Described by: JW
Date: 16/11/2021
Type: QUADRAT

Landform: Lower slope
Rock Type: Laterite



Vegetation: *Eucalyptus clelandiorum and Eucalyptus oldfieldii low open woodland over Atriplex ?vesicaria and Eremophila interstans subsp. interstans mid shrubland over Dodonaea stenozyga, Olearia muelleri and Maireana pentatropis low open shrubland*

Condition: Good **Disturbance Type:** Fauna tracks/scats,Historical Clearing

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	120	35	
Dodonaea stenozyga	90	6	
Eremophila interstans subsp. interstans	190	20	
Eucalyptus clelandiorum	400	2	
Eucalyptus oldfieldii	60	2	
Maireana georgei	5	0.1	
Maireana pentatropis	20	1	
Olearia muelleri	20	5	
Ptilotus obovatus var. obovatus	15	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q16
Location MGA 50 324948 **mE** 6570710 **mN**

Described by: BD,SW
Date: 16/11/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Ironstone



Vegetation: *Eucalyptus griffithsii mid woodland over Eremophila oldfieldii subsp. angustifolia tall sparse shrubland over Eremophila interstans subsp. interstans mid sparse shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	30	0.1	
Dodonaea lobulata	80	1	
Eremophila glabra subsp. glabra	40	0.5	
Eremophila interstans subsp. interstans	180	3	
Eremophila oldfieldii subsp. angustifolia	500	2	
Eucalyptus griffithsii	1100	25	
Maireana trichoptera	20	0.1	
Olearia muelleri	40	1	
Ptilotus obovatus var. obovatus	25	0.1	
Rhagodia drummondii	20	0.1	
Senna artemisioides subsp. filifolia	40	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q17
Location MGA 50 327349 **mE** 6571149 **mN**

Described by: JW
Date: 16/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite,Sandstone,Shale



Vegetation: *Atriplex vesicaria, Maireana georgei and Maireana pentatropis low chenopod shrubland over *Asphodelus fistulosus low sparse herbland*

Condition: Poor **Disturbance Type:** Vehicle tracks,Fauna tracks/scats,Historical Clearing,Infrastructure

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
**Asphodelus fistulosus*	35	10	
Atriplex vesicaria	100	26	
Maireana georgei	10	15	
Maireana pentatropis	20	10	
**Salvia verbenaca*	10	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q18
Location MGA 50 324668 **mE** 6570076 **mN**

Described by: BD,SW
Date: 16/11/2021
Type: QUADRAT

Landform: Hilltop
Rock Type: Calcrete,Ironstone



Vegetation: *Acacia collegialis and Eremophila oldfieldii subsp. angustifolia tall sparse shrubland over Dodonaea lobulata mid sparse shrubland over Senna artemisioides subsp. filifolia low sparse shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia collegialis	350	5	
Atriplex nummularia subsp. spathulata	140	0.1	
Dodonaea lobulata	140	5	
Enchylaena tomentosa var. tomentosa	40	0.1	
Eremophila oldfieldii subsp. angustifolia	350	5	
Maireana pentatropis	15	0.1	
Maireana trichoptera	15	0.1	
Ptilotus obovatus var. obovatus	25	1	
Santalum acuminatum	250	0.1	
Scaevola spinescens	130	0.1	
Senna artemisioides subsp. filifolia	15	2	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q19
Location MGA 50 328122 **mE** 6571915 **mN**

Described by: JW
Date: 16/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite

No photo available

Vegetation: *Eucalyptus salmonophloia low woodland over Eremophila interstans subsp. interstans mid sparse shrubland over Atriplex vesicaria and Atriplex sp. low open chenopod shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex sp.	35	5	
Atriplex vesicaria	100	20	
Eremophila interstans subsp. interstans	120	5	
Eucalyptus salmonophloia	1000	15	
Maireana georgei	15	0.1	
Salsola australis	5	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q20
Location MGA 50 324559 **mE** 6569671 **mN**

Described by: BD,SW
Date: 16/11/2021
Type: QUADRAT

Landform: Upper slope
Rock Type: Ironstone



Vegetation: *Eucalyptus salmonophloia and Eucalyptus salubris mid open woodland over Eremophila interstans subsp. interstans and Eremophila oldfieldii subsp. angustifolia tall sparse shrubland over Senna artemisioides subsp. filifolia and Atriplex nummularia subsp. spathulata mid sparse shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	25	0.1	
Atriplex nummularia subsp. spathulata	120	0.5	
Dodonaea lobulata	60	0.1	
Eremophila glabra subsp. glabra	90	0.1	
Eremophila interstans subsp. interstans	350	3	
Eremophila oldfieldii subsp. angustifolia	250	1	
Eucalyptus salmonophloia	1200	3	
Eucalyptus salubris	1100	2	
Maireana ?georgei	15	0.1	
Maireana pentatropis	25	0.1	
Maireana sedifolia	100	0.5	
Maireana trichoptera	15	0.1	
Olearia muelleri	30	0.1	
Ptilotus obovatus var. obovatus	15	0.1	
Scaevola spinescens	30	0.1	
Sclerolaena fusiformis	15	0.1	
Senna artemisioides subsp. filifolia	130	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q21
Location MGA 50 327523 **mE** 6573455 **mN**

Described by: JW
Date: 16/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite



Vegetation: *Eucalyptus griffithsii low open woodland over Eremophila oldfieldii subsp. angustifolia and Eremophila interstans subsp. interstans tall open shrubland over Senna artemisioides subsp. filifolia and Dodonaea stenozyga mid sparse shrubland*

Condition: Good **Disturbance Type:** Vehicle tracks,Litter

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Dodonaea stenozyga	120	2	
Eremophila interstans subsp. interstans	220	5	
Eremophila oldfieldii subsp. angustifolia	290	10	
Eucalyptus griffithsii	500	1	
Maireana ?marginata	30	2	
Maireana georgei	15	1	
Olearia muelleri	25	1	
Ptilotus obovatus var. obovatus	30	10	
Senna artemisioides subsp. filifolia	120	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q22
Location MGA 50 324398 **mE** 6569324 **mN**

Described by: BD,SW
Date: 16/11/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Ironstone



Vegetation: *Acacia collegialis and Eremophila oldfieldii subsp. angustifolia tall open shrubland over Ptilotus obovatus var. obovatus and *Salvia verbenaca low herbland*

Condition: Good **Disturbance Type:** Grazing,Litter,Fauna tracks/scats,Historical Clearing

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia collegialis	400	8	
Enchylaena tomentosa var. tomentosa	40	0.1	
Enneapogon caerulescens	4	0.1	
Eremophila oldfieldii subsp. angustifolia	350	4	
Hibiscus sturtii var. grandiflorus	15	0.1	
Maireana trichoptera	20	0.1	
Ptilotus obovatus var. obovatus	35	35	
**Salvia verbenaca*	30	0.5	
Sclerolaena fusiformis	15	0.1	
Sida petrophila	30	4	
Solanum cleistogamum	10	0.1	
Solanum lasiophyllum	25	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q23
Location MGA 50 327250 **mE** 6573660 **mN**

Described by: JW
Date: 16/11/2021
Type: QUADRAT

Landform: Mud slope scree
Rock Type: Laterite



Vegetation: *Eucalyptus torquata low open woodland over Eremophila oldfieldii subsp. angustifolia and Acacia tetragonophylla tall open shrubland over Dodonaea stenozyga, Senna artemisioides subsp. filifolia and Alyxia buxifolia mid shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia tetragonophylla	250	1	
Alyxia buxifolia	130	1	
Dodonaea stenozyga	190	45	
Eremophila oldfieldii subsp. angustifolia	250	15	
Eucalyptus torquata	900	5	
Senna artemisioides subsp. filifolia	170	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q24
Location MGA 50 324535 **mE** 6569030 **mN**

Described by: BD,SW
Date: 16/11/2021
Type: QUADRAT



Landform: Mid slope
Rock Type: Calcrete,Ironstone

Vegetation: *Eucalyptus salmonophloia mid open woodland over Atriplex nummularia subsp. spathulata low sparse chenopod shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	15	0.1	
Atriplex nummularia subsp. spathulata	90	5	
Eucalyptus salmonophloia	1200	6	
Maireana pentatropis	20	0.1	
Maireana trichoptera	10	0.1	
Senna artemisioides subsp. filifolia	50	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q25
Location MGA 50 326779 **mE** 6572716 **mN**

Described by: JW
Date: 16/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite,Limestone,Quartz



Vegetation: *Eucalyptus griffithsii low open woodland over Eremophila glabra subsp. glabra, Atriplex vesicaria and Maireana georgei low shrubland over Osteocarpum salsuginosum low sparse herbland*

Condition: Poor,Very Poor **Disturbance Type:** Weeds,Vehicle tracks,Litter,Historical Clearing,Infrastructure

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?holocarpa	35	5	
Atriplex vesicaria	38	15	
Enneapogon caerulescens	5	0.1	
Eremophila glabra subsp. glabra	35	30	
Eucalyptus griffithsii	400	2	
Maireana georgei	20	15	
Maireana pentatropis	25	1	
Maireana tomentosa	20	5	
Osteocarpum salsuginosum	15	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q26
Location MGA 50 325151 **mE** 6568826 **mN**

Described by: BD,SW
Date: 16/11/2021
Type: QUADRAT

Landform: Undulating plain
Rock Type: Ironstone



Vegetation: *Eucalyptus salmonophloia and Eucalyptus salubris mid woodland over Senna artemisioides subsp. filifolia mid isolated shrubs over Atriplex ?vesicaria low isolated chenopod shrubs*

Condition: Very Good **Disturbance Type:** Historical Clearing

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	40	0.5	
Dodonaea lobulata	50	0.1	
Eremophila parvifolia subsp. auricampi	40	0.1	
Eucalyptus salmonophloia	1200	15	
Eucalyptus salubris	1100	5	
Senna artemisioides subsp. filifolia	120	0.5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q27
Location MGA 50 326933 **mE** 6578601 **mN**

Described by: JW
Date: 17/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite,Quartz



Vegetation: *Eucalyptus griffithsii low open woodland over Eremophila oldfieldii subsp. angustifolia mid open shrubland over Dodonaea stenozyga, Eremophila glabra subsp. glabra and Santalum spicatum mid open shrubland over Atriplex vesicaria, Exocarpos aphyllus and Pittosporum angustifolium low sparse shrubland*

Condition: Good **Disturbance Type:** Vehicle tracks

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	42	0.5	
Atriplex vesicaria	60	5	
Dodonaea stenozyga	200	20	
Eremophila glabra subsp. glabra	110	1	
Eremophila oldfieldii subsp. angustifolia	250	20	
Eucalyptus griffithsii	500	1	
Exocarpos aphyllus	100	1	
Lycium australe	40	0.5	
Maireana georgei	20	0.5	
Pittosporum angustifolium	60	1	
Ptilotus obovatus var. obovatus	30	2	
Santalum spicatum	170	1	
Senna artemisioides subsp. filifolia	40	0.5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q28
Location MGA 50 325835 **mE** 6569465 **mN**

Described by: BD,SW
Date: 16/11/2021
Type: QUADRAT

Landform: Drainage line
Rock Type: Ironstone



Vegetation: *Eucalyptus salubris mid open forest over Eremophila interstans subsp. interstans tall sparse shrubland over Atriplex nummularia subsp. spathulata mid sparse shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	100	2	
Atriplex nummularia subsp. spathulata	120	2	
Dodonaea lobulata	200	0.1	
Eremophila interstans subsp. interstans	300	4	
Eremophila parvifolia subsp. auricampi	50	0.1	
Eucalyptus salubris	1100	35	
Maireana trichoptera	50	0.1	
Olearia muelleri	90	0.1	
Ptilotus obovatus var. obovatus	40	0.1	
Scaevola spinescens	80	0.1	
Sclerolaena diacantha	10	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q29
Location MGA 50 326944 **mE** 6579386 **mN**

Described by: JW
Date: 17/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Dolerite,Laterite,Quartz

No photo available

Vegetation: *Eucalyptus griffithsii low open woodland over Acacia hemiteles, Dodonaea stenozyga and Santalum spicatum mid shrubland over Atriplex vesicaria, Senna artemisioides subsp. filifolia and Olearia muelleri low open shrubland*
Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia hemiteles	140	15	
Alyxia buxifolia	35	1	
Atriplex vesicaria	70	5	
Dodonaea stenozyga	120	15	
Eucalyptus griffithsii	700	10	
Olearia muelleri	15	2	
Santalum spicatum	200	5	
Senna artemisioides subsp. filifolia	45	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q31
Location MGA 50 326956 **mE** 6579776 **mN**

Described by: JW
Date: 17/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite

No photo available

Vegetation: *Eucalyptus griffithsii low open woodland over Eremophila interstans subsp. interstans tall shrubland over Eremophila oppositifolia subsp. angustifolia, Exocarpos aphyllus and Eremophila glabra subsp. glabra mid sparse shrubland*
Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Abutilon cryptopetalum	38	0.1	
Acacia erinacea	40	0.5	
Acacia jennerae	50	5	
Alyxia buxifolia	40	15	
Dodonaea stenozyga	35	1	
Eremophila glabra subsp. glabra	110	0.5	
Eremophila interstans subsp. interstans	220	45	
Eremophila oppositifolia subsp. angustifolia	200	1	
Eremophila scoparia	48	0.1	
Eucalyptus griffithsii	500	5	
Exocarpos aphyllus	110	1	
Maireana trichoptera	10	0.1	
Olearia muelleri	20	0.5	
Senna artemisioides subsp. filifolia	35	0.5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q32
Location MGA 50 325641 **mE** 6569459 **mN**

Described by: BD,SW
Date: 17/11/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Laterite,Quartz



Vegetation: *Eucalyptus websteriana subsp. websteriana low open woodland over Acacia collegialis tall open shrubland over Dodonaea lobulata low open shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia collegialis	450	11	
Austrostipa trichophylla	5	0.1	
Cheilanthes lasiophylla	5	0.1	
Cheilanthes sieberi subsp. sieberi	8	0.1	
Chrysocephalum puteale	10	0.1	
Dodonaea lobulata	100	13	
Enneapogon caerulescens	3	0.1	
Eremophila alternifolia	30	0.1	
Eremophila oldfieldii subsp. angustifolia	20	0.1	
Eucalyptus websteriana subsp. websteriana	300	1	
**Euphorbia drummondii*	5	0.1	
Goodenia havilandii	10	0.1	
Maireana trichoptera	10	0.1	
Olearia muelleri	35	0.1	
Ptilotus obovatus var. obovatus	20	1	
Scaevola spinescens	50	0.1	
Sida ?petrophila	10	0.1	
Solanum lasiophyllum	10	0.1	
Waitzia acuminata var. acuminata	10	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q33
Location MGA 50 324395 **mE** 6579552 **mN**

Described by: JW
Date: 17/11/2021
Type: QUADRAT

Landform: Ridge
Rock Type: Laterite



Vegetation: *Acacia collegialis tall open shrubland over Eremophila oldfieldii subsp. angustifolia mid sparse shrubland over Dodonaea stenozyga and Solanum lasiophyllum low open shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia collegialis	400	21	
Aristida contorta	5	0.1	
Dodonaea stenozyga	50	20	
Eremophila oldfieldii subsp. angustifolia	120	10	
Goodenia havilandii	15	0.1	
Solanum lasiophyllum	15	0.5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q34
Location MGA 50 325544 **mE** 6569645 **mN**

Described by: BD,SW
Date: 17/11/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Laterite



Vegetation: *Eucalyptus oleosa subsp. oleosa low isolated trees over Acacia acuminata and Acacia collegialis tall open shrubland over Dodonaea lobulata and Eremophila georgei mid open shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	450	10	
Acacia collegialis	450	3	
Cheilanthes sieberi subsp. sieberi	5	0.1	
Dodonaea lobulata	120	11	
Eremophila georgei	120	1	
Eucalyptus oleosa subsp. oleosa	500	0.5	
Leichhardtia australis	300	0.1	
Ptilotus obovatus var. obovatus	15	0.1	
Senna artemisioides subsp. filifolia	130	0.1	
Solanum lasiophyllum	3	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q35
Location MGA 50 324374 **mE** 6579775 **mN**

Described by: JW
Date: 17/11/2021
Type: QUADRAT

Landform: MId slope
Rock Type: Laterite,Quartz



Vegetation: *Acacia acuminata tall open shrubland over Maireana triptera, Senna artemisioides subsp. filifolia and Dodonaea stenozyga low open shrubland over Ptilotus obovatus var. obovatus and Ptilotus polystachyus low sparse herbland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	400	28	
Cheilanthes lasiophylla	5	0.1	
Dodonaea stenozyga	45	3	
Eremophila glabra subsp. glabra	45	2	
Maireana triptera	25	5	
Ptilotus obovatus var. obovatus	15	1	
Ptilotus polystachyus	35	1	
Senna artemisioides subsp. filifolia	46	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q36
Location MGA 50 324947 **mE** 6578526 **mN**

Described by: BD,SW
Date: 17/11/2021
Type: QUADRAT

Landform: Upper slope
Rock Type: Granite,Laterite



Vegetation: *Eucalyptus clelandiorum and Eucalyptus salmonophloia mid open woodland over Eremophila interstans subsp. interstans tall sparse shrubland over Eremophila parvifolia subsp. auricampi and Atriplex nummularia subsp. spathulata low sparse shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	40	0.1	
Atriplex nummularia subsp. spathulata	80	0.5	
Cratystylis conocephala	40	0.1	
Eremophila interstans subsp. interstans	250	3	
Eremophila parvifolia subsp. auricampi	100	1	
Eucalyptus clelandiorum	1100	3	
Eucalyptus salmonophloia	1100	2	
Exocarpos aphyllus	100	0.1	
Maireana trichoptera	10	0.1	
Roepera ovata	5	0.1	
Scaevola spinescens	50	0.1	
Senna artemisioides subsp. filifolia	160	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q37
Location MGA 50 323658 **mE** 6579927 **mN**

Described by: JW
Date: 17/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite,Quartz



Vegetation: *Eucalyptus salmonophloia and Eucalyptus oleosa subsp. oleosa mid woodland over Eremophila interstans subsp. interstans and Atriplex ?vesicaria mid shrubland over Senna artemisioides subsp. filifolia, Chenopodium curvispicatum and Olearia muelleri low open shrubland*

Condition: Good **Disturbance Type:** Vehicle tracks

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	140	15	
Chenopodium curvispicatum	45	2	
Eremophila interstans subsp. interstans	200	25	
Eucalyptus oleosa subsp. oleosa	1300	2	
Eucalyptus salmonophloia	1500	15	
Maireana pentatropis	15	0.1	
Maireana sedifolia	45	1	
Olearia muelleri	35	2	
Senna artemisioides subsp. filifolia	35	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q38
Location MGA 50 324822 **mE** 6578130 **mN**

Described by: BD,SW
Date: 17/11/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Laterite



Vegetation: *Acacia collegialis and Eremophila oldfieldii subsp. angustifolia tall open shrubland over Dodonaea lobulata and Eremophila georgei mid sparse shrubland over Ptilotus obovatus var. obovatus low isolated herbs*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia collegialis	450	20	
Aristida contorta	5	0.1	
Cheilanthes sieberi subsp. sieberi	5	0.1	
Dodonaea lobulata	100	7	
Eremophila georgei	130	0.5	
Eremophila oldfieldii subsp. angustifolia	230	2	
Goodenia havilandii	15	0.1	
Leichhardtia australis	30	0.1	
Ptilotus obovatus var. obovatus	30	0.5	
Santalum acuminatum	300	0.1	
Scaevola spinescens	45	0.1	
Sida ?petrophila	10	0.5	
Solanum lasiophyllum	10	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q39
Location MGA 50 323564 **mE** 6579153 **mN**

Described by: JW
Date: 17/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Ironstone,Laterite,Quartz



Vegetation: *Eucalyptus celastroides low woodland over Eremophila interstans subsp. interstans mid sparse shrubland over Maireana pentatropis, Atriplex vesicaria and Chenopodium curvispicatum low sparse chenopod shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex vesicaria	100	2	
Chenopodium curvispicatum	35	1	
Eremophila interstans subsp. interstans	120	10	
Eucalyptus celastroides	600	20	
Maireana pentatropis	25	5	
Olearia muelleri	35	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q40
Location MGA 50 324436 **mE** 6578315 **mN**

Described by: BD,SW
Date: 17/11/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Laterite,Quartz



Vegetation: *Acacia collegialis tall open shrubland over Dodonaea lobulata and Eremophila georgei mid open shrubland over Ptilotus obovatus var. obovatus low isolated herbs*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia collegialis	450	15	
Acacia tetragonophylla	210	0.1	
Aristida contorta	10	0.1	
Cheilanthes lasiophylla	5	0.1	
Cheilanthes sieberi subsp. sieberi	8	0.1	
Dodonaea lobulata	170	10	
Eremophila georgei	140	3	
Eremophila oldfieldii subsp. angustifolia	50	0.1	
Goodenia havilandii	15	0.1	
Leichhardtia australis	10	0.1	
Ptilotus obovatus var. obovatus	15	0.5	
Santalum acuminatum	270	0.1	
Scaevola spinescens	120	0.1	
Solanum lasiophyllum	5	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q41
Location MGA 50 323554 **mE** 6579206 **mN**

Described by: JW
Date: 18/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite,Quartz



Vegetation: *Eucalyptus griffithsii low open woodland over Eremophila interstans subsp. interstans, Eremophila glabra subsp. glabra and Acacia hemiteles mid open shrubland over Tecticornia halocnemoides, Atriplex sp. and Maireana trichoptera low chenopod shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia hemiteles	160	3	
Atriplex sp.	25	5	
Eremophila glabra subsp. glabra	110	5	
Eremophila interstans subsp. interstans	140	15	
Eucalyptus griffithsii	1000	5	
Exocarpos aphyllus	180	1	
Frankenia ?fecunda	5	0.1	
Maireana trichoptera	20	5	
Senna artemisioides subsp. filifolia	60	2	
Tecticornia halocnemoides	100	25	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q42
Location MGA 50 323685 **mE** 6577907 **mN**

Described by: BD,SW
Date: 17/11/2021
Type: QUADRAT

Landform: Footslope
Rock Type: Ironstone,Quartz



Vegetation: *Eremophila interstans subsp. interstans mid sparse shrubland over Tecticornia halocnemoides low open samphire shrubland*

Condition: Good **Disturbance Type:** Vehicle tracks

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	50	2	
Atriplex nummularia subsp. spathulata	90	1	
Eremophila interstans subsp. interstans	180	2	
Eremophila parvifolia subsp. auricampi	30	0.1	
Exocarpos aphyllus	30	0.1	
Frankenia ?fecunda	20	0.1	
Lawrencia repens	3	0.1	
Maireana trichoptera	10	0.1	
Ptilotus exaltatus	2	0.1	
Rhagodia drummondii	15	0.1	
Roepera ovata	8	0.1	
Sclerolaena fusiformis	5	0.1	
Tecticornia halocnemoides	90	11	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q43
Location MGA 50 323723 **mE** 6578705 **mN**

Described by: JW
Date: 18/11/2021
Type: QUADRAT



Landform: Ridge crwat
Rock Type: Ironstone,Laterite,Quartz

Vegetation: *Eucalyptus celastroides low woodland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eucalyptus celastroides	700	25	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2R44
Location MGA 50 323751 **mE** 6577898 **mN**

Described by: BD,SW
Date: 17/11/2021
Type: RELEVE

Landform: Cracking clay No photo available
Rock Type: Ironstone,Quartz

Vegetation: *Streptoglossa liatroides and Sclerolaena cuneata low sparse herbland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Goodenia pinnatifida	5	0.1	
Ptilotus exaltatus	25	0.1	
Sclerolaena cuneata	5	0.5	
Streptoglossa liatroides	2	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q45
Location MGA 50 323830 **mE** 6584592 **mN**

Described by: JW
Date: 18/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Laterite,Quartz

No photo available

Vegetation: *Eremophila oldfieldii subsp. angustifolia tall sparse shrubland over Acacia acuminata and Senna artemisioides subsp. filifolia mid sparse shrubland over Atriplex vesicaria, Maireana pentatropis and Maireana georgei low sparse chenopod shrubland*
Condition: Poor **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	170	5	
Atriplex vesicaria	45	5	
Eremophila oldfieldii subsp. angustifolia	220	5	
Maireana georgei	15	0.5	
Maireana pentatropis	15	2	
Ptilotus exaltatus	25	5	
Ptilotus obovatus var. obovatus	35	1	
Rhodanthe chlorocephala subsp. rosea	5	0.1	
**Salvia verbenaca*	15	0.5	
Senna artemisioides subsp. filifolia	140	1	
Solanum lasiophyllum	20	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q46
Location MGA 50 324398 **mE** 6577581 **mN**

Described by: BD,SW
Date: 17/11/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Ironstone,Quartz



Vegetation: *Eucalyptus salmonophloia mid open woodland over Eremophila interstans subsp. interstans tall sparse shrubland over Atriplex nummularia subsp. spathulata mid sparse shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	50	2	
Atriplex nummularia subsp. spathulata	160	6	
Eremophila interstans subsp. interstans	250	1	
Eucalyptus salmonophloia	1300	7	
Maireana trichoptera	15	0.1	
Scaevola spinescens	30	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q48
Location MGA 50 324472 **mE** 6578839 **mN**

Described by: BD,SW
Date: 17/11/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Granite,Ironstone,Quartz



Vegetation: *Eucalyptus salubris low open woodland over Eremophila oldfieldii subsp. angustifolia and Acacia collegialis tall sparse shrubland over Dodonaea lobulata and Senna artemisioides subsp. filifolia mid sparse shrubland*

Condition: Good **Disturbance Type:** Litter,Historical Clearing

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia collegialis	300	2	
Aristida contorta	5	0.1	
Dodonaea lobulata	130	4	
Eremophila oldfieldii subsp. angustifolia	250	4	
Eucalyptus salubris	600	1	
Maireana trichoptera	10	0.1	
Olearia muelleri	40	0.1	
Ptilotus obovatus var. obovatus	15	0.1	
Scaevola spinescens	50	1	
Senna artemisioides subsp. filifolia	150	3	
Trymalium myrtillus subsp. myrtillus	150	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q50
Location MGA 50 325838 **mE** 6579783 **mN**

Described by: BD,SW
Date: 18/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Ironstone,Quartz



Vegetation: *Acacia hemiteles, Casuarina pauper and Eremophila oldfieldii subsp. angustifolia tall sparse shrubland over Senna artemisioides subsp. filifolia, Acacia jennerae and Eremophila deserti mid sparse shrubland over Scaevola spinescens, Chenopodium curvispicatum and Maireana trichoptera low sparse shrubland*

Condition: Good **Disturbance Type:** Vehicle tracks,Fauna tracks/scats,Historical Clearing

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia hemiteles	230	4	
Acacia jennerae	130	2	
Aristida contorta	10	0.1	
Atriplex ?vesicaria	40	0.1	
Atriplex nummularia subsp. spathulata	330	0.1	
Austrostipa platychaeta	150	0.1	
**Carrichtera annua*	15	0.1	
Casuarina pauper	300	1	
Chenopodium curvispicatum	20	0.5	
Eremophila deserti	170	1	
Eremophila oldfieldii subsp. angustifolia	220	1	
Leichhardtia australis	100	0.1	
Maireana sedifolia	160	2	
Maireana tomentosa	5	0.1	
Maireana trichoptera	30	0.5	
Pimelea microcephala subsp. microcephala	190	1	
Pittosporum angustifolium	200	0.1	
Ptilotus obovatus var. obovatus	35	0.1	
Salsola australis	4	0.1	
**Salvia verbenaca*	25	0.1	
Scaevola spinescens	100	3	
Sclerolaena fusiformis	10	0.5	
Senna artemisioides subsp. filifolia	170	3	
Solanum nummularium	35	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q52
Location MGA 50 325464 **mE** 6579380 **mN**

Described by: BD,SW
Date: 18/11/2021
Type: QUADRAT

Landform: Claypan
Rock Type: Calcrete,Ironstone,Quartz



Vegetation: *Dodonaea lobulata and Eremophila interstans subsp. interstans mid sparse shrubland over Maireana trichoptera, Atriplex vesicaria and Maireana georgei low sparse chenopod shrubland over *Salvia verbenaca, Ptilotus exaltatus and Sclerolaena fusiformis low herbland*

Condition: Good **Disturbance Type:** Weeds,Vehicle tracks

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex vesicaria	50	1	
Calandrinia baccata	5	0.1	
**Carrichtera annua*	15	1	
**Centaurea melitensis*	25	0.1	
Chenopodium curvispicatum	30	0.1	
Dodonaea lobulata	150	4	
Dysphania melanocarpa forma leucocarpa	10	0.1	
Eremophila interstans subsp. interstans	180	1	
Lawrencia repens	5	1	
Maireana georgei	20	1	
Maireana trichoptera	40	3	
Monachather paradoxus	5	0.1	
**Oligocarpus calendulaceus*	5	0.1	
Ptilotus exaltatus	35	12	
Ptilotus obovatus var. obovatus	20	0.1	
**Salvia verbenaca*	20	15	
Sclerolaena fusiformis	8	5	
Senna artemisioides subsp. filifolia	150	0.1	
Solanum lasiophyllum	10	0.1	
Streptoglossa liatroides	5	3	
Vittadinia dissecta var. hirta	30	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2Q54
Location MGA 50 324779 **mE** 6583442 **mN**

Described by: BD,SW
Date: 18/11/2021
Type: QUADRAT



Landform: Undulating plain
Rock Type: Ironstone,Laterite

Vegetation: *Eucalyptus salmonophloia low open woodland over Eremophila oldfieldii subsp. angustifolia tall isolated shrubs over Senna artemisioides subsp. filifolia, Eremophila interstans subsp. interstans and Dodonaea lobulata mid open shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia tetragonophylla	170	0.1	
Aristida contorta	15	0.1	
Atriplex nummularia subsp. spathulata	120	0.1	
Dodonaea lobulata	100	2	
Eremophila glabra subsp. glabra	160	1	
Eremophila interstans subsp. interstans	160	3	
Eremophila oldfieldii subsp. angustifolia	250	0.5	
Eremophila parvifolia subsp. auricampi	130	1	
Eucalyptus salmonophloia	900	5	
Leichhardtia australis	150	0.1	
Maireana trichoptera	15	0.1	
Olearia muelleri	30	0.1	
Ptilotus obovatus var. obovatus	30	0.1	
Roepera ovata	5	0.1	
Scaevola spinescens	50	0.1	
Senna artemisioides subsp. filifolia	140	8	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2R05
Location MGA 50 327540 **mE** 6571802 **mN**

Described by: JW
Date: 16/11/2021
Type: RELEVE

Landform: Minor creek line
Rock Type: Laterite

No photo available

Vegetation: *Eucalyptus torquata low woodland over Dodonaea stenozyga mid sparse shrubland over Ptilotus obovatus var. obovatus and Haloragis trigonocarpa low sparse herbland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Dodonaea stenozyga	110	5	
Eucalyptus torquata	400	20	
Haloragis trigonocarpa	40	2	
Ptilotus obovatus var. obovatus	25	6	
Senna artemisioides subsp. filifolia	48	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2R06
Location MGA 50 327365 **mE** 6572989 **mN**

Described by: JW
Date: 16/11/2021
Type: RELEVE

Landform: Lake
Rock Type: N/A



Vegetation: **Schinus molle var. areira low woodland over Aristida contorta low grassland over *Heliotropium europaeum, Heliotropium curassavicum and *Sonchus asper low herbland*

Condition: Degraded **Disturbance Type:** Weeds,Grazing,Vehicle tracks,Litter,Fauna tracks/scats

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Aristida contorta	30	70	
Heliotropium curassavicum	18	1	
**Heliotropium europaeum*	2	40	
**Schinus molle var. areira*	300	15	
**Sonchus asper*	70	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2R07
Location MGA 50 327376 **mE** 6570901 **mN**

Described by: JW
Date: 16/11/2021
Type: RELEVE

Landform: MId slope
Rock Type: Laterite



Vegetation: *Eucalyptus oleosa subsp. oleosa low woodland over Atriplex vesicaria low sparse chenopod shrubland over Heliotropium curassavicum low sparse herbland*

Condition: Good **Disturbance Type:** Vehicle tracks

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex vesicaria	60	10	
Eucalyptus oleosa subsp. oleosa	700	15	
Heliotropium curassavicum	40	10	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2R09
Location MGA 50 327166 **mE** 6574087 **mN**

Described by: JW
Date: 16/11/2021
Type: RELEVE

Landform: Plain
Rock Type: Laterite



Vegetation: *Eucalyptus torquata and Eucalyptus griffithsii low woodland over Eremophila oldfieldii subsp. angustifolia and Santalum acuminatum tall open shrubland over Dodonaea stenozyga, Senna artemisioides subsp. filifolia and Alyxia buxifolia low shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Alyxia buxifolia	50	5	
Dodonaea stenozyga	80	25	
Eremophila oldfieldii subsp. angustifolia	300	25	
Eucalyptus griffithsii	800	2	
Eucalyptus torquata	1000	15	
Santalum acuminatum	220	2	
Senna artemisioides subsp. filifolia	90	18	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2R11
Location MGA 50 325721 **mE** 6569452 **mN**

Described by: BD,SW
Date: 16/11/2021
Type: RELEVE

Landform: Drainage line
Rock Type: Ironstone



Vegetation: *Eucalyptus salmonophloia mid woodland over Eremophila interstans subsp. interstans and Acacia collegialis tall open shrubland over Senna artemisioides subsp. filifolia and Dodonaea lobulata mid open shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	250	0.1	
Acacia collegialis	300	1	
Dodonaea lobulata	120	2	
Eremophila interstans subsp. interstans	250	20	
Eremophila oldfieldii subsp. angustifolia	250	0.1	
Eremophila parvifolia subsp. auricampi	40	0.1	
Eucalyptus salmonophloia	1200	20	
Olearia muelleri	40	0.1	
Ptilotus obovatus var. obovatus	40	0.1	
Senna artemisioides subsp. filifolia	150	15	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2R13
Location MGA 50 324764 **mE** 6579229 **mN**

Described by: BD,SW
Date: 17/11/2021
Type: RELEVE

Landform: Plain
Rock Type: Calcrete,Laterite

No photo available

Vegetation: *Maireana georgei mid sparse chenopod shrubland over Atriplex nummularia subsp. spathulata, Maireana tomentosa and Atriplex ?vesicaria low sparse chenopod shrubland over *Centaurea melitensis and Ptilotus obovatus var. obovatus low open herbland*

Condition: Very Poor **Disturbance Type:** Weeds,Vehicle tracks,Litter,Historical Clearing,Infrastructure

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	25	0.5	
Atriplex nummularia subsp. spathulata	20	1	
Atriplex quadrivalvata	15	0.1	
**Centaurea melitensis*	40	10	
Hibiscus solanifolius	120	0.1	
Maireana georgei	120	2	
Maireana tomentosa	30	1	
Ptilotus obovatus var. obovatus	35	10	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2R15
Location MGA 50 324420 **mE** 6579488 **mN**

Described by: JW
Date: 17/11/2021
Type: RELEVE

Landform: Ridge crwst
Rock Type: Laterite,Quartz



Vegetation: *Eucalyptus campaspe and Eucalyptus oleosa subsp. oleosa low open forest over Senna artemisioides subsp. filifolia mid open shrubland over Olearia muelleri and Eremophila glabra subsp. glabra low open shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eremophila glabra subsp. glabra	90	1	
Eucalyptus campaspe	1000	25	
Eucalyptus oleosa subsp. oleosa	1000	15	
Olearia muelleri	28	10	
Senna artemisioides subsp. filifolia	200	18	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C2R17
Location MGA 50 323480 **mE** 6579368 **mN**

Described by: JW
Date: 17/11/2021
Type: RELEVE

Landform: Plain
Rock Type: Ironstone,Laterite



Vegetation: *Eucalyptus oleosa subsp. oleosa and Eucalyptus celastroides low woodland over Senna artemisioides subsp. filifolia and Eremophila interstans subsp. interstans low sparse shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Eremophila interstans subsp. interstans	35	0.5	
Eucalyptus celastroides	500	1	
Eucalyptus oleosa subsp. oleosa	700	10	
Olearia muelleri	25	0.1	
Senna artemisioides subsp. filifolia	60	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C3Q01
Location MGA 50 328133 **mE** 6574120 **mN**

Described by: JW
Date: 18/11/2021
Type: QUADRAT

Landform: Plai
Rock Type: Laterite



Vegetation: *Eucalyptus griffithsii low open woodland over Eremophila interstans subsp. interstans, Senna artemisioides subsp. filifolia and Acacia jennerae mid open shrubland over Alyxia buxifolia, Westringia rigida and Olearia muelleri low sparse shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	120	1	
Acacia jennerae	140	1	
Alyxia buxifolia	90	2	
Eremophila interstans subsp. interstans	130	5	
Eucalyptus griffithsii	700	5	
Exocarpos aphyllus	150	1	
Maireana tomentosa	10	0.1	
Olearia muelleri	28	0.5	
Ptilotus exaltatus	15	0.1	
Senna artemisioides subsp. filifolia	120	5	
Westringia rigida	45	2	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C3Q02
Location MGA 50 328109 **mE** 6573080 **mN**

Described by: BD,SW
Date: 18/11/2021
Type: QUADRAT

Landform: Upper slope
Rock Type: Granite,Laterite



Vegetation: *Eucalyptus torquata low open forest over Dodonaea stenozyga low sparse shrubland*

Condition: Good **Disturbance Type:** Litter

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
?Enchylaena tomentosa	20	0.1	
Atriplex ?vesicaria	40	0.1	
Dodonaea lobulata	90	0.1	
Dodonaea stenozyga	80	3	
Eremophila interstans subsp. interstans	180	0.1	
Eremophila parvifolia subsp. auricampi	60	0.1	
Eucalyptus torquata	800	35	
Exocarpos aphyllus	40	0.1	
Maireana trichoptera	10	0.1	
Ptilotus obovatus var. obovatus	10	0.1	
Rytidosperma sp.	10	0.1	
Scaevola spinescens	50	0.1	
Solanum nummularium	5	0.1	
Trymalium myrtillus subsp. myrtillus	20	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C3Q02A
Location MGA 50 327861 **mE** 6573908 **mN**

Described by: JW
Date: 18/11/2021
Type: QUADRAT



Landform: Hill top
Rock Type: Granite,Ironstone,Laterite

Vegetation: *Eucalyptus torquata low open woodland over Dodonaea stenozyga, Acacia acuminata and Eremophila oldfieldii subsp. angustifolia mid open shrubland over Alyxia buxifolia and Senna artemisioides subsp. filifolia low sparse shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia acuminata	200	3	
Acacia dissona var. dissona	200	1	
Alyxia buxifolia	50	1	
Dodonaea stenozyga	110	12	
Eremophila oldfieldii subsp. angustifolia	150	3	
Eucalyptus torquata	1000	5	
Maireana georgei	5	0.1	
Senna artemisioides subsp. filifolia	70	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C3Q02B
Location MGA 50 327412 **mE** 6574092 **mN**

Described by: JW
Date: 18/11/2021
Type: QUADRAT

Landform: Plain
Rock Type: Ironstone,Laterite



Vegetation: *Eucalyptus griffithsii low open woodland over Eremophila oldfieldii subsp. angustifolia mid sparse shrubland over Atriplex vesicaria, Dodonaea stenozyga and Acacia dissona var. dissona low open shrubland*

Condition: Very Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia dissona var. dissona	25	1	
Acacia hemiteles	100	1	
Atriplex vesicaria	45	15	
Dodonaea stenozyga	25	5	
Eremophila interstans subsp. interstans	25	1	
Eremophila oldfieldii subsp. angustifolia	150	5	
Eucalyptus griffithsii	700	5	
Maireana pentatropis	15	0.1	
Maireana tomentosa	10	0.5	
Olearia muelleri	25	1	
Ptilotus obovatus var. obovatus	15	1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C3Q06
Location MGA 50 327864 **mE** 6573343 **mN**

Described by: BD,SW
Date: 18/11/2021
Type: QUADRAT

Landform: Mid slope
Rock Type: Calcrete,Laterite



Vegetation: *Eucalyptus torquata low woodland over Eremophila interstans subsp. interstans tall sparse shrubland over Dodonaea stenozyga mid sparse shrubland*

Condition: Good **Disturbance Type:** Vehicle tracks,Fauna tracks/scats

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Atriplex ?vesicaria	50	0.1	
Atriplex nummularia subsp. spathulata	40	0.1	
Austrostipa platychaeta	80	0.1	
Dodonaea stenozyga	150	1	
Eremophila interstans subsp. interstans	370	1	
Eremophila parvifolia subsp. auricampi	30	0.1	
Eucalyptus torquata	800	15	
Maireana sedifolia	120	0.1	
Maireana tomentosa	5	0.1	
Maireana trichoptera	15	0.1	
Olearia muelleri	40	0.1	
Senna artemisioides subsp. filifolia	60	0.1	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C3R01
Location MGA 50 328239 **mE** 6574703 **mN**

Described by: JW
Date: 18/11/2021
Type: RELEVE

Landform: Plain
Rock Type: Laterite



Vegetation: *Eucalyptus griffithsii low open woodland over Eremophila interstans subsp. interstans tall open shrubland over Atriplex vesicaria and Exocarpos aphyllus mid open shrubland*

Condition: Good **Disturbance Type:** None

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Alyxia buxifolia	90	1	
Atriplex vesicaria	110	15	
Dianella revoluta var. divaricata	60	0.5	
Dodonaea stenozyga	15	0.5	
Eremophila glabra subsp. glabra	70	2	
Eremophila interstans subsp. interstans	220	15	
Eucalyptus griffithsii	1000	5	
Exocarpos aphyllus	130	5	
Maireana pentatropis	15	0.5	
Maireana trichoptera	20	0.1	
Olearia muelleri	15	0.5	
Pimelea spiculigera var. thesioides	20	0.1	
Ptilotus exaltatus	35	5	

FLORA SITE SHEET

Project Name 4794 Coolgardie Biological Survey
Site: C3R04
Location MGA 50 328218 **mE** 6573560 **mN**

Described by: BD,SW
Date: 18/11/2021
Type: RELEVE

Landform: Creek line
Rock Type: Granite,Quartz



Vegetation: *Eucalyptus salmonophloia mid open forest over Eremophila interstans subsp. interstans tall sparse shrubland over Acacia jennerae mid sparse shrubland*

Condition: Good **Disturbance Type:** Weeds,Vehicle tracks

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
?Pimelea sp.	170	0.1	
Acacia jennerae	150	5	
**Asphodelus fistulosus*	30	0.1	
Atriplex ?vesicaria	30	2	
Atriplex nummularia subsp. spathulata	50	1	
**Carrichtera annua*	20	0.1	
**Centaurea melitensis*	20	0.1	
Chloris truncata	30	0.1	
Eragrostis dielsii	3	0.1	
Eremophila interstans subsp. interstans	210	4	
Eremophila oldfieldii subsp. angustifolia	140	0.1	
Eucalyptus salmonophloia	1100	40	
Maireana trichoptera	20	0.1	
Olearia muelleri	40	0.1	
**Oligocarpus calendulaceus*	5	0.1	
Pittosporum angustifolium	210	0.1	
Ptilotus exaltatus	30	0.1	
Ptilotus obovatus var. obovatus	25	0.1	
Sclerolaena diacantha	5	0.1	
Senna artemisioides subsp. filifolia	120	0.1	
Vittadinia dissecta var. hirta	15	0.1	

Appendix F
Fauna Habitat Assessments

HABC01

Project:	4794 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	899984.8973525156	**Northing**	6572010.013459269
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	5 - 25%
Condition			
Quality	Good	**Habitat Features**	
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Peeling bark,Rock crevices,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Low (<10 m)	Open forest (50-80%)	*Acacia sp.*
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*dodonaea sp.*
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	*ptilotus sp.*



Fulcrum photo ID	42151a58-0510-40c7-b5b8-39f62d4c1f75,4ffc3568-888a-4c64-9f70-

HABC02

Project:	4795 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	899822.8621105128	**Northing**	6571973.766455285
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	25 - 50%
Condition			
Quality	Very good	**Habitat Features**	
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Leaf litter,Peeling bark,Rock crevices,Woody debris
Introduced fauna	Rabbit		

Vegetation

Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Acacia sp.*
Mid stratum	Mid (1-2 m)	Open mallee shrubland (20-50%)	
Ground stratum	Low (>0.5 m)	Open forbland (20-50%)	*ptilotus sp.*



Fulcrum photo ID	687a6808-3ad9-4430-9631-687bd7c191ca,3a9bdcb2-3829-4fc9-b373-

HABC03

Project:	4796 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	899951.8547312932	**Northing**	6571730.697303254
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Quartz
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown	**Surface stone size classes present**	0 - 5%
Condition			
Quality	Good	**Habitat Features**	
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Litter,Vehicle tracks	**Microhabitats**	Hollows - trees,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*eucalyptus mallee*
Ground stratum	Low (>0.5 m)	Open forbland (20-50%)	*eremophila sp, salt Bush, acacia sp.*



Fulcrum photo ID	cae7ef5d-35d9-43c9-bff0-76d8079f5710,e1c8ac9f-dd84-4e1b-a0b8-

HABC04

Project:	4797 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	899917.5832372475	**Northing**	6571665.113011075
Landform and soil		**Rock**	
Landform	Undulating plain	**Rock type/s**	Granite,Quartz
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	5 - 25%
Condition			
Quality	Good	**Habitat Features**	
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Peeling bark,Rock crevices,Woody debris
Introduced fauna	Cattle		

Vegetation			
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)	*Eremophila sp.*
Mid stratum	Mid (1-2 m)	Shrubland and/or heathland (50-80%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	*ptilotus sp.*



Fulcrum photo ID	5e27f824-34b2-4807-bc1c-60a160cc8ad3,d582a71f-1bea-4caa-99e9-

HABC05

Project:	4798 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	900074.8952529589	**Northing**	6571739.672393914
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Litter,Vehicle tracks,Weeds	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Forbland (50-80%)	*saltbush sp.*



Fulcrum photo ID	e29ce514-0173-433b-bb49-ef3ded5af200,1db3699d-1b8b-4cf9-950a-

HABC06

Project:	4799 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	900594.4049126134	**Northing**	6571695.699349251
Landform and soil		**Rock**	
Landform	Gorge	**Rock type/s**	Granite
Soil type	Clay	**Surface stone cover**	
Soil colour	Brown	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Highly degraded		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Present
Disturbance	Clearing,Litter,Vehicle tracks	**Microhabitats**	Exfoliating rock
Introduced fauna	Goat		

Vegetation

Upper stratum	Absent		
Mid stratum	Absent		
Ground stratum	Low (>0.5 m)	Sparse tussock grassland (0.25-20%)	*eraharta sp.*



Fulcrum photo ID	7c25ab6a-4d43-4390-897a-cb707b353f57,7ba253fb-c9d3-4b40-885f-

HABC07

Project:	4800 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	901166.9975909423	**Northing**	6571815.560922004
Landform and soil		**Rock**	
Landform	Undulating plain	**Rock type/s**	Granite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Litter,Vehicle tracks	**Microhabitats**	Burrows,Leaf litter,Peeling bark,Woody debris
Introduced fauna	Cattle,Rabbit		

Vegetation			
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)	*Eucalyptus sp. and eremophila sp.*
Mid stratum	Low (0.5-1 m)	Shrubland and/or heathland (50-80%)	*dodonaea*
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	*saltbush and Ptilotus sp.*



Fulcrum photo ID	0103efbf-c7eb-4e3f-bb46-943ea4911830,ccb4b5f6-49b0-4d03-8017-

HABC08

Project:	4801 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	901301.0032407076	**Northing**	6571962.571508318
Landform and soil		**Rock**	
Landform	Undulating plain	**Rock type/s**	Granite
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Grey,Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	Cattle		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	*saltbush sp.*



Fulcrum photo ID	212d5260-a83c-4619-b069-494f4f980745,0b6d6cef-7222-4fa8-9bcc-

HABC09

Project:	4802 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	901682.8518081398	**Northing**	6571863.583170791
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Quartz
Soil type	Sandy clay	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Litter	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp.*
Ground stratum	Absent		



Fulcrum photo ID	117fc066-1e33-488f-b006-63d6e0f432e1,e1f0326e-d28b-470e-b3ef-

HABC10

Project:	4803 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	902022.5631623187	**Northing**	6572062.188234046
Landform and soil		**Rock**	
Landform	Upper slope	**Rock type/s**	Granite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Red	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Rock crevices,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Shrubland and/or heathland (50-80%)	*acacia sp. eremophila sp.*
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	



Fulcrum photo ID	b36a6fd3-4521-41ec-ba74-6fdeac4098bb,0044da98-5d6a-4f2e-9cba-

HABC11

Project:	4804 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	902400.9875870193	**Northing**	6571798.486756262
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Calcrete,Granite
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Leaf litter,Peeling bark,Rock crevices,Woody debris
Introduced fauna	Goat,Rabbit		

Vegetation

Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Shrubland and/or heathland (50-80%)	*eremophila sp. dodenea sp. acacia sp.*
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	*eremophila*



Fulcrum photo ID	3c1c6583-ed7c-459a-93f5-8dd769a4d26c,4211c7c8-571a-4138-af6c-

HABC12

Project:	4805 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	902370.029827407	**Northing**	6571589.932107501
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Unknown
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Shrubland and/or heathland (50-80%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	



Fulcrum photo ID	aef600dc-722f-4dd1-a355-599e69a6b123,e75ca763-a192-495f-a373-

HABC13

Project:	4806 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	900730.9056804918	**Northing**	6570131.034563001
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Granite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Brown,Red	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance		**Microhabitats**	Leaf litter,Peeling bark,Rock crevices,Woody debris
Introduced fauna	Goat,Rabbit		

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Acacia sp.*
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*dodonaea sp.*
Ground stratum	Low (>0.5 m)	Isolated tussock grasses (<0.25%)	*grass species*



Fulcrum photo ID	58005a12-2165-49c3-b705-24e2a50985e8,0b2d1291-65d4-48da-b5d6

HABC14

Project:	4807 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	900889.8561838119	**Northing**	6569940.604672145
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Calcrete,Granite,Quartz
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown,Grey	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp. salt bush*
Ground stratum	Mid (0.5-1 m)	Open forbland (20-50%)	*salt bush sp.*



Fulcrum photo ID	3b56a64c-51c9-4e00-bdc1-f54d4301f218,c0fddb0c-66e8-40b3-9c48-

HABC15

Project:	4808 Coolgardie Biological Spring Survey		
Date	2021-10-12	**Personnel**	LC
Easting	901542.5074801195	**Northing**	6568846.8061696505
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Calcrete,Granite
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown,Red	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Rock crevices,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*acacia sp.*
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	*ptilotus sp*



Fulcrum photo ID	bfb61e82-be29-4f8f-a414-761f945af8e4,e6e2629f-1f45-4bcd-9213-

HABC16

Project:	4809 Coolgardie Biological Spring Survey		
Date	2021-10-13	**Personnel**	LC
Easting	902295.8342707243	**Northing**	6571439.575077539
Landform and soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Calcrete,Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Erosion	**Microhabitats**	Hollows - trees,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	*Saltbush sp.*



Fulcrum photo ID	b70c7eb9-827e-46df-b8e4-5e4e110d293a,85f73721-6a97-4980-94c7-

HABC17

Project:	4810 Coolgardie Biological Spring Survey		
Date	2021-10-13	**Personnel**	LC
Easting	901495.8347967644	**Northing**	6571719.769933704
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Calcrete,Granite,Quartz
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown,Orange,Yellow	**Surface stone size classes present**	0 - 5%
Condition			
Quality	Good	**Habitat Features**	
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Litter,Vehicle tracks	**Microhabitats**	Burrows,Hollows - logs,Hollows - trees,Leaf litter,Peeling bark,Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*ptilotus sp. and herb sp.*



Fulcrum photo ID	372a2bcc-d839-41ff-9db2-d990a2431994,cd2c96ca-6b1d-49e3-b273-

HABC18

Project:	4811 Coolgardie Biological Spring Survey		
Date	2021-10-13	**Personnel**	LC
Easting	899905.7739034619	**Northing**	6571300.257774439
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange,Red	**Surface stone size classes present**	25 - 50%
Condition			
Quality	Very good	**Habitat Features**	
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Peeling bark,Rock crevices,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Isolated trees (<0.25%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Shrubland and/or heathland (50-80%)	*dodenea sp. eremophila sp.*
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	*ptilotus sp.*



Fulcrum photo ID	3663874c-d46e-438f-8c20-f9744960ca60,30a5a95b-d86a-4c39-8c3b-

HABC19

Project:	4812 Coolgardie Biological Spring Survey		
Date	2021-10-13	**Personnel**	LC
Easting	899738.7645235118	**Northing**	6571320.002878793
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Granite,Quartz
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Absent		
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*saltbush sp. and Ptilotus sp.*



Fulcrum photo ID	3996f487-e2d9-4d38-9be8-65219fc9ea13,d5e4af84-5d54-464a-b161-

HABC20

Project:	4813 Coolgardie Biological Spring Survey		
Date	2021-10-14	**Personnel**	LC
Easting	900350.4372829349	**Northing**	6571342.937353729
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Calcrete,Granite,Quartz
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown,Grey	**Surface stone size classes present**	5 - 25%
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Erosion,Litter,Vehicle tracks	**Microhabitats**	Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*saltbush sp. and herb sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*saltbush sp.*



Fulcrum photo ID	cfd77415-c024-4198-bd3a-e011a5fb5404,15466c44-d7ac-4902-a088-

HABC21

Project:	4814 Coolgardie Biological Spring Survey		
Date	2021-10-14	**Personnel**	LC
Easting	900421.5213021053	**Northing**	6571645.335509442
Landform and soil		**Rock**	
Landform	Claypan	**Rock type/s**	Granite
Soil type	Clay	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Highly degraded		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Clearing,Erosion,Litter,Overgrazing,Vehicle	**Microhabitats**	Rock crevices,Woody debris
Introduced fauna	Cattle		

Vegetation			
Upper stratum	Mid (10-30 m)	Isolated trees (<0.25%)	*Eucalyptus sp.*
Mid stratum	Absent		
Ground stratum	Low (>0.5 m)	Tussock grassland (50-80%)	*grass sp. and thistle sp. sedges boemia sp.*



Fulcrum photo ID	bfe042ed-7948-4c78-9fe1-7c8541220392,7696b9b4-9eeb-4df8-8e63-

HABC22

Project:	4815 Coolgardie Biological Spring Survey		
Date	2021-10-14	**Personnel**	LC
Easting	900235.352356134	**Northing**	6572033.776216977
Landform and soil		**Rock**	
Landform	Upper slope	**Rock type/s**	Calcrete,Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange,Red	**Surface stone size classes present**	5 - 25%
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Clearing,Litter,Vehicle tracks,Weeds	**Microhabitats**	Leaf litter,Peeling bark,Rock crevices,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Woodland (20-50%)	*Acacia sp.*
Mid stratum	Low (0.5-1 m)	Sparse shrubland and/or heathland (0.25-20%)	*dodenea sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*ptilotus sp. herbs*



Fulcrum photo ID	51a9f868-dbfc-4d0d-aa65-cebf271c9d24,bcb04dd4-53d3-407a-9ce9-

HABC23

Project:	4816 Coolgardie Biological Spring Survey		
Date	2021-10-14	**Personnel**	LC
Easting	900167.7359049395	**Northing**	6570928.550377593
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Calcrete,Granite,Quartz
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown,Grey,Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Highly degraded		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Clearing,Litter,Vehicle tracks	**Microhabitats**	Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Low (0.5-1 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*saltbush cena sp. herbs sp.*



Fulcrum photo ID	4e1b0f41-0592-423d-8408-a19672a9d5c6,f06cb18e-09e9-41d6-a61b-

HABC24

Project:	4817 Coolgardie Biological Spring Survey		
Date	2021-10-14	**Personnel**	LC
Easting	899663.2610756675	**Northing**	6571226.542719762
Landform and soil		**Rock**	
Landform	Upper slope	**Rock type/s**	Calcrete,Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Peeling bark,Rock crevices,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Isolated trees (<0.25%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*eremophila sp. dodenea sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*ptilotus sp. salt bush sp.*



Fulcrum photo ID	8f123c2e-9663-4712-845a-fe15deec853c,26ed00e2-46e6-4415-ad80-

C2H2

Project:	4818 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	SW
Easting	897743.7674614477	**Northing**	6565685.35287808
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Laterite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Little or no fire evidence (>5 years)	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Peeling bark
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia and Melaleuca sp*
Ground stratum	Low (>0.5 m)	Isolated hummock grasses (<0.25%)	*Scaveloa spin*



Fulcrum photo ID	c4cad0bd-4f57-4209-9459-7401a6a867d2

C2H4

Project:	4819 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	SW
Easting	897738.8708299723	**Northing**	6565557.982810425
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Laterite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	75 - 100%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Peeling bark
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Melaleuca sp*
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Scaveloa spin*



Fulcrum photo ID	a0f87fb2-1a73-43d5-bfb4-bf7e2ce804a4

C2H6

Project:	4820 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	SW
Easting	897718.2217606371	**Northing**	6565454.049011737
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Laterite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	75 - 100%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance		**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Isolated trees (<0.25%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Eucalyptus sp*
Ground stratum	Low (>0.5 m)		



Fulcrum photo ID	a25ac42a-b0be-4c30-a8b2-8e07a2f5bcd9

C2H8

Project:	4821 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	SW
Easting	897820.0346483674	**Northing**	6565227.984386012
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Laterite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	5 - 25%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Isolated trees (<0.25%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Eremophila sp*
Ground stratum			



Fulcrum photo ID	93421722-1ad4-4c10-9e11-de2ef1902d8b

C2H10

Project:	4822 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	SW
Easting	898008.8963851782	**Northing**	6565265.629842697
Landform and soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Calcrete,Laterite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange,Red	**Surface stone size classes present**	25 - 50%
Condition			
Quality	Very good	**Habitat Features**	
Fire History	Unknown	**Water Source**	Absent
Disturbance	Erosion	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Eremophila*
Ground stratum			



Fulcrum photo ID	45de2c23-38f7-401c-8d48-42e59fe7b842

C2H12

Project:	4823 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	SW
Easting	898183.4047518701	**Northing**	6565240.394553069
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Laterite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition			
Quality	Good	**Habitat Features**	
Fire History	Unknown	**Water Source**	Absent
Disturbance	Erosion	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Low (0.5-1 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*Senna art fil*
Ground stratum			



Fulcrum photo ID	08469bcc-a34b-4b23-bf34-76982cd97e9c

HABC2LC01

Project:	4824 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	LC
Easting	899664.2211246493	**Northing**	6565980.506265143
Landform and soil		**Rock**	
Landform	Gorge	**Rock type/s**	Granite,Quartz
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown,Yellow	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Highly degraded		
Fire History	Unknown	**Water Source**	Absent
Disturbance		**Microhabitats**	Exfoliating rock,Rock crevices
Introduced fauna	None observed		

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*eremophila sp. salt bush sp.*



Fulcrum photo ID	4ebf3251-d69c-4d7e-93c5-260eba7ae549,d2ea3ab1-5502-453c-9997-

HABC2LC02

Project:	4825 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	LC
Easting	899850.8139667105	**Northing**	6565706.821050039
Landform and soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Granite,Quartz
Soil type	Sandy clay	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance		**Microhabitats**	Leaf litter,Peeling bark,Rock crevices,Woody debris
Introduced fauna	Goat		

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	*eremophila sp.*



Fulcrum photo ID	4b2247e7-9fed-441d-b103-59e6bf65756c,a6bfbb91-71be-4e28-992d-

HABC2LC03

Project:	4826 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	LC
Easting	900665.7028282916	**Northing**	6565871.541426335
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Quartz
Soil type	Sandy clay	**Surface stone cover**	
Soil colour	Orange,Red	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Rock crevices,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Low (<10 m)	Open forest (50-80%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp.*
Ground stratum	Mid (0.5-1 m)	Sparse forbland (0.25-20%)	*eremophila sp.*



Fulcrum photo ID	b0752528-0a49-4733-a884-d5b48bd2d627,ce6b6969-95db-4c53-bfdd-

HABC2LC04

Project:	4827 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	LC
Easting	900563.0312287982	**Northing**	6565632.278082406
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Granite,Quartz
Soil type	Clay	**Surface stone cover**	
Soil colour	Orange,Red	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Litter,Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Rock crevices,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Low (<10 m)	Woodland (20-50%)	*eremophila sp. Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*ptilotus sp.*



Fulcrum photo ID	2b2a12b3-b9f2-4fd2-9d5d-b72a773595d9,19860892-f6e1-4a85-843a-

HABC2LC05

Project:	4828 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	LC
Easting	900752.345712022	**Northing**	6565409.609161669
Landform and soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Granite,Quartz
Soil type	Clay	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Erosion,Vehicle tracks	**Microhabitats**	Leaf litter,Peeling bark,Rock crevices,Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*eremophila sp.*



Fulcrum photo ID	bc023295-6531-4172-95cc-e3d96c28e365,3b64dc10-30df-4627-8e7f-

HABC2LC06

Project:	4829 Coolgardie Biological Spring Survey		
Date	2021-11-15	**Personnel**	LC
Easting	900415.1933355466	**Northing**	6565440.556371264
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Quartz
Soil type	Clay	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Litter,Vehicle tracks	**Microhabitats**	Hollows - logs,Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Open forest (50-80%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp., salt bush sp. (in photos)*
Ground stratum	Absent		



Fulcrum photo ID	30f77ad9-d6b9-45a3-885d-56cf525debd8,a70c538c-fc2a-4dbd-be76-

C2H14

Project:	4830 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	SW
Easting	898138.1000480026	**Northing**	6564928.758600489
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Ironstone
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia sp*
Ground stratum	Absent		



Fulcrum photo ID	6eb608e3-e562-4314-b5d8-0ecf176e3906

C2H16

Project:	4831 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	SW
Easting	898035.707931469	**Northing**	6564690.336170336
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Ironstone
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Eremophila*
Ground stratum	Absent		



Fulcrum photo ID	10efecf9-ff45-4474-8f07-5ef50a3af30e

C2H18

Project:	4832 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	SW
Easting	897721.3419470013	**Northing**	6564081.199149741
Landform and soil		**Rock**	
Landform	Upper slope	**Rock type/s**	Calcrete,Laterite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition			
Quality	Disturbed	**Habitat Features**	
Fire History	Unknown	**Water Source**	Absent
Disturbance		**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Eremophila*
Ground stratum	Absent		



Fulcrum photo ID	25ba9c30-9a14-438f-952a-4d1cff16da86

C2H20

Project:	4833 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	SW
Easting	897584.545833359	**Northing**	6563668.195859093
Landform and soil		**Rock**	
Landform	Escarpment	**Rock type/s**	Laterite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition			
Quality	Very good	**Habitat Features**	
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Eremophila*
Ground stratum			



Fulcrum photo ID	2cd10b5a-17ad-4733-9cfb-f59f28c2f915

C2H22

Project:	4834 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	SW
Easting	897407.7797388354	**Northing**	6563338.106537405
Landform and soil		**Rock**	
Landform	Lower slope	**Rock type/s**	Laterite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance		**Microhabitats**	Hollows - trees,Leaf litter,Peeling bark,Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia sp*
Ground stratum	Absent		



Fulcrum photo ID	41f4047f-24e6-432f-a252-5b9c5469bfc3

C2H24

Project:	4835 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	SW
Easting	897534.3882230611	**Northing**	6563041.229803004
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Calcrete,Laterite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Atriplex sp*
Ground stratum	Absent		



Fulcrum photo ID	271b8409-d185-4552-a223-f5daf7b9d31a

C2H26

Project:	4836 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	SW
Easting	898122.0154905103	**Northing**	6562781.590976534
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Laterite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*Senna sp*
Ground stratum			



Fulcrum photo ID	1f602d5d-5404-457f-b29f-7f84c7aaf087

C2H28

Project:	4837 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	SW
Easting	898839.090998794	**Northing**	6563393.36065102
Landform and soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Laterite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Eremophila*
Ground stratum	Absent		



Fulcrum photo ID	c4b932de-0fdf-423c-ad63-8302ddd73365

C2H30

Project:	4838 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	SW
Easting	898737.6863762725	**Northing**	6563394.817201562
Landform and soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Laterite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Erosion	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia*
Ground stratum	Absent		



Fulcrum photo ID	d16a4f03-6dd4-407a-9184-f1b3cd802bc0

HABC2LC07

Project:	4839 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	LC
Easting	900704.6350980257	**Northing**	6565575.750708525
Landform and soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Granite,Quartz
Soil type	Clay	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Erosion	**Microhabitats**	Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*eremophila sp.*



Fulcrum photo ID	51affc75-b427-4809-8ef2-d024d562bb5f,266b71e9-b0ea-422e-8f3d-

HABC2LC08

Project:	4840 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	LC
Easting	900776.5532258475	**Northing**	6565713.262605984
Landform and soil		**Rock**	
Landform	Upper slope	**Rock type/s**	Granite
Soil type	Clay	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Leaf litter,Peeling bark,Rock crevices,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*ptilotus sp.*



Fulcrum photo ID	21c66f48-529d-461a-b6c1-d0ce4033c0f2,193ee8c1-7c0d-4271-ac0a-

HABC2LC09

Project:	4841 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	LC
Easting	900164.9336511727	**Northing**	6565653.958929246
Landform and soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Granite,Quartz
Soil type	Sand	**Surface stone cover**	
Soil colour	Orange,White	**Surface stone size classes present**	5 - 25%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Erosion	**Microhabitats**	Hollows - logs,Hollows - trees,Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*eremophila sp.*
Ground stratum	Mid (0.5-1 m)	Forbland (50-80%)	*eremophila sp.*



Fulcrum photo ID	0fca10bc-0b3f-4884-a596-1bdc49f0718d,8c8bcab2-c4f1-453a-9933-

HABC2LC10

Project:	4842 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	LC
Easting	900449.314056684	**Northing**	6564956.76156202
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Quartz
Soil type	Clay	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	5 - 25%
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Clearing,Erosion,Litter	**Microhabitats**	Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*eremophila sp.*
Ground stratum	Mid (0.5-1 m)	Forbland (50-80%)	*eremophila sp.*



Fulcrum photo ID	490f139c-c787-45ce-8b70-4790296ee53c,e21395e7-7464-42cf-bbb9-

HABC2LC11

Project:	4843 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	LC
Easting	901276.6564614684	**Northing**	6565677.347229139
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Quartz
Soil type	Clay	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	5 - 25%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Forbland (50-80%)	*eremophila sp.*



Fulcrum photo ID	bbb0226c-b301-4a5f-ae00-44c3dc787f94,d6688097-4e41-4751-a79f-

HABC2LC12

Project:	4844 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	LC
Easting	900519.9630059553	**Northing**	6566882.003260277
Landform and soil		**Rock**	
Landform	Claypan	**Rock type/s**	None
Soil type	Clay	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	
Condition			
Quality	Disturbed	**Habitat Features**	
Fire History	Unknown	**Water Source**	Present
Disturbance	Vehicle tracks,Weeds	**Microhabitats**	
Introduced fauna	None observed		

Vegetation			
Upper stratum	Absent		
Mid stratum	Absent		
Ground stratum	Low (>0.5 m)	Grassland (50-80%)	*various weeds*



Fulcrum photo ID	5e418349-31da-4044-8d04-a4990c1f72b0,450a84a8-a05b-4ee2-a0d1-

HABC2LC13

Project:	4845 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	LC
Easting	900731.210354395	**Northing**	6567309.737509467
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	0 - 5%
Condition			
Quality	High quality	**Habitat Features**	
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Woodland (20-50%)	*eucalyptus sp.*
Mid stratum	Tall (>2 m)	Shrubland and/or heathland (50-80%)	*eremophila sp.*
Ground stratum	Mid (0.5-1 m)	Open forbland (20-50%)	*eremophila sp. amd other mixed herbs*



Fulcrum photo ID	570709d4-00c6-43d2-9de6-ef44159e1c8e,2c8bbe5f-630c-45f1-87bb-

HABC2LC14

Project:	4846 Coolgardie Biological Spring Survey		
Date	2021-11-16	**Personnel**	LC
Easting	900023.0356903123	**Northing**	6566601.201476825
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Clearing,Vehicle tracks,Weeds	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Rock crevices,Woody debris
Introduced fauna	Goat,Rabbit		

Vegetation			
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)	*eucalyptus sp.*
Mid stratum	Tall (>2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*acacia sp.*
Ground stratum	Low (>0.5 m)	Forbland (50-80%)	*eremophila sp.*



Fulcrum photo ID	2cc3ef18-e4b7-46ee-9c1d-0f4614438dc9,6c342fc0-f7f5-443d-9f15-

HABC2LC15

Project:	4847 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	LC
Easting	900431.2214361653	**Northing**	6572530.387661901
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*dodenea sp.*
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	*ptilotus sp.*



Fulcrum photo ID	4199f50b-b3c4-4fd5-9f8a-3a7d7df69999,761b02e4-9a61-427a-b17e-

HABC2LC16

Project:	4848 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	LC
Easting	900465.6771902259	**Northing**	6573277.0945564695
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Calcrete,Granite
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	Cattle		

Vegetation			
Upper stratum	Low (<10 m)	Open forest (50-80%)	*eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp.*
Ground stratum	Mid (0.5-1 m)	Sparse forbland (0.25-20%)	*eremophila sp. mixed herbs*



Fulcrum photo ID	c208e2cf-2947-4ff4-b0f0-2556bb277948,c4d25400-28ff-4427-be00-

HABC2LC17

Project:	4849 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	LC
Easting	897973.2561752913	**Northing**	6573513.342421641
Landform and soil		**Rock**	
Landform	Upper slope	**Rock type/s**	Calcrete,Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	5 - 25%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Open forest (50-80%)	*eucalyptus sp., acacia sp.*
Mid stratum	Low (0.5-1 m)	Shrubland and/or heathland (50-80%)	*dodenea sp, eremophila sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*ptilotus sp., eremophila sp.*



Fulcrum photo ID	372d8949-1d3b-4870-87bd-7951b013d9e4,6cf82aac-74d5-4f6d-afb6-

HABC2LC18

Project:	4850 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	LC
Easting	897208.723548352	**Northing**	6573995.251239745
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	5 - 25%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Litter,Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*eucalyptus sp.*
Mid stratum	Tall (>2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*eremophila sp.*
Ground stratum	Tall (1-2 m)	Forbland (50-80%)	*eremophila sp.*



Fulcrum photo ID	7081e49e-b513-4cfc-a25e-8219bc15b8f3,4be2e29b-ea2a-4adf-9a60-

HABC2LC19

Project:	4851 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	LC
Easting	897024.5424583412	**Northing**	6573400.948208064
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Calcrete,Ironstone,Laterite
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	75 - 100%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*eucalyptus sp.*
Mid stratum	Low (0.5-1 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Isolated forbs (<0.25%)	*herb in photos*



Fulcrum photo ID	4635704e-82e0-486f-bffd-6cb63a245066,db940a29-9610-40ed-a43e-

HABC2LC20

Project:	4852 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	LC
Easting	897207.7894486763	**Northing**	6573276.328611162
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	5 - 25%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Hollows - trees,Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*eucalyptus sp.*
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eucalyptus sp.*
Ground stratum	Mid (0.5-1 m)	Forbland (50-80%)	*eremophila sp. eremophila sp.*



Fulcrum photo ID	b50692de-a768-4d17-bf33-bb534451e50e,1a36084b-a01d-479b-8a3d-

C2H32

Project:	4853 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	SW
Easting	898647.6288961614	**Northing**	6563412.670039611
Landform and soil		**Rock**	
Landform	Escarpment	**Rock type/s**	Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia sp*
Ground stratum	Absent		



Fulcrum photo ID	6fed3548-6854-44ad-ace1-79cee900d9bb

C2H34

Project:	4854 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	SW
Easting	898574.3445931688	**Northing**	6563567.903756286
Landform and soil		**Rock**	
Landform	Lower slope	**Rock type/s**	Laterite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance		**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia*
Ground stratum	Absent		



Fulcrum photo ID	5cebab13-aadb-470a-b104-5994b272e88d

C2H36

Project:	4855 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	SW
Easting	898440.2002370819	**Northing**	6572518.477781318
Landform and soil		**Rock**	
Landform	Upper slope	**Rock type/s**	Granite,Laterite
Soil type	Loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	5 - 25%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Eremophila*
Ground stratum	Absent		



Fulcrum photo ID	3ee1eb2e-e0e3-4e77-9780-bb40cd650728

C2H38

Project:	4856 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	SW
Easting	898296.4071683842	**Northing**	6572123.600769359
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Granite,Laterite,Quartz
Soil type	Loam	**Surface stone cover**	
Soil colour	Orange,Red	**Surface stone size classes present**	50 - 75%
Condition			
Quality	Very good	**Habitat Features**	
Fire History	Unknown	**Water Source**	Absent
Disturbance		**Microhabitats**	Hollows - logs,Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia*
Ground stratum	Absent		



Fulcrum photo ID	b933e67c-48b0-421d-8100-6518118a4171

C2H40

Project:	4857 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	SW
Easting	897937.4325779848	**Northing**	6572315.898469241
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Laterite,Quartz
Soil type	Loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	50 - 75%
Condition			
Quality	Very good	**Habitat Features**	
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Hollows - logs,Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia*
Ground stratum	Absent		



Fulcrum photo ID	219563fd-c9bd-4cd0-8160-634649c52222

C2H42

Project:	4858 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	SW
Easting	897160.8402197923	**Northing**	6571960.858564717
Landform and soil		**Rock**	
Landform	Lower slope	**Rock type/s**	Ironstone,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	75 - 100%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Eremophila*
Ground stratum	Absent		



Fulcrum photo ID	e4db22e5-83d5-4438-9c84-680175928daf

C2H46

Project:	4859 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	SW
Easting	897842.0485219336	**Northing**	6571592.065394482
Landform and soil		**Rock**	
Landform	Undulating plain	**Rock type/s**	Ironstone,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Eremophila and Atriplex*
Ground stratum	Absent		



Fulcrum photo ID	d8c7d48f-634c-4c46-a402-4949c69c1196

C2H48

Project:	4860 Coolgardie Biological Spring Survey		
Date	2021-11-17	**Personnel**	SW
Easting	897986.3585784157	**Northing**	6572856.793533593
Landform and soil		**Rock**	
Landform	Upper slope	**Rock type/s**	Granite,Ironstone,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Unknown	**Water Source**	Absent
Disturbance		**Microhabitats**	Hollows - logs,Leaf litter,Peeling bark,Woody debris
Introduced fauna			

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia, eremophila, senna*
Ground stratum	Absent		



Fulcrum photo ID	77fa71fc-2061-4776-b46f-5533c5547e69

C2H50

Project:	4861 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	SW
Easting	899410.3384907652	**Northing**	6573733.02122001
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Laterite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Woody debris
Introduced fauna	Rabbit		

Vegetation			
Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Allocasuarina, Acacia*
Ground stratum	Absent		



Fulcrum photo ID	fc56790e-0b7a-4af8-83ad-43361892dc2a

C2H52

Project:	4862 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	SW
Easting	899024.133330778	**Northing**	6573326.9469294455
Landform and soil		**Rock**	
Landform	Claypan	**Rock type/s**	Laterite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	5 - 25%
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Woody debris
Introduced fauna	Cattle,Rabbit		

Vegetation

Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Eremophila*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*Weed*



Fulcrum photo ID	3932baf5-4aea-4948-89e6-ec5c8ba929e9

C2H54

Project:	4863 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	SW
Easting	898558.6120445768	**Northing**	6577434.127282435
Landform and soil		**Rock**	
Landform	Undulating plain	**Rock type/s**	Ironstone,Laterite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Hollows - logs,Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	Rabbit		

Vegetation

Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Eremophila*
Ground stratum	Absent		



Fulcrum photo ID	90af6e6b-2828-4926-bd8c-7ce23e0bbedf

C3H2

Project:	4864 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	SW
Easting	901330.4863598039	**Northing**	6566876.698387651
Landform and soil		**Rock**	
Landform	Upper slope	**Rock type/s**	Granite,Laterite
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Brown	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Mid (10-30 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Low (0.5-1 m)	Sparse shrubland and/or heathland (0.25-20%)	*Senna sp*
Ground stratum	Absent		



Fulcrum photo ID	9639322a-c25b-452c-9395-2d845a0db67d

C3H6

Project:	4865 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	SW
Easting	901099.8592427254	**Northing**	6567133.638773368
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Granite,Laterite,Quartz
Soil type	Clay	**Surface stone cover**	
Soil colour	Brown	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	None observed	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	Cattle		

Vegetation

Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Eremophila*
Ground stratum	Absent		



Fulcrum photo ID	8c9b4a09-e53a-4d9d-8d80-11e634b91457

HABC2LC21

Project:	4866 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	LC
Easting	897544.5825756477	**Northing**	6572777.829306185
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Ironstone,Quartz
Soil type	Clay	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	5 - 25%
Condition			
Quality	Good	**Habitat Features**	
Fire History	Unknown	**Water Source**	Absent
Disturbance	Litter,Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*eremophila sp*



Fulcrum photo ID	0f0d98ec-ac0a-44f0-8ad5-c4fc373482ad,537a883e-d403-430b-8f06-

HABC2LC22

Project:	4867 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	LC
Easting	897656.784997021	**Northing**	6572883.799383562
Landform and soil		**Rock**	
Landform	Mid slope	**Rock type/s**	Calcrete,Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	25 - 50%
Condition			
Quality	Highly degraded	**Habitat Features**	
Fire History	Unknown	**Water Source**	Absent
Disturbance	Clearing,Erosion,Vehicle tracks	**Microhabitats**	Rock crevices,Woody debris
Introduced fauna	None observed		

Vegetation

Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*eucalyptus sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*eremophila sp.*



Fulcrum photo ID	0cc91ff4-82c9-4e1a-8a1d-4d2ee6573b54,5ea1acb4-732a-4029-ace5-

HABC2LC23

Project:	4868 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	LC
Easting	897726.5517688439	**Northing**	6573587.154734112
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*eremophila sp.*



Fulcrum photo ID	af1106ec-72c2-4078-a6cf-65fdc8ed54e0,772849ce-8e9f-4ea7-8aff-

HABC2LC24

Project:	4869 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	LC
Easting	897731.7215430276	**Northing**	6578600.152287805
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Calcrete,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	0 - 5%
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Litter,Vehicle tracks	**Microhabitats**	Leaf litter,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp.*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*eremophila sp.*



Fulcrum photo ID	7264e4af-f5e3-4399-a7c3-718a30cf91f9,043ac726-f8bb-4b81-9e64-

HABC3LC01

Project:	4870 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	LC
Easting	901535.8496579034	**Northing**	6568495.428023138
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Granite,Ironstone,Quartz
Soil type	Clay loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	0 - 5%
Condition			
Quality	Very good	**Habitat Features**	
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks,Weeds	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Shrubland and/or heathland (50-80%)	*eremophila sp.*
Ground stratum	Mid (0.5-1 m)	Forbland (50-80%)	*eremophila sp.*



Fulcrum photo ID	8e57e003-8ef0-4049-8a3d-f7be3316a26a,985a366e-c098-4cbd-9c83-

HABC3LC02

Project:	4871 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	LC
Easting	901385.6159884571	**Northing**	6567944.72848946
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Calcrete,Granite,Ironstone
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown,Orange	**Surface stone size classes present**	5 - 25%
Condition			
Quality	Good	**Habitat Features**	
Fire History	Unknown	**Water Source**	Absent
Disturbance	Litter,Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	Cattle		

Vegetation			
Upper stratum	Low (<10 m)	Woodland (20-50%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*eremophila sp., sandlewood*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*eremophila sp. and mixed herbs*



Fulcrum photo ID	0456611e-322d-43f0-961a-92e3214f4ff6,b383b714-6500-46fb-b290-

HABC3LC03

Project:	4872 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	LC
Easting	901116.1473216031	**Northing**	6567716.167221133
Landform and soil		**Rock**	
Landform	Undulating plain	**Rock type/s**	Calcrete,Granite
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Brown,Orange,Red	**Surface stone size classes present**	50 - 75%
Condition		**Habitat Features**	
Quality	Good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Litter,Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*dodenea sp, mixed shrubs*
Ground stratum	Low (>0.5 m)	Sparse forbland (0.25-20%)	*mixed herbs*



Fulcrum photo ID	a233588d-1aef-4741-8ae9-5b0d1c66fa0a,42b4783a-a56b-40d7-8240-

HABC3LC04

Project:	4873 Coolgardie Biological Spring Survey		
Date	2021-11-18	**Personnel**	LC
Easting	900730.2686670613	**Northing**	6567991.079386459
Landform and soil		**Rock**	
Landform	Plain	**Rock type/s**	Calcrete,Granite
Soil type	Sandy loam	**Surface stone cover**	
Soil colour	Orange	**Surface stone size classes present**	25 - 50%
Condition		**Habitat Features**	
Quality	Very good		
Fire History	Unknown	**Water Source**	Absent
Disturbance	Vehicle tracks	**Microhabitats**	Leaf litter,Logs > 10 cm,Peeling bark,Woody debris
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Eucalyptus sp.*
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*eremophila sp.*
Ground stratum	Mid (0.5-1 m)	Sparse forbland (0.25-20%)	*eremophila sp., mixed herbs*



Fulcrum photo ID	20c229a2-37df-4ff5-9e14-6fa99181557f,a6d138ee-2032-4f92-93bc-

Appendix G
Fauna Inventory

Conservation Status: State - Listed under Biodiversity Conservation Act 2016 or Department of Biodiversity, Conservation and Attractions Conservation, Federal - Listed under Environmental Protection and Biodiversity Conservation Act 1999. VU - Vulnerable, MA - Marine. * - Introduced species.

Family	Scientific Name	Common Name	Conservation Status		Method						
			State	Federal	Sighting	Call	Remains	Scat	Tracks	Burrow	Digging
Aves											
Acanthizidae	*Smicrornis brevirostris*	Weebill				2					
	Acanthiza inornata	Western Thornbill				2					
	Aphelocephala leucopsis	Southern Whiteface				1					
	Calamanthus cautus	Shy Groundwren (Shy Heathwren)				1					
	Acanthiza uropygialis	Chestnut-rumped Thornbill			2	1					
	Sericornis frontalis					1					
Artamidae	*Artamus personatus*	Masked Woodswallow			2						
Cacatuidae	*Cacatua roseicapilla*	Galah				1					
	Cacatua leadbeateri	Major Mitchell's Cockatoo				1					
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		MA	2			1			
	Coracina maxima	Ground Cuckoo-shrike				1					
	Lalage tricolor	White-winged Triller				1					
Climacteridae	*Climacteris rufus*	Rufous Treecreeper				1					
Columbidae	*Phaps chalcoptera*	Common Bronzewing			1						
	Ocyphaps lophotes	Crested Pigeon			3						
Corvidae	*Corvus bennetti*	Little Crow				5					
	Corvus orru cecilae	Western Crow				1					
	Corvus coronoides	Australian Raven			2						
Cracticidae	*Strepera versicolor*	Grey Currawong			4	2					
Dromaiidae	*Dromaius novaehollandiae*	Emu						1	2		
Estrildidae	*Taeniopygia guttata*	Zebra Finch				2					
Falconidae	*Falco cenchroides*	Australian Kestrel (Nankeen Kestrel)		MA	3						
Maluridae	*Malurus splendens*	Splendid Fairywren				1					
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird			1	3					
	Lichmera indistincta	Brown Honeyeater				1					
	Gavicalis virescens	Singing Honeyeater			13	2					

Family	Scientific Name	Common Name	Conservation Status		Method						
			State	Federal	Sighting	Call	Remains	Scat	Tracks	Burrow	Digging
	Manorina flavigula	Yellow-throated Miner				4					
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater			7						
	Melithreptus brevirostris	Brown-headed Honeyeater				1					
	Gliciphila melanops	Tawny-crowned Honeyeater			2	1					
Meropidae	*Merops ornatus*	Rainbow Bee-eater		MA	1						
Monarchidae	*Grallina cyanoleuca*	Magpie-lark		MA	2						
Motacillidae	*Anthus australis*	Australian Pipit			4						
Oreoicidae	*Oreoica gutturalis*	Crested Bellbird			1	11					
Otididae	*Ardeotis australis*	Australian Bustard							1		
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler			5	8					
	Pachycephala occidentalis	Western Golden Whistler (Western Whistler)			6						
Petroicidae	*Microeca fascinans*	Jacky Winter			1	1					
Psittacidae	*Melopsittacus undulatus*	Budgerigar			23						
	Platycercus zonarius	Australian Ringneck			17	2					
Psophodidae	*Cinclosoma clarum*	Western Chestnut Quail-thrush (Copperback Quail-thrush)			2						
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail			2						
Mammalia											
Bovidae	**Capra hircus*	Goat						8	1		
	**Bos taurus*	European Cattle						9	7		
Canidae	**Canis familiaris familiaris*	Dog						2			
	**Vulpes vulpes*	Red Fox						1			
Dasyuridae	*Dasyurus geoffroii fortis*	Western Quoll, Chuditch	VU	VU				1			
Equidae	**Equus caballus*	Horse						1			
Felidae	**Felis catus*	Cat					1				
Leporidae	**Oryctolagus cuniculus*	Rabbit			1		3	18		1	2
Macropodidae	*Macropus fuliginosus melanops*	Western Grey Kangaroo			1			39	2		
	Osphranter rufus	Red Kangaroo, Marlu			2						
Reptilia											
Agamidae	*Ctenophorus maculatus*				2						

Family	Scientific Name	Common Name	Conservation Status		Method						
			State	Federal	Sighting	Call	Remains	Scat	Tracks	Burrow	Digging
	Ctenophorus cristatus	Bicycle Dragon			6						
	Tympanocryptis pseudopsephos	Goldfields pebble-mimic dragons			2						
	Ctenophorus ornatus	Ornate Crevice Dragon			1						
Diplodactylidae	*Crenadactylus ocellatus*	South-western Clawless Gecko			3						
Gekkonidae	*Heteronotia binoei*	Bynoe's Gecko			8						
	Gehyra variegata	Variegated gehyra			2						
Scincidae	*Tiliqua rugosa*	Bobtail			8		2				
Varanidae	*Varanus gouldii*	Bungarra or Sand Goanna			1						

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Coolgardie Project

Coolgardie *Camponotus* sp. nr. *terebrans* Targeted Survey

Prepared for

Focus Minerals Limited

May 2022

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Document Reference	Revision	Prepared by	Reviewed by	Admin Review	Submitted to Client	
					Copies	Date
5023AA_Rev0	Internal Draft	R. Eastwood M. Lohr P. Walker	S. Walker	-	-	24/03/2022
5023AA_Rev1	Client Draft	360 Environmental	Focus Minerals	-	1x electronic	07/04/2022
5023AA_Rev2	Client Final	M. Lohr	S. Walker	LI	1x electronic	03/05/2022

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Executive Summary

Focus Minerals Limited commissioned 360 Environmental Pty Ltd part of SLR Consulting to undertake a targeted survey for the ant *Camponotus* sp. nr. *terebrans* – an ant species associated with the Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*, CR, DBCA EPBC) within the Three Mile Mine Project, Coolgardie. The Survey Area consists of several discrete parcels of land adjacent to the townsite of Coolgardie, Western Australia and covers approximately 1,786 ha.

The purpose of the assessment was to determine whether colonies of the ant *Camponotus* sp. nr. *terebrans* were present within the Survey Area in large enough numbers to support the Arid Bronze Azure Butterfly (ABAB). The survey was conducted to inform decisions regarding the specific lease areas for proposed construction sites within the Survey Area. This report presents the background, methods, results, and discussion of the survey undertaken.

Potential ABAB habitat containing smooth-barked eucalypt species within the Survey Area was delimited prior to the survey based on aerial imagery and previous 360 Environmental biological surveys to the Survey Area. Within the 1,055 ha of potential ABAB habitat, 326 suitable trees were searched in accordance with DBCA protocols. Searching was also conducted during transects between the trees identified at each tree survey point.

No colonies of *Camponotus* sp. nr. *terebrans* were detected within the Survey Area. A single colony of ants in the genus *Camponotus* was observed, however, the ants were identified as *Camponotus nigriceps*. This species is not associated with the ABAB. The Survey Area falls within the known range of the ABAB, and smooth-barked eucalypts used by their host ant are widespread within the Survey Area. However, habitat quality within the Survey Area was generally poor due to scarcity of loose sandy soils where *C.* sp. nr. *terebrans* typically occurs. Substantial levels of disturbance from historic mining activities within the Survey Area may facilitate the high abundance of the meat ant *Iridomyrmex purpureus* observed during the survey. *Iridomyrmex purpureus* is considered a competitor of the ABAB. The high abundance of this species, in conjunction with suboptimal substrates, probably explains the lack of detection of *C.* sp. nr. *terebrans* within the Survey Area.

Another conservation significant butterfly, the Inland Hairstreak (*Jalmenus aridus*, P1, DBCA), was opportunistically observed during the survey at three locations in the southwest of the Survey Area. Three adults were collected for identification and the specimens have been vouchered at the Western Australia Museum. A total of 16 adult Inland Hairstreaks were observed, including the three collected specimens. This species was previously only known from one location; however, three additional populations of the species have recently been found north of Kalgoorlie. Host plants used by *J. aridus* and similar habitats to the sites where *J. aridus* was observed within the Survey Area appear to be present in the nearby Kangaroo Hills Timber Reserve and are common in the wider region. This suggests that additional populations might be detected in similar habitats in adjacent areas outside the Survey Area under appropriate environmental conditions.

Abbreviations

Abbreviations used through the report are described below in

Table 1: Abbreviations

Abbreviations	Description
ABAB	Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*)
BAM Act	Biosecurity and Agriculture Management Act 2007
BC Act	Biodiversity Conservation Act 2016
BoM	Bureau of Meteorology
CD	Conservation Dependent Fauna
CR	Critically Endangered
DAWE	Department of Agriculture, Water, and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DoE	Department of Environment
DP	Declared Pest
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EN	Endangered
EP Act	Environmental Protection Act 1986
EPA	Environmental Protection Authority
EPBC Act	Environment Protection Biodiversity and Conservation Act 1999
ESA	Environmentally Sensitive Area
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys for Assessments
MI	Migratory
MNES	Matters of National Environmental Significance
NVIS	National Vegetation Information System
OS	Other Specially Protected Fauna
P	Priority
PEC	Priority Ecological Community

Abbreviations	Description
PMST	Protected Matters Search Tool
T	Threatened
TEC	Threatened Ecological Community
TPFL	Threatened and Priority Flora Database
VU	Vulnerable
WAH	Western Australian Herbarium
WAM	Western Australian Museum
WoNS	Weeds of National Significance

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1 Introduction

1.1 The Project

Focus Mineral Limited (FML) commissioned 360 Environmental Pty Ltd (360 Environmental) part of SLR Consulting (SLR) to undertake a fauna survey targeting the host ant (*Camponotus* sp. nr. *terebrans*) of the critically endangered Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*) (ABAB) to support the environmental and planning approvals for proposed expansions to the FML mining operation in Coolgardie Western Australia (the Project).

The Project consists of pre-defined Survey Areas surrounding the townsite of Coolgardie, Western Australia (Figure 1) and covers approximately 1786 hectares (ha) in the Coolgardie bioregion of Western Australia.

1.2 Objectives and Scope

In order to meet the objectives of this assessment, the following scope of works was undertaken:

- Conduct a targeted survey for the ant species *Camponotus* sp. nr. *terebrans* in all areas of suitable habitat in the Survey Area, applying the formula for number and spacing of sample trees given by Department of Biodiversity, Conservation and Attractions (2020a) based on area of suitable habitat
- Produce a succinct report and maps to identify presence/absence of *Camponotus* sp. nr. *terebrans* at all tree survey points, and extent of any large colonies of the ant
- Opportunistically scan suitable habitat for *Jalmenus aridus*
- Produce a final report detailing presence/absence of *Camponotus* sp. nr. *terebrans* and report on any *Jalmenus aridus* sightings.

2 Background

2.1 Protection of Fauna

Western Australian fauna is formally protected by the following legislative measures:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environmental Protection Act 1986* (WA) (EP Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

In addition to these legislative measures, the WA Department of Biodiversity, Conservation and Attractions (DBCA) priority fauna list provides a non-legislative list of possibly threatened, rare but not threatened or near threatened taxa.

In addition to these protection mechanisms, the EIA process is supported by various guidance documents published by the Environmental Protection Authority (EPA), DBCA and the Department of Agriculture Water and Environment (DAWE).

Western Australia

- *Technical Guidance - Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (Environmental Protection Authority, 2020)
- *Guideline for the survey of arid bronze azure butterfly (ABAB) in Western Australia* (Department of Biodiversity Conservation and Attractions, 2020c)
- *Arid bronze azure butterfly (ABAB) survey in Western Australia additional information* (Department of Biodiversity Conservation and Attractions, 2020b).

Commonwealth

- *Matters of National Environmental Significance – Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, 2013)
- *Matters of National Environmental Significance – Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, 2013)
- *Conservation Advice: Ogyris subterrestris petrina Arid bronze azure (a butterfly)* (Threatened Species Scientific Comitte, 2014).

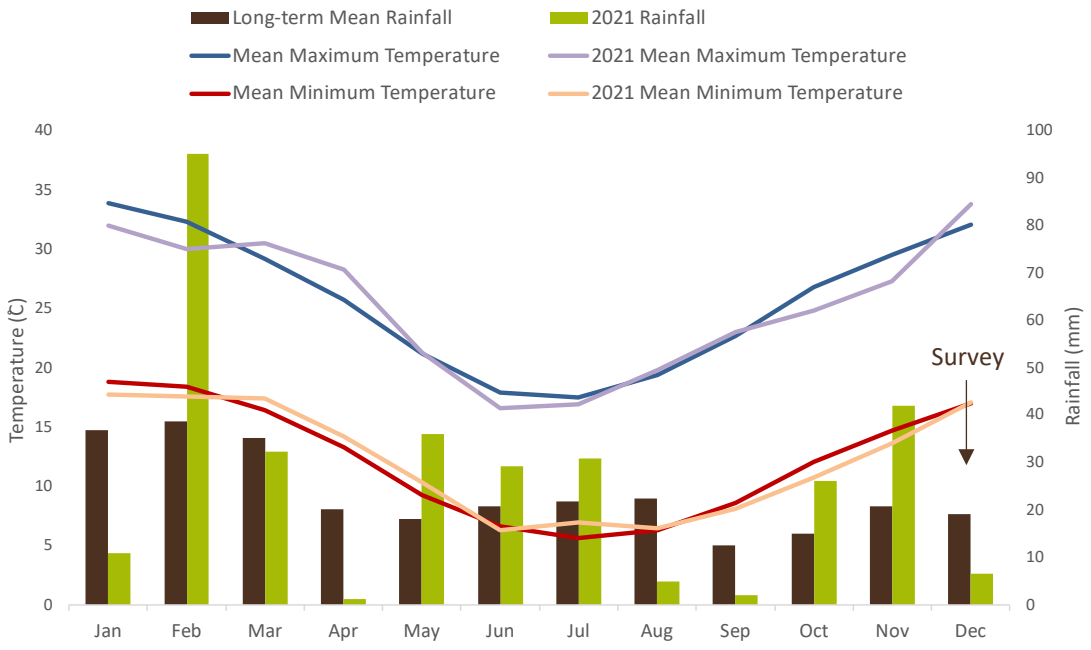
2.2 Existing Environment

2.2.1 Climate

The closest long-term Bureau of Meteorology weather station to the Survey Area with a complete temperature and rainfall dataset is Kalgoorlie-Boulder airport (Station 012038), located approximately 28 km Northeast of the Survey Area. Climate statistics were calculated utilising data from the most current climate normal, which is defined as a 30 year interval (Bureau of Meteorology, 2022), where possible. A climate normal is a period long enough to include year-to-year variations while avoiding the influence of longer-term changes in climate (Bureau of Meteorology, 2022).

The long-term mean minimum temperature for Kalgoorlie-Boulder Airport ranges from 5.6˚C (July) to 18.8˚C (January) (1991 to 2020) and the long-term mean maximum temperature ranges from 17.5 (July) to 33.9˚C (January; **Graph 1**).

The Kalgoorlie-Boulder Airport weather station recorded 316.6 mm of rainfall in 2021, which is 35.4 mm above the long-term average of 281.2 mm (1991 to 2020; **Graph 1**). In the three months prior to the survey (September 2021 to November 2021), 70 mm of rainfall was recorded, which is 21.8 mm above the long-term average of 48.2 mm (**Graph 1**).



Graph 1: Long term (1991-2020) and 2021 total rainfall, maximum and minimum temperatures for Kalgoorlie-Boulder Airport weather station (Station 012038) (Bureau of Meteorology, 2021)**.**

2.2.2 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared by the Department of Water and Environmental Regulation (DWER) to prevent the degradation of important environmental values such as Threatened flora, Threatened Ecological Communities (TECs) or significant wetlands.

The Survey Area does not occur within a mapped ESA. The nearest ESA is the Rowles Lagoon Conservation Park located approximately 52 km north-west of the Survey Area (Figure 1) (Department of Water and Environmental Regulation, 2020).

2.2.3 Conservation Areas

The Survey Area is not located within any listed conservation area (Figure 1) (Department of Biodiversity Conservation and Attractions, 2021). The nearest conservation area is the Kangaroo Hills Timber Reserve which is situated adjacent to the southwestern section of the Survey Area separated by Nepean Road.

3 Methods

3.1 Field Survey

3.1.1 Field Personnel

The survey was conducted by Dr Rod Eastwood and Dr Michael Lohr, where Michael has over eight years of experience conducting fauna surveys and wildlife research in WA with substantial experience in the Goldfields Region, including surveys for short range endemic invertebrates. Dr Eastwood is a Research Associate at the WA Museum who has extensive field and research experience with the ABAB and related butterflies with symbiotic relationships with ants (e.g. Eastwood et al. 2006; Eastwood & Fraser 1999). He has conducted surveys for the targeted ant species (*Camponotus* sp. nr. *terebrans*) at Barbalin NR and multiple other sites. During surveys in 2020 and 2021 he identified four additional colonies of the host ant. His previous surveys have significantly increased the known area of occupation of the targeted species.

3.1.2 Licence and Authorisation

Where applicable, specimens were collected under Fauna taking license FO25000042 issued to Dr Eastwood, Authorization to Take or Disturb Threatened Species (Fauna) license number TFA 2021-0077 issued to A. A. Williams (Dr Eastwood authorised), and Flora taking license FB62000354 issued to Dr Michael Lohr.

3.1.3 Targeted Survey for *Camponotus* sp. nr. t*erebrans* and Arid Bronze Azure Butterflies

Field methods followed those described in the DBCA survey guidelines (Department of Biodiversity Conservation and Attractions, 2020b, 2020c). Potential ABAB habitat containing smooth-barked eucalypt species within the Survey Area was delimited prior to the survey using aerial imagery and observations during a previous visit to one portion of the Survey Area. A total of 1,055 ha of potentially suitable ABAB habitat was identified within the Survey Area (Figure 2).

The number and spacing of tree locations in potentially suitable ABAB habitat to be searched for *Camponotus* ant nests was determined using the following formula (Department of Biodiversity Conservation and Attractions, 2020c):

- No. sample trees: $10 \times \sqrt{(site\ area\ in\ ha)}$ = 325 trees
- Spacing: $\sqrt{\frac{(site\ area\ in\ ha \times 10{,}000}{(No.sample\ trees)}}$ = 150 metres

Minor modifications to the grid of tree survey points were made and one additional point was added for a total of 326 tree survey points to ensure that all potentially suitable habitat was adequately covered.

Tree survey points were searched during walked transects. Multiple trees (up to ten or more) were inspected during the walk between tree survey points and in the immediate vicinity. A point was scored 'absent', and the GPS location recorded, if no *Camponotus* ant nests were

identified. A tree survey was scored 'present', and the following data collected if *Camponotus* ant nests were found at any tree in the vicinity of the tree survey point:

- GPS location
- Tree species
- Diameter at breast height (DBH)
- Soil type
- If inquiline[1] *Pogonoscopus* sp. were observed in the ant nest
- The numbers of any additional nests in the vicinity of the tree survey point
- Photographs of the tree, nest, and ants.

Reproductive structures from the host tree were also collected, where possible, for positive identification if nests were located.

GPS-enabled tablets loaded with base data including aerial imagery, Survey Area boundary, and the grid of preselected sites were used for navigation and data collection in the field. Garmin GPS units were used to record transect routes and distances travelled.

3.1.4 Opportunistic searches for *Jalmenus aridus*

While conducting targeted searches for *Camponotus* sp. nr. *terebrans* at the Three Mile Project site, habitat identified as suitable for *Jalmenus aridus* (P1, DBCA) was opportunistically inspected by Dr Eastwood, as three new populations of the species have recently been found north of Kalgoorlie.

3.1.5 Specimen Collection and Identification

Butterfly specimens were collected with a hand net and euthanized with ethyl acetate before placing in a glassine envelope and storing at 3ºC until returning to Perth. Specimens were then prepared in accordance with WAM standard protocols, fully labelled, databased and deposited in the WAM Entomological collection.

Adult butterflies were tentatively identified in the field and confirmed with reference to Braby (2004) and to known *J. aridus* specimens in Dr Eastwood's collection at the Museum of Comparative Zoology, Harvard University (https://mczbase.mcz.harvard.edu/).

Ant specimens were preserved in 100% ethanol and taken to confirmed by Dr Brian Heterick at the Western Australia Museum for confirmation of identifications made in the field.

Tree and shrub species were identified by the WA Herbarium based on specimens collected in the field.

[1] An animal that exploits the living space of another

3.1.6 Weather Conditions

Weather conditions for the survey are presented in Table 2. Temperature and rainfall data is from Kalgoorlie-Boulder Airport weather station (Station 012038) (Bureau of Meteorology, 2021). Minimum temperatures during the survey were above the long-term average minimum temperature for December (12.2˚C), and maximum temperatures during the survey were similar to the long-term average maximum temperature for December (25.7˚C). A total of 6.4 mm of rainfall was recorded during December 2021, which is lower than the long-term median of 16.2mm.

Table 2: Targeted *Camponotus* sp. nr. *terebrans* Survey weather conditions

Date	Temperature (˚C)		Rainfall (mm)	Max wind speed km/h
	Min	Max		
13/12/2021	12.0	29.8	0	41
14/12/2021	17.6	36.9	0	50
15/12/2021	15.1	34.4	0	57
16/12/2021	21.8	41.1	0	61

3.2 Limitations

Limitations and constraints of the targeted survey are detailed in Table 3.

Table 3: Limitations and constraints associated with the survey

Variable	Degree of Limitation	Potential Constraints on Survey Outcomes
Survey Scope	Not a constraint	A targeted survey for the ant *Camponotus* sp. nr. *terebrans* was undertaken in accordance with DBCA Guidance (Department of Biodiversity Conservation and Attractions, 2020b, 2020c) and was considered appropriate to support approvals applications.
Availability of Data	Not a constraint	All data required to complete the scope of works including regional and local contextual information was available.
Site Access	Not a constraint	The Survey Area was able to be accessed by vehicle and on foot.
Survey Intensity and Resources	Not a constraint	Survey intensity (number and spacing of trees) was determined by the formulae provided in DBCA guidance. The number of trees surveyed was consistent with the recommendations generated by the formulae for the area of potential habitat present in the survey area.
Experience	Not a constraint	The survey was conducted by Dr Rod Eastwood and Dr Michael Lohr. Dr Lohr has over eight years of experience conducting fauna surveys and wildlife research in WA including substantial experience in the Goldfields Region, including surveys for SRE invertebrates. Dr Eastwood is a Research Associate at the WA Museum who has extensive field and research experience with the

Variable	Degree of Limitation	Potential Constraints on Survey Outcomes
		ABAB and related butterflies with symbiotic relationships with ants (e.g. Eastwood et al. 2006; Eastwood & Fraser 1999). He has conducted surveys for the targeted ant species (*Camponotus* sp. nr. *terebrans*) at Barbalin NR and multiple other sites. During surveys in 2020 and 2021 he identified four additional colonies of the host ant. His previous surveys have significantly increased the known area of occupation of the targeted species.
Timing, weather, season	Not a constraint	Surveys for *Camponotus* sp. nr. *terebrans* may be conducted at any time of the year or time of day and are not substantially impacted by weather.
Life Forms Sampled	Not a constraint	The survey targeted one species of ant and was consistent with DBCA guidelines for this species. An additional priority species was opportunistically observed and collected during the survey. All taxa recorded were able to be identified with a high level of scientific confidence to species level.
Mapping Reliability	Not a constraint	Potential *Camponotus* sp. nr. *terebrans* habitat mapping prior to the survey was based largely on aerial imagery of the Survey Area and a previous visit to one portion of the Survey Area. Areas where uncertainty about habitat type was an issue were included as potential habitat to ensure that no areas of potential habitat went unsurveyed.
Disturbances (fire, flood etc.)	Not a constraint	No disturbances occurred during any of the surveys. Areas of disturbance associated with clearing, historic mining, and rubbish were not an impediment to the survey.
Completeness	Not a constraint	The survey was considered complete for a targeted ABAB survey. Staff appropriately surveyed the number of trees required by DBCA guidelines.

4 Results

4.1 *Camponotus* sp. nr. *terebrans* and Arid Bronze Azure Butterflies

Despite the presence of suitable smooth-barked eucalypt trees and areas of floristic diversity, no *C.* sp. nr. *terebrans* (ABAB ants) or Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*) were found within the Survey Area. One nest of another species of *Camponotus* ant was found at tree survey point 070 (Figure 3), but ants from the nest were positively identified on site as (*C. nigriceps*). Samples of these ants were collected, and the identification was subsequently confirmed by Dr Brian Heterick at the Western Australia Museum.

4.1.1 Site Condition and Suitability

There were several ridges and topological undulations across the site that were dissected by dry creek beds opening onto seasonally dry shallow valleys and sheet flood plains. The soil substrate across most of the elevated areas was rocky and compacted, particularly along ridge lines. Habitat along many of the ridges was consistent with habitat at the type locality of ABAB at Lake Douglas; however, in lower areas the drainage was poor and most of the sandy soil had become compacted.

There is clear evidence that the site has been heavily disturbed during a long history of prospecting and mining within the Survey Area as is evident by numerous open mine shafts, mounds of overburden, tailings dumps, topsoil stockpiles, and litter associated with historic mining camps and operations. The site is also widely dissected by modern mining pits and infrastructure, access roads, haul roads and many smaller tracks, as well as the Great Eastern Highway, the Coolgardie-Esperance Highway, and the remains of a narrow-gauge railway.

The high levels of disturbance and the rocky substrate do not preclude *C.* sp. nr. *terebrans* from being present at the site even though it is now known that the type locality site, which shares similar characteristics with this Survey Area, was atypical.

4.2 *Jamenus aridus*

A total of 16 *Jalmenus aridus* adults (Plate 1) were identified at three locations within the Survey Area, one location near tree survey point 297 and two locations near tree survey point 274 (Figure 4; Table 4). The locations were in the south-western corner of the Survey Area (~4 km south of Coolgardie) and separated by approximately 500 m. No butterfly early stages nor any evidence of feeding damage or remains of the exoskeletons of *J. aridus* pupae were found.

Tree survey point 297 is in a sandy flood plain bordered with many *Senna artemisioides filifolia* plants that extend up the slopes on either side (Plate 2).

Tree survey point 274 is situated on a rocky ridge at the shallow head of an eroded creek-line with scattered *Senna artemisioides filifolia* plants growing along the creek line (Plate 3). This site represents a previously unrecorded habitat type for *J. aridus*. Butterflies were observed flying around *Eremophila alternifolia* and other flowering shrubs. Several of these plants were

inspected for the presence of *Froggattella kirbii* ants, which are known to associate with *J. aridus,* but only a small unidentified black ant was found.

Three *J. aridus* adults were collected for positive identification. Butterflies collected were lodged in the WAM as voucher specimens and as primary evidence for a new population within the Survey Area (Table 4).



Plate 1: *Jalmenus aridus* observed within the Survey Area



Plate 2: Habitat present at tree survey point 297



Plate 3: Habitat present at tree survey point 274

Table 4: *Jalmenus aridus* collected at Focused Minerals Ltd., Three Mile Project site at Coolgardie by R. Eastwood and M. Lohr in December 2021

WAM voucher	Date	Latitude	Longitude	Sighted	Collected
E113097	15 Dec 2021	-30.987295	121.164944	1 F	1 F
E113098	16 Dec 2021	-30.983250	121.166345	8 M	1 M
E113099	16 Dec 2021	-30.983693	121.166852	2 F, 2 M	1 F

5 Discussion

5.1 *Camponotus* sp. nr. *terebrans* and Arid Bronze Azure Butterflies

The ABAB was identified as potentially occurring the Survey Area in a flora and fauna desktop review conducted for a previous fauna survey (360 Environmental Pty Ltd 2022 (in prep)). Potentially suitable habitat containing smooth-barked eucalypts was observed during in the subsequent field survey (360 Environmental Pty Ltd 2022). The ABAB is listed as Critically Endangered under the *Biodiversity Conservation Act* 2016 and the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 due to their geographic distribution and low estimated number of mature individuals (Threatened Species Scientific Comitte, 2014). Detailed survey guidelines were published in September 2020 (Department of Biodiversity Conservation and Attractions, 2020b, 2020c).

Until recently, only two extant populations of ABAB are known, one at Barbalin Nature Reserve, Muckinbudin in the northern Avon Wheatbelt (Gamblin, Williams, Williams, & Richardson, 2009), and a second site approximately 100 km from Barbalin (Department of Biodiversity Conservation and Attractions, 2020a). Both sites are approximately 300 km west of the Survey Area at Coolgardie. In October 2021, two additional sites were discovered just north of Kalgoorlie (both by R. Eastwood). The type locality for ABAB is at Lake Douglas, 19-28 km north-east of the Survey Area; however, the butterfly and its host ant are now extinct at this location.

The butterfly is difficult to survey for, as adults are present for only a few weeks each year and may disperse through habitat unsuitable for breeding. Caterpillars of the ABAB are known to live only within the nests of an undescribed species of sugar ant (referred to as *Camponotus* sp. nr. *terebrans*), where they eat the ants' early stages and/or are fed by the ants. The ant nests may also be inhabited by leaf hoppers (*Pogonoscopus* spp. (Cicadellidae)), which the ants protect and in return feed on the anal excretions (honeydew) of the leaf hoppers. The ants are associated with smooth-barked eucalypt woodlands on sandy soil, but at the type locality for ABAB, the ants were found in rocky substrate along a ridge line (Rod Eastwood pers. obs.). Furthermore, *C.* sp. nr. *terebrans* ants are often found in disturbed sites (Field, 1999; McArthur, Adams, & Shattuck, 1997).

DBCA recommends surveying first for the ant and only looking for the butterfly at sites with large colonies of the host ant that could support an ABAB sub-population. Ant survey guidelines include a map of potential habitat for the host ant in WA, which includes large areas of woodland across the State (Department of Biodiversity Conservation and Attractions, 2020c). All significant *Camponotus* sp. nr *terebrans* colonies are assumed to be critical habitat for ABAB. The presence of ABAB in an ant colony is dynamic, since ABAB can disperse across the landscape and become established at new ant colonies, while existing colonies can decline over time.

5.1.1 Survey Outcomes

No *C.* sp. nr. *terebrans* (ABAB ants) or Arid Bronze Azure Butterflies (*Ogyris subterrestris petrina*) were found within the Survey Area. Areas with sandy substrate where *C.* sp. nr. *terebrans* is typically located were poorly drained and compacted, reducing their suitability.

The meat ant *Iridomyrmex purpureus* was found to be widespread and common across the majority of the Survey Area. This is very likely a contributing factor to the absence of *C.* sp. nr. *terebrans*, particularly in what is likely a marginal habitat for the *C.* sp. nr. *terebrans* ant. Only one nest of the related species, *C. nigriceps*, was found at tree survey point 070, but these ants are larger than *C.* sp. nr. *terebrans* and their nest architecture makes them less vulnerable to attacks from *I. purpureus*. *Camponotus nigriceps* is not associated with the ABAB.

5.2 *Jalmenus aridus*

The Inland Hairstreak, *Jalmenus aridus*, is listed as Priority 1 under the Biodiversity Conservation Act 2016 and, until recently, was only known from its type locality at Lake Douglas, approximately 12 km SW of Kalgoorlie. It was discovered in November 1983 breeding on a single *Acacia tetragonophylla*, but soon after its discovery the tree started to die, and the butterflies disappeared. Over the following decade, additional surveys resulted in collections of several specimens on a second *A. tetragonophylla* nearby, and a few specimens from a *Senna nemophilla* (= *S. artemisioides filifolia*) less than one km from the original tree (Williams, Williams, & Lundstrom, 1998). The last sighting of *J. aridus* at Lake Douglas was in 1999 (P. Samson pers. comm. 2021). A single specimen was found at Ngaanyatjarra approximately 460 km NE of Laverton in 1987 (ALA, 2022). Three additional populations of the species have recently been found north of Kalgoorlie. Most specimens have been recorded/collected in October or November, but there are a few records from mid-January and April.

Jalmenus aridus has a mutualistic association with the ant *Froggattella kirbii*. The butterfly larvae feed on the flowers and/or leaves of their host plant while the ants are in constant attendance. The larvae produce sweet secretions containing amino acids and sugars which the ants consume (Maschwitz, Margarete, & Schurian, 1975; Pierce, 1988). In return, the presence of the ants protects the butterfly larvae from parasitoids and predators. Larvae do not survive in the absence of their attendant ants (Pierce, 1988).

There are no guidelines for *J. aridus* surveys since it is difficult to predict when and where they might occur. Their attendant ant species has a wide but patchy distribution throughout open woodland areas across most of Australia (Shattuck, 1999) so the presence of ants cannot predict the likely presence of the butterfly, as is the case with ABAB and *C.* sp. nr. *terebrans*. The *J. aridus* host plant, *Senna artemisioides filifolia,* also has a distribution that covers most of WA and the distribution of their *Acacia tetragonophylla* host plant is even broader (Western Australian Herbarium, 2021). Furthermore, appearance of *J. aridus* adults – and other butterflies within the same genus – is highly irregular and strongly impacted by variation in local environmental conditions (Sands & New, 2002). The difficulty in surveying for this species as well as the limited

understanding of its habitat selection and timing of the emergence of adults likely all contribute to the lack of records of *J. aridus* outside of its type locality until recently.

5.2.1 Survey Outcomes

Jalmenus aridus adults were found at two sites within the Survey Area.

The environmental conditions at tree survey point 297 are similar to other known sites for *J. aridus*; however, no *Froggattella kirbii* ants were found. It is also possible that this subpopulation extends further up the creek line and outside the Survey Area across Nepean Road.

Although no *F. kirbii* were found at tree survey point 274, an unidentifiable ant was seen attending scale insects and leaf hoppers on the *Senna artemisioides filifolia* plants. It is unclear whether this unidentified ant has a relationship with *J. aridus*. If mutualisms exist between *J. aridus* and additional ant species, its suitable habitat may be more extensive than currently documented.

Determining the extent of *J. aridus* populations within the Survey Area was outside of the scope of this project, however, aerial imagery suggests that similar habitat to the locations where it was observed is abundant in vicinity of the Survey Area. These habitats appear to extend into land under conservation tenure in adjacent portions of the Kangaroo Hills Timber Reserve.

6 Conclusion

- No ABAB host ants (*Camponotus* sp. nr. *terebrans*) or Arid Bronze Azure Butterflies (*Ogyris subterrestris petrina*, CR, DBCA EPBC) were found within the Survey Area despite a comprehensive search.
- It is unlikely that the ABAB ants could colonise the marginal habitat within the Survey Area in the foreseeable future due to the presence of large numbers of *Iridomyrmex purpureus* ants.
- Adult Inland Hairstreak butterflies (*Jalmenus aridus*, P1, DBCA) were observed at three locations within the Survey Area.
- The observation of *J. aridus* at sites approximately 500 m apart was unexpected, but it is an important addition to the known populations of this Priority 1 listed species. The discovery of *J. aridus* in habitat which is substantially different to habitat used by its other known populations suggests its distribution may be larger than currently documented.

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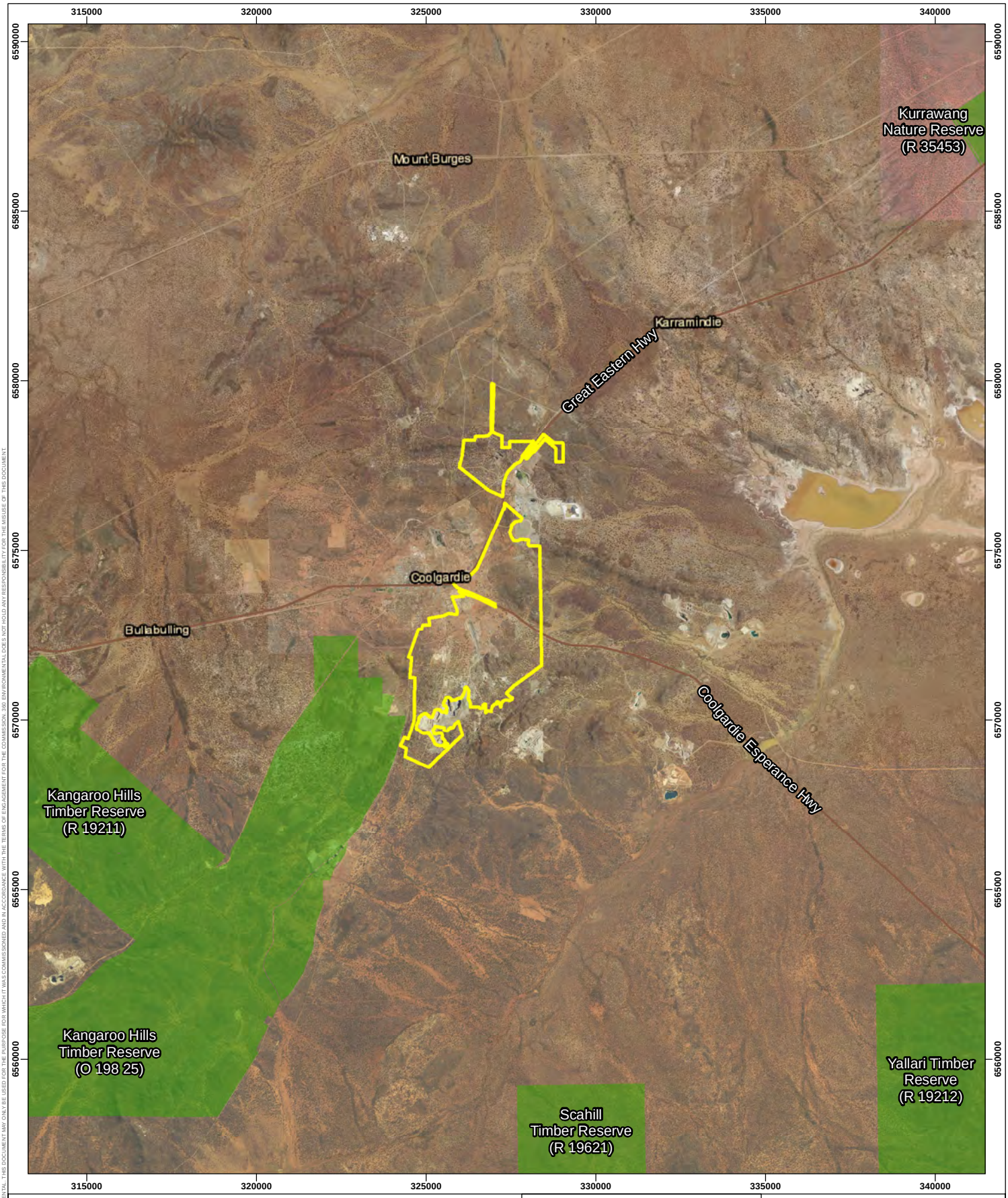
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- Survey Area

DBCA Managed Lands and Waters

- DBCA Managed Land

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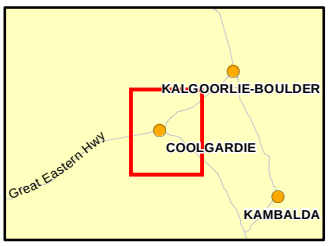
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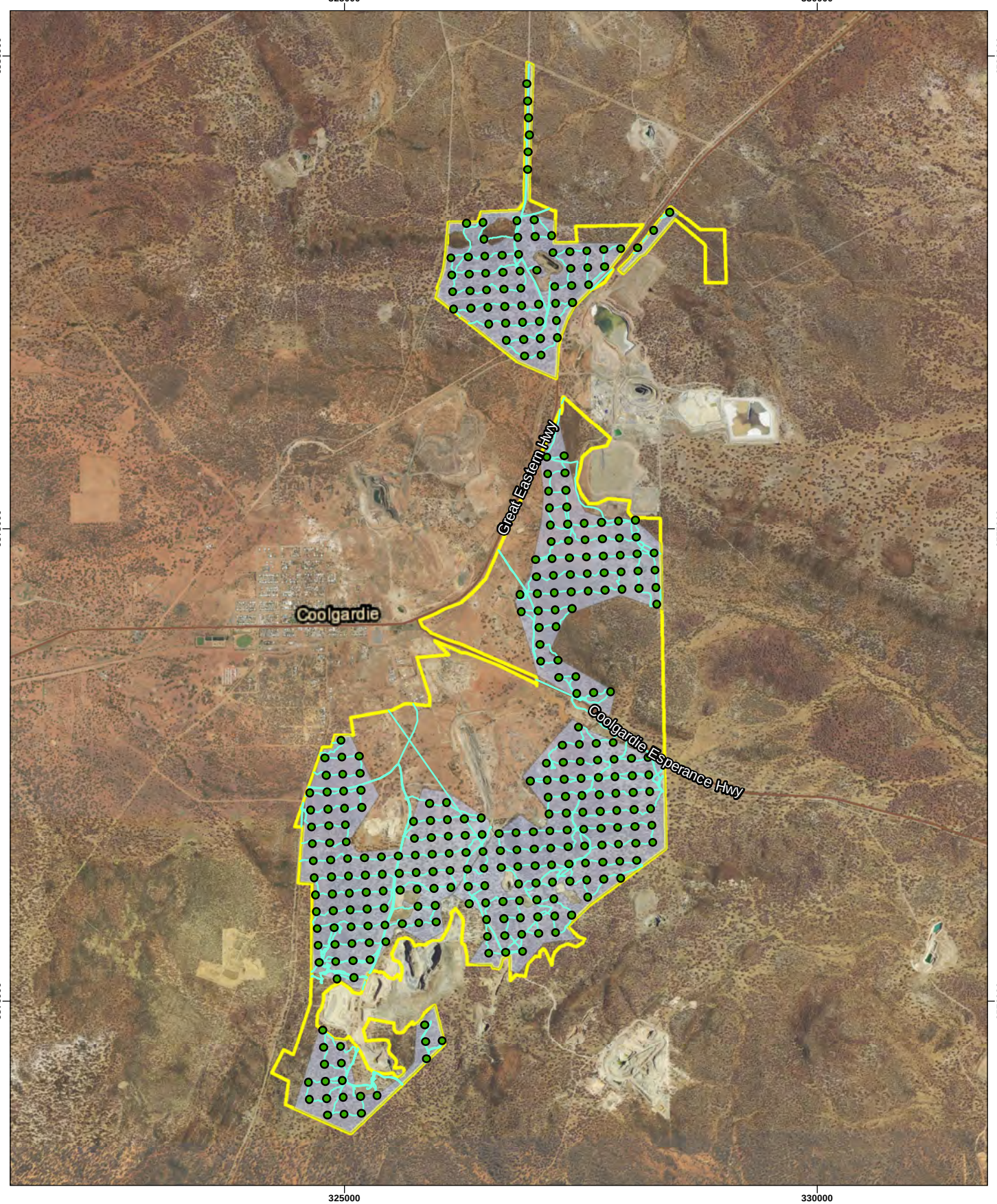
Coolgardie

Coolgardie *Camponotus* sp. nr. *terebrans* Targeted Survey

Figure 1

Survey Area and Conservation and Environmentally Sensitive Areas

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Legend

- Survey
- Potential *Camponotus* sp. nr. *terebrans*
- GPS Tracks
- Tree Sample Points

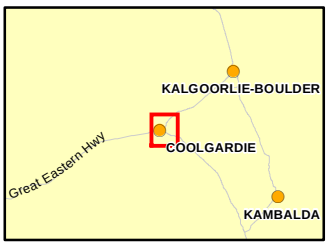
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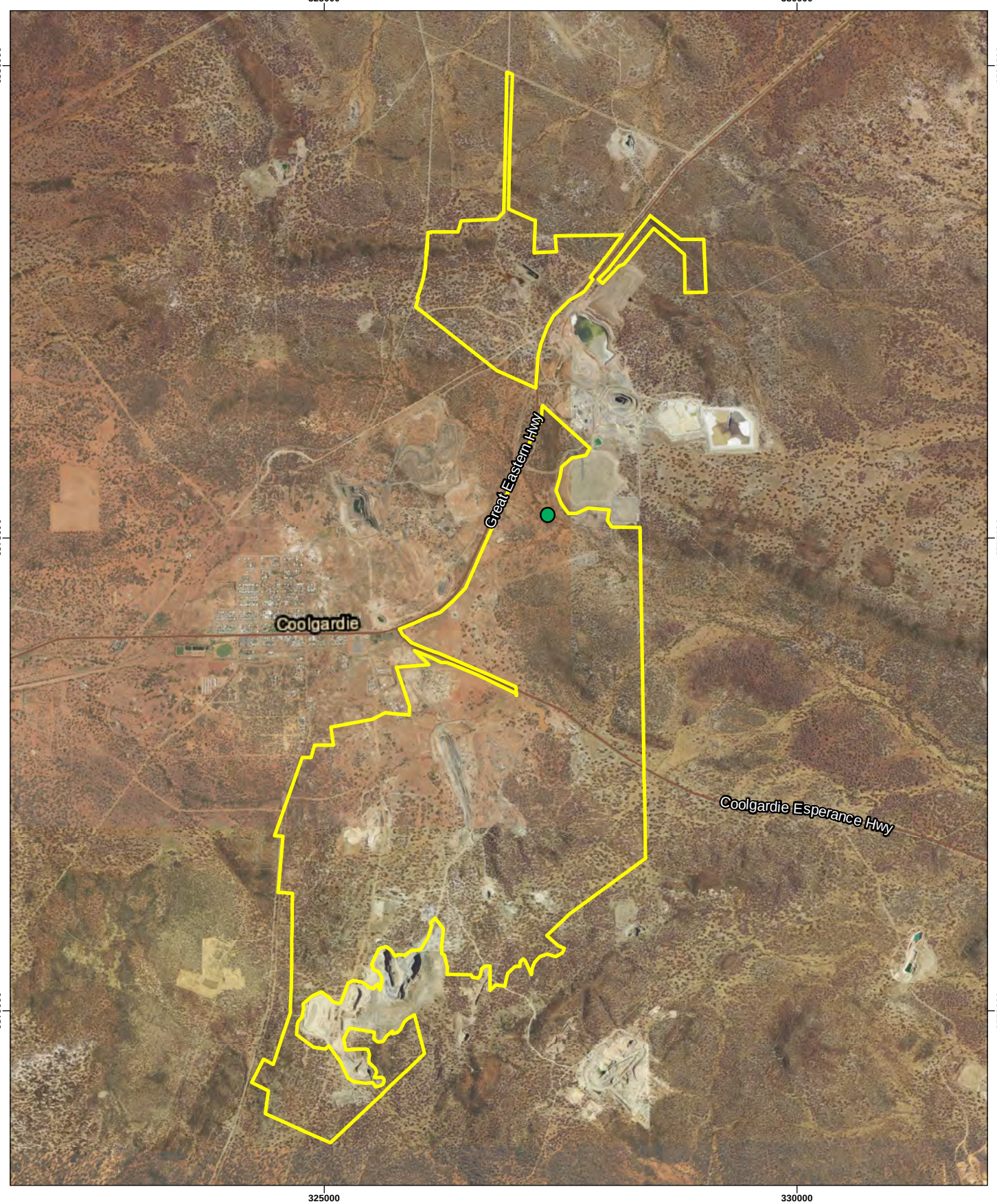
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Coolgardie

Coolgardie *Camponotus* sp. nr. *terebrans* Targeted Survey

Figure 2
Potential ABAB Habitat and Survey Effort

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Legend

- Survey Area
- *Camponotus nigriceps* Nest (Not Associated with Significant Butterflies)

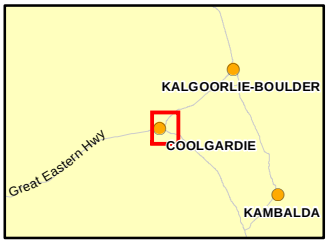
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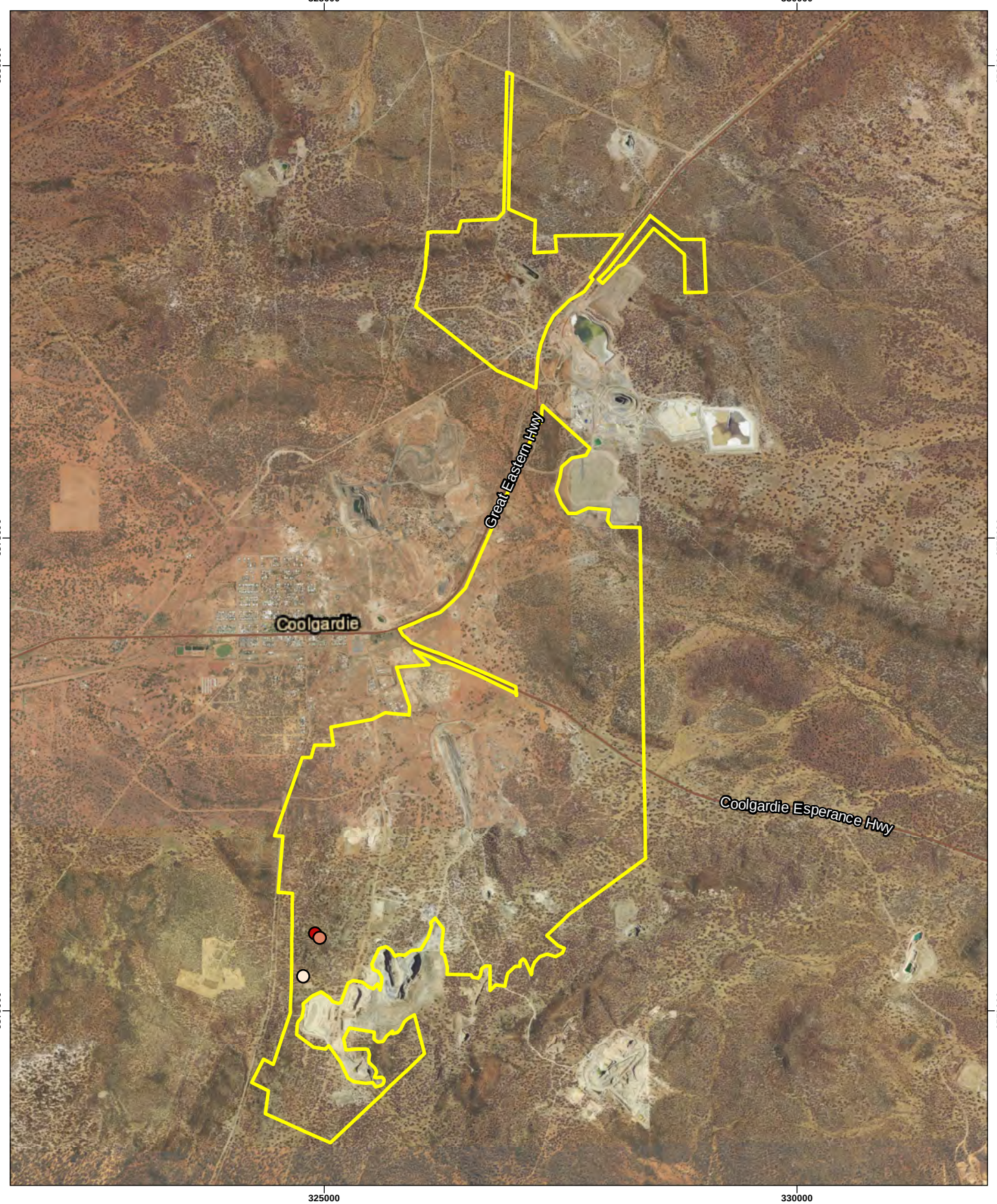
Coolgardie *Camponotus* sp. nr. *terebrans* Targeted Survey

Figure 3

***Camponotus nigriceps* Nest**

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Legend

- Survey Area

Inland Hairstreak (*Jalmenus aridus*) Locations

- Observed Number: 2
- Observed Number: 5
- Observed Number: 9

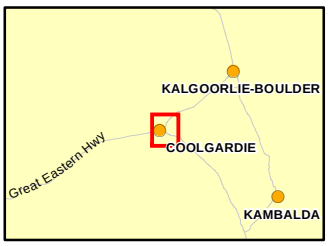
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Focus Minerals Limited
Coolgardie
Coolgardie *Camponotus* sp. nr. *terebrans* Targeted Survey

Figure 4

Inland Hairstreak (*Jalmenus aridus*) Locations and Numbers Observed Nest

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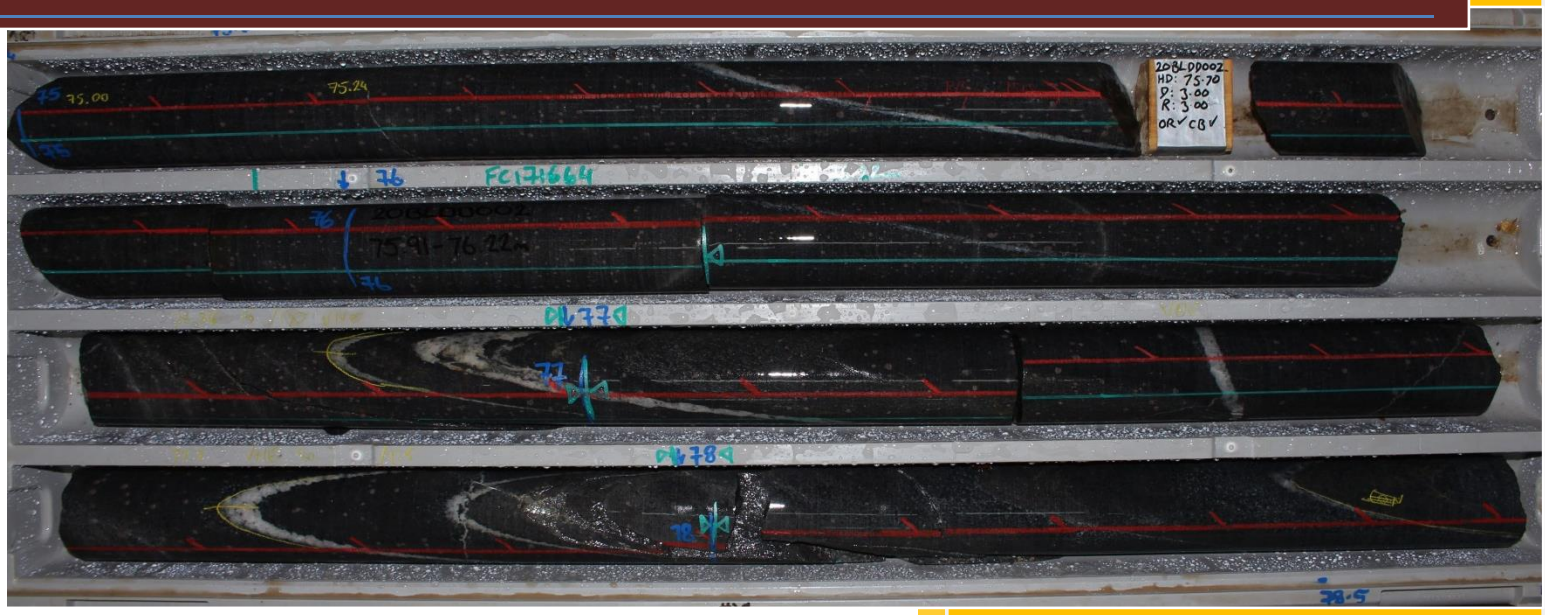
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Desktop assessment for subterranean fauna for the Coolgardie Gold Project – Alicia, Big Blow, Bonnievale, Brilliant, CNX, Greenfields and Happy Jack Deposit Areas, Coolgardie, Western Australia



Report by *Invertebrate Solutions Pty Ltd* for 360 Environmental Pty Ltd on behalf of Focus Minerals Ltd.

May 2022

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Invertebrate Solutions (2022). Desktop assessment for subterranean fauna for the Coolgardie Gold Project – Alicia, Big Blow, Bonnievale, Brilliant, CNX, Greenfields and Happy Jack, Coolgardie, Western Australia. Unpublished report to 360 Environmental Pty Ltd on behalf of Focus Minerals Ltd, May 2022.

Report Number 2022ISJ03_F01_20220519

Prepared for: Focus Minerals Ltd

Frontispiece: Diamond core photo of mafic volcanics.

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Executive Summary

The Coolgardie Gold Project – Alicia, Big Blow, Bonnievale, Brilliant, CNX, Greenfields and Happy Jack deposit Areas, Coolgardie (the Project) is located, in the Goldfields region of Western Australia. The proponent, Focus Minerals Ltd (Focus), proposes to recommence existing historical mining operations with ore processed at existing facilities.

Invertebrate Solutions has been requested by Focus to undertake a desktop assessment for subterranean fauna (stygofauna and troglofauna) for the seven Project areas. Searches of the Western Australian Museum databases for Crustaceans and Arachnids/Myriapods were undertaken for a rectangular area approximately 250,000 ha, centred on Coolgardie townsite.

The Project is within the Norseman-Wiluna Greenstone Belt of the Eastern Goldfields Province which is largely covered in shallow colluvium and alluvium. The colluvium and alluvium lithologies surrounding and within much of the Project area have a low suitability for both troglofauna and stygofauna habitat due to the absence of interconnected voids in these fine grained units. The ultramafics and other volcanics are generally considered to be poor habitat for troglofauna or stygofauna unless they are highly fractured locally. The intrusive granitoids are also considered to have poor subterranean fauna suitability due to a general absence of interconnected voids unless they are highly locally fractured. Examination of diamond drill core from the seven Project areas has shown fracturing to be absent in the most part, or minor and provides little opportunity for subterranean fauna.

The absence of stygofauna and troglofauna records from the Coolgardie and Kalgoorlie area would suggest that stygofauna habitat, and therefore subterranean fauna is generally absent or present in very low abundance, although it is unknown what sampling intensity has previously been undertaken, and it may be due to a paucity of sampling. It is however reasonable to conclude that subterranean fauna have a low likelihood of occurrence within the Project areas, when considering the absence of potential voids and cracks and the hypersaline nature of the groundwater.

No further survey work for stygofauna or troglofauna is necessary in order to meet the Technical Guidance – Subterranean Fauna Surveys for Environmental Impact Assessment (EPA2021).

1. Introduction

The Coolgardie Gold Project – Alicia, Big Blow, Bonnievale, Brilliant, CNX, Greenfields and Happy Jack deposit Areas, Coolgardie (the Project) is located, in the Goldfields region of Western Australia. The proponent, Focus Minerals Ltd (Focus), proposes to recommence existing historical mining operations with ore processed at existing facilities.

Invertebrate Solutions has been requested by Focus to undertake a desktop assessment for subterranean fauna (stygofauna and troglofauna) for the Coolgardie Gold Project areas.

Subterranean fauna are comprised of stygofauna (aquatic subterranean dependent species) and troglofauna (air breathing subterranean dependent species), which are known to form a subterranean faunal biodiversity hotspot on a worldwide scale in the Pilbara and Yilgarn cratons of Western Australia (Guzik et al. 2010). Over 4,000 species of subterranean fauna are likely to occur in Western Australia (Guzik et al. 2010), and it is estimated that over 80% of these taxa remain unknown to science. Subterranean fauna are also known to play an important role in ecosystem function (Humphreys 2006). Many species of subterranean fauna have highly restricted ranges, and can be considered short range endemics (*sensu* Harvey 2002), sometimes as a result of highly restricted ranges due to habitat connectivity issues and evolutionary history. Stygofauna and troglofauna are known to occur widely in much of Western Australia with many locally endemic species present.

The high degrees of local endemism and lack of habitat connectivity make subterranean fauna susceptible to impacts from localised projects (Ponder & Colgan 2002), with species' extinction a real possibility if they are not adequately considered during project planning phases.

1.1 Purpose of this report

Focus has requested Invertebrate Solutions to undertake the following scope of works for the Project:

- Undertake a desktop review for stygofauna and troglofauna presence.
- Undertake a risk assessment for impacts to stygofauna and troglofauna from the proposed development.
- Provide recommendations to minimise potential impacts and any suggested requirements for further work to comply with relevant legislation.
- Provide a written report containing the above items.

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Figure 1 Coolgardie Gold Project – Alicia, Big Blow, Bonnievale, Brilliant, CNX, Greenfields and Happy Jack deposit Areas, Coolgardie Project subterranean fauna desktop study area.

1.2 Desktop Study Area, Project Areas and Background Environmental Information

The Project areas are centred around the Coolgardie townsite, in the Goldfields region of Western Australia and shown in Figure 1. The seven separate areas comprising the Project are the Alicia, Big Blow, Bonnievale, Brilliant, CNX, Greenfields and Happy Jack deposit areas

The Desktop Study area is rectangular and consists of sides approximately 50 km in length (~250,000 Ha), bounded by the north west corner (30.677928°S, 120.908854°E) and the south east corner (31.153665°S, 121.417397°E). The study area is centred on the project and was used for the purposes of database searches and relevant literature (Figure 1).

The Interim Biogeographic Regionalisation of Australia (IBRA) classifies Australia's landscapes into 89 large geographically distinct bioregions based on common climate, geology, landform, native vegetation, and species information (DAWE 2022). The Project is located within the Coolgardie (IBRA) bioregion, which has an arid to semi-arid warm Mediterranean climate. The bioregion is characterised by Mallees and low scrub on sandplains with lateritised uplands, playas and granite outcrops. Eucalyptus woodlands contain diverse and endemic species on low greenstone hills, valley alluvials and broad plains of calcareous earth. In the west, the scrub is rich in endemic Proteaceae, while in the east they are rich in endemic Acacia species. Drainage is internal to playas and salt lakes (Environment Australia 2000).

The land tenure for the Project area consists of pastoral Crown and Unallocated Crown Land and the localised climate is classified as warm and temperate with an average annual rainfall of 269 mm recorded at the Bureau of Meteorology (BoM) Station 12018 in Coolgardie (BoM, 2022), which is located centrally within the Desktop Study area. Annual rainfall is highly variable, but with the majority of rainfall occurring during the late summer through to winter months linked to both cyclonic events (January to March) and southern fronts (April – August) (Plate 1).

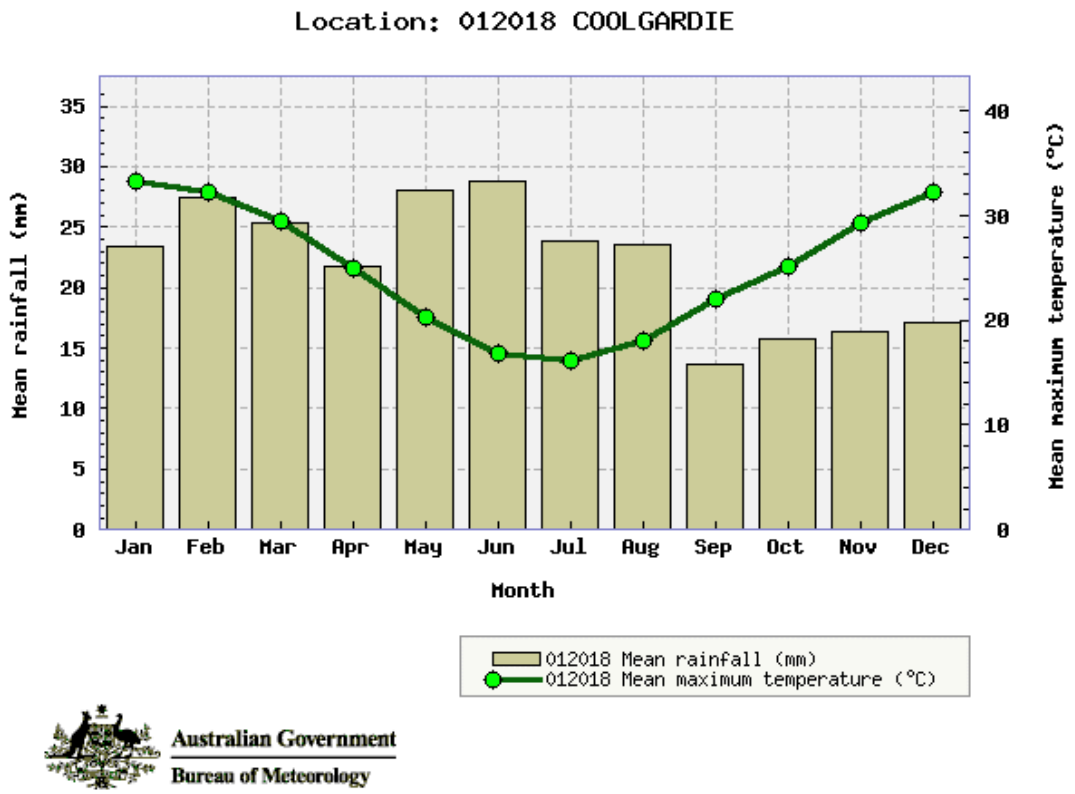


Plate 1 Coolgardie long term climate data (After BOM.gov.au).

1.3 Documents examined

The following documents have been examined in the compilation of this report, along with other referenced scientific papers used to provide general background:

- Kern, A.M. (1995). Hydrogeology of the Kalgoorlie 1:250,000 sheet. Geological Survey of Western Australia, Department of Minerals and Energy. Hydrogeological Series Explanatory Notes, 16p.

This report has been prepared with regard to the Technical Guidance – Subterranean Fauna Surveys for Environmental Impact Assessment (EPA2021).

1.4 Conservation Legislation and Guidance Statements

Subterranean fauna are protected under state legislation via the newly enacted *Biodiversity Conservation Act 2016* (BC Act) which came into force on 1st January 2019, replacing the *Wildlife Conservation Act 1950* (WC Act). The new BC Act is aligned with the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The assessment of subterranean fauna for environmental impact assessment (EIA) is undertaken in Western Australia with regard to the Technical Guidance – Subterranean Fauna Surveys for Environmental Impact Assessment (EPA2021). A summary flowchart of the assessment process for subterranean fauna is shown in Plate 2.

At the State level, the BC Act provides a list of species that have special protection as listed under Part 2 of the BC Act, 2016. This notice is updated periodically by the Department of Biodiversity, Conservation and Attractions (DBCA) (formerly the Department of Parks and Wildlife (DPaW)) and the current list (November 2019) includes numerous subterranean species mainly from the Cape

Range and Pilbara regions. Included in the list are crustaceans, arachnids and myriapods that are considered to be "rare or likely to become extinct, as critically endangered fauna, or are declared to be fauna that is in need of special protection" (DPaW 2015). In addition to the specially protected fauna, DBCA also maintains a list of Priority fauna that are considered to be of conservation significance but do not meet the criteria for formal listing under the BC Act. The Priority fauna list is irregularly updated by DBCA and, although it offers no formal legislative protection, these species are generally considered in the EIA process.

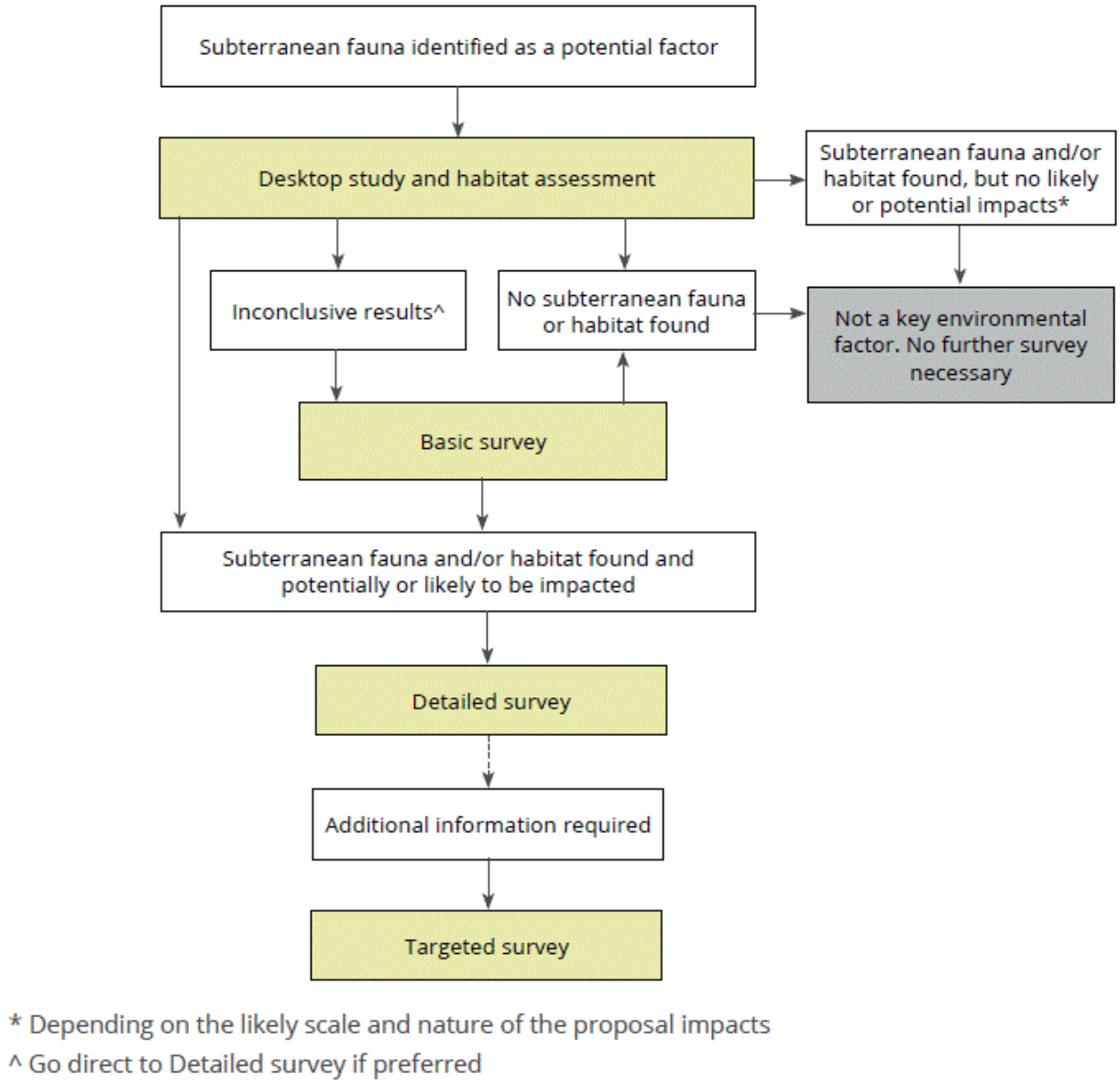


Plate 2 Flowchart of the process for undertaking subterranean fauna assessments for impact assessment in Western Australia (EPA 2021).

The *BC Act* now provides the ability for the state government of Western Australia to formally list Threatened Ecological Communities (TECs), along with threatening processes. Several subterranean ecological communities are recognised as Threatened including the Bundera Cenote Anchialine community on Cape Range, Cameron's Cave near the townsite of Exmouth on Cape Range, stygal root mat communities in both the Yanchep and Margaret River regions and stygobionts in the Ethel Gorge aquifer in the Pilbara.

The federal *EPBC Act* protects both species and ecological communities. The most relevant listings for subterranean fauna include the Bundera Cenote on the western side of the Cape Range which contains a unique anchialine ecosystem including the stygal Cape Range Remipede *Kumonga exleyi* (Yager and Humphreys 1996) that is listed as Vulnerable. The Cape Range gudgeon *Milyeringa veritas* and the Cape Range blind eel *Ophisternon candidum* (Humphreys 2008) are also listed as Vulnerable species from subterranean habitats on the Cape Range. No EPBC listed subterranean species occur in the Goldfields region.

1.5 Classifications of subterranean dependence

Subterranean fauna is a collective term that refers to both troglofauna (terrestrial subterranean fauna inhabiting air voids) and stygofauna (aquatic subterranean fauna) (Humphreys 2000). Extensive amounts of jargon has historically been associated with subterranean fauna and multiple forms of classification have been used through time (Sket 2008). The most commonly accepted classifications divide troglofauna into categories that describe a particular species' degree of dependence upon the subterranean environment. Due to the reliance upon ecological information to determine if a species is a troglobite, the concept of troglomorphy (Christiansen 1962), specific morphological adaptations to the subterranean environment, is used to define obligate subterranean species. The term troglomorphy, initially confined to morphology, has since been used to describe both morphological or behavioural adaptations (Howarth 1973). This combination provides a practical system, easily applied in the field and requires minimal detailed ecological studies (Sket 2008). The level of subterranean dependency for different ecological groupings is described below:

- Troglobiont: animals that are obligate subterranean species, and mostly show morphological adaptation to subterranean habitats (troglomorphisms) including depigmentation, loss or reduction of eyes, elongation of appendages, flightlessness or wing reduction, and extra sensory hairs.
- Troglophiles: animals that can complete their entire lifecycle within a cave but possess no specific adaptations to the cave environment. These species are capable of living outside caves in suitably dark and moist epigean habitats.
- Trogloxenes: animals that use the subterranean environment but require surface environments to complete part of their lifecycle (generally either feeding or breeding). Common trogloxenes are cave dwelling bats, cave swiftlets and cave crickets that leave subterranean habitats to feed.

The terms above refer to stygofauna when the prefix is altered to stygo (Humphreys 2000).

Species which inhabit the deep soil habitat (Edaphophiles) often exhibit convergent morphological adaptations to those animals found exclusively within caves, such as loss/reduction of eyes, body

flattening, loss of pigmentation etc. Soil dwelling species typically lack restrictions in distribution, as these organisms have experienced relatively minimal isolation in evolutionary timeframes, thus, only true troglobitic animals are studied in subterranean fauna surveys. Taxa discussed in this study were assessed upon their combination of loss/reduction of eyes, and reduction in pigmentation, wing development, and elongation of appendages to assess if a taxa was an edaphophile or truly reliant upon the subterranean habitat (Troglobiont).

1.6 Report Limitations and Exclusions

This study was limited to the written scope provided to the client by Invertebrate Solutions (24th February 2021) and in Section 1.1. This study was limited to the extent of information made available to Invertebrate Solutions at the time of undertaking the work. Information not made available to this study, or which subsequently becomes available may alter the conclusions made herein.

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

The opinions, conclusions and any recommendations in this report are based on assumptions made by Invertebrate Solutions described in this report (this section and throughout this report). Invertebrate Solutions disclaims liability arising from any of the assumptions being incorrect.

Invertebrate Solutions has prepared this report on the basis of information provided by Focus Minerals Ltd, 360 Environmental Pty Ltd and others (including Government authorities), which Invertebrate Solutions has not independently verified or checked beyond the agreed scope of work. Invertebrate Solutions does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

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

1.7 Assumptions and Limitations

Invertebrate Solutions has made the following assumptions in the writing of this report and its subsequent conclusions:

- No significant dewatering will be required for the mining proposal and operations will not impact the regional watertable.
- Existing borefield(s) and water allocations will be sufficient for construction and process water.

2. Desktop Methods

The subterranean fauna desktop review comprises:

- An assessment of the likelihood that subterranean species are present in the habitats located within the study area.

The likelihood of stygofauna and troglofauna species occurring in the study area was assessed using a combination of regional information, geological, hydrogeological and database searches including:

- Analysis of published and unpublished reports concerning subterranean fauna from the region.
- Available geological maps.
- Geological, geotechnical and hydrogeological information available for the Study area.
- Results of a Protected Matters Search from the Commonwealth Department of Agriculture, Water the Environment (DAWE) website.
- Records of fauna held by the Western Australian Museum.

Based on the analysis of all available information the study area was assigned a level of likelihood to support subterranean fauna of either 'Low', 'Moderate', 'High', or 'Definite'.

3. Desktop Subterranean Fauna Review

3.1 Subterranean fauna in the Yilgarn

A wide variety of differing geologies within the Yilgarn provide numerous opportunities for subterranean fauna to be present. The most likely habitat for both stygofauna and troglofauna are the sometimes extensive and numerous calcrete outcrops, many of which are listed as Priority Ecological Communities (PECs) for their endemic stygofauna assemblages (Cooper et al. 2002; Cooper et al. 2007; Watts and Humphreys 2003; Watts and Humphreys 2004; Guzik et al. 2011). The upper unsaturated portions of Yilgarn calcretes contain troglofauna including pseudoscorpions, spiders, palpigrades and isopods (Barranco & Harvey 2008, Baehr et al. 2012, Cooper et al. 2008, Edward & Harvey 2008 and Platnick 2008). The diversity of troglofauna in calcrete can be exceptionally high with 45 species of troglofauna recorded from the Yeelirrie calcrete (Bennelongia 2015) and 20 species at Lake Maitland (Outback Ecology 2011).

The presence of subterranean fauna in other lithologies is mixed with palaeochannel aquifers often being host to stygofaunal assemblages, but not as diverse as surfical calcrete aquifers (GHD 2012). This is due to lower hydraulic conductivity in palaeochannel aquifers compared with highly transmissive calcrete aquifers. Smaller and less well connected pore spaces limits the infiltration and dispersion of oxygen and carbon into subterranean habitats (Hose et al. 2015).

The lithologies associated with gold deposits tend to have smaller voids with less connectivity that makes them less preferable to host subterranean fauna unless the rocks are highly fractured. Intense weathering profiles of many gold bearing lithologies also reduce the likelihood of subterranean fauna with available pore spaces clogged with clay weathering products from the saprolitic zone. Troglofauna surveys at the Tropicana project recorded only four troglofauna species (Ecologia 2009a), compared with more vuggy Banded Iron Formation (BIF) habitats such as those surveyed at Weld Range, Koolyanobbing and Mt Jackson that have yielded moderately rich troglofauna communities (Ecologia 2009b, Bennelongia 2008a; Bennelongia 2008b).

Analysis has shown that there is little correlation between water quality and geology for predicting the presence of stygofauna, however, the non-random siting of groundwater wells in highly transmissive locations within various geologies has undoubtedly created a bias in the data (Halse et al. 2014). When stygofauna is present it does, however, show high levels of endemism with 98% of the stygobites and 83% of the other groundwater species recorded in the Pilbara being endemic (Halse et al. 2014). Stygofauna communities within the Yilgarn show similar patterns of endemism associated with calcrete aquifers. The majority of calcrete aquifers sampled in a systematic manner have revealed the presence of high degrees of stygofaunal and to a lesser degree troglofauna endemism, with many calcretes listed as PECs by DBCA under the BC Act (2016).

3.2 Conservation Significant Fauna and Habitats

A list of conservation significant subterranean invertebrate fauna for the Desktop Study Area was compiled from the DBCA Wildlife Conservation (Specially Protected Fauna) Notice 2019 (DBCA 2019) and the DAWE's Protected Matters Search Tool (PMST, 9th July 2021, 50 km search). No subterranean species that are listed under the BC Act and/or the EPBC Act are likely to occur, or

have known habitat within the Desktop Study Area. The PMST results listed no known subterranean fauna within the Desktop Study Area. A full description of the DBCA and EPBC conservation codes are shown in Appendix 1 and 2 respectively. The full list of species obtained from the PMST search is shown in Appendix 2.

3.3 Subterranean Fauna Habitat in the Coolgardie Area

The Kalgoorlie 1:250,000 sheet area, that includes Coolgardie area are greenstone rocks and generally host local aquifers containing saline to hypersaline groundwater (Kern, 1995). Groundwater storage is largely limited to secondary porosity from fracturing in discrete localised areas. Aquifers associated with each of the three Project areas have been demonstrated by pump testing to be limited in extent (Aquageo 2021). Kern (1995) also reports limited interconnectivity of the fractured rock aquifer zone with recharge likely to be local.

The fractured bedrock is characterised by secondary permeability resulting from tectonic fracturing and further enhanced by chemical dissolution. Fractured-bedrock aquifers occur more commonly in mafic, ultramafic, and granitic rocks than in sedimentary or felsic volcanic and volcaniclastic rocks with open fractures occurring up to a depth of 125 m along major faults and shear zones (Kern 1995)

The ultramafics and other volcanics are generally considered to be poor habitat for troglofauna or stygofauna unless they are highly fractured locally (Table 1). Examination of diamond drill core from the Project areas (Plate 3 and Plate 4) has shown fracturing to be absent in the most part or minor, and provides little opportunity for subterranean fauna.

The local granitoids are also considered to have poor subterranean fauna suitability due to being massive in nature with minor foliation and a general absence of interconnected voids except at a localised permeable horizon immediately above the fresh bedrock (Kern 1995, Table 1, Plate 3). Pegmatite dykes and quartz veins are highly fractured and can locally form important aquifers (Kern 1995), however, in general the granitic rock are considered to be poor aquifer hosts in the Coolgardie and Kalgoorlie region and hence are considered to have a low likelihood of forming suitable stygofauna habitat (Table 1, Plate 5).

The presence of the Bonnievale palaeochannel aquifer to the north of the Project areas provides some limited habitat for stygofauna, as it is comprised of fine grained sand, confined by a clay and silt layer (Kern 1995, Table 1). The fine grained sand provides potential for large amounts of water storage, but generally lacks the interconnected void spaces required for stygofauna habitat. The Palaeochannel and its associated aquifer is some distance (approximately 5 km) from the Bonnievale Project area, and approximately 10 – 12 km north of the Alicia, Big Blow, Happy Jack, Greenfields, CNX, and Brilliant Project areas and due to the tight localised geology of the Project areas any dewatering is not anticipated to extend laterally any significant distance (Aquageo 2021).



Plate 3 Mafic (upper) and granitic (lower) core (BONDD068) from the Bonnievale Project Area showing no fracturing at depth that would provide potential habitat for stygofauna.

Table 1 Geological units in the Coolgardie area and Subterranean fauna habitat potential.

Unit	Description / Remarks	Subterranean Fauna Suitability
Colluvium and alluvium	Quartz sand and soil	Low for stygofauna and troglofauna.
Bonnievale Palaeochannel	Sand confined by clay and silts	Low to Moderate for stygofauna (hypersaline) Nil for troglofauna (saturated)
Coolgardie Sill	Basalt	Low for stygofauna (Moderate if highly fractured) Low for troglofauna
Granitoids	Intrusive granodiorite	Low for stygofauna (Moderate if highly fractured) Low for troglofauna
Archean basement greenstones	Partially remelted Archean ultra mafics, komatiites	Low for stygofauna and troglofauna unless highly fractured.

3.4 Likelihood of stygofauna presence

A search was undertaken of the Western Australian Museum databases for Crustaceans (WAM 2021a) and Arachnids/Myriapods (WAM 2021b). The results of these searches were filtered for subterranean stygofauna species. No stygofauna records are present within the WAM database records.

It should be noted that only WAM records from the Arachnida/Myriapoda, and Crustacean databases are available to determine subterranean species and does not include records of Insects (i.e. Stygobiontic diving beetles) as the WAM Insect database is unavailable for database searches.

Water quality in the Greenfields Project area is largely hypersaline with historical total dissolved solids (TDS) measurements of between 28,000 mg/L to 40,000 mg/L further reducing the likelihood that stygofauna are present within the local aquifers. Although stygofauna have occasionally been recorded in hypersaline groundwater (up to 35,000 mg/L TDS), this has mostly been associated with aquifers at the edges of salt lakes and the majority of hypersaline waters have not been found to contain stygofauna. No water quality data was available for the Alicia, Big Blow, Brilliant, CNX, Happy Jack or Bonnievale Projects, however, the majority of groundwater in the Coolgardie region, especially at depth is saline to hypersaline (Kern 1995, Invertebrate Solutions 2020).

The absence of stygofauna records from the Coolgardie and Kalgoorlie area would suggest that stygofauna habitat, and therefore stygofauna is generally absent or present in very low abundance, although it is unknown what sampling intensity has previously been undertaken and it may be due to a paucity of sampling. It is, however, reasonable to conclude that stygofauna have a low likelihood of occurrence within the Project areas examined especially when considering the absence of available habitat within core examined and sub-optimal water quality.

The core photos from the three project areas examined all showed a general absence of any fracturing at depth that may provide secondary porosity necessary to provide habitat for stygofauna (Plate 3, Plate 4, Plate 5, Plate 6, Plate 7).

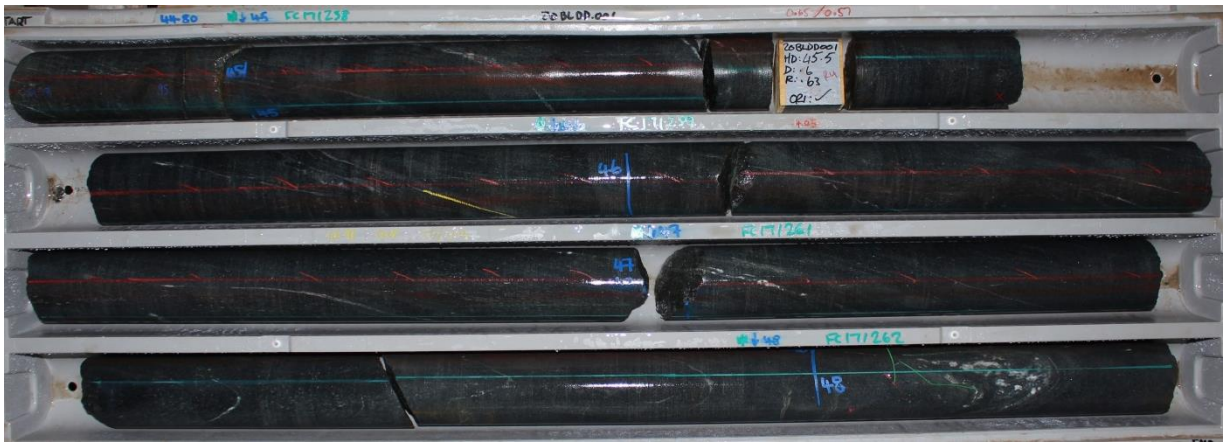


Plate 4 Ultra mafic rock from the Brilliant Project area showing no fracturing at depth that would provide potential habitat for stygofauna.



Plate 5 Ultra mafic and pegmatitic rock from the Greenfield Project area showing no fracturing at depth that would provide potential habitat for stygofauna.

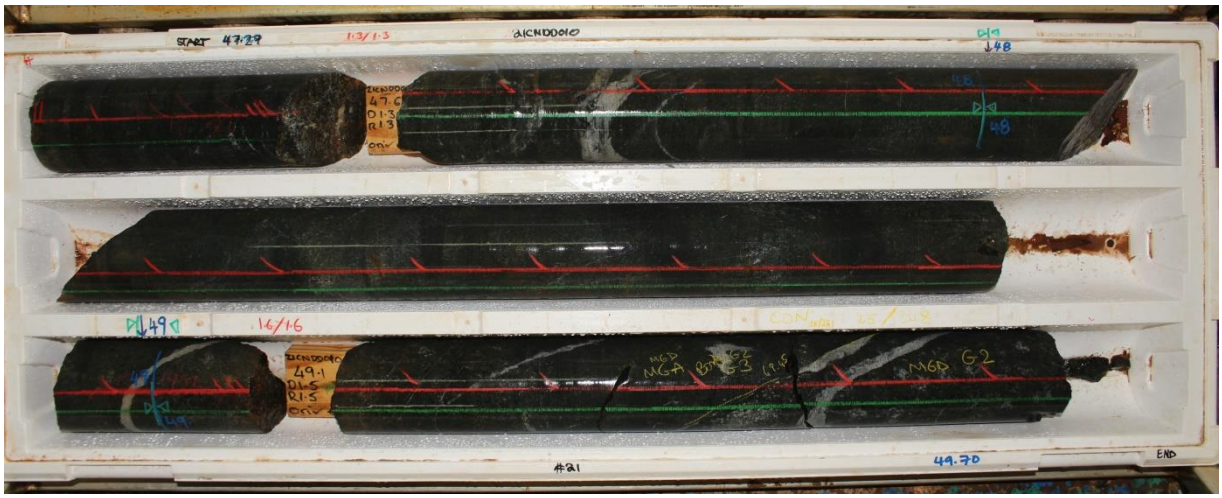


Plate 6 Ultra mafic rock from the CNX Project area showing no fracturing at depth that would provide potential habitat for stygofauna.

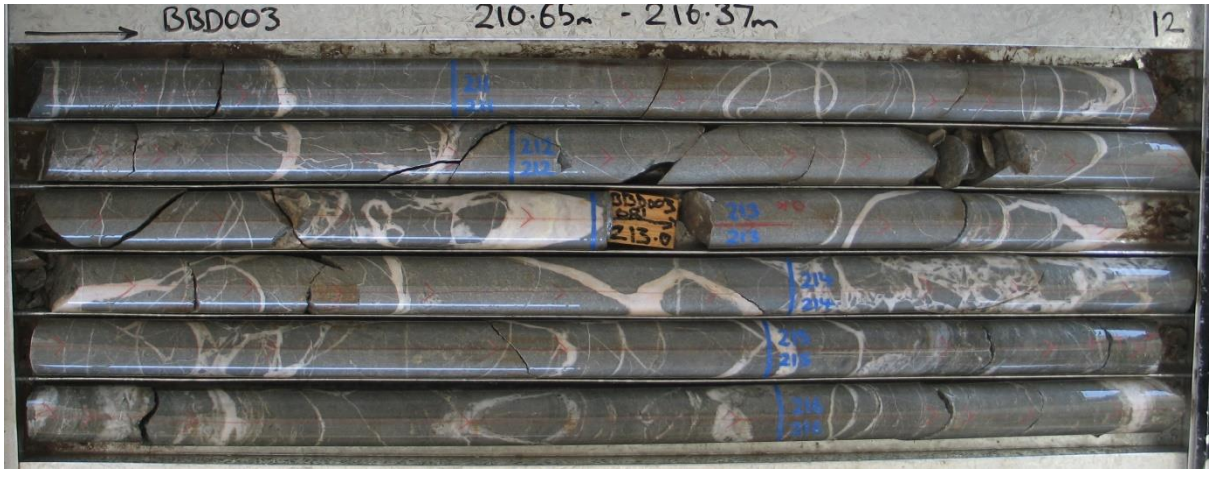


Plate 7 Mafic rock with quartz veins from the Big Blow Project area showing no fracturing at depth that would provide potential habitat for stygofauna.

3.5 Likelihood of troglofauna presence

A search was undertaken of the Western Australian Museum databases for Crustaceans (WAM 2021a) and Arachnids/Myriapods (WAM 2021b). The results of these filtered for subterranean troglofauna species. No troglofauna has been recorded from within the Desktop Study Area in databased WAM records.

The absence of troglofauna records from the Coolgardie and Kalgoorlie area would suggest that troglofauna is generally absent or present in very low abundance, although it is unknown what sampling intensity has previously been undertaken and it may be due to a paucity of sampling.



Plate 8 Clay dominated non-saturated zones in the Bonnievale area shows Low or Nil troglofauna habitat potential.



Plate 9 Clay dominated non-saturated zones in the CNX area shows Low or Nil troglofauna habitat potential.

The overlaying colluvium, known as the Mesovoid Shallow Substratum (MSS) is virtually un-sampled, but is increasingly known worldwide to contain significant troglobiont communities (Ortuño 2013); however, the sand and soil dominated nature of this colluvium makes the likelihood low that it will contain troglofauna in this particular area.

Core photos examined for the upper non-saturated zone confirm the absence of suitable fracturing that provides interconnected void space in the upper rock strata that may provide habitat for troglofauna. The alluvium and colluvium deposits surrounding and within the majority of the Project areas have a low suitability for troglofauna habitat, due to the fine silty nature of the alluvium that also infills any minor voids or fractures (Plate 8 and Plate 9).

4. Conclusions and Recommendations

The Coolgardie Gold Project – Alicia, Big Blow, Bonnievale, Brilliant, CNX, Greenfields and Happy Jack deposit Areas, Coolgardie, is within the Norseman-Wiluna Greenstone Belt of the Eastern Goldfields Province, which is largely covered in shallow colluvium and alluvium. The colluvium and alluvium lithologies surrounding and within much of the seven Project areas have a low suitability for both troglofauna and stygofauna habitat due to the absence of interconnected voids in these fine grained units. The ultramafics and other volcanics are generally considered to be poor habitat for troglofauna or stygofauna unless they are highly fractured locally. The intrusive granitoids are also considered to have poor subterranean fauna suitability due to a general absence of interconnected voids unless they are highly locally fractured. Examination of diamond drill core from the Project areas has shown fracturing to be absent in the most part, or minor and provides little opportunity for subterranean fauna. Water quality in the Coolgardie Gold Project area is largely hypersaline (Focus Minerals 2021) further reducing the likelihood that stygofauna are present within the local aquifers.

The absence of stygofauna and troglofauna records from the Coolgardie area would suggest that subterranean habitat, are generally absent or present in very low abundance, although it is unknown what sampling intensity has previously been undertaken and it may be due to a paucity of sampling. It is reasonable to conclude that subterranean fauna have a low likelihood of occurrence within the seven Project areas, when considering the absence of potential voids and cracks and the hypersaline nature of the groundwater.

No further survey work for stygofauna or troglofauna is necessary in order to meet the Technical Guidance – Subterranean Fauna Surveys for Environmental Impact Assessment (EPA2021).

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Appendix 1

DBCA Conservation Categories

Appendix 2

Protected Matters Search Results

www.invertebratesolutions.com

Appendix C: Addendum – *Dasyurus geoffroii*

SLR Consulting Australia
Level 1, 500 Hay Street, Subiaco WA 6008, Australia

14 November 2024

Attention: Gemma Blick
Focus Minerals Limited
Level 5, 8 St Georges Terrace
Perth WA 6000

RE: Coolgardie Gold Project Biological Survey - 360 Environmental 2021

Dear Gemma

360 Environmental Pty Ltd (now SLR Consulting Australia (SLR)) was commissioned by Focus Minerals Limited (FML) to undertake a biological survey to support the environmental approval process for an expansion of FML's Coolgardie operations in 2021. During this survey, 360 personnel observed what they considered to potentially be a Chuditch (*Dasyurus geoffroii*) scat. We understand that, based on the report's finding, the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) imposed conditions related to the Chuditch.

SLR notes that at the time the 360 Environmental report was written, the Species Profile and Threats Database indicated that the species or species habitat may occur within the survey area. This combined with the scat informed the conclusions made in the report. We note that scat identification cannot be definitive without genetic testing. Such testing would have provided clarity regarding whether the scat was from a Chuditch. Unfortunately, genetic testing was outside the scope of our works and the scat has not been retained and thus cannot be tested now.

In response to your query SLR reviewed the 2021 360 Environmental report findings, including the information on the scat in question, and considered the most up-to-date distribution maps from Strahan's Mammals of Australia (Baker & Gynther, 2023). As noted above scat identification cannot be definitive without genetic testing and the distribution maps indicate that the survey area is outside the currently known distribution of the Chuditch. SLR therefore considers that, on the balance of probabilities, Chuditch does not occur within the survey area and we therefore believe that the approval conditions related to the Chuditch have little basis and would serve no useful purpose.

Regards,

SLR Consulting Australia

Appendix D: Addendum – *Jalmenus aridus*

From: Rod Eastwood
To: Gemma Blick; Michael Lohr
Subject: Re: Inland Hairstreak Paper
Date: Thursday, 3 October 2024 5:58:15 PM
Attachments: image004.png
image005.png

Hello Gemma,

I can confirm that I searched for the P1 listed butterfly, *Jalmenus aridus* (Inland Hairstreak) when we surveyed the Three Mile Project, Coolgardie for the Critically Endangered butterfly (*Ogyris petrina*, aka ABAB) on 15-16/12/2021 (I do this routinely on all surveys). This was the first record of *J. aridus* occurring in December, so I was a little surprised to find them at that time. I can also confirm that the majority of the habitat was unsuitable for either butterfly species. No *Camponotus* sp. nr. *terebrans* ants (the host ant for *Ogyris petrina*), were located during the survey so the entire survey area does not support the ABAB butterfly.

The small population of *J. aridus* I found in Kangaroo Hills Timber reserve was collected on 14/10/2023 so I cannot say for certain that *J. aridus* does not occur in other areas on the Three Mile Project site in October or other times of year. However, I believe it would be impractical or excessive to test this.

Jalmenus aridus was first found at Lake Douglas in 1983 and was subsequently listed as Priority 1 (data deficient) since it was only known to occur at the single site. In 2021 a new population was found at Kalgoorlie and today the butterfly is known from 16 breeding sites with its Extent of Occurrence (EOO) measuring 8500 sq. km (data not yet published). So it seems likely that the butterfly is not as rare as was first thought.

Feel free to ask if you have any more questions.

Regards,

Rod.
****
Rod Eastwood PhD
133/1 Rowe Avenue
Rivervale, WA 6103
Australia
Phone: +61 (0)476 054 927

Research Associate
Western Australian Museum
****

On Thu, Oct 3, 2024 at 11:22 AM Gemma Blick <gblick@focusminerals.com.au> wrote:

> Hi Rod,
>
> Further to Mikes email below, can you please confirm what he mentioned around the 2022 ABAB survey areas on our tenements in Coolgardie that were surveyed being unlikely to support the Inland Hairstreak and also that you searched for them during that survey.
>
> Kind Regards
>
> Gemma
>
> **Gemma Blick**
> **Environment Manager**
> **T:** +61 8 9215 7888 | **M:** 0427 618 533
>
> **Focus Minerals Limited**
> Level 5, 8 St Georges Terrace
> Perth WA 6000
> PO Box 3233

East Perth WA 6892

BEFORE PRINTING THIS E-MAIL
please consider the environment

From: Michael Lohr <mlohr@slrconsulting.com>
Sent: Thursday, 3 October 2024 11:16 AM
To: Gemma Blick <gblick@focusminerals.com.au>
Cc: Rod Eastwood <rodeastwood6@gmail.com>
Subject: Inland Hairstreak Paper

Hi Gemma,

It was great to talk earlier. Here is the paper I mentioned. I spoke to Rod and he confirmed that most to the habitat within the survey area would not be likely to support Inland Hairstreak but he mentioned that he subsequently detected another population on conservation tenure land relatively close to the populations we found within the survey area. I've copied Rod in in case you have any follow up questions about the sufficiency of the survey we did to detect the Inland Hairstreak across the survey area. Please reach out if you require any additional surveys for the planned expansions.

Cheers,

Mike

Dr Michael Lohr ***(he/him/his)***
Principal Zoologist - Ecology & Biodiversity
Fauna Ecology Team Leader

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Appendix E: Pre-clearance surveys completed to meet conditions of CPS 10870/1

TERRESTRIAL ECOSYSTEMS

Ref: 2025-0131-002-st

26 August 2025

Trinity Vallance
Senior Environmental Advisor
Focus Minerals
PO Box 3233
East Perth WA 6892

Re: Pre-clearance inspection for the CNX project area

Dear Trinity

Terrestrial Ecosystems is pleased to provide a report on its pre-clearance survey of ~66ha of habitat in the CNX project area (i.e., project area; Figure 1). This assessment was completed to satisfy the conditions of Clearing Permit 10870/1, listed below.

Clearing permit 10870/1:

> 9. Fauna management – Malleefowl
>
> Where clearing authorised under this Permit is to occur between 1 September and 31 January, the Permit Holder shall:
>
> a) Within two weeks prior to undertaking any clearing, engage an *environmental specialist* to conduct an inspection of the area to be cleared to identify *active (in use) Malleefowl (Leipoa ocellata) mounds*.
> b) Where an *active (in use) Malleefowl mound* is identified under Condition 9(a) of this Permit, the Permit Holder shall ensure that no clearing occurs within 200 metres of the mound, during the months of September through to January, unless first approved by the CEO.
>
> 10. Fauna management - southern whiteface
>
> Where clearing authorised under this permit is to occur between 1 July and 31 October, the permit holder shall:
>
> a) Within two weeks prior to undertaking any clearing, engage a *fauna specialist* to conduct an inspection of the area to be cleared to identify *active (in use) southern whiteface* (*Aphelocephala leucopsis) nests.*
> b) Where an *active (in use) southern whiteface (Aphelocephala leucopsis) nest* is identified under Condition 10(a) of this Permit, the Permit Holder shall ensure that no clearing occurs within 10 metres of the nest, during the months of July through to October, unless first approved by the *CEO*.



Figure 1. Survey area

Terrestrial Ecosystems' staff have completed numerous pre-clearance inspections, fauna surveys, and fauna assessments in the region and are familiar with the habitats and fauna expected in the project area.

Malleefowl (*Leipoa ocellata*)

Malleefowl is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act 1999*) and *Biodiversity Conservation Act 2016* (*BC Act 2016*).

Malleefowl are large, ground-dwelling birds that rarely fly unless alarmed or are perching for the night. Historically, Malleefowl have been found in mallee regions of southern Australia from approximately the 26th parallel of latitude southwards. Before vegetation clearing for agriculture, Malleefowl were abundant in the WA Wheatbelt and many areas to the east. Vegetation clearing for agriculture also opened adjacent bushland to predators, and in the southwest of WA, Malleefowl often now only persist in isolated remnant patches of native vegetation, particularly in the Goldfields.

Malleefowl build distinctive nests that comprise a large mound of soil/rock covering a central core of leaf litter. These nest mounds range in diameter but span more than five metres and may be up to one metre high. Malleefowl are generally monogamous, and once breeding commences, they pair for life. The terrestrial activity of Malleefowl and building their mounds on the ground means that the birds, their eggs, and newly hatched chicks are vulnerable to foxes, cats, and raptors (Benshemesh, 2007; Benshemesh & Burton, 1999; Lewis & Hines, 2014; Priddel & Wheeler, 1990) The presence of active or recently active nest mounds provides a good indication of the presence of Malleefowl in an area.

The preferred habitat for Malleefowl is shrubs and thickets of mallee *Eucalyptus* spp., *Melaleuca lanceolata*, *Acacia linophylla,* and any other dense litter-forming shrublands, however, they are also found in a diverse range of habitat types (Johnstone & Storr, 1998).

The National Recovery Plan for Malleefowl (Benshemesh, 2007) lists vegetation clearing, habitat fragmentation and isolation, sheep grazing, predation by foxes, and, to a lesser extent, cats, raptors, wild dogs, bushfires, and climate change as the primary threats to the survival of this species. Conservation and preservation strategies are focussed on habitat protection, in particular, the use of conservation reserves (e.g. Australian Wildlife Conservancy's reserve at Mt Gibson, and Bush Heritages reserves at Eurardy and Charles Darwin), improved fire management, fencing to contain sheep or exclude them from remnant vegetation in agricultural lands, habitat regeneration and improved connectivity, reducing goats and predator control (Benshemesh, 2007).

The potential presence of Malleefowl in mining, exploration, or infrastructure areas requires that the company manage threats to avoid, minimise, and mitigate potential impacts. This bird has been recorded in the adjacent areas and broader region, however, there are no known records in the project area.

Southern Whiteface (*Aphelocephala leucopsis*)

Southern Whiteface is listed as Vulnerable under the *EPBC Act and BC Act*.

It is a small bush bird found in the arid and semi-arid interior from the WA coast near Hamelin Bay through the Great Victoria Desert into the arid areas of South Australia, Victoria, NSW and Queensland (Department of Climate Change Energy the Environment and Water, 2023; Johnstone & Storr, 2004).

It is found in open woodlands and shrublands with an understorey of grasses and low shrubs (Department of Climate Change Energy the Environment and Water, 2023). It forages on the ground, feeding on insects, spiders and seeds that are mostly found in the leaf litter. (Department of Climate Change Energy the Environment and Water, 2023; Johnstone & Storr, 2004).

Survey methodology

Dr Scott Thompson (Terrestrial Ecosystems Principal Zoologist) completed a site inspection and assessment on 25 August 2025 with the assistance of Trinity Vallance from Focus Mineral Ltd. The site assessment was conducted using foot transects, and the openness of the habitat determined the density of searches. Plates 1-8 show the variations in habitat type and quality across the site. Some of the assessed areas overlapped with previously cleared habitat.

If Malleefowl mounds were located, the Terrestrial Ecosystems zoologist would collect data consistent with the National Malleefowl Monitoring System. At each known location, the mound would be classified on a 6-point rating as follows:

1. Typical crater with raised rim – this is a typical shape of an inactive mound, and it can be open or closed;
2. Mound fully dugout – the characteristic of this profile is that the crater slopes down steeply and at the base, the sides drop vertically to form a box-like structure with side usually 20-30 cm deep. Often litter may have been raked into windrows and may have started to enter the mound;
3. Mound with litter – this is the next stage after profile 2. Litter will have been raked into the mound by Malleefowl and thick layers of litter are evident on the surface. There may or may not be sand mixed with the litter at this stage;
4. Mound mounded up but no crater – this is the typical profile of an active by unopened mound;
5. Mound forms a sandy crater with peak in the centre – this is a profile of an active mound that is in the process of being closed by the Malleefowl; and
6. Mound low and flat without a peak or crater.



In addition to the mound profile rating, details regarding the dimensions and status of each mound would be recorded. Any mounds would be photographed, and the surrounding area would be searched for evidence of activity and use (e.g., scats, footprints, feathers, eggshells, goanna diggings, litter raked, etc.). This search would be conducted within a 25m radius of any mound.

If Malleefowl mounds were found, then Terrestrial Ecosystems' zoologist would place two sticks in an 'X' on top of each recently active mound. These sticks can be used on subsequent visits to determine whether there has been any activity at the mound.

Results

The project area habitat was open with good visibility (Plates 1-8). No Malleefowl tracks or mounds were recorded, and no Southern Whiteface were heard of or observed.

Some of the project area has recently been cleared for mining activity. A few fallen trees, stumps, piles of trees, and woody debris were present, but there were no good-quality woodland areas.

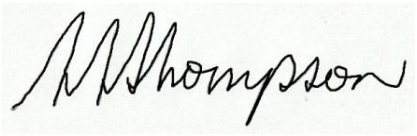
Discussion

No vertebrate fauna of conservation significance, no confirmed Southern Whiteface nests and no Malleefowl mounds were recorded. The habitat is disturbed, so it is not likely to be core habitat for Malleefowl.

As with all mining and exploration activities, Terrestrial Ecosystems encourages minimising vegetation clearing where possible so that development does not leave fragmented areas that can reduce habitat connectivity.

Please do not hesitate to contact the undersigned (0407 385 239) if you require any further information.

Yours sincerely



Dr Scott Thompson
Director and Principal Zoologist

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Plate 1. Project area habitat



Plate 2. Project area habitat



Plate 3. Project area habitat



Plate 4. Project area habitat



Plate 5. Project area habitat

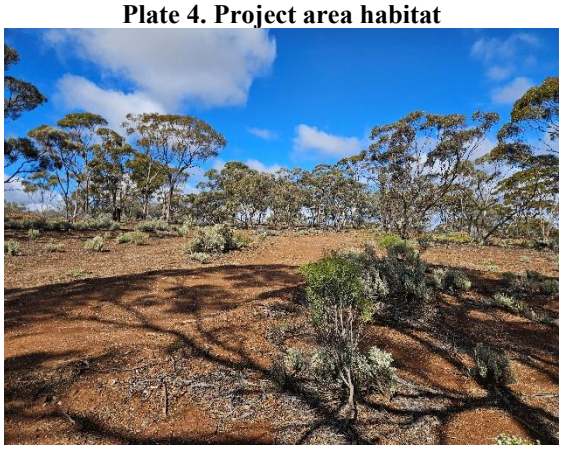


Plate 6. Project area habitat



Plate 7. Project area habitat – historical clearing



Plate 8. Project area habitat – historical clearing

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TERRESTRIAL ECOSYSTEMS

Ref: 2025-0144-003-st

9 September 2025

Trinity Vallance
Senior Environmental Advisor
Focus Minerals
PO Box 3233
East Perth WA 6892

Re: Pre-clearance inspection for the CNX project area

Dear Trinity

Terrestrial Ecosystems is pleased to provide a report on its pre-clearance survey of habitat in the CNX project area (i.e., project area; Figure 1). This assessment was completed to satisfy the conditions of Clearing Permit 10870/1, listed below.

Clearing permit 10870/1:

9. Fauna management – Malleefowl

Where clearing authorised under this Permit is to occur between 1 September and 31 January, the Permit Holder shall:

a) Within two weeks prior to undertaking any clearing, engage an *environmental specialist* to conduct an inspection of the area to be cleared to identify *active (in use) Malleefowl (Leipoa ocellata) mounds*.
b) Where an *active (in use) Malleefowl mound* is identified under Condition 9(a) of this Permit, the Permit Holder shall ensure that no clearing occurs within 200 metres of the mound, during the months of September through to January, unless first approved by the CEO.

10. Fauna management - southern whiteface

Where clearing authorised under this permit is to occur between 1 July and 31 October, the permit holder shall:

a) Within two weeks prior to undertaking any clearing, engage a *fauna specialist* to conduct an inspection of the area to be cleared to identify *active (in use) southern whiteface* (*Aphelocephala leucopsis) nests.*
b) Where an *active (in use) southern whiteface (Aphelocephala leucopsis) nest* is identified under Condition 10(a) of this Permit, the Permit Holder shall ensure that no clearing occurs within 10 metres of the nest, during the months of July through to October, unless first approved by the *CEO*.



Figure 1. Survey area
(portions of the area have been historically cleared)

Terrestrial Ecosystems' staff have completed numerous pre-clearance inspections, fauna surveys, and fauna assessments in the region and are familiar with the habitats and fauna expected in the project area.

Malleefowl (*Leipoa ocellata*)

Malleefowl is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act 1999*) and *Biodiversity Conservation Act 2016* (*BC Act 2016*).

Malleefowl are large, ground-dwelling birds that rarely fly unless alarmed or are perching for the night. Historically, Malleefowl have been found in mallee regions of southern Australia from approximately the 26th parallel of latitude southwards. Before vegetation clearing for agriculture, Malleefowl were abundant in the WA Wheatbelt and many areas to the east. Vegetation clearing for agriculture also opened adjacent bushland to predators, and in the southwest of WA, Malleefowl often now only persist in isolated remnant patches of native vegetation, particularly in the Goldfields.

Malleefowl build distinctive nests that comprise a large mound of soil/rock covering a central core of leaf litter. These nest mounds range in diameter but span more than five metres and may be up to one metre high. Malleefowl are generally monogamous, and once breeding commences, they pair for life. The terrestrial activity of Malleefowl and building their mounds on the ground means that the birds, their eggs, and newly hatched chicks are vulnerable to foxes, cats, and raptors (Benshemesh, 2007; Benshemesh & Burton, 1999; Lewis & Hines, 2014; Priddel & Wheeler, 1990) The presence of active or recently active nest mounds provides a good indication of the presence of Malleefowl in an area.

The preferred habitat for Malleefowl is shrubs and thickets of mallee *Eucalyptus* spp., *Melaleuca lanceolata*, *Acacia linophylla,* and any other dense litter-forming shrublands, however, they are also found in a diverse range of habitat types (Johnstone & Storr, 1998).

The National Recovery Plan for Malleefowl (Benshemesh, 2007) lists vegetation clearing, habitat fragmentation and isolation, sheep grazing, predation by foxes, and, to a lesser extent, cats, raptors, wild dogs, bushfires, and climate change as the primary threats to the survival of this species. Conservation and preservation strategies are focussed on habitat protection, in particular, the use of conservation reserves (e.g. Australian Wildlife Conservancy's reserve at Mt Gibson, and Bush Heritages reserves at Eurardy and Charles Darwin), improved fire management, fencing to contain sheep or exclude them from remnant vegetation in agricultural lands, habitat regeneration and improved connectivity, reducing goats and predator control (Benshemesh, 2007).

The potential presence of Malleefowl in mining, exploration, or infrastructure areas requires that the company manage threats to avoid, minimise, and mitigate potential impacts. This bird has been recorded in the adjacent areas and broader region, however, there are no known records in the project area.

Southern Whiteface (*Aphelocephala leucopsis*)

Southern Whiteface is listed as Vulnerable under the *EPBC Act and BC Act*.

It is a small bush bird found in the arid and semi-arid interior from the WA coast near Hamelin Bay through the Great Victoria Desert into the arid areas of South Australia, Victoria, NSW and Queensland (Department of Climate Change Energy the Environment and Water, 2023; Johnstone & Storr, 2004).

It is found in open woodlands and shrublands with an understorey of grasses and low shrubs (Department of Climate Change Energy the Environment and Water, 2023). It forages on the ground, feeding on insects, spiders and seeds that are mostly found in the leaf litter. (Department of Climate Change Energy the Environment and Water, 2023; Johnstone & Storr, 2004).

Survey methodology

Dr Scott Thompson (Terrestrial Ecosystems Principal Zoologist) completed a site inspection and assessment on 9 September 2025 with the assistance of Trinity Vallance from Focus Mineral Ltd. The site assessment was conducted using foot transects, and the openness of the habitat determined the density of searches. Plates 1-8 show the variations in habitat type and quality across the site. Some of the assessed areas overlapped with previously cleared habitat.

If Malleefowl mounds were located, the Terrestrial Ecosystems zoologist would collect data consistent with the National Malleefowl Monitoring System. At each known location, the mound would be classified on a 6-point rating as follows:

1. Typical crater with raised rim – this is a typical shape of an inactive mound, and it can be open or closed;
2. Mound fully dugout – the characteristic of this profile is that the crater slopes down steeply and at the base, the sides drop vertically to form a box-like structure with side usually 20-30 cm deep. Often litter may have been raked into windrows and may have started to enter the mound;
3. Mound with litter – this is the next stage after profile 2. Litter will have been raked into the mound by Malleefowl and thick layers of litter are evident on the surface. There may or may not be sand mixed with the litter at this stage;
4. Mound mounded up but no crater – this is the typical profile of an active by unopened mound;
5. Mound forms a sandy crater with peak in the centre – this is a profile of an active mound that is in the process of being closed by the Malleefowl; and
6. Mound low and flat without a peak or crater.



In addition to the mound profile rating, details regarding the dimensions and status of each mound would be recorded. Any mounds would be photographed, and the surrounding area would be searched for evidence of activity and use (e.g., scats, footprints, feathers, eggshells, goanna diggings, litter raked, etc.). This search would be conducted within a 25m radius of any mound.

If Malleefowl mounds were found, then Terrestrial Ecosystems' zoologist would place two sticks in an 'X' on top of each recently active mound. These sticks can be used on subsequent visits to determine whether there has been any activity at the mound.

Results

The project area habitat was open with good visibility (Plates 1-8). No Malleefowl tracks or mounds were recorded, and no Southern Whiteface were heard of or observed.

Some of the project area has recently been cleared for mining activity. A few fallen trees, stumps, piles of trees, and woody debris were present, but there were no good-quality woodland areas.

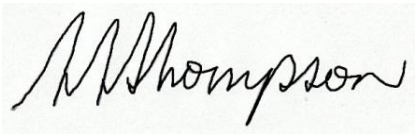
Discussion

No vertebrate fauna of conservation significance, no confirmed Southern Whiteface nests and no Malleefowl mounds were recorded. The habitat is disturbed, so it is not likely to be core habitat for Malleefowl.

As with all mining and exploration activities, Terrestrial Ecosystems encourages minimising vegetation clearing where possible so that development does not leave fragmented areas that can reduce habitat connectivity.

Please do not hesitate to contact the undersigned (0407 385 239) if you require any further information.

Yours sincerely



Dr Scott Thompson
Director and Principal Zoologist

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Plate 1. Project area habitat



Plate 2. Project area habitat



Plate 3. Project area habitat



Plate 4. Project area habitat



Plate 5. Project area habitat



Plate 6. Project area habitat

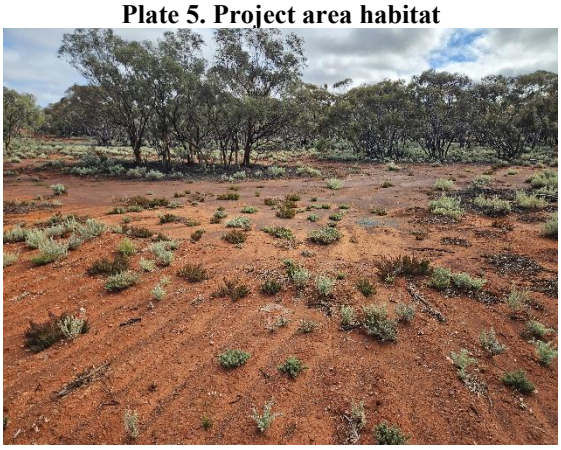


Plate 7. Project area habitat

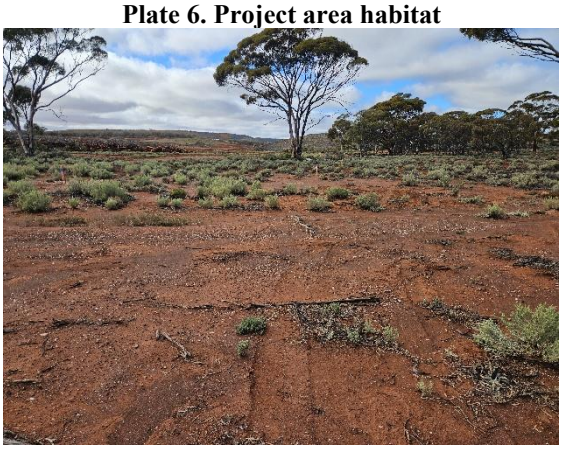


Plate 8. Project area habitat

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