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Basic and targeted terrestrial fauna survey for the Belisama Conventional Gas Project

Prepared for Hancock Energy (PBN) Pty Ltd

December 2025

Final

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Version history

Author/s	Reviewer/s	Version	Version number	Date submitted	Submitted to
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EXECUTIVE SUMMARY

Hancock Energy (PBN) Pty Ltd (Hancock) is seeking to develop the Belisama Conventional Gas Project (the Project), located 11 km south-west of the town of Mingenew, Western Australia. In 2025, Phoenix Environmental Sciences Pty Ltd (Phoenix) was commissioned by Hancock to undertake a basic terrestrial fauna survey and targeted survey for Malleefowl and Carnaby's Cockatoo for the Project. The surveys were conducted for an area defined as the extended development footprint (3,731.2 ha), which includes an alternative centralised processing facility (alternative CPF) and additional pipelines that connect the alternative CPF to a central hub, the West Erregulla Project and the Dampier to Bunbury Natural Gas Pipeline. The purpose of the survey was to support additional permits required for the extended development footprint.

The field survey was conducted from 19 – 22 August 2025. A desktop review undertaken prior to the field survey identified records of 254 vertebrate species within 40 km of the study area, 39 of which are listed as conservation significant. No significant vertebrate records were returned within the study area but the desktop review identified nearby records of Carnaby's Cockatoo and a roosting site less than 2 km away, though no Carnaby's Cockatoo breeding is known within the region.

The desktop review also identified 266 short-range endemic (SRE) invertebrate taxa within 100 km of the study area, including 10 confirmed, 18 likely and 88 potential SRE taxa. The remaining taxa were widespread species or data deficient (lacking taxonomic or geographical certainty). Nine Threatened and Priority mygalomorph spider species were also identified in the desktop review. No SRE taxa have previously been recorded in the study area.

Remnant native vegetation covers only 10.6% of the study area, with the remainder comprised of cleared or highly disturbed areas. Ten fauna habitats were defined, comprising cleared areas (83.2%), open *Banksia* woodland (3.6%), plantations (3.4%), remnant woodland/shrubland over paddock (2.8%), Sheoak and *Acacia* shrubland (2.2%), low to mid shrubland/grassland (2.0%), open eucalypt woodland (1.5%) creek line (1.3%), shrubland on lateritic breakaway (<0.05%) and tall closed shrubland (<0.05%). The remnant habitats are highly fragmented and degraded by surrounding intensive use and invasive species.

The survey recorded a total of 65 vertebrate fauna species, including 4 frogs, 6 reptiles, 43 birds and 12 mammals (inc. 4 introduced). No Threatened or Priority vertebrate fauna were recorded in the survey. The likelihood of occurrence assessment determined that Carnaby's Cockatoo is the only significant species that is likely to occur. The remaining species are either unlikely to occur due to known distributions and habitat preferences or possibly occur as irregular visitors only.

A black cockatoo habitat assessment determined the highest value habitat for Carnaby's Cockatoo was the open *Banksia* woodland, which received a score of 3 (low to moderate value) out of 10. The remainder of the habitats were rated as low to negligible in foraging value. Twelve potential nesting trees were identified, none with hollows or evidence of black cockatoo presence.

No evidence of Malleefowl was recorded during the survey. Although much of the remnant vegetation in the study area received a moderate Malleefowl suitability score, it is highly fragmented and degraded and therefore non-viable for supporting the species.

Twelve taxa from SRE groups were recorded in the survey. Of these, one is a likely SRE, 3 are potential SREs, 4 are data deficient and 4 are widespread (not SREs). Five taxa had significant divergence from their closest matches on GenBank and/or the Phoenix database and are considered a new species. The remnant habitats in the study area were considered low potential SRE value, excluding an isolated shrubland on lateritic breakaway, characterised by a south-facing rocky slope.

The pipeline route is proposed to be predominantly adjacent to existing tracks within cleared paddocks, with small sections intersecting remnant vegetation. Hancock are proposing to employ horizontal Directional Drilling (HDD) beneath creek line and *Banksia* woodland habitats which will avoid impacts to these habitats. The narrow disturbance footprint of the pipeline is unlikely to impact

significant vertebrate fauna. Disturbance should avoid impact on the eucalypt woodland habitat that may provide future potential nesting trees and the lateritic breakaway habitat that is of high value for SREs.

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ACRONYMS AND ABBREVIATIONS

BC Act	*Biodiversity Conservation Act 2016*
BoM	Bureau of Meteorology
CD	Conservation Dependent
CPF	Centralised processing facility
CR	Critically Endangered
DBCA	Department of Biodiversity, Conservation and Attractions
DBH	Diameter at breast height
DCCEEW	Department of Climate Change, Energy, the Environment and Water
IBRA	Interim Biogeographic Regionalisation of Australia
IBSA	Index of Biodiversity Surveys for Assessment
EIA	Environmental impact assessments
EN	Endangered
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EW	Extinct in the Wild
EX	Extinct
Mig.	Migratory
NES	National Environmental Significance
P	Priority
OS	Species otherwise in need of special protection
SP	Specially protected
SRE	Short-range endemic
TEC	Threatened Ecological Communities
VU	Vulnerable

1 INTRODUCTION

Hancock Energy (PBN) Pty Ltd (Hancock) is seeking to develop the Belisama Conventional Gas Project (the Project;), located 11 km south-west of the town of Mingenew, Western Australia (WA; Figure 1-1). In June 2025, Phoenix Environmental Sciences Pty Ltd (Phoenix) was commissioned by Hancock to undertake a basic and targeted terrestrial fauna survey for the Project.

The purpose of the survey was to collect fauna data to inform environmental impact assessment (EIA) for the Project (Figure 1-1). The study area is located on the border of the Mingenew, Irwin and Three Springs shires and in the South-West Climatic Region as defined by EPA (2020).

1.1 BACKGROUND

In 2022 and 2023, Phoenix was commissioned by Energy Resources Limited (ERL), a wholly owned subsidiary of Mineral Resources Ltd (MinRes), to conduct ecological surveys for the Lockyer Gas Project (LGP) (Phoenix 2023b, 2024). Since completion of these surveys, Hancock have acquired the LGP and its associated permits from MinRes. Hancock have since identified an alternative location for the Central Processing Facility (CPF) and extended the development footprint. Consequently, Hancock has renamed the Proposal as the Belisama Conventional Gas Project and identified additional survey work is required to inform an EIA for the Project.

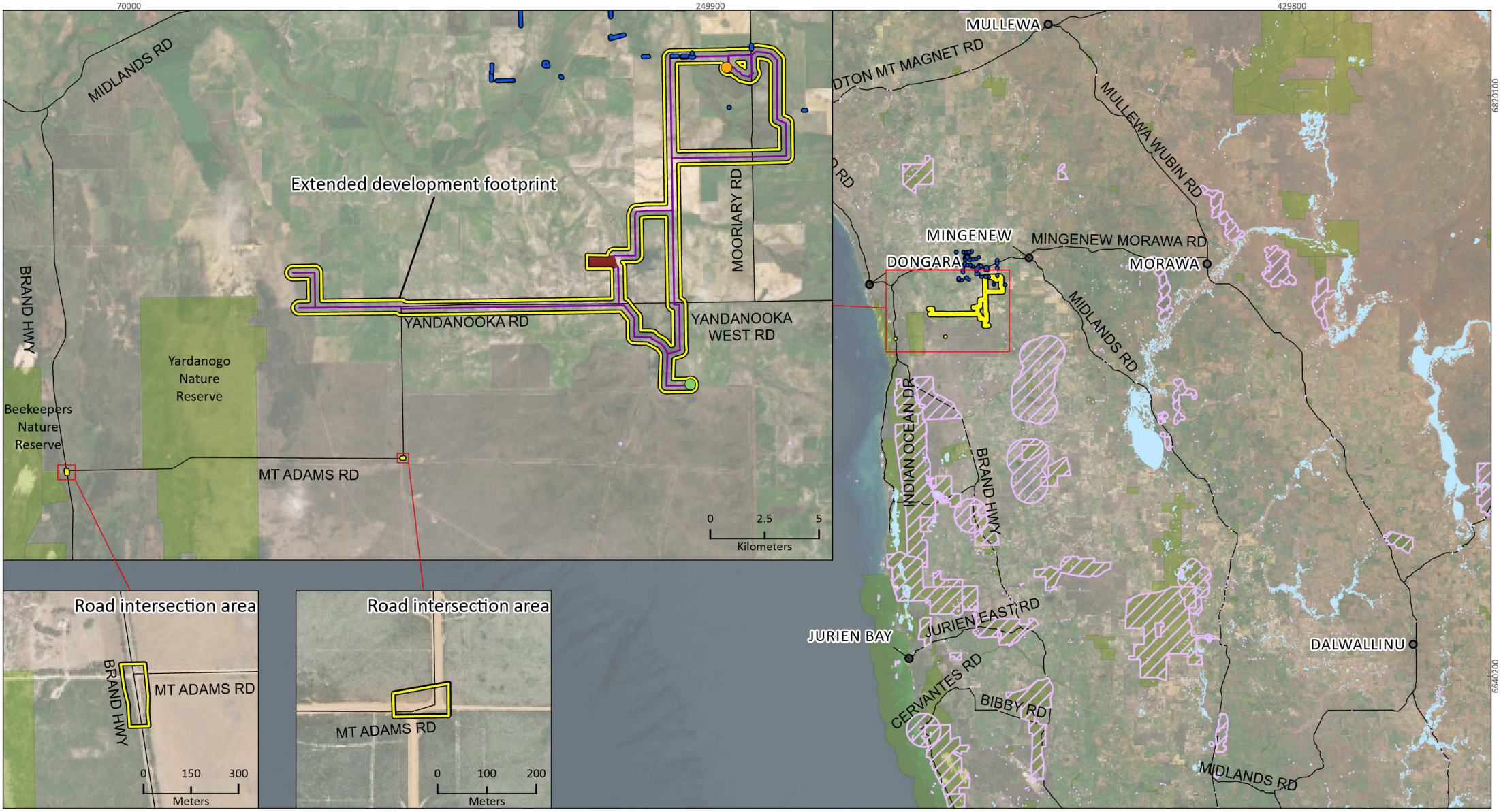
1.2 SCOPE OF WORK

The scope of work for the basic and targeted terrestrial fauna survey was as follows:

- desktop study -
    - to gather contextual information on the potential fauna and fauna habitats of the study area
    - to gather contextual information on the potential short-range endemic (SRE) and significant invertebrate fauna habitats and species of the study area
- basic survey –
    - to gather broad fauna and habitat information on the vertebrate fauna and SRE values of the study area (EPA 2016c, 2020)
    - to map and describe fauna habitats (EPA 2020)
- targeted survey –
    - to assess the presence of significant species likely to occur in the study area
    - to describe and map habitats or features that are important to significant fauna or faunal assemblages, such as for breeding, foraging or dispersal.

1.3 STUDY AREA

The study area for the survey was approximately 3,731.2 ha and encompassed the extended development footprint (EDF) for the Project and 2 additional road intersection areas (Figure 1-1). The EDF includes an alternative centralised processing facility (alternative CPF) and additional pipelines that connect the alternative CPF to the central hub in the north-east, the West Erregulla Project located south-east and the Dampier to Bunbury Natural Gas Pipeline to the west. A 300 m buffer of the proposed pipeline route was applied to assess the fauna values and associated habitats, and to account for any minor adjustments to the development footprint. The study area overlaps with small fragments previously surveyed for the LGP (Phoenix 2023b) (Figure 1-1).



Hancock Prospecting Pty Ltd
Belisama Conventional Gas Project

Project No	1740
Date	1/12/2025
Drawn by	JL
Map author	JL

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Kilometers

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- Study area
- Previous Phoenix study areas
- Proposed pipeline route
- Central Hub
- West Erregulla (WER-3 & Hub)
- Alternative centralised gas processing facility
- DBCA managed land
- Lakes
- Environmentally Sensitive Areas
- Roads

Figure 1-1

Project location and study area

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2 LEGISLATIVE CONTEXT

The protection of fauna in WA is principally governed by 3 acts:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- State *Biodiversity Conservation Act 2016* (BC Act)
- State *Environmental Protection Act 1986* (EP Act).

2.1 COMMONWEALTH

The EPBC Act is administered by the Federal Department of Climate Change, Energy, the Environment and Water (DCCEEW). The EPBC Act provides for the listing of Threatened fauna as matters of National Environmental Significance (NES). Under the EPBC Act, actions that have, or are likely to have, a significant impact on a matter of NES, require approval from the Australian Government Minister for the Environment through a formal referral process. Key threats and habitat critical to the survival of EPBC Act Threatened species are usually defined in the conservation advice and/or recovery plan for the species.

Conservation categories applicable to Threatened fauna species under the EPBC Act are as follows:

- Extinct (EX)[1] – there is no reasonable doubt that the last individual has died
- Extinct in the Wild (EW) – taxa known to survive only in captivity
- Critically Endangered (CR) – taxa facing an extremely high risk of extinction in the wild in the immediate future
- Endangered (EN) – taxa facing a very high risk of extinction in the wild in the near future
- Vulnerable (VU) – taxa facing a high risk of extinction in the wild in the medium-term
- Conservation Dependent (CD)[1] – taxa whose survival depends upon ongoing conservation measures; without these measures, a conservation dependent taxon would be classified as Vulnerable, Endangered or Critically Endangered.

Threatened Ecological Communities (TECs) are also listed as matters of NES and are often associated with faunal values.

The EPBC Act is also the enabling legislation for protection of Migratory species as matters of NES under several international agreements:

- Japan-Australia Migratory Bird Agreement (JAMBA)
- China-Australia Migratory Bird Agreement (CAMBA)
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn)
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

[1] Species listed as Extinct and Conservation Dependent are not matters of NES and therefore do not trigger the EPBC Act.

2.2 STATE

2.2.1 Threatened and Priority species

In WA, the BC Act provides for the listing of Threatened fauna species (Government of Western Australia 2018a, b) in the following categories:

- Critically Endangered (CR) – species facing an extremely high risk of extinction in the wild in the immediate future[2]
- Endangered (EN) – species facing a very high risk of extinction in the wild in the near future[2]
- Vulnerable (VU) – species facing a high risk of extinction in the wild in the medium term future[2].

Species may also be listed as specially protected (SP) under the BC Act in one or more of the following categories:

- species of special conservation interest (conservation dependent fauna, CD) – species with a naturally low population, restricted natural range, of special interest to science, or subject to or recovering from a significant population decline or reduction in natural range
- migratory species (Mig.), including birds subject to international agreement
- species otherwise in need of special protection (OS).

The Department of Biodiversity, Conservation and Attractions (DBCA) administers the BC Act and also maintains a non-statutory list of Priority fauna. Priority species are still considered to be of conservation significance – that is they may be Threatened – but cannot be considered for listing under the BC Act until there is adequate understanding of threat levels imposed on them. Species on the Priority fauna list are assigned to one of 4 Priority (P) categories, P1 (highest) – P4 (lowest), based on level of knowledge/concern.

2.2.2 Critical habitat

Under the BC Act, habitat is eligible for listing as critical habitat if it is critical to the survival of a Threatened species or a TEC and its listing is otherwise in accordance with the ministerial guidelines.

2.2.3 Other significant fauna

Under the EPA's environmental factor guideline (EPA 2016a), fauna may be considered significant for reasons other than listing as a Threatened or Priority species, including:

- species with restricted distribution (see also section 2.2.4)
- species subject to a degree of historical impact from threatening processes
- providing an important function required to maintain the ecological integrity of a significant ecosystem.

2.2.4 Short-range endemic invertebrates

SRE invertebrate fauna are defined as animals that display restricted geographic distributions, nominally less than 10,000 km^2, that may also be disjunct and highly localised (Harvey 2002). EPA (2016a) identifies species with restricted distributions as being significant fauna in the context of environmental impact assessments (EIA). SRE fauna need to be considered in EIA as localised, small

[2] As determined in accordance with criteria set out in the ministerial guidelines.

populations of species that are generally at greater risk of changes in conservation status due to environmental change than other, more widely distributed taxa.

Short-range endemism in terrestrial invertebrates is believed to have evolved through two primary processes (Harvey 2002):

- Relictual – where the drying climate reduced the area of suitable habitat available to a species, forcing a range contraction. Such habitats typically maintain historic mesic conditions (e.g. south-facing rock faces or slopes of mountains or gullies).
- Habitat speciality – where species settled in particular isolated habitat types (e.g. rocky outcrops) by means of dispersal and evolved in isolation into distinct species.

SRE invertebrates have however also been reported in more widespread habitats such as spinifex plains or woodlands, mainly in groups with low dispersal capabilities, for example mygalomorph spiders and millipedes (see for example Car & Harvey 2014; Rix et al. 2018).

There can be uncertainty in categorising a specimen as an SRE due to several factors including poor regional survey density, lack of taxonomic research and problems of identification, i.e. specimens that may represent SREs cannot be identified to species level based on the life stage. For example, in contrast to mature males, juvenile and female millipedes, mygalomorph spiders and scorpions cannot be identified to species level. Molecular techniques such as 'barcoding' (Hebert *et al.* 2003a; Hebert *et al.* 2003b) are routinely employed to overcome taxonomic or identification problems.

3 EXISTING ENVIRONMENT

3.1 INTERIM BIOGEOGRAPHIC REGIONALISATION OF AUSTRALIA

The Interim Biogeographic Regionalisation of Australia (IBRA) classifies Australia's landscapes into large 'bioregions' and 'subregions' based on climate, geology, landform, native vegetation and species information (DoEE 2016). The study area is in the Geraldton Sandplains bioregion, predominantly within the Lesueur Sandplain (GS3) subregion, with a small portion intersecting the Geraldton Hills (GS2) subregion (Figure 3-1).

The Lesueur Sandplain subregion is characterised by Desmond and Chant (2001b) as:

"composed mainly of proteaceous scrub-heaths, rich in endemics, on the sandy earths of an extensive, undulating, lateritic sandplain mantling Permian to Cretaceous strata. Extensive York Gum and Jam woodlands occur on outwash plains associated drainage. The Lesueur Sandplain (GS3) comprises coastal aeolian and limestones, Jurassic siltstone and sandstones (often heavily lateritised) of central Perth Basin. Alluvials are associated with drainage systems. There are extensive yellow sandplains in south-eastern parts, especially where the subregions overlaps the western edge of the Pilbara Craton. Shrub-heaths rich in endemics occur on a mosaic of lateritic mesas, sandplains, coastal sands and limestones. Heath on laterised sandplains along the subregions north-eastern margins."

The Geraldton Hills subregion is characterised by Desmond and Chant (2001a) as:

"Comprises mainly proteaceous scrub-heaths, rich in endemics, on the sandy earths of an extensive, undulating, and lateritic sandplain mantling Permian to Cretaceous strata. Extensive York Gum and Jam woodlands occur on outwash plains associated drainage. The Geraldton Hills subregion (GS2) incorporates the southern end of Carnarvon Basin and northern end of the Perth Basin, with exposed areas of Permian/ Silurian siltstone and Jurassic sandstones, mostly overlain by sandplains, alluvial plains, and coastal limestones. Sand heaths with emergent *Banksia* and *Actinostribus*, York Gum woodlands on alluvial plains, proteaceous heath and Acacia scrubs on limestones depending on depth of coastal-sand mantle, low closed forest of *Acacia rostellifera* (now cleared) on alluvial plains of Greenough and Irwin River (behind beach dunes system south of Geraldton). Also includes the Pinjarra Orogen which is an area of Hill country with a Proterozoic basement, and comprises extensive, undulating, lateritic uplands mantled in sandplains supporting proteaceous shrublands and mallees while valleys support York Gum and Jam."

3.2 LAND SYSTEMS AND SURFACE GEOLOGY

DPIRD undertakes land system mapping for WA using a nesting soil-landscape mapping hierarchy (Schoknecht & Payne 2011). While the primary purpose of the mapping is to inform pastoral and agricultural land capability, it is also useful for informing biological assessments. Under this hierarchy, land systems are defined as areas with recurring patterns of landforms, soils, vegetation and drainage (Payne & Leighton 2004).

The study area intersects 3 land systems (Table 3-1; Figure 3-2). The eastern end of the study area occurs within the Mount Horner System, while the central portion is dominated by the Mount Adams System. The western end of the study area and the Brand Highway/Mt Adams intersection, occurs in the Tamala South System, accounting for 4.5% overall.

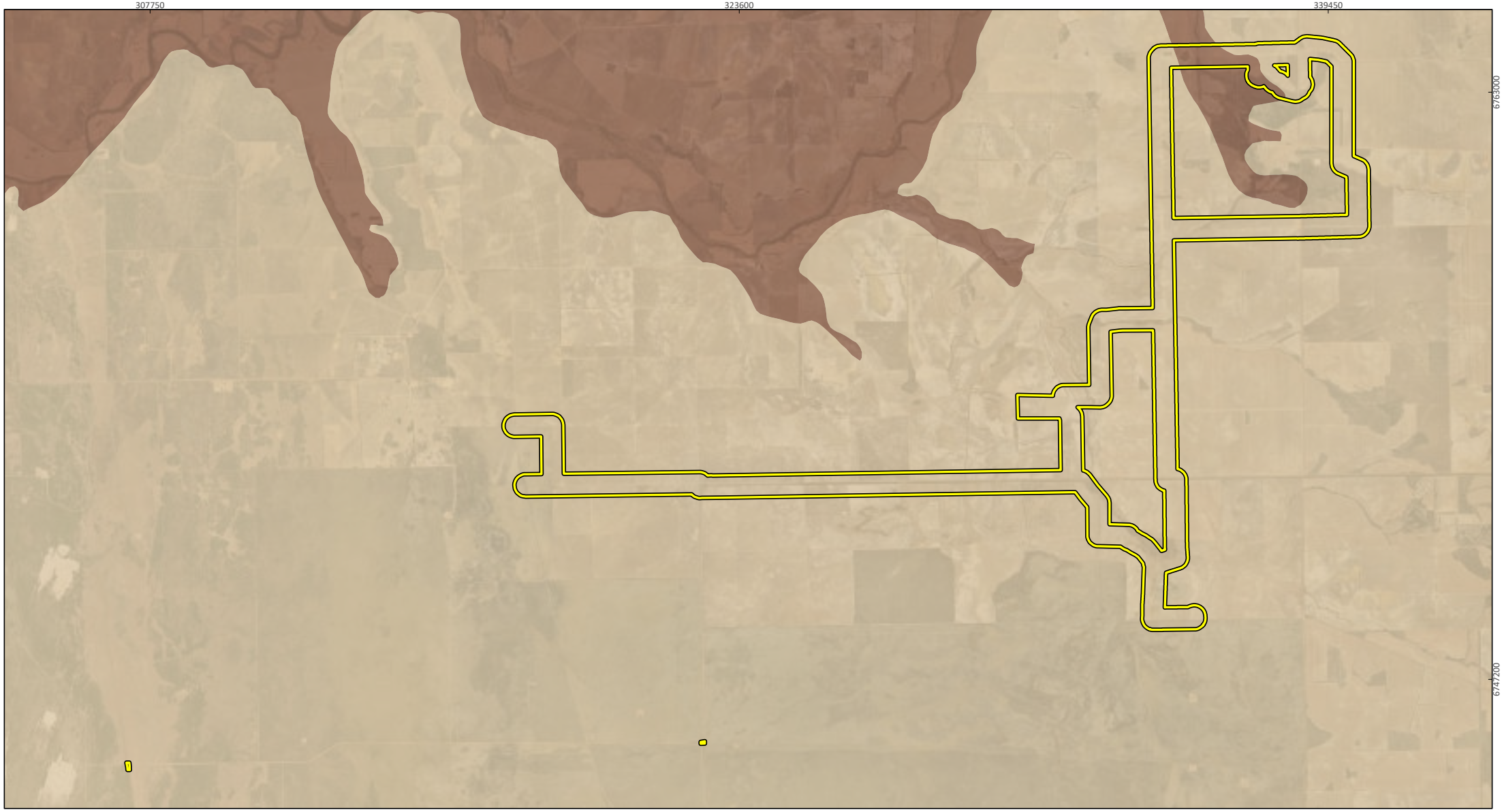
Table 3-1 Land systems and extent in study area

Land system	Description	Area (ha)	% of study area
Mount Horner System	Lateritic breakaways with spillway sands. Long gentle slopes broken by low gravel ridges and broad open depressions.	2,143.2	57.4
Mount Adams System	Gently undulating sandplain with low gravel ridges and occasional laterite breakaways.	1,421.8	38.1
Tamala South System	Rises and low hills with relict dunes and some limestone outcrop on coastal limestone north of Jurien Bay. Yellow deep sands common, with yellow/brown shallow sands and calcareous shallow and deep sands. Banksia woodlands and heathlands.	166.2	4.5
	Total	**3,731.2**	**100.0**

According to the Surface Geology of Australia 1:1,000,000 scale, Western Australia database (Stewart *et al.* 2008), the study area intersects 7 geological formations (Table 3-2; Figure 3-2). More than half of the study area is characterised as sand plains, with colluvial soils forming the second most dominant geology.

Table 3-2 Surface geology of the study area, extent by deposit type

Surface geology	Abbreviation	Description	Area (ha)	% of study area
Sand plain 38499	Czs	Sand or gravel plains; quartz sand sheets commonly with ferruginous pisoliths or pebbles, minor clay; local calcrete, laterite, silcrete, silt, clay, alluvium, colluvium, aeolian sand	2,068.5	55.4
Colluvium 38491	Qrc	Colluvium, sheetwash, talus; gravel piedmonts and aprons over and around bedrock; clay-silt-sand with sheet and nodular kankar; alluvial and aeolian sand-silt-gravel in depressions and broad valleys in Canning Basin; local calcrete, reworked laterite	974.3	26.1
Dunes 38496	Qd	Dunes, sandplain with dunes and swales; may include numerous interdune claypans; residual and aeolian sand with minor silt and clay; aeolian red quartz sand, clay and silt, in places gypsiferous; yellow hummocky sand	190.3	5.1
Yarragadee Formation	Jsya	Variegated sandstone, feldspathic sandstone, siltstone, shale, conglomerate, coal	176.3	4.7
Parmelia Group	Kspm	Sandstone, siltstone, shale	168.0	4.5
Alluvium 38485	Qa	Channel and flood plain alluvium; gravel, sand, silt, clay, locally calcreted	152.4	4.1
Tamala Limestone	Qdct	Unconsolidated to strongly lithified calcarenite with calcrete/kankar soils; aeolian. Locally quartzose, feldspathic, or heavy-mineral-bearing.	1.4	<0.05
		Total	**3,731.2**	**100.0**



Hancock Prospecting Pty Ltd
Belisama Conventional Gas Project

Project No	1740
Date	16/12/2025
Drawn by	JL
Map author	JL

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Kilometers

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Study area

Region, subregion

Geraldton Sandplains, Geraldton Hills

Geraldton Sandplains, Lesueur Sandplain

Figure 3-1

Study area in relation to IBRA bioregions and subregions

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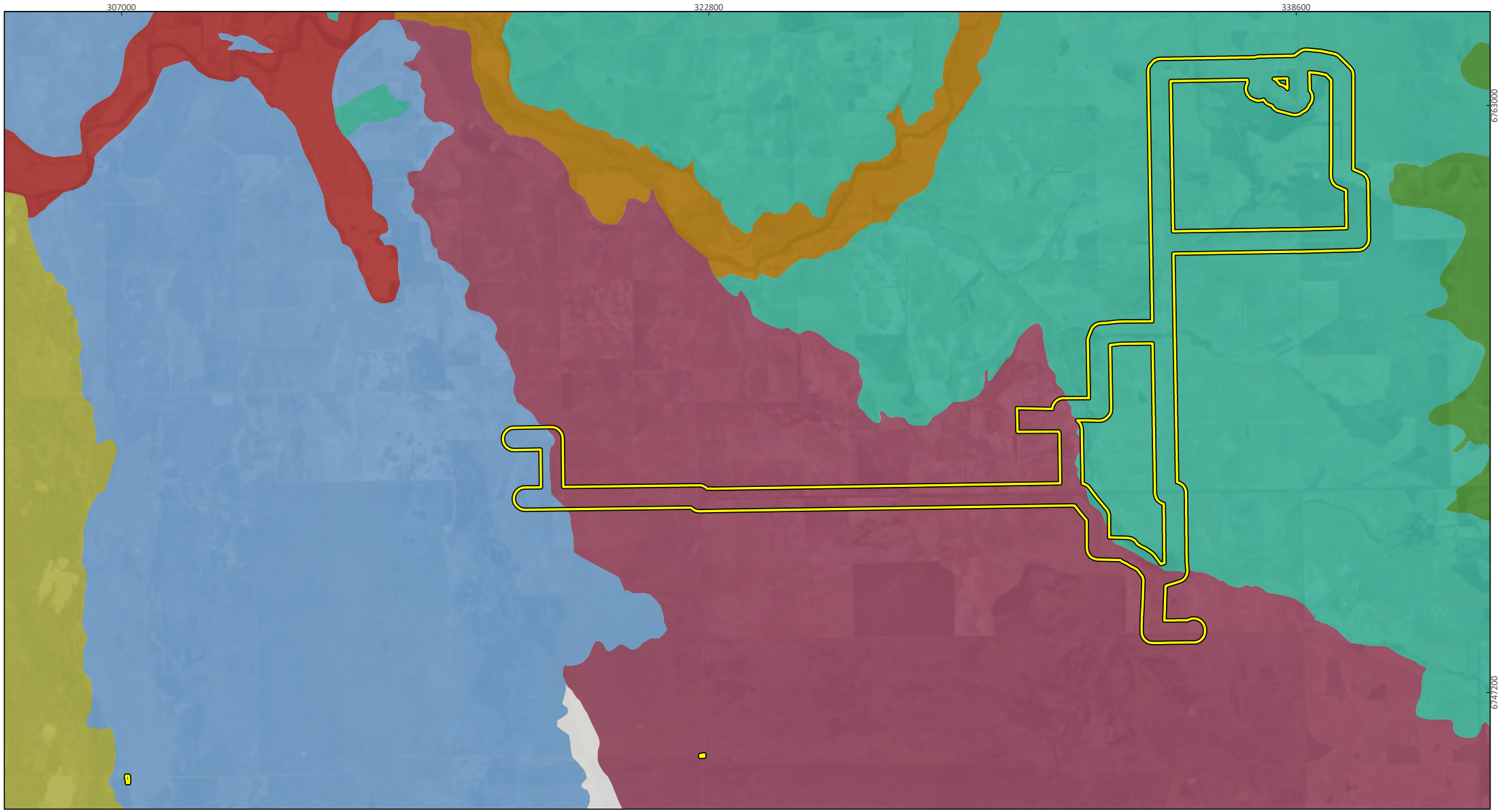

Hancock Prospecting Pty Ltd
Belisama Conventional Gas Project

Project No	1740
Date	16/12/2025
Drawn by	JL
Map author	JL

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Kilometers

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- Study area

Land system

- Correy System
- Eradu System
- Greenough Alluvium System
- Irwin System
- Mount Adams System
- Mount Horner System
- Quindalup Central System
- Tamala South System

Figure 3-2

Land systems in the study area

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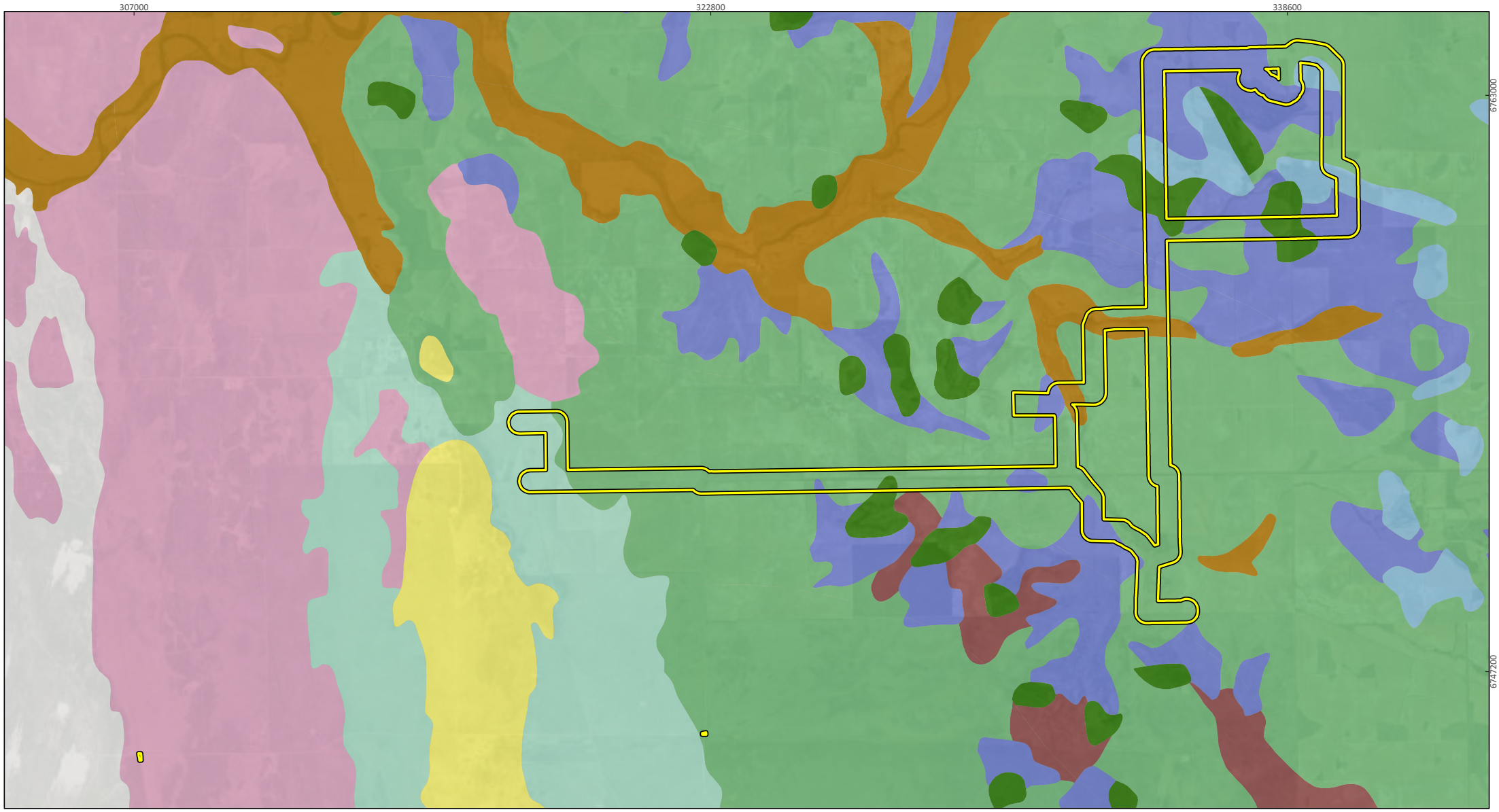

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Study area

Surface geology

- Parmelia Group
- Tamala Limestone
- Yarragadee Formation
- alluvium 38485
- coastal dunes 38488
- colluvium 38491
- dunes 38496
- ferruginous duricrust 38498
- lake deposits 38492
- sand plain 38499

Figure 3-3

Surface geology in the study area

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3.3 CLIMATE AND WEATHER

The climate of the Lesueur Sandplain (GS3) subregion is described as warm semi-arid to Mediterranean (Desmond & Chant 2001a, b). The nearest Bureau of Meteorology (BoM) weather station with comprehensive data collection (since 2011) is Geraldton Airport (no. 008315, Latitude: 28.80 °S Longitude 114.70 °E), located 74 km northwest of the study area.

Geraldton Airport records the highest mean maximum monthly temperature (33.1°C) in February (lowest in July, 20.5°C) and the lowest minimum mean monthly temperature (9.1°C) in August (highest in February, 19.5°C) (Figure 3-3). Mean annual rainfall is 363.2 mm with June and July recording the highest monthly mean (77.8 and 74.4 mm respectively; Figure 3-3).

Daily mean temperatures at Geraldton Airport preceding the survey (in August) were relatively consistent with the recorded averages since station commencement, with June 0.9°C above average, and July 1.7°C below average (Figure 3-3). During the month of the survey, the daily mean minimum temperatures were 0.4°C higher than the monthly mean, and the daily mean maximum temperatures were 0.7°C lower than the monthly mean.

Total monthly rainfall in June and July 2025 was much higher than average monthly rainfall, recording 135.0 mm and 111.4 mm respectively (Figure 3-3). During the month of the survey in August, the total rainfall was 49.1 mm greater than the historic mean rainfall (Figure 3-3). The area received a total of 49.2 mm of rain over the duration of the survey, with 38.8 mm over the course of a single day.

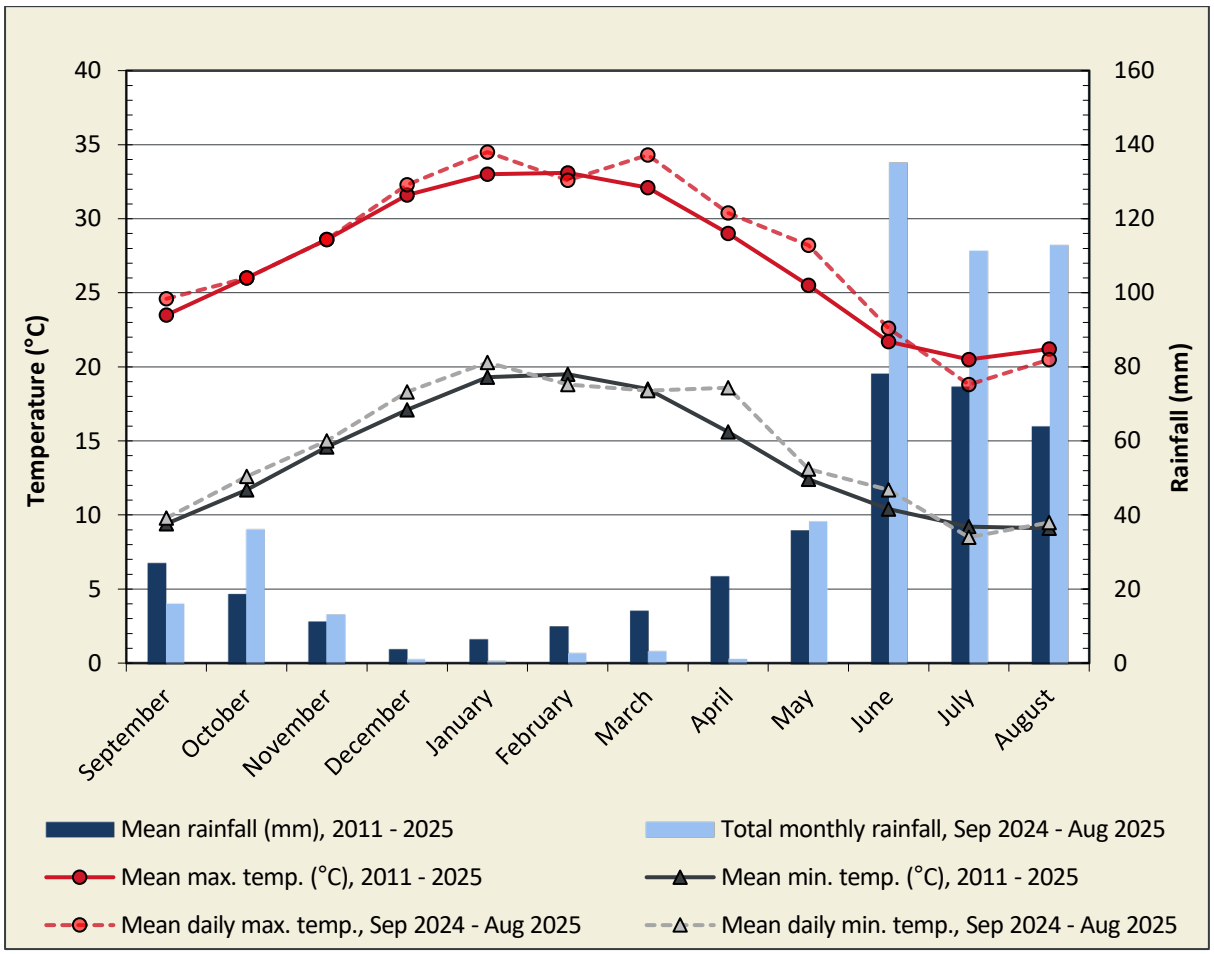


Figure 3-4 **Annual climate and weather data for Geraldton Airport (no. 008315) and mean monthly data for the 12 months preceding the survey (BoM 2025)**

3.4 LAND USE

The dominant land use of the Geraldton Sandplains bioregion is dryland agriculture, with lesser areas of conservation, grazing, unallocated Crown Land and Crown reserves (Desmond & Chant 2001a, b). The study area is predominantly located on cleared farmland, with the proposed pipeline route mostly aligned adjacent to remnant vegetation.

3.5 CONSERVATION RESERVES AND ENVIRONMENTALLY SENSITIVE AREAS

There are no conservation reserves or environmentally sensitive areas that intersect the study area. The nearest conservation reserve is Yardanogo Nature Reserve, which is adjacent to Mt Adams Road, 1.8 km west of the western terminus of the study area. Beekeepers Nature Reserve is also located to the west of the Brand Highway and Mt Adams Road intersection, 13.6 km west of the study area (Figure 1-1).

4 METHODS

The basic and targeted terrestrial fauna survey was conducted in accordance with relevant survey guidelines and guidance, including:

- *EPA Environmental Factor Guideline: Terrestrial fauna* (EPA 2016a)
- *EPA Technical Guidance: Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020)
- *EPA Technical Guidance: Sampling of short range endemic invertebrate fauna* (EPA 2016c)
- *National Malleefowl Monitoring Manual* (NMRT 2022).

4.1 DESKTOP REVIEW

Searches of several biological databases were undertaken to identify and prepare lists of significant fauna that may occur within the study area (Table 4-1). A literature search was conducted for accessible reports for biological surveys conducted within 40 km of the study area to build on the lists developed from the database searches (Table 4-2).

Table 4-1 Database searches conducted for the desktop review

Database	Target group/s	Search coordinates and extent
Protected Matters Search Tool (DCCEEW 2025a)	EPBC Act Threatened and Migratory fauna	Study area plus a 40 km buffer
DBCA Threatened and Priority Fauna Database (DBCA 2025b)	Threatened and Priority fauna	
Dandjoo Biodiversity Data Repository (DBCA 2025a)	Fauna records	
Index of Biodiversity Surveys for Assessment (IBSA) database (IBSA 2025) for nearby survey reports and data	Fauna survey records and data	
WA Museum Arachnid and Myriapod Database, Mollusca Database (WAM 2025)	Arachnid, myriapod and mollusc SREs	100 km^2 search area encompassing the study area between 28.3372°S, 114.0919°E (northwest corner) and 30.2958°S, 116.4004°E (southeast corner)

Table 4-2 Survey reports included in the desktop review

Report author	Survey description	Project
Bamford (2021a)	Basic fauna assessment	Arrowsmith North Project
Bamford (2021c)	Level 1 fauna assessment	West Erregulla Gas Field Project
Bamford (2024)	Carnaby's Cockatoo assessment	Lockyer Gas Project
Eco Logical Australia (2020)	Basic and targeted fauna survey	West Erregulla Pipeline Project
Phoenix (2023a)	Basic terrestrial fauna assessment	Minjiny Project
Phoenix (2023b)	Targeted fauna survey	Lockyer Gas Project
Phoenix (2024)	Targeted fauna survey	Lockyer Gas Project
Preston (2021)	Level 1 fauna assessment and targeted surveys	Arrowsmith North Silica Sand Project
Woodman Environmental (2018)	Flora, vegetation and fauna assessment	Waitsia-03 Flowline Corridor

Report author	Survey description	Project
Woodman Environmental (2020)	Level 1 fauna survey, reconnaissance and targeted flora and vegetation survey	Cervantes 1 Conventional Well

4.2 FIELD SURVEY

4.2.1 Survey methods and timing

The field survey was completed in winter from 19 – 22 August 2025. The field survey methods for the fauna survey included:

- habitat assessment (see 4.2.1.1)
- active diurnal searches (4.2.1.2)
- avifauna surveys (4.2.1.3)
- black cockatoo habitat assessments (4.2.1.4)
- Malleefowl habitat assessment (4.2.1.6)
- SRE invertebrate sampling (4.2.1.7).

A total of 14 survey sites were sampled, with habitat assessments conducted at an additional 12 sites (Figure 4-1; Appendix 1).

4.2.1.1 Habitat assessment

Initial habitat characterisation was undertaken using various remote geographical tools, including aerial photography (Google Earth®), land system maps and topographic maps. Habitats with the potential to support significant terrestrial fauna species were identified based on known habitats of such species within the Geraldton Sandplains bioregion. Tentative sites were selected for the terrestrial fauna survey to represent all habitat types. Final survey site selection was conducted after ground-truthing of site characteristics.

At the broadest scale, site selection considered aspect, topography and land systems. At the finer scale, consideration was given to proximity to water bodies (drainage lines and creek), vegetation complexes and condition and soil type. Sites were primarily chosen to represent the best example of distinct habitats within the broader habitat associations of the study area with a focus on species of conservation significance identified in the desktop review. Habitat descriptions and characteristics were recorded at all survey sites, including topography, soils, vegetation and litter cover, condition and disturbances (Figure 4-1; Table 4-4; Appendix 2).

Table 4-3 Terrestrial fauna survey effort

Site name	Habitat assessment	Ultrasonic recording (nights)	Birding (minutes)	Foraging – vertebrates (minutes)	Foraging – SRE (minutes)	Litter sieve - SRE (#)	Trapdoor spider burrow excavation (#)	Opportunistic sighting (#)
Site 01	✓	3	20	15	15			
Site 02	✓	3	20	30	30			
Site 03	✓	3	20	30	30			
Site 04	✓		20	30	30	3		

Site name	Habitat assessment	Ultrasonic recording (nights)	Birding (minutes)	Foraging – vertebrates (minutes)	Foraging – SRE (minutes)	Litter sieve - SRE (#)	Trapdoor spider burrow excavation (#)	Opportunistic sighting (#)
Site 05	✓		20	30	30		2	
Site 06	✓		10					
Site 07	✓							
Site 08	✓		20	30	30	4	1	
Site 09	✓							1
Site 10	✓		20	30	30		2	
Site 11	✓							
Site 12	✓							4
Site 13	✓							3
Site 14	✓		20	30	30		1	
Site 15	✓		20	30	30	4		
Site 16	✓		20	30	30			
Site 17	✓		20	30	30			
Site 18	✓							1
Site 19	✓				15			3
Site 20	✓							
Site 21	✓							
Site 22	✓							
Site 23	✓		20	30	30		1	
Site 24	✓							
Site 25	✓							
Site 26	✓							
Opp1								1
Opp2								2
Opp3								1
Opp4								1
Total	**26**	**9**	**250**	**345**	**360**	**11**	**7**	**17**

4.2.1.2 Active searches

Active searches (foraging) for vertebrates were undertaken at 12 sites throughout the study area (labelled 'fauna site' in Figure 4-1). Active searches primarily targeted diurnal herpetofauna and mammals from direct sightings and secondary evidence. Searches focused primarily on significant species identified in the desktop review as potentially occurring within the study area.

Searches were undertaken in any observable microhabitats considered likely to support mammals, reptiles and amphibians. Techniques included: raking leaf and bark litter, overturning logs, searching

beneath the bark of trees, investigating dead trees and logs, investigating burrows, investigating infrastructure ruins or disused building materials such as tin piles and identifying any secondary evidence including tracks, diggings, scats, fur or sloughs (shed skins), predation or feeding sites, and fauna constructed structures, such as nests. Up to 30 minutes were spent active searching at each site for a total of 5.75 hours over the duration of the field survey (Table 4-3).

Additional opportunistic observations were also recorded during the survey, including observations made during travel.

4.2.1.3 Avifauna surveys

Up to 20-minutes of avifauna surveys (birding) were undertaken at 13 sites (Table 4-3). Avifauna surveys were confined to the habitat type (up to 2 ha) represented by each site to collect assemblage data for each habitat. Surveys consisted of bird recordings from visual sightings, call recognition and secondary evidence such as tracks, scats, feeding residue, feathers, and structures such as bowers and nests. A total of 4.2 person hours of avifauna census was undertaken during the field survey (Table 4-3).

Additional avifauna observations were also recorded opportunistically while other field work was being completed, including observations made during travel and active searches.

4.2.1.4 Black cockatoo breeding

The study area is within the modelled distribution and on the edge of the breeding range for Carnaby's Cockatoo (*Zanda latirostris*; EN). Additionally, there is one record of Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*; VU) within the desktop search area; however, the study area is outside of the modelled distribution for this subspecies (DAWE 2022; Phoenix 2025). The black cockatoo habitat assessment therefore entailed recording of breeding and roosting habitat and assessment of foraging habitat quality for Carnaby's Cockatoo.

Breeding habitat for Carnaby's Cockatoo consists of woodland or forest; however, they will also breed in areas of former woodland or forest habitats which consist of now fragmented patches of habitat and/or isolated trees. Breeding habitat is defined in (DAWE 2022) as "habitat that contains known, suitable or potential nesting trees."

Nesting trees that have a hollow suitable for black cockatoo breeding can be categorised as either a known nesting tree, where breeding activity has been recorded, or a potential nesting tree where a suitable hollow is present but there is no evidence of use. Potential nesting trees are defined as trees that have a diameter at breast height (DBH) of at least 300 – 500 mm, depending on the tree species, but currently do not have hollows (DAWE 2022). The minimum DBH for hollow formation ranges between 300 (*Eucalyptus salmonophloia* salmon gum, *E. wandoo* wandoo) and 500 mm (all other species). Known breeding tree species in the Geraldton Sandplains bioregion include *Corymbia calophylla* marri, *E. accedens* powderbark, *E. loxophleba* subsp. *loxophleba* york gum, *E. marginata* jarrah, *E. rudis* flooded gum and *E. gomphocephala* tuart.

The location of all potential nesting trees was recorded on GPS. Tree species identifications were conducted in the field, where possible, using tree descriptors and photographs. Trees that met the required DBH measurement were inspected for hollows and were assessed for any suitability of nesting and/or roosting. The number and size (aperture) of hollows at each tree was recorded.

Where hollows could be observed, they were considered 'suitable' where the hollow entrance was estimated to be >100 mm in diameter, >300 mm deep and aligned near-vertical (typically the main trunk). Where it was not possible to confirm that the hollow met the assessment criteria from the ground, the hollow was assessed as possibly suitable. Hollows that clearly did not meet the criteria were identified as unsuitable hollow; however, were still recorded as meeting the minimum DBH.

Trees with hollows suitable for current breeding were inspected for evidence of use by the species such as wear and/or chew marks around hollow entrance.

Presence of known roosting species was recorded. Known roosting tree species in the Geraldton Sandplains bioregion include jarrah, marri, flooded gum, river gum and tuart.

Observations of foraging habitat quality and feeding residues were recorded during the survey. This information, together with the fauna habitat mapping was used to define quality foraging habitat. Assessment of quality of foraging habitat considered the importance of food plants present based on current available information on food preferences.

4.2.1.5 Black cockatoo foraging habitat

The foraging value of each habitat type within the study area was assessed for Carnaby's Cockatoo using the scoring system developed by Bamford Consulting Ecologists (Bamford 2021b), outlined in Appendix 6. Carnaby's Cockatoos forage in native shrubland, kwongan heathland and woodland on seeds, flowers and nectar of native proteaceous plant species (*Banksia* spp., *Hakea* spp. and *Grevillea* spp.), as well as *Callistemon* spp. and Marri (DAWE 2022).

The scoring system provides a numerical value that reflects the significance of vegetation as foraging habitat for black cockatoos. The scoring is based on the composition, condition and structure of the vegetation at each site, its context in terms of size and distance from potential breeding sites, and density of black cockatoos in the area. The components required for calculating an overall score out of 10 are:

- site condition – a score out of 6 for the vegetation composition, condition and structure
- site context – a score out of 3 for the context of the site, such as availability of foraging habitat nearby
- species stocking rate – a score out of one for species density based on observed or predicted regular presence of foraging birds.

The score is then moderated, in that if vegetation has a value of 0-2 (negligible to low foraging value), the context and species density score will be recorded as 0, on the basis that birds will not use such areas unless they are adjacent to at least low - moderate quality foraging habitat valued at 3 or above.

Signs of black cockatoo foraging were recorded in the study area, including the location, tree species and time since foraging.

4.2.1.6 Malleefowl habitat assessment

Malleefowl habitat was assessed in the field using a set of environmental variables based on features of critical Malleefowl habitat in Western and Central Australia, as described in the National Recovery Plan (Benshemesh 2007). Individual sites were assessed with a numerical score as a basis for mapping areas of suitable habitat in the study area. The score used is an unweighted sum of values for the attributes presented in Table 4-4, with a maximum achievable score of 12.

Table 4-4 Malleefowl habitat assessment criteria

Attribute	Description	Score and suitability		
		0 - low/unsuitable	1 - moderate	2 - high
Substrate	Suitability of substrate to build a mound. Easily workable/moveable substrates regarded as more suitable.	Rocky/hard substrate	Clay, large gravel	Sand, sandy loam, sandy clay, small gravel (e.g. laterite)
Slope	Suitability of slope to build a mound. Level ground less	Steep	Moderate	Flat/gentle

Attribute	Description	Score and suitability		
		0 - low/unsuitable	1 - moderate	2 - high
	susceptible to soil and leaf litter disturbance from rainfall runoff.			
Leaf litter	Availability of leaf litter suitable for mound construction and foraging.	Sparse/none	Moderate	Abundant
Canopy cover	Amount of canopy cover. Higher canopy cover contributes to protection from aerial predators	Sparse/none	Moderate	Continuous/near continuous
Vegetation screening	Amount of horizontal vegetation screening between ground level and 2m high. Dense vegetation screening provides greater protection from ground-dwelling predators.	Sparse/none	Moderate	Dense
Vegetation type	Presence of suitable vegetation such as Mulga- type *Acacia*, Mallee, *Casuarina*, *Melaleuc*a, *Callitris* or similar.	Not present	Present but not dominant	Dominant

Scores of 4 or greater were considered to represent potential Malleefowl habitat. Malleefowl habitat was assigned a habitat suitability of low (scores of 3 or less), moderate (scores of 4 – 8), or high (score of 9 or more) depending on the above characteristics (Table 4-4). High suitability habitat is defined as primary nesting and foraging habitat, that is regarded as habitat critical for the survival of the species. Moderate suitability habitat is defined as moderately suitable for breeding, and suitable for foraging and dispersal. Low suitability habitat may still be used for dispersal and occasional foraging.

Scores attributed to a site were applied to vegetation type polygons and the entire polygon (usually) assigned as the corresponding suitability (low, moderate or high). Where 2 or more sites were assessed within a single polygon, the higher score was applied unless features of the lower-scored site(s) were more representative. Where no site occurred within a polygon, polygons were classified based on scores for similar vegetation nearby and inspection of relative vegetation density.

4.2.1.7 SRE invertebrate sampling

Sampling for SRE invertebrates was conducted at 13 sites (Table 4-3. Sampling comprised the following methods:

- SRE habitat assessment and mapping
- active foraging
- litter/soil sieving.

A standardised approach was undertaken whereby each site was sampled for up to 30 minutes, a total search effort of approximately 6 hours (Table 4-3). Trapdoor spider burrows identified during the searches were excavated if they were considered inhabited. Excavation involved removing soil from around the burrow to carefully expose the burrow chamber and remove the spider. A total of 7 burrow excavations were attempted.

Combined litter/soil sifts were undertaken at 3 sites, with a minimum of 3 sifts conducted at each site dependent on abundance of leaf litter. In total, 11 sifts were undertaken (Table 4-3). The collection of leaf litter samples was standardised volumetrically by the diameter and height (310 mm x 50 mm = 1.55 L) of the sieves which were filled with compressed litter and the upper layers of underlying soil. Samples were sieved through three stages of decreasing mesh size over a round tray and invertebrates were picked from the sieves and tray with forceps. These samples particularly targeted small spiders (Araneomorphae), pseudoscorpions, buthid scorpions, millipedes, centipedes (in particular Geophilomorpha and Cryptopidae), and slaters.

4.2.1.8 SRE potential habitat rating

Fauna habitat mapping was assessed for its potential to support endemic SRE species and communities. Potential SRE habitat was rated as follows:

- High – defined/known areas of habitat that contain elements that often give rise to specialisation or dependency in invertebrate fauna, such as aspect (e.g. south-facing slopes, geological features (e.g. granite), soil types that retain water (e.g. clay, loam). These habitats may also include habitat isolates which have the capacity to restrict dispersal.
- Low – areas of largely intact native vegetation that occur broadly across the landscape, are less incised and typically link more restricted habitats. This may include land that was cleared but has since been rehabilitated or is in the process of being rehabilitated.
- None – land that has been previously cleared for other uses that no longer contains native vegetation.

4.2.1.9 SRE status rating

Currently, there is no accepted system to determine the likelihood that a species is an SRE. The WA Museum applies 3 categories: confirmed, potential, and widespread. Confirmed SREs are taxa for which the distribution is known to be less than 10,000 km^2, the taxonomy is well known, and the group is well represented in collections and/or via comprehensive sampling (WAM 2013). Potential SREs include those taxa for which there is incomplete knowledge of taxonomy or geographic distribution, and the group is not well represented in collections. Phoenix applies 5 categories based on the WA Museum criteria (Table 4-5).

Table 4-5 Short-range endemic categories

SRE category	Criteria
Confirmed	Distribution < 10,000 km^2. Taxonomy of the group is well known (but not necessarily published); group is well-represented in collections, in particular from the region in question; high levels of endemism exist in documented species; inference is often possible from immature specimens. Occupy **patchy[1]/isolated[2]** habitats.
Likely	Distribution < 10,000 km^2. Taxonomically poorly resolved group but group is generally well-represented in collections; unusual morphology for the group; often recorded as singletons in survey and few, if any, regional records. Occupy **patchy/isolated** habitats.
Potential	Distribution < 10,000 km^2. Taxonomically poorly resolved group; patchy distribution, often common in certain microhabitats, but no other regional records; congeners (= species in the same genus) often widespread. Occupy **patchy/isolated** habitats, as well as **some nearby widespread** habitats.

SRE category	Criteria
Data deficient	Species which lack taxonomic or geographical certainty (i.e. are known from one or two locations, and/or lack taxonomic classification).
Widespread (not SRE)	Distribution >10,000 km^2. Occupy **multiple widespread** habitats.

[1]A network of multiple smaller areas of habitat surrounded by unsuitable/widespread habitat.

[2]Unique habitat surrounded by unsuitable/widespread habitat.

4.2.1.10 SRE taxonomy

Initial higher-level (class, order, family) identifications of specimens were undertaken by Phoenix staff in Phoenix' invertebrate laboratory. Final specials designations were allocated using specialist morphological and/or molecular sequencing (Table 4-6). Where possible, identifications were compared with reference material from the WA Museum and/or taxonomist reference collections.

Table 4-6 Specialist taxonomists

Person	Title	Taxa
Dr Blake Wyber	Senior Invertebrate Zoologist, Phoenix	Selenopidae spiders, Chilopoda, Gastropoda
Dr Calum Irvine	Senior Zoologist; Phoenix	Isopoda, Diplopoda

Genomic analysis was undertaken for all specimens for which morphological identification did not provide sufficient taxonomic resolution. A total of 16 specimens were sent for molecular analyses, comprising 6 centipedes, 5 isopods, and 5 millipedes. All specimens produced a successful sequence. Tissue from each specimen was obtained in Phoenix' laboratory and sequenced by Genotyping Australia.

Sequences were edited and analysed using Geneious Prime 2025.01.3. Sequences for comparison were sourced from GenBank (Benson *et al.* 2012) and Phoenix's DNA database using the megablast search function in Geneious. For each sequence, the most similar 10 matches were retrieved. In cases where the retrieved sequences represented a species more than twice, the 2 longest sequences were retained and the shorter conspecific sequences discarded. Where megablast results yielded families differing from the morphological assessment, additional sequences were obtained from GenBank, representing the morphological taxonomic assessment. If all the resulting blast sequences represented organisms from a different taxonomic class, sequences were discarded as likely contamination.

SRE specimens collected during the survey will be lodged with the WA Museum.

4.2.1.11 Likelihood of occurrence assessment

Following the field survey, the likelihood of occurrence for each significant fauna species identified in the desktop review was assessed and assigned to one of 4 ratings:

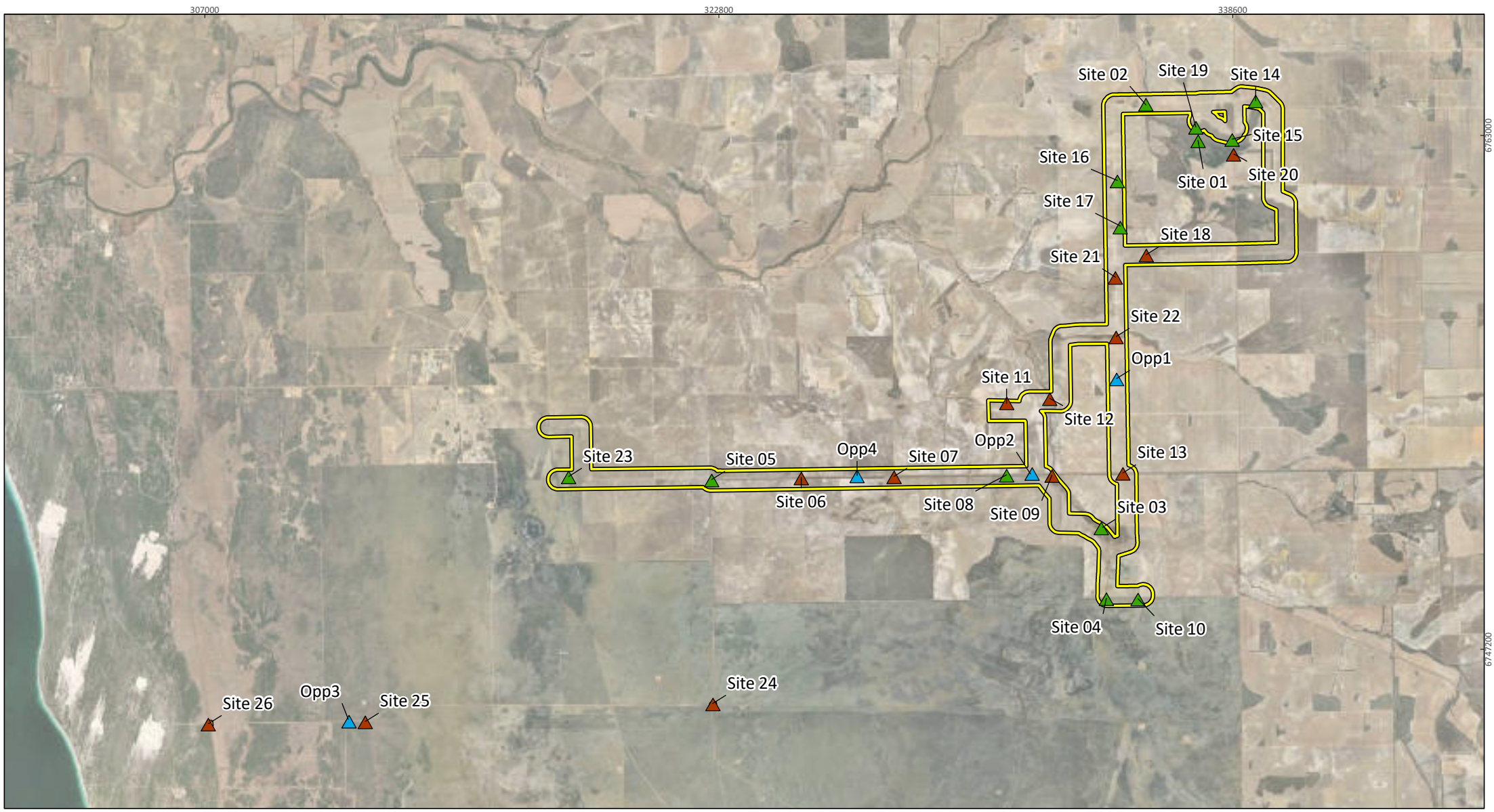
- recorded – species recorded within the study area by previous or current survey
- likely – study area within current known range of species, suitable habitat within the study area and home range of species intersects study area based on known records
- possible – study area within current known range of species, suitable habitat within the study area and home range of species does not intersect study area based on known records
- unlikely – study area outside current known range of species or no suitable habitat present in study area.

4.2.2 Survey personnel

The personnel involved in the surveys are listed in Table 4-7. All survey work was carried out under relevant licences issued by DBCA under the BC Act (Table 4-7).

Table 4-7 Survey personnel

Name	Permit	Qualifications	Role/s
Floyd Holmes	N/A	Ph.D., Hons. (Biological Sciences), B.Sc. (Physics & Conservation Biology)	Project oversight
Jade Larkman	Fauna taking (biological assessment) licence no. BA27001357	B.Sc. (Environmental Management)	Project management, field survey, reporting, map production
Blake Wyber		Ph.D. (Evolutionary Biology)	Field survey, specimen processing and identification
Madeline Wallington	N/A	B.Sc. (Conservation and Wildlife Biology, Marine Biology), Hons. (Marine Biology)	Specimen processing



Hancock Prospecting Pty Ltd
Belisama Conventional Gas Project

Project No	1740
Date	16/12/2025
Drawn by	JL
Map author	JL

0 2.5 5
Kilometers

1:157,500 (at A4) GDA 1994 MGA Zone 50

P:\Data\Projects\Lockyer Development Project\1740-LD-HPPL-FAU\GIS\Mapping\MapDocuments\Figures\1740_maps\L\1740_maps\L.aprx

- Study area
- Fauna site
- Habitat assessment only
- Opportunistic sighting

Figure 4-1

Fauna survey sites

PHOENIX ENVIRONMENTAL SCIENCES

5 RESULTS

5.1 DESKTOP REVIEW

5.1.1 Vertebrate fauna

The desktop review identified records of 254 vertebrate taxa within the desktop search extent. The list comprised 14 frogs, 51 reptiles, 162 birds (including 2 naturalised species) and 27 mammals (including 11 introduced) (Table 5-1; Appendix 3).

Table 5-1 Summary of terrestrial fauna desktop results

Class	Native	Introduced	Total
Amphibians	14	0	14
Reptiles	51	0	51
Birds	160	2	162
Mammals	16	11	27
Total	**241**	**13**	**254**

Previous Phoenix surveys for the Project (Phoenix 2023b, 2024) collectively recorded 72 vertebrate fauna species, including 1 frog, 56 birds (including 2 naturalised), 9 mammals (including 4 introduced) and 6 reptiles (Phoenix 2023b, 2024) (Table 5-2). Eucalypt woodlands were the most common habitat type recorded during these surveys, followed by shrublands and riparian zones. A total of 160 black cockatoo potential nesting trees were recorded; however, only one suitable hollow was identified (Table 5-2). The results of both surveys indicated that the remnant vegetation was of low foraging value for black cockatoos and was unsuitable to support Malleefowl.

Table 5-2 Summary of previous fauna surveys for the Project

Survey	Report	Habitats	Vertebrate fauna species	Results
Targeted fauna survey for the Lockyer Development Project	Phoenix (2023b)	*Eucalyptus* woodland (44.9%) Cleared or disturbed (30.9%) Shrubland (17.2%) Riparian zone (7.1%)	43 species - 2 reptiles - 33 birds - 8 mammals (4 introduced)	- No potential nesting trees meeting minimum DBH were recorded within study area. - marginal Carnaby's Cockatoo foraging habitat - no suitable Malleefowl habitat
	Phoenix (2024)	Cleared (49.3%) Non-native plantation (19.0%) Eucalypt woodland (16.9%) *Acacia* shrubland (13.9%) Riparian zone (0.8%)	51 species - 1 frog - 5 reptiles - 41 birds (2 naturalised) - 4 mammals (3 introduced)	- 160 potential nesting trees with DBH >500 mm, with 36 hollows - A further 369 trees with DBH 300–500 mm recorded but none were wandoo or salmon gum) - one suitable hollow - Carnaby's Cockatoo foraging evidence on *Banksia* - low value, degraded black cockatoo foraging habitat - no suitable Malleefowl habitat

Thirty-nine significant vertebrate species were identified in the desktop review, comprising 21 species listed as Threatened, Conservation Dependent or Specially Protected under the EPBC Act and/or BC Act (Table 5-3). Five species are listed as Priority by DBCA (Table 5-3). Twenty-one avifauna species are listed as Migratory under the EPBC Act/BC Act (Table 5-3), including 8 species also listed as Threatened or Priority.

Twelve species were returned in the EPBC Protected Matters search that have no records associated, however the desktop search area is within the species' projected distribution.

No significant vertebrate species have previously been recorded within the study area (Figure 5-1). A previous survey for the Project (for a different study area) identified Carnaby's Cockatoo *Banksia* foraging evidence (Phoenix 2024).

Table 5-3 Significant vertebrate fauna identified in the desktop review

Species	Status	Proximity to study area	Habitat
Birds (31)			
Actitis hypoleucos Common Sandpiper	Mig. (EPBC & BC Acts)	9.0 km NE	Found across a wide range of wetlands: small ponds, large inlets and mudflats where they forage on the shore usually close to the vegetation (DCCEEW 2025b). Prefers rocky creeks, channels, dams, and mangrove-lined inlets (Geering *et al.* 2007).
Anous stolidus Common Noddy	Mig. (EPBC & BC Acts)	*	Occurs mainly in the ocean off the Queensland coast, but also off the north-west and central WA coast (DCCEEW 2025b). During the breeding season, it occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand (DCCEEW 2025b).
Anous tenuirostris melanops Australian Lesser Noddy	VU (EPBC Act); EN (BC Act)	16.5 km NNW	In Australia, breeds on 3 offshore islands within the Houtman Abrolhos Archipelago. Forages on seas and reefs within a limited range of these islands (Surman *et al.* 2017).
Aphelocephala leucopsis Southern Whiteface	VU (EPBC Act)	*	Occurs over most of Australia south of the tropics (Schodde & Mason 1999). Inhabits a range of open woodlands and shrublands with an understory of grasses and/or shrubs, generally characterised by acacias or eucalypts on ranges, foothills and lowlands, and plains (Higgins & Peter 2002). Forages on insects, spiders, and seeds almost exclusively on the ground (Higgins & Peter 2002).
Apus pacificus Fork-tailed Swift	Mig. (EPBC & BC Acts)	17.3 km NNW	Found across a range of habitats, from inland open plains to coastal and wooded areas, where it is exclusively aerial (1-300m above ground) (DCCEEW 2025b).
Arenaria interpres Ruddy Turnstone	VU/Mig. (EPBC Act); Mig. (BC Act)	16.7 km NNW	Mainly found on coastal regions with exposed rock coastlines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It strongly prefers rocky shores or beaches where there are large deposits of rotting seaweed (DCCEEW 2025b). Mainly forages between lower supralittoral and lower littoral zones of foreshores, from strand-line to wave-zone. They often forage among banks of stranded seaweed or other tide-wrack. They are also known to forage on exposed rocky platforms, coral reefs and mudflats (Higgins & Davies 1996).

Species	Status	Proximity to study area	Habitat
Calidris acuminata Sharp-tailed Sandpiper	VU/Mig. (EPBC Act); Mig. (BC Act)	17.3 km NNW	Muddy edges of shallow fresh or brackish vegetated wetlands, including lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland (DCCEEW 2025b).
Calidris canutus Red Knot	VU/Mig. (EPBC Act); EN (BC Act)	*	Typically occupy intertidal mudflats, sandflats and sheltered coasts. They are also known to occupy beaches, lagoons, harbours and sandy beaches. They have also been recorded occupying saline terrestrial wetlands and sewage ponds and are rarely found in freshwater swamps (DCCEEW 2025b).
Calidris ferruginea Curlew Sandpiper	CR/Mig. (EPBC Act); CR (BC Act)	*	Occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons. They are known to favour non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bores/drains, usually with bare edges of mud or sand (DCCEEW 2025b).
Calidris melanotos Pectoral Sandpiper	Mig. (EPBC & BC Acts)	*	Shallow fresh to saline wetlands such as coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (DCCEEW 2025b).
Calidris ruficollis Red-necked Stint	Mig. (EPBC & BC Acts)	14.7 km NW	Mostly found in coastal areas, including sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores (DCCEEW 2025b). Forages on bare wet mud on intertidal mudflats or sandflats, or in very shallow water; mostly in areas with a film of surface water and mostly close to edge of water. They have been recorded foraging in flooded paddocks and in a freshly cropped lucerne paddock near lagoons (Higgins & Davies 1996).
Calyptorhynchus banksii naso Forest Red-tailed Black Cockatoo	VU (EPBC & BC Acts)	37.0 km NE	Mainly occurs in dense jarrah, karri and marri forests, mainly in the hilly interior, and a range of other forest and woodland types (DCCEEW 2025b).Changes in foraging preferences due to habitat alteration have led more regular movement of birds in the northern Darling plateau area onto the Swan Coastal Plain and around the Perth metropolitan area
Falco hypoleucos Grey Falcon	VU (EPBC & BC Acts)	*	Occurs in a wide variety of arid habitats including open woodlands and open *Acacia* shrubland, hummock and tussock grasslands and low shrublands, particularly where crossed by tree-lined water courses (Schoenjahn *et al.* 2019; TSSC 2020).
Falco peregrinus Peregrine Falcon	OS (BC Act)	12.5 km NNW	Preferred habitat includes cliffs and wooded watercourses. Nesting occurs mainly on cliff ledges, granite outcrops, quarries and in trees with old raven or Wedge-tailed Eagle nests (Johnstone & Storr 1998).
Hydroprogne caspia Caspian Tern	Mig. (EPBC & BC Acts)	16.1 km NNW	Found in sheltered coastal habitats and near-coastal terrestrial wetlands (DCCEEW 2025b).
Leipoa ocellata Malleefowl	VU (EPBC & BC Acts)	7.5 km S	Malleefowl occur mainly in scrubs and thickets of mallee (*Eucalyptus* spp.), boree (*Melaleuca lanceolata*)

Species	Status	Proximity to study area	Habitat
			and bowgada (*Acacia linophylla*), and other dense litter-forming shrublands including Mulga Shrublands (Johnstone & Storr 2004). Nest mounds require sandy soil as well as abundant litter (Benshemesh 2007).
Limosa lapponica Bar-tailed Godwit	Mig. (EPBC & BC Acts)	24.8 km S	Occupies a variety of aquatic habitats such as intertidal sandflats, banks, mudflats, estuaries coastal lagoons and harbours. They have also been found in saltmarshes and brackish coastal wetlands (DCCEEW 2025b).
Motacilla cinerea Grey Wagtail	Mig. (EPBC & BC Acts)	*	Vagrant visitor to Australia that inhabits fast-flowing streams and rivers (IUCN 2019).
Numenius madagascariensis Eastern Curlew	CR/Mig. (EPBC Act); CR (BC Act)	*	Occurs mainly on intertidal mudflats, on exposed seagrass beds or mudflats (Geering *et al.* 2007). Also utilises sand spits of estuaries, mangroves, lake shores and ocean beaches.
Onychoprion anaethetus Bridled Tern	Mig. (EPBC & BC Acts)	*	Occurs in tropical and subtropical seas, rarely found in inshore continental waters (DCCEEW 2025b).
Oxyura australis Blue-billed Duck	P4 (DBCA list)	6.1 km ENE	Endemic to Australia's temperate regions, inhabiting terrestrial wetlands (fresh or saline) with extensive bordering vegetation, including artificial wetlands, such as sewage ponds (Birdlife International 2015; del Hoyo *et al.* 2014).
Pandion haliaetus Osprey	Mig. (EPBC & BC Acts)	16.2 km NNW	Occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. Occur in a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes (DCCEEW 2025b).
Rostratula australis Australian Painted Snipe	EN (EPBC & BC Acts)	*	Inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (DCCEEW 2025b).
Sterna dougallii Roseate Tern	Mig. (EPBC & BC Acts)	*	Occurs in coastal and marine areas in subtropical and tropical seas (DCCEEW 2025b).
Sternula albifrons Little Tern	VU/Mig. (EPBC Act); Mig. (BC Act)	*	In Australia, they inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets (DCCEEW 2025b).
Sternula nereis nereis Fairy Tern	VU (EPBC & BC Acts)	16.4 km NNW	Nests on sheltered, sandy beaches. Have also been known to occur on the edges of offshore estuaries, islands, wetlands and other areas of the mainland coastline (DCCEEW 2025b).
Thalasseus bergii Greater Crested Tern	Mig. (EPBC & BC Acts)	9.9 km S	Found in coastal areas including low lying rocky, sandy and coral islands. They are often found on open shores and less commonly found in tidal creeks and inland waterbodies (DCCEEW 2025b).
Tringa brevipes Grey-tailed Tattler	Mig. (EPBC & BC Acts); P4 (DBCA list)	29.5 km NW	Occurs on sheltered coasts with reefs and rock platforms or mudflats, and can also be found on reefs or platforms that are exposed at low tide (DCCEEW 2025b).

Species	Status	Proximity to study area	Habitat
Tringa nebularia Common Greenshank	EN/Mig. (EPBC Act); Mig. (BC Act)	16.8 km NNW	Mostly occurs on the coast but sometimes inland; uses permanent and ephemeral terrestrial wetlands, including rivers and creeks (DCCEEW 2025b).
Tringa stagnatilis Marsh Sandpiper	Mig. (EPBC & BC Acts)	16.7 km NNW	Inhabits coastal and inland wetlands, estuarine and mangrove mudflats, beaches, swamps, lakes and several other types of wetlands (Morcombe 2004).
Zanda latirostris Carnaby's Cockatoo	EN (EPBC & BC Acts)	1.4 km W	Occurs in uncleared or remnant native eucalypt woodlands of south-west WA. During the breeding season, it occurs mainly in eucalypt woodlands with suitable hollow-bearing trees in the wheatbelt. In the non-breeding season, they occur on coastal plains. Foraging habitat includes native vegetation surrounding breeding areas during the breeding season, and banksia heath and woodlands in the non-breeding season (DCCEEW 2025b).
Reptiles (3)			
Cyclodomorphus branchialis Gilled Slender Blue-tongue Skink	VU (BC Act)	39.3 km NNE	A ground dwelling, crepuscular and nocturnal species that shelters by day in hammock grass, leaf-litter, including *Acacia*, and under fallen logs and stumps. Prefers the deep leaf litter on sandy beaches vegetated mainly with coastal spinifex (Cogger 2014).
Egernia stokesii subsp. badia Western Spiny-tailed Skink	EN (EPBC Act); VU (BC Act)	34.2 km S	Known to occur in semi-arid areas of south-west WA between Shark Bay and Minnivale (DCCEEW 2025b). The species have been recorded in York Gum, Gimlet and Salmon Gum woodlands with numerous fallen logs.
Neelaps calonotos Black-striped Snake	P3 (DBCA list)	2.3 km WSW	Restricted to the sandy coastal strip of the Swan Coastal Plain between Mandurah and Lancelin, with some records existing inland at Gingin, Bullsbrook and Caversham (Storr *et al.* 2002). Occurs in heathlands and woodlands on dunes and sand plains (Wilson & Swan 2021).
Mammals (5)			
Dasyurus geoffroii Chuditch	VU (EPBC & BC Acts)	14.4 km NNW	The Chuditch is now confined to south-WA, occurring in only 5% of its former range. Prior to European settlement the species occupied approximately 70% of continental Australia (Smith *et al.* 2004); (Van Dyck & Strahan 2008). The species is now mostly found in Jarrah forest and woodland of the southwest or heath and mallee habitats along the south coast. Uses horizontal hollow logs or earth burrows as refugia and dens (DEC 2012b).
Hydromys chrysogaster Water-rat	P4 (DBCA list)	2.2 km W	In the south-west of WA, the Water-rat occupies habitats in the vicinity of permanent water, favouring areas with dense, low-lying vegetation, in the south-west of Western Australia, the Water-rat occupies habitats in the vicinity of permanent water, favouring areas with dense, low-lying vegetation, low density canopy cover, good water quality, narrow water bodies and some habitat complexity (DEC 2012c; Speldewinde *et al.* 2013). It is likely that woody debris, rock ledges and wetland islands are important for refuge and feeding. Can also occur in mangrove and estuarine areas (IUCN 2019).

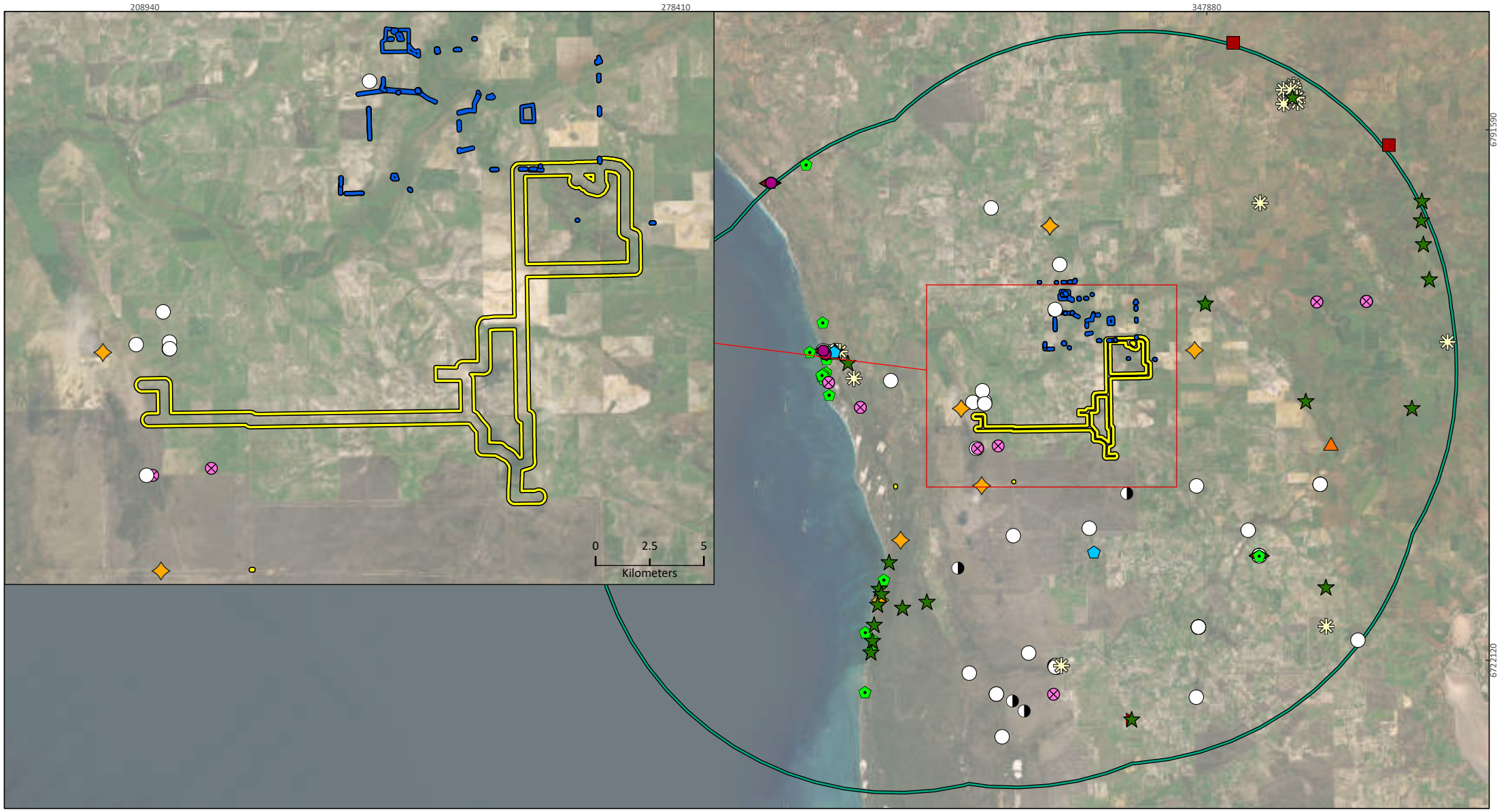
Species	Status	Proximity to study area	Habitat
Notamacropus irma Western Brush Wallaby	P4 (DBCA list)	3.8 km W	A grazing species that occurs in open forest or woodland with low grasses and scrubby thickets, and also found in some areas of mallee and heathland (DEC 2012d). Prefers open grassy areas and are absent in Karri forests with dense understorey (Woinarksi & Burbidge 2016).
Phascogale tapoatafa wambenger South-western Brush-tailed Phascogale	CD (BC Act)	25.1 km E	Occurs in mature dry sclerophyll forests and open woodlands that contain hollow-bearing trees. These nocturnal, arboreal carnivores forage for food under the bark of trees (DEC 2012a) and nest in the hollows of dead and mature jarrah and marri trees (Burbidge & Woinarksi 2020).
Pseudocheirus occidentalis Western Ringtail Possum	CR (EPBC & BC Acts)	12.3 km S	Formerly found in several types of forest and woodland (DPaW 2017), the species is now mostly restricted to long unburnt mature peppermint/tuart closed forest and relatively unburnt jarrah and marri forests and woodlands with limited disturbance. It also occurs in coastal heath, peppermint woodland, myrtaceous heaths and shrubland, riparian zones and karri forest (DPaW 2017).

*Projected distribution only.

5.1.1.1 Black cockatoos

The study area is within the modelled distribution and breeding range for Carnaby's Cockatoo (*Zanda latirostris*) (DAWE 2022). The desktop searches also identified several White-tailed black cockatoo records; however, as the distribution of Baudin's Cockatoo (*Zanda baudinii*) does not extend as far north as the desktop review area, it can be assumed that these records are Carnaby's Cockatoo. A Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) was reported at Coalseam Conservation Park (approximately 37 km north-east of the study area) in 2019. This record is considered an outlier as the current known range for this species extends only as far north as Lancelin (DAWE 2022) and therefore is unlikely to regularly occur within the desktop review area.

One known Carnaby's Cockatoo roosting site is located approximately 1.4 km north of the western end of the study area (DBCA 2019) (Figure 5-2). The most recent record of a Carnaby's Cockatoo within the vicinity of this roost is from 2018. Two roosting sites are known from Arrowsmith River approximately 25 km away; however, these sites are outside the local area, which is defined as a 15 km radius of the centre point of the study area (Bamford 2021b) (Figure 5-2). No Carnaby's Cockatoo breeding activity has been confirmed within the desktop area.



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Map author	JL

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Kilometers

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- Study area
- Previous Phoenix study areas
- 40 km desktop search buffer

Status

- CD (BC Act)
- CR (EPBC & BC Acts)
- EN (EPBC & BC Acts)
- EN/Mig. (EPBC Act); Mig. (BC Act)
- EN/VU (EPBC Act; BC Act)
- Mig. (EPBC & BC Acts)
- OS (BC Act)
- P1 (DBCA list)
- P3 (DBCA list)
- P4 (DBCA list)
- VU (BC Act)
- VU (EPBC & BC Acts)
- VU (EPBC Act); EN (BC Act)
- VU/Mig. (EPBC Act); Mig. (BC Act)

Figure 5-1

Desktop records of significant vertebrate fauna

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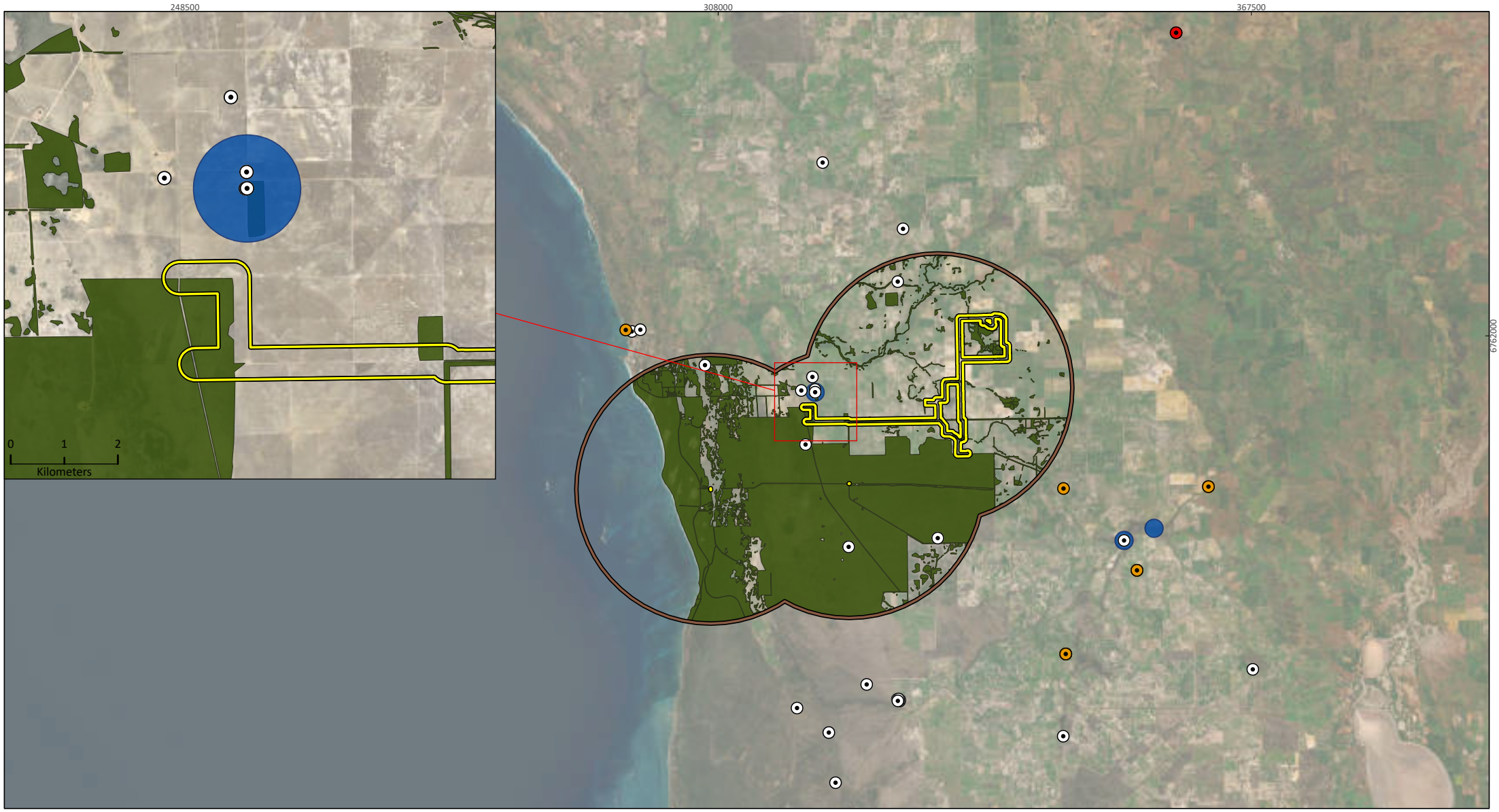

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- Study area
- 15 km buffer (local area)
- Native vegetation extent (DPIRD-005)
- Black cockatoo roosting sites (DBCA-064)

DBCA black cockatoo records

- Carnaby's cockatoo
- Forest Red-tailed black cockatoo
- White-tailed black cockatoo (likely Carnaby's Cockatoo)

Figure 5-2

Black cockatoo desktop records, known roosting locations and extent of native vegetation within the local area

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5.1.2 SRE invertebrate fauna

The desktop review identified records of 10 confirmed SRE taxa, 18 likely and 88 potential SRE taxa from within the SRE desktop search area (Table 5-4; Figure 5-3; Appendix 4). A further 74 data deficient taxa of uncertain SRE status were identified. The desktop records indicate no SRE species have previously been recorded within the study area (Figure 5-3).

Of the 116 confirmed, likely or potential SRE taxa, 23 are named species. The remaining 93 comprise taxa named only to morphospecies codes as applied by the WA Museum or are not identified to confirmed species level (i.e. "sp." or "cf."). Most of the taxa classified as data deficient (Table 5-4) are unidentifiable ("sp. indet.", i.e. female or juvenile specimens) or could not be identified to species or morphospecies. These may represent new species or other species listed in the same genus where records exist.

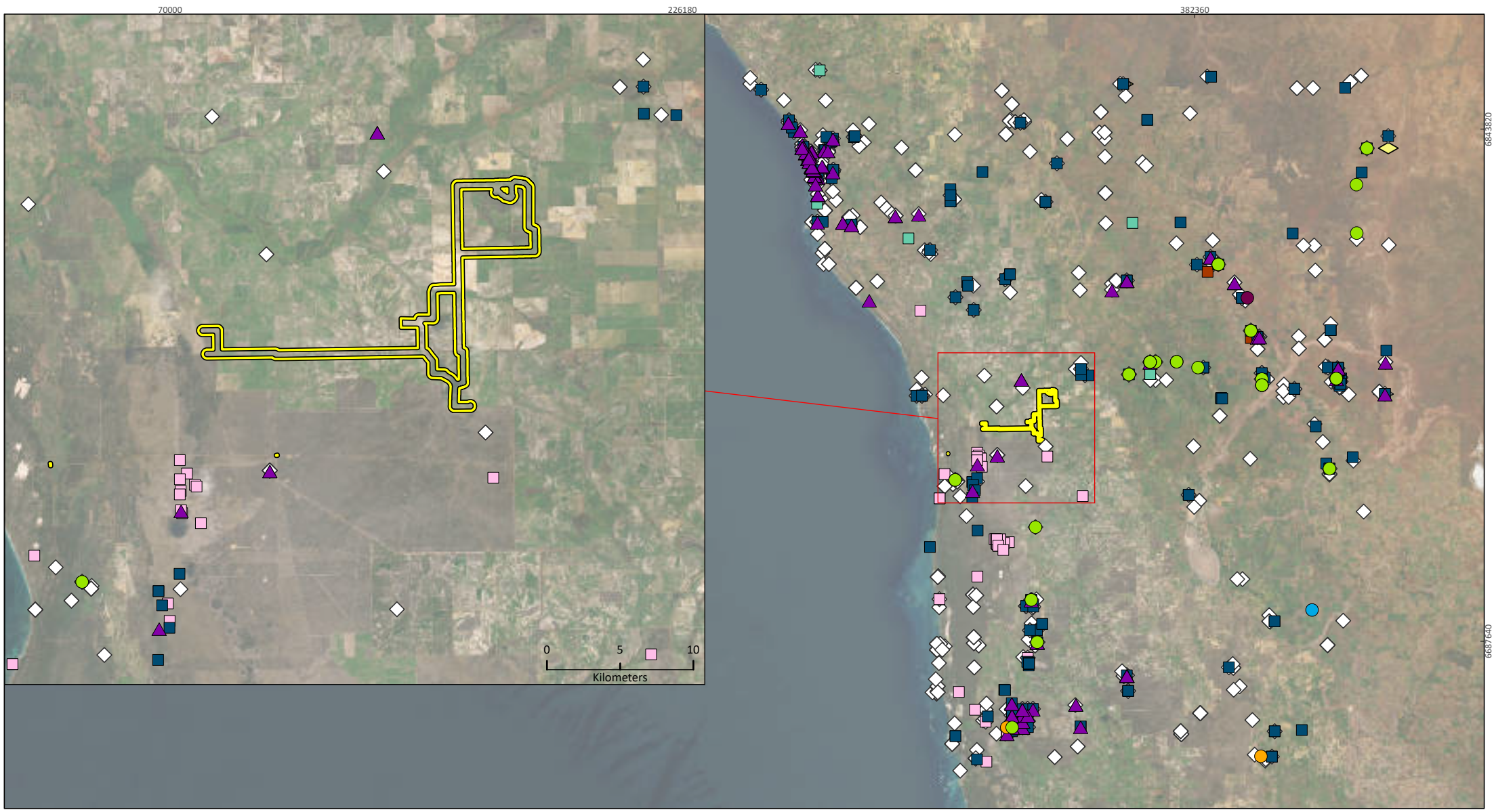
Table 5-4 Summary of SRE and significant invertebrate taxa identified in the desktop review

Group	SRE status						Total
	Confirmed	Likely	Potential	Data deficient	Widespread	Other significant	
Centipede	-	-	-	7	3	-	**10**
Harvestmen	-	-	1	4	4	-	**9**
Isopod	-	1	9	6	4	-	**20**
Jumping spider	-	-	1	1	-	-	**2**
Land snail	-	-	7 (incl. one P1)	10	13	1 EX	**31**
Millipede	-	12	17	6	5	-	**40**
Mygalomorph	10, incl.: - 1 P1 - 2 P2 - 1 EN	5	44, incl.: - 1 P1 - 1 P3 - 1 P4	21	23, incl: - 1 P3	1 VU/ EN	**104**
Pseudoscorpion	-	-	1	14	10	-	**25**
Scorpion	-	-	8	5	12	-	**25**
Total	**10**	**18**	**88**	**74**	**74**	**2**	**266**

All the confirmed taxa identified in the desktop review are mygalomorph spiders. The 4 named *Idiosoma* species identified are also listed as conservation significant (3 Priority and 1 Endangered) (Table 5-5). One land snail is listed as Extinct. The study area is also within the projected range of Vulnerable/Endangered *Idiosoma nigrum* (DCCEEW 2025a); however, there are no known records of this species within the desktop review area. Thirteen likely SRE taxa (1 isopod and 12 millipedes) have been recorded within the desktop review area and are representatives from groups that are likely to be SREs, though there is not enough data to confirm this status.

Table 5-5 Confirmed, likely and significant invertebrate taxa identified in the desktop review

Taxon	SRE status / cons. status	Closest record (km)	Habitat records
Class: Arachnida, Order: Araneae (spiders), Infraorder: Mygalomorphae (trapdoor spiders)			
Bungulla bringo	Likely	29.9	Gully with York gum
Bungulla riparia	Confirmed	17.5	Under leaf litter on sand
Euoplos `MYG792`	Likely	10.5	
Euoplos `MYG886`	Likely	63.5	
Euoplos `MYG887`	Likely	85.2	
Euoplos hoggi	Confirmed	62.6	
Euoplos mcmillani	Confirmed	48.3	
Euoplos saplan	Confirmed	85.0	
Hesperonatalius harrietae	Likely	93.8	Sand dune, gully sides
Idiosoma dandaragan	Confirmed/P2 (DBCA list)	117.8	
Idiosoma gardneri	Confirmed/P2 (DBCA list)	87.5	
Idiosoma gutharuka	Confirmed/P1 (DBCA list)	63.4	
Idiosoma kopejtkaorum	Confirmed/EN (BC Act)	97.7	Creekline in York gum woodland
Idiosoma nigrum	VU (EPBC Act); EN (BC Act)	Projected distribution	
Proshermacha armigera	Confirmed	62.1	
Teyl `MYG693`	Confirmed	62.1	
Phylum: Arthropoda, Subphylum: Crustacea, Class: Malacostraca, Order: Isopoda (slaters)			
Buddelundia opaca	Likely	80.2	
Phylum: Arthropoda, Subphylum: Myriapoda, Class: Diplopoda (millipedes)			
Antichiropus `DIP078`	Likely	7.6	*Banksia* low woodland on sand
Antichiropus `DIP081`	Likely	50.8	
Antichiropus `DIP099, mcmillani`	Likely	35.1	
Antichiropus `DIP106, mt lesueur1`	Likely	81.5	
Antichiropus `DIP107, Mt Lesueur2, ML2`	Likely	75.8	
Antichiropus `DIP147, koolanooka/PKI/ bulbulus`	Likely	86.1	Cliff base under small rocks
Antichiropus `DIP232`	Likely	6.3	Shrubland
Podykipus `Geraldton 1`	Likely	85.7	
Podykipus `Geraldton 2`	Likely	101.1	
Podykipus `Geraldton 3`	Likely	85.7	Sand dune
Podykipus `Geraldton 4`	Likely	85.7	
Podykipus `Geraldton 5`	Likely	85.7	
Phylum: Mollusca, Class: Gastropoda, Superorder: Eupulmonata (land snails)			
Bothriembryon whitleyi	EX	22.0	



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Study area

SRE status

- Confirmed
- Confirmed/P1
- Confirmed/P2
- Confirmed/EN
- Data Deficient
- Likely
- Potential
- Potential/P1
- Potential/P3
- Potential/P4
- Widespread/P3

Figure 5-3

Desktop records of SRE invertebrates

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5.2 FIELD SURVEY

5.2.1 Vertebrate fauna

5.2.1.1 Habitats

Four broad habitat groupings were defined for the study area (Table 5-6), comprising: degraded habitats (3,337.2 ha, 89.4%), woodlands (187.5 ha, 5.1%), shrublands (158.8 ha, 4.3%) and drainage line (47.7 ha, 1.3%). Within these groupings, 10 habitat types were defined, including 4 shrublands, 2 woodlands and a single drainage line habitat (Table 5-6). The nearly 90% of the study area that is degraded was comprised of cleared or highly disturbed areas, while remnant native vegetation covers only 10.6% of the overall study area.

The remnant native vegetation persisting in the study area is in very good to degraded condition, with one or more disturbance factors such as feral animals, weed infestation, litter, historical clearing and tracks recorded at every site (Appendix 2.

The dominant remnant native habitat type present was Open *Banksia* woodland, occurring mostly within a recently burnt block of vegetation at the western end of the study area (Figure 5-4). A smaller extent of *Banksia* woodland also occurs along Yandanooka Road. This habitat offers the highest foraging value for Carnaby's Cockatoo; however, the quality and cover of *Banksia* is relatively low.

Open eucalypt woodlands, comprising 1.5% of the study area, occurs predominantly in the northeast (Figure 5-4). This habitat has been subject to degradation through weed infestation, feral species, and partial clearing that has resulted in an understorey structure that has been significantly altered. While there is some potential for regeneration, these areas are unlikely to return to a good condition without intensive management.

The corridor of roadside vegetation bordering Yandanooka Road is predominantly Sheoak and *Acacia* shrubland that is generally in good condition, as although some level of disturbance is present, the basic vegetation structure remains mostly intact (EPA 2016b). Scattered eucalypts may also be present within this habitat.

Although the creek line habitat represents only 1.3% of the study area, this habitat type recorded the greatest diversity of fauna species, likely due to this habitat supporting semi-aquatic species such as frogs and water birds (Appendix 5). High levels of rainfall leading up to the survey resulted in particularly high inundation of the minor creek lines.

Two restricted habitats were identified, each occurring across less than 0.05 ha of the study area: a lateritic breakaway located within a paddock and a dense thicket behind coastal dunes. Neither of these habitats are of high value for significant vertebrate fauna species.

Table 5-6 Extent and description of each fauna habitat in the study area

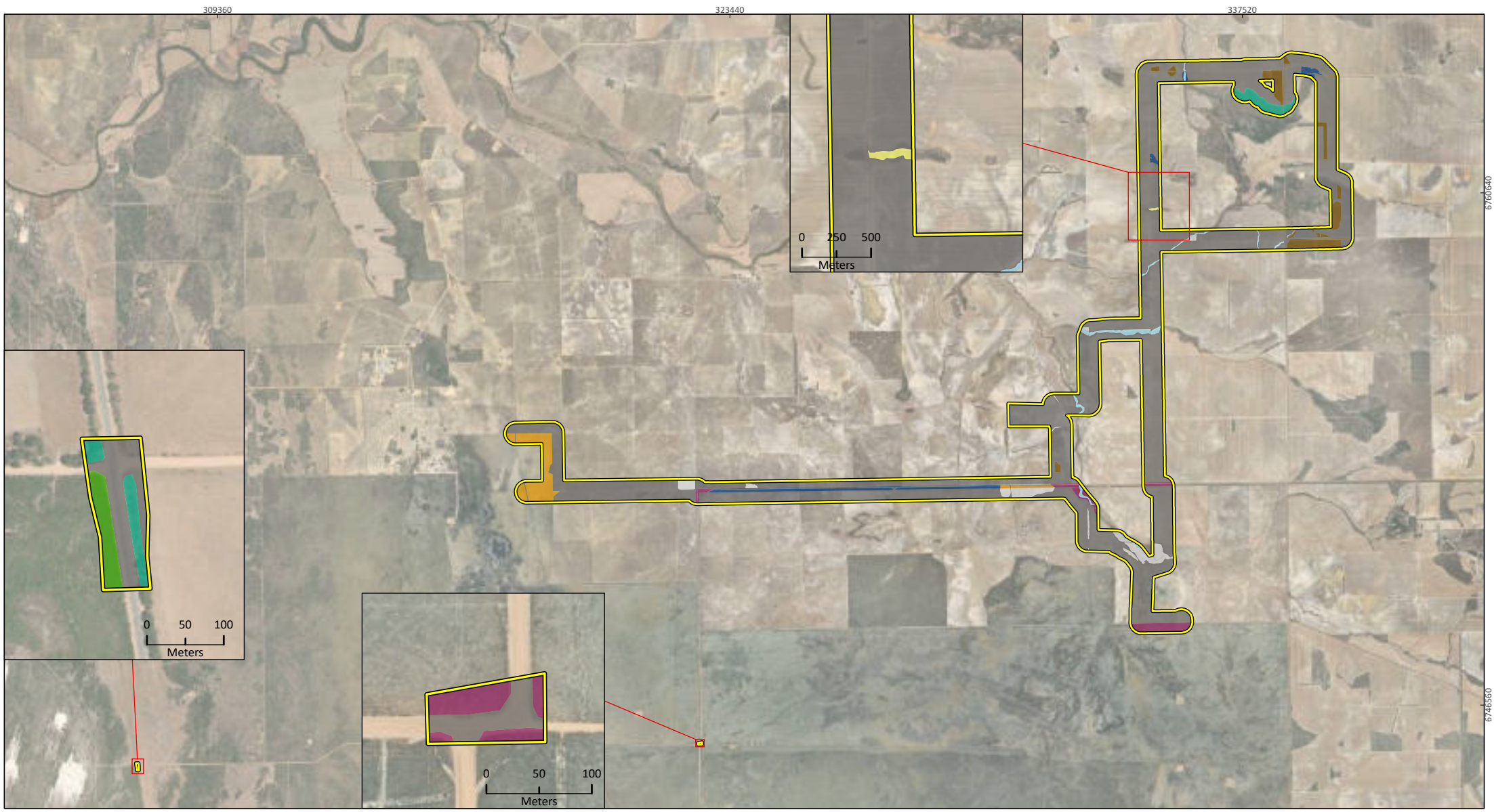
Habitat type	Site/s	Description	Extent in study area and % of study area	Representative photograph
Degraded (3,337.2 ha, 89.4%)				
Cleared	11	Land that has been historically cleared for paddocks, agriculture or roads. No native vegetation present.	3,104.8 ha 83.2%	
Plantation	-	Historically cleared land that has been replanted with eucalypts and other species, in varying stages of growth. Includes planted roadside vegetation. Some trees of suitable black cockatoo potential nesting tree size.	127.1 ha 3.4%	

Habitat type	Site/s	Description	Extent in study area and % of study area	Representative photograph
Remnant woodland/shrubland over paddock	-	Areas of remnant overstorey (eucalypts, tall *Acacia* shrubs) over degraded paddocks with no native understorey. Often heavily degraded and grazed by livestock.	105.3 ha 2.8%	
Woodlands (187.5 ha, 5.0%)				
Open *Banksia* woodland	8, 23	Mid to tall *Banksia* open woodland over mixed mid to low shrubland and native grasses on sandy soil. The largest patch of this habitat has been recently burnt (2023) and has negligible leaf litter and *Banksia* cover. Groves of *Banksia* at Site 08 (20% cover) represent highest value foraging resource for black cockatoos.	132.8 ha 3.6%	

Habitat type	Site/s	Description	Extent in study area and % of study area	Representative photograph
Open eucalypt woodland	15, 19	Open eucalypt woodland over sparse shrubland and continuous weed cover. Transitions into Sheoak shrubland on upper slopes. Small number of trees are of suitable potential nesting tree size.	54.7 ha 1.5%	
Shrublands (158.8 ha, 4.3%)				
Sheoak and *Acacia* shrubland	6, 7, 14, 16	Sheoak and/or *Acacia* shrubland in varying densities over mixed mid to low shrubs over tussock grasses and weeds. Scattered eucalypts present. Varying degrees of degradation depending on proximity to paddocks.	81.3 ha 2.2%	

Habitat type	Site/s	Description	Extent in study area and % of study area	Representative photograph
Low to mid shrubland/grassland	4, 5, 10, 13, 24	Mixed low to mid shrubs over tussock grassland on sandy soils. No trees present.	75.4 ha 2.0%	
Shrubland on lateritic breakaway	17	Sparse tall shrubs over mixed dense shrubland over tussock grasses and invasive grass cover on a south facing lateritic breakaway. A grove of quandong trees present.	1.8 ha <0.05%	

Habitat type	Site/s	Description	Extent in study area and % of study area	Representative photograph
Tall closed shrubland	26	Dense tall shrubland (*Acacia* and *Melaleuca* spp.) over invasive grasses and herbs on sandy loam soil. Transitions into coastal dune systems to the west.	0.3 ha <0.05%	
Drainage lines (47.7 ha, 1.3%)				
Creek line	1, 2, 3, 9, 12, 18, 20, 21, 22	Inundated creeks that have formed along low points within the landscape. Bordered by different vegetation depending on the degree of degradation. Reeds and sedges may be present. *Eucalyptus camaldulensis* (river red gum) often occurring along creeks.	47.7 ha 1.3%	



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Study area

Habitat

- *Banksia* woodland
- Cleared
- Creek line
- Tall closed shrubland
- Low to mid shrubland/grassland
- Open eucalypt woodland
- Plantation
- Remnant woodland/shrubland over paddock
- Sheoak and *Acacia* shrubland
- Shrubland on lateritic breakaway

Figure 5-4

Fauna habitats in the study area

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5.2.1.2 Assemblage

A total of 65 terrestrial vertebrate species representing 42 families and 58 genera were recorded in the study area during the field survey (Appendix 5). The assemblage included 62 native species and 3 introduced species. The recorded assemblage represents 25.6% of the species identified in the desktop review (Table 5-7).

Table 5-7 Number of vertebrate species recorded in survey in comparison to desktop results, by group

Group	No. species identified in desktop review	No. species recorded in survey
Amphibians	14	4
Reptiles	51	6
Birds	162 (inc. 2 naturalised)	43
Mammals	27 (inc. 11 introduced)	12 (inc. 4 introduced)
Total	**254**	**65**

Five species were recorded in field but were not identified in the desktop review:

- Australian Shelduck, *Tadorna tadornoides*
- Gould's Wattled Bat, *Chalinolobus gouldii*
- Straw-necked Ibis, *Threskiornis spinicollis*
- White-necked Heron, *Ardea pacifica*
- White-striped Free-tailed Bat*, Austronomus australis.*

5.2.1.3 Significant vertebrate fauna

No Threatened or Priority vertebrate fauna were recorded in the survey (Appendix 5).

The likelihood of occurrence assessment (section 4.2.1.10) for the significant species identified in the desktop review (section 5.1) determined one is likely to occur, 8 may possibly occur and 30 are unlikely to occur (Table 5-8). A number of migratory birds were returned in the desktop review due to the proximity of the study area to the coastline; however, most of these species are restricted to coastal or wetland habitats and are unlikely to occur inland.

Carnaby's Cockatoo (EN) is the only significant vertebrate species that is considered likely to occur within the study area. This species is known to occur within the broader area, and although it was not recorded during the survey, the presence of low value foraging habitat and potential nesting trees indicate that it is likely Carnaby's Cockatoo will be an irregular visitor to the study area.

Table 5-8 Likelihood of occurrence for significant vertebrate fauna identified in the desktop review

Species	Status	Likelihood of occurrence	Broad habitats in the study area				Comment
			Shrubland	Eucalypt woodland	*Banksia* woodland	Creek line	
Birds (31)							
Actitis hypoleucos Common Sandpiper	Mig. (EPBC & BC Acts)	Possible				✓	Waterbodies within the study area may provide suitable habitat.
Anous stolidus Common Noddy	Mig. (EPBC & BC Acts)	Unlikely					Restricted to marine environments.
Anous tenuirostris melanops Australian Lesser Noddy	VU (EPBC Act); EN (BC Act)	Unlikely					Restricted to marine environments.
Aphelocephala leucopsis Southern Whiteface	VU (EPBC Act)	Possible	✓	✓			Potentially suitable open woodland and shrubland habitat present.
Apus pacificus Fork-tailed Swift	Mig. (EPBC & BC Acts)	Possible	✓	✓	✓	✓	Not restricted by terrestrial habitats.
Arenaria interpres Ruddy Turnstone	VU/Mig. (EPBC Act); Mig. (BC Act)	Unlikely					Absence of suitable coastal habitat.
Calidris acuminata Sharp-tailed Sandpiper	VU/Mig. (EPBC Act); Mig. (BC Act)	Unlikely					Absence of suitable wetland habitat.
Calidris canutus Red Knot	VU/Mig. (EPBC Act); EN (BC Act)	Unlikely					Absence of suitable coastal habitat.
Calidris ferruginea Curlew Sandpiper	CR/Mig. (EPBC Act); CR (BC Act)	Unlikely					Absence of suitable coastal habitat.
Calidris melanotos Pectoral Sandpiper	Mig. (EPBC & BC Acts)	Unlikely					Absence of suitable coastal habitat.
Calidris ruficollis Red-necked Stint	Mig. (EPBC & BC Acts)	Unlikely					Absence of suitable coastal habitat.

Species	Status	Likelihood of occurrence	Broad habitats in the study area				Comment
			Shrubland	Eucalypt woodland	*Banksia* woodland	Creek line	
Calyptorhynchus banksii naso Forest Red-tailed Black Cockatoo	VU (EPBC & BC Acts)	Unlikely					Outside of range of the *naso* subspecies, which is known to extend as far north as the Lancelin region.
Falco hypoleucos Grey Falcon	VU (EPBC & BC Acts)	Unlikely					No suitable habitat and outside of current known range.
Falco peregrinus Peregrine Falcon	OS (BC Act)	Possible		✓		✓	A number of records approximately 38 km away at Coalseam Conservation Park. Unlikely to nest within the study area but may be an occasional visitor.
Hydroprogne caspia Caspian Tern	Mig. (EPBC & BC Acts)	Unlikely					Absence of suitable coastal habitat.
Leipoa ocellata Malleefowl	VU (EPBC & BC Acts)	Unlikely					Remnant vegetation within the study area too fragmented and degraded to support Malleefowl.
Limosa lapponica Bar-tailed Godwit	Mig. (EPBC & BC Acts)	Unlikely					Absence of suitable coastal habitat.
Motacilla cinerea Grey Wagtail	Mig. (EPBC & BC Acts)	Unlikely					Absence of suitable fast-flowing waterbodies and no known records within 40 km.
Numenius madagascariensis Eastern Curlew	CR/Mig. (EPBC Act); CR (BC Act)	Unlikely					Absence of suitable coastal habitat.
Onychoprion anaethetus Bridled Tern	Mig. (EPBC & BC Acts)	Unlikely					Restricted to marine environments.
Oxyura australis Blue-billed Duck	P4 (DBCA list)	Possible				✓	Potentially suitable waterbodies with dense bordering vegetation present along creek lines. This species has been recorded nearby; however, the most recent record is from 2007.
Pandion haliaetus Osprey	Mig. (EPBC & BC Acts)	Unlikely					Absence of suitable coastal habitat.

Species	Status	Likelihood of occurrence	Broad habitats in the study area				Comment
			Shrubland	Eucalypt woodland	*Banksia* woodland	Creek line	
Rostratula australis Australian Painted Snipe	EN (EPBC & BC Acts)	Unlikely					Absence of suitable wetland habitat and no known records from the desktop review area.
Sterna dougallii Roseate Tern	Mig. (EPBC & BC Acts)	Unlikely					Restricted to marine environments.
Sternula albifrons Little Tern	VU/Mig. (EPBC Act); Mig. (BC Act)	Unlikely					Absence of suitable coastal habitat.
Sternula nereis nereis Fairy Tern	VU (EPBC & BC Acts)	Unlikely					Absence of suitable coastal habitat.
Thalasseus bergii Greater Crested Tern	Mig. (EPBC & BC Acts)	Unlikely					Absence of suitable coastal habitat.
Tringa brevipes Grey-tailed Tattler	Mig. (EPBC & BC Acts); P4 (DBCA list)	Unlikely					Absence of suitable coastal habitat.
Tringa nebularia Common Greenshank	EN/Mig. (EPBC Act); Mig. (BC Act)	Possible				✓	Potentially suitable creek line habitat present.
Tringa stagnatilis Marsh Sandpiper	Mig. (EPBC & BC Acts)	Unlikely					Absence of suitable wetland habitat.
Zanda latirostris Carnaby's Cockatoo	EN (EPBC & BC Acts)	Likely		✓	✓	✓	Suitable foraging and roosting habitat within the region. Likely an irregular visitor to the study area.
Reptiles (3)							
Cyclodomorphus branchialis Gilled Slender Blue-tongue Skink	VU (BC Act)	Unlikely					Absence of suitable habitats with dense leaf litter.
Egernia stokesii subsp. *badia* Western Spiny-tailed Skink	EN (EPBC Act); VU (BC Act)	Unlikely					Absence of suitable York Gum woodlands.
Neelaps calonotos Black-striped Snake	P3 (DBCA list)	Possible	✓		✓		Potentially suitable sand plain and dune habitat within the western end of the study area.

Species	Status	Likelihood of occurrence	Broad habitats in the study area				Comment
			Shrubland	Eucalypt woodland	*Banksia* woodland	Creek line	
Mammals (5)							
Dasyurus geoffroii Chuditch	VU (EPBC & BC Acts)	Unlikely					Outside of current known range.
Hydromys chrysogaster Water-rat	P4 (DBCA list)	Possible				✓	May occur along larger, inundated creek lines within the study area.
Notamacropus irma Western Brush Wallaby	P4 (DBCA list)	Unlikely					Potentially suitable habitat within wider region however the most recent record is from 2002.
Phascogale tapoatafa wambenger South-western Brush-tailed Phascogale	CD (BC Act)	Unlikely					Outside of current known range and absence of suitable habitat.
Pseudocheirus occidentalis Western Ringtail Possum	CR (EPBC & BC Acts)	Unlikely					Outside of current known range and absence of suitable forest habitat.

5.2.1.4 Black cockatoo habitat assessment

Foraging habitat quality rating for Carnaby's Cockatoo was variable between habitats in the study area, but generally low, with scores ranging from 0/10 to 3/10 (Table 5-9). The highest scoring habitat based on the Bamford scoring system (see section 4.2.1.5 for method) was 3/10 for *Banksia* woodland (132.8 ha), which is considered low to moderate foraging value. Open eucalypt woodlands received a low habitat quality score of 2 (54.7 ha) and six habitat types received a low habitat quality score of 1 (totalling 438.6 ha) on the basis that scattered known food plants may occur within these areas. Cleared and Tall closed shrubland were rated 0 (totalling 3,105.1 ha).

Stocking rate was scored 0/1 because the desktop review indicated intermittent presence of Carnaby's Cockatoo in the vicinity of the study area, and no evidence of Carnaby's Cockatoo was recorded during the survey.

The Creek line, Open eucalypt woodland and Plantation habitat types provide potential roosting habitat for Carnaby's Cockatoo.

Table 5-9 Carnaby's Cockatoo habitat quality scores per habitat type

Habitat	Area (ha)	% of study area	Veg. condition (/6)	Context (/3)	Density (/1)	HQS (/10)
Cleared	3,104.8	83.2	0	0	0	0
Creek line	47.7	1.3	1	0	0	1
Low to mid shrubland/grassland	75.4	2.0	1	0	0	1
Open *Banksia* woodland	132.8	3.6	3	0	0	3
Open eucalypt woodland	54.7	1.5	2	0	0	2
Plantation	127.1	3.4	1	0	0	1
Remnant woodland/shrubland over paddock	105.3	2.8	1	0	0	1
Sheoak and *Acacia* shrubland	81.3	2.2	1	0	0	1
Shrubland on lateritic breakaway	1.8	0.0	1	0	0	1
Tall closed shrubland	0.3	0.0	0	0	0	0

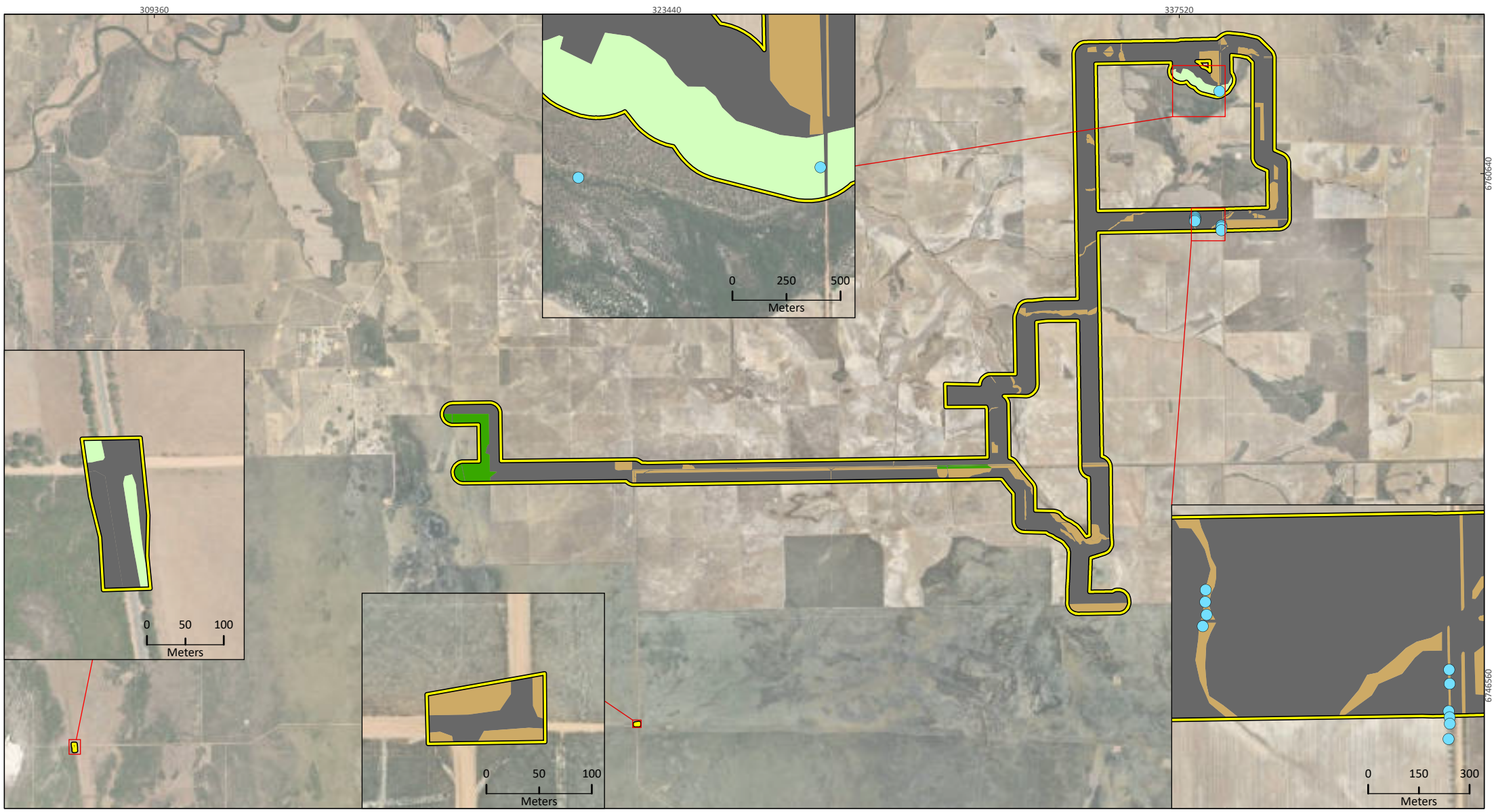
5.2.1.5 Potential nesting trees

A total of 12 potential nesting trees with a DBH ≥500 mm were recorded, 8 of which were located inside the study area and the remaining 4 located within 300 m of the study area (Figure 5-5). All were located either in degraded remnant patches of vegetation or on road verges along the edges of paddocks. All of the non-planted trees recorded were located within drainage lines and were River Gum (*Eucalyptus camaldulensis*), a species that occurs along watercourses (Figure 5-6) (WA Herbarium 2025). The remaining unidentified trees were planted along roads. No hollows or evidence of black cockatoo use was recorded.

Table 5-10 Potential nesting trees recorded during the survey

Tree name	Tree species	DBH (mm)	Hollows present	Suitable for BC	Foraging evidence	Inside study area?
1740JL-01	*Eucalyptus camaldulensis*	500	No	No	None	No
1740JL-02	*Eucalyptus camaldulensis*	550	No	No	None	Yes

Tree name	Tree species	DBH (mm)	Hollows present	Suitable for BC	Foraging evidence	Inside study area?
1740JL-03	*Eucalyptus camaldulensis*	650	No	No	None	Yes
1740JL-04	*Eucalyptus camaldulensis*	700	No	No	None	Yes
1740JL-05	*Eucalyptus camaldulensis*	650	No	No	None	Yes
1740JL-06	*Eucalyptus camaldulensis*	500	No	No	None	Yes
1740JL-07	*Eucalyptus* sp.	650	No	No	None	No
1740JL-08	*Eucalyptus camaldulensis*	700	No	No	None	No
1740JL-09	*Eucalyptus* sp.	700	No	No	None	No
1740JL-10	*Eucalyptus* sp.	500	No	No	None	Yes
1740JL-11	*Eucalyptus* sp.	1,100	No	No	None	Yes
1740JL-12	*Eucalyptus* sp.	500	No	No	None	Yes



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Drawn by	JL
Map author	JL

0 2.5 5
Kilometers

1:140,800 (at A4) GDA 1994 MGA Zone 50

Study area

Potential nesting trees

Habitat quality score

0: No foraging value

1: Negligible foraging value

2: Very low foraging value

3: Low to moderate foraging value

Figure 5-5

Black cockatoo foraging habitat quality and potential nesting trees

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Figure 5-6 Example of *E. camaldulensis* potential nesting tree within a paddock drainage line

5.2.1.6 Malleefowl habitat assessment

No Malleefowl mounds or secondary evidence (e.g. tracks) were detected during the survey. Malleefowl habitat assessments were completed at all sites. A score of 4 is the lowest score necessary for the habitat to be considered suitable for Malleefowl. The unweighted habitat score was found to be moderately suitable for Malleefowl at 24 sites, indicating that at least 2 of the assessment criteria were met and thus are classified as secondary breeding, foraging and dispersal habitat (Table 5-8). However, it should be noted that possessing suitable attributes does not necessarily mean the habitat is functional for Malleefowl use. For example, 7 sites received a total score of 4, on the basis that the site has sandy substrate and negligible slope; however, no other suitable attributes (such as vegetation type or sufficient cover) are present. Additional factors, including vegetation condition and fragmentation, were used to adjust the suitability score based on its viability.

Much of the habitat within the study area is remnant roadside vegetation, adjacent to roads and paddocks. These areas may possess several of the required attributes to be considered suitable Malleefowl habitat but are unable to offer protection to mounds or protection from predation due to their elongated borders and small areas of vegetation. Additionally, a site that is highly degraded by continuous weed cover is unlikely to be functional for Malleefowl foraging and dispersal.

The final Malleefowl habitat rating has been characterised as either viable or non-viable, based on the total score, extent of the vegetation and level of degradation. Six sites have been assessed as being moderately suitable for Malleefowl as they exhibit at least 3 of the required attributes, have a condition rating of Good or above, and are not restricted to an isolated or narrow patch of vegetation (highlighted in grey in Table 5-11). The remainder of the study area (95.6%) is either unsuitable and/or non-viable for supporting Malleefowl (Figure 5-7).

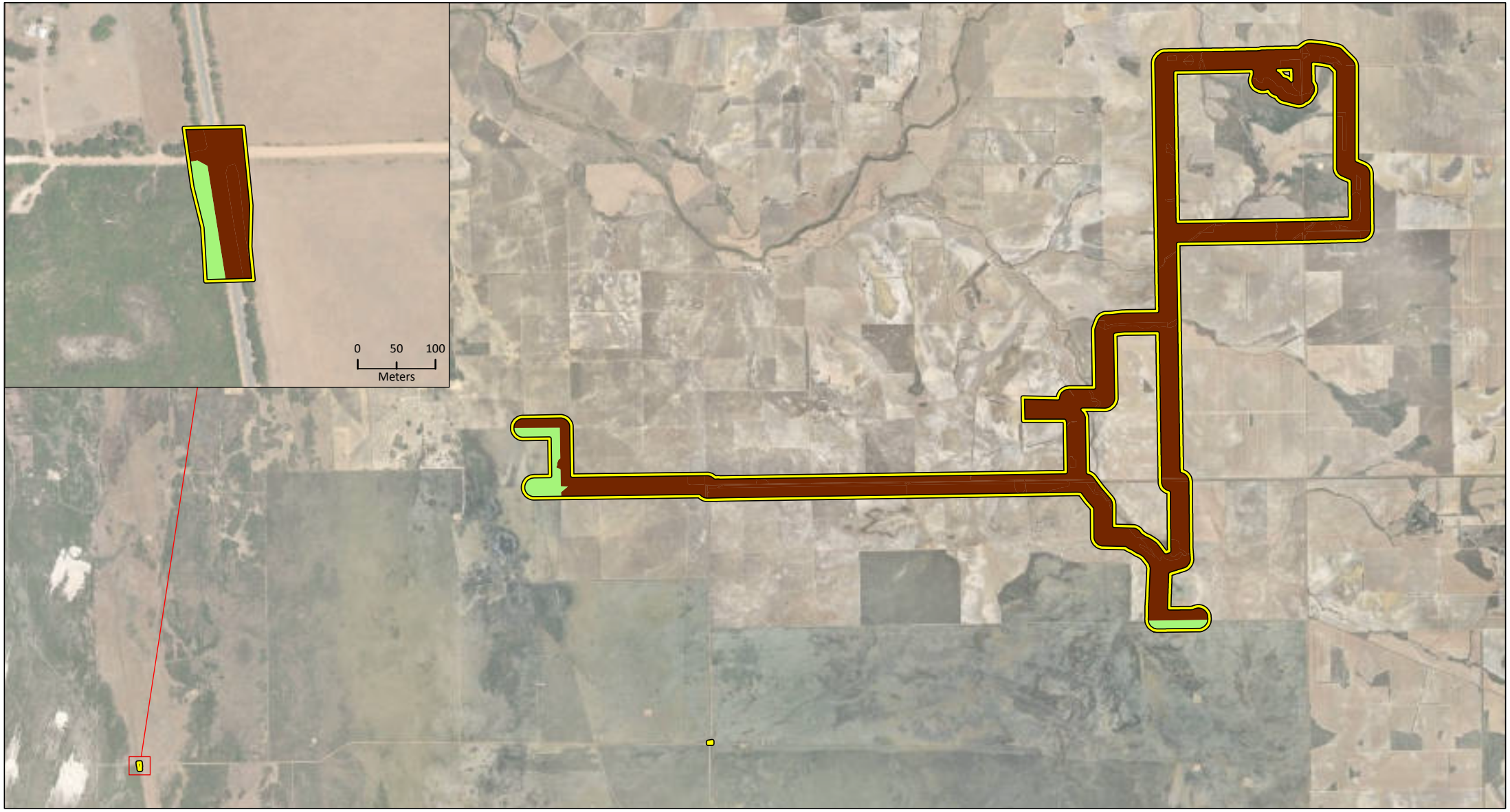
Table 5-11 Malleefowl habitat assessment scores

Site	Score (0 = low, 1 = moderate, 2 = high)						Total score	Unweighted suitability	Vegetation condition	Viable
	Substrate	Slope	Leaf litter	Canopy cover	Vegetation screening	Vegetation type				
Site 01	2	2	0	1	0	1	6	Moderate	Degraded	N
Site 02	2	2	0	0	1	0	5	Moderate	Degraded	N
Site 03	2	2	0	0	0	0	4	Moderate	Degraded	N
Site 04	2	2	0	0	1	1	6	Moderate	Very Good	Y
Site 05	2	2	0	0	1	0	5	Moderate	Very Good	N
Site 06	2	2	0	0	0	0	4	Moderate	Good	N
Site 07	2	2	0	1	1	1	7	Moderate	Good	N
Site 08	2	2	1	0	1	0	6	Moderate	Good	N
Site 09	2	2	0	1	1	0	6	Moderate	Degraded	N
Site 10	2	2	0	0	1	0	5	Moderate	Very Good	Y
Site 11	2	2	0	0	0	0	4	Moderate	Completely Degraded	N
Site 12	2	2	0	0	0	0	4	Moderate	Degraded	N
Site 13	2	2	0	0	0	0	4	Moderate	Degraded	N
Site 14	2	2	0	0	1	0	5	Moderate	Degraded	N
Site 15	2	2	0	1	0	0	5	Moderate	Degraded	N
Site 16	1	2	0	0	1	0	4	Moderate	Degraded	N
Site 17	1	0	0	0	1	0	2	Not suitable	Degraded	N

Site	Score (0 = low, 1 = moderate, 2 = high)						Total score	Unweighted suitability	Vegetation condition	Viable
	Substrate	Slope	Leaf litter	Canopy cover	Vegetation screening	Vegetation type				
Site 18	2	2	0	0	0	0	4	Moderate	Degraded	N
Site 19	1	1	0	1	0	0	3	Not suitable	Degraded	N
Site 20	1	2	1	1	2	1	8	Moderate	Good	Y
Site 21	1	2	0	0	0	1	4	Moderate	Degraded	N
Site 22	1	2	0	0	0	1	4	Moderate	Degraded	N
Site 23	2	2	0	0	1	0	5	Moderate	Good	Y
Site 24	2	2	0	0	0	0	4	Moderate	Good	N
Site 25	2	1	0	1	2	1	7	Moderate	Very Good	Y
Site 26	2	2	1	1	2	0	8	Moderate	Good	Y

5.2.1.7 Introduced species

Introduced species were evident throughout the study area, identified by tracks and scats. Evidence of cat (*Felis catus*), rabbit (*Oryctolagus cuniculus*) and fox (*Vulpes vulpes*) were detected at several sites. Sheep (*Ovis aries*) were recorded throughout the study area due to the remnant vegetation in the study area being adjacent to livestock paddocks.



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Map author	JL

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Study area

Malleefowl habitat suitability

Non-viable

Viable

Figure 5-6

Malleefowl habitat suitability within the study area

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5.2.2 SRE invertebrate fauna

5.2.2.1 Habitats

Most of the study area (3,104.8 ha) had no potential SRE value as it was cleared and devoid of native habitat (Table 5-9; Figure 5-8). The shrubland on lateritic breakaway (1.8 ha) received a high SRE rating, as it was characterised by a south-facing rocky slope. Creek line habitat (47.7 ha) was variable in suitability for SREs, ranging from low to high depending on condition. The remainder of habitats (558.9 ha) were of low value to SREs as they lacked the complexity or isolation that gives rise to restricted species.

Table 5-12 Extent and description of each SRE habitat in the study area

Habitat type	Site/s	Description	Extent in study area and % of study area	SRE habitat rating
Cleared	11	Land that has been historically cleared for paddocks, agriculture or roads. No native vegetation present.	3,104.8 ha 83.2%	None
Open *Banksia* woodland	8, 23	Mid to tall *Banksia* open woodland over mixed mid to low shrubland and native grasses on sandy soil. Negligible leaf litter in burnt areas.	132.8 ha 3.6%	Low
Plantation	-	Historically cleared land that has been replanted with eucalypts and other species, in varying stages of growth. Includes planted roadside vegetation. May provide small amounts of SRE habitat in leaf litter.	127.1 ha 3.4%	Low
Remnant woodland/shrubland over paddock	-	Areas of remnant overstorey (eucalypts, tall *Acacia* shrubs) over degraded paddocks with no native understorey. Often heavily degraded and grazed by livestock with no leaf litter present.	105.3 ha 2.8%	Low
Sheoak and *Acacia* shrubland	6, 7, 14, 16	Sheoak and/or *Acacia* shrubland in varying densities over mixed mid to low shrubs over tussock grasses and weeds. Varying levels of leaf litter.	81.3 ha 2.2%	Low
Low to mid shrubland/grassland	4, 5, 10, 13, 24	Mixed low to mid shrubs over tussock grassland on sandy soils. Low habitat complexity and sparse leaf litter.	75.4 ha 2.0%	Low
Open eucalypt woodland	15, 19	Open eucalypt woodland over sparse shrubland and continuous weed cover. Transitions into Sheoak shrubland on upper slopes. Fallen logs may provide SRE microhabitats.	54.7 ha 1.5%	Low
Creek line	1, 2, 3, 9, 12, 18, 20, 21, 22	Inundated creeks that have formed along low points within the landscape. Bordered by different vegetation depending on the degree of degradation. Reeds and sedges may be present.	47.7 ha 1.3%	Low to high depending on condition

Habitat type	Site/s	Description	Extent in study area and % of study area	SRE habitat rating
		Low lying areas generally exhibit higher moisture levels and amount of leaf litter. Heavily degraded creeks within paddocks are overrun by weeds and are of low value.		
Shrubland on lateritic breakaway	17	Sparse tall shrubs over mixed dense shrubland over tussock grasses and invasive grass cover on a south facing lateritic breakaway. South-facing slope and rocky habitat are of high value to SREs.	1.8 ha <0.05%	High
Tall closed shrubland	26	Dense tall shrubland (*Acacia* and *Melaleuca* spp.) over invasive grasses and herbs on sandy loam soil. Transitions into coastal dune systems to the west. Very little leaf litter and habitat complexity.	0.3 ha <0.05%	Low

5.2.2.2 SRE records

A total of 66 specimens from SRE groups were collected within the study area (Figure 5-8; Table 5-10), including 29 isopods, 24 centipedes, 9 millipedes and 4 snails. Of the 12 taxa recorded, one is a likely SRE, the millipede *Antichiropus* 'DIP232', and 3 isopods are potential SREs, *Buddelundia* 'Phoenix0392', *Buddelundia* 'Phoenix0396' and *Buddelundia* 'Phoenix0150'. Four taxa are data deficient and 4 are widespread and not considered SREs.

Of the 12 taxa, 5 had significant divergence from their closest matches on GenBank and/or the Phoenix database and are considered a new species:

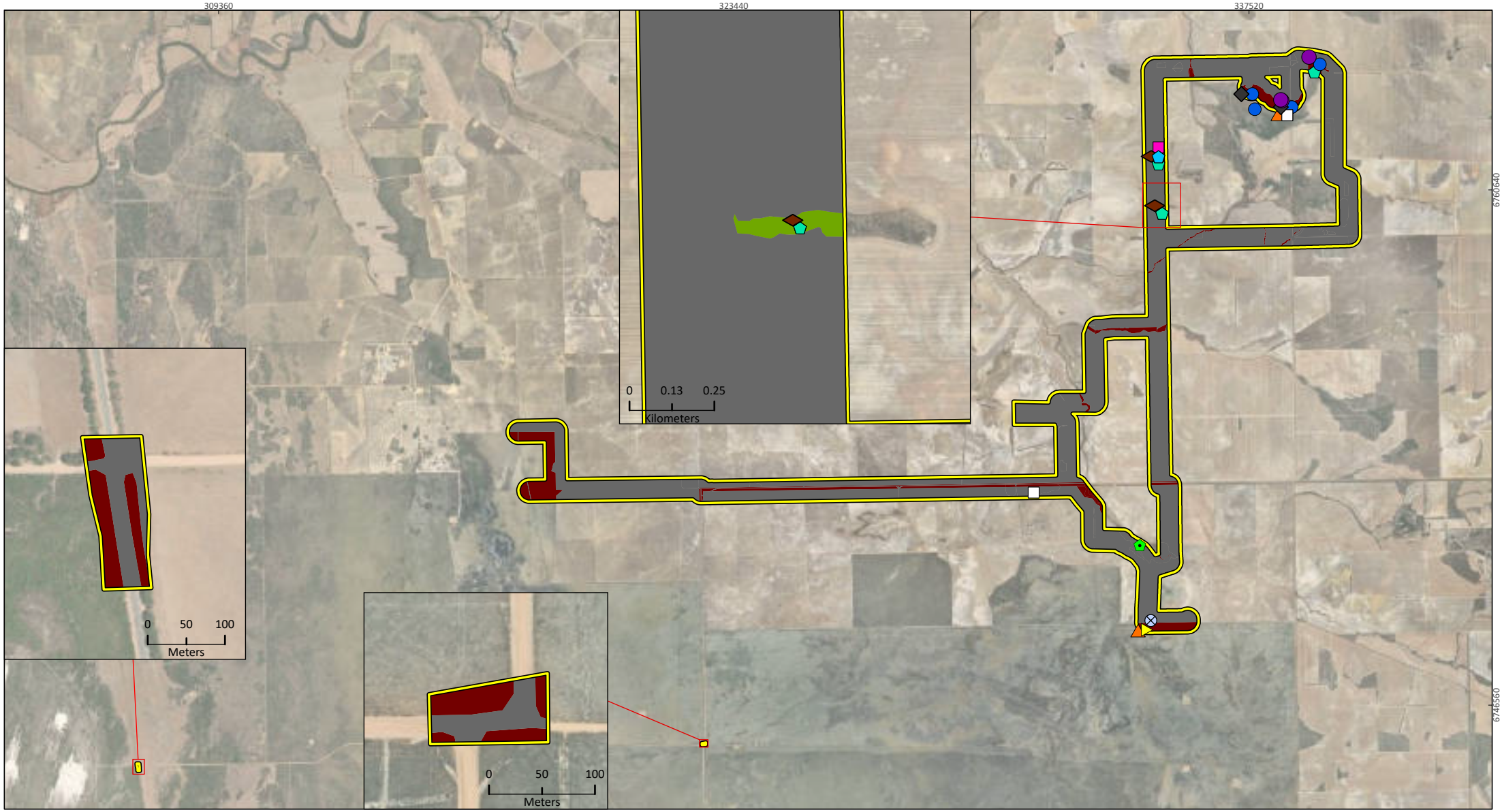
- *Buddelundia* 'Phoenix0392' – collected at 2 sites in low shrubland and open eucalypt woodland habitat
- *Buddelundia* 'Phoenix0393' – collected at one site in low shrubland habitat
- Philosciidae 'Phoenix0394' – collected at 3 sites, all within open eucalypt woodland habitat
- *Lithobiomorpha* 'Phoenix0395' – collected at one site in low shrubland habitat
- *Buddelundia* 'Phoenix0396' – collected at one site in Sheoak and *Acacia* shrubland.

All new species were recorded in low potential SRE habitat. No Threatened or Priority SRE taxa identified in the desktop review were recorded in the survey.

Table 5-13 Specimens from SRE groups recorded in the field survey

Higher order / family	Taxa	Site/s	Habitat/s	No. Specimens	SRE status/ significance	Comments
Class: Chilopoda (centipedes)						
Geophilomorpha	Geophilomorpha 'sp indet.'	16, 17	Sheoak and *Acacia* shrubland Shrubland on lateritic breakaway	3	Data deficient	Genetics failed. Assigned to order level only, group known to include SRE taxa.
Henicopidae	Henicopidae 'sp. voucher NZ796_2023'	8, 15	*Banksia* woodland Open eucalypt woodland	11	Widespread	Up to **1.5%** divergent from closest available match. Conspecific with taxa also known from New Zealand.
Lithobiomorpha	Lithobiomorpha 'Phoenix0395'	4	Low to mid shrubland/grassland	5	Data deficient	This specimen is a minimum of **18.1%** divergent from its closest available match and is therefore considered to be a new species.
Scolopendromorpha	Scolopendromorpha 'sp indet.'	3, 14, 16	Creek line Sheoak and *Acacia* shrubland	3	Widespread	Not a target SRE group.
Scutigeromorpha	Scutigeromorpha 'sp indet.'	16	Sheoak and *Acacia* shrubland	2	Widespread	Not a target SRE group.
Class: Diplopoda (millipedes)						
Paradoxosomatidae	*Antichiropus* 'DIP232'	14, 16, 17	Sheoak and *Acacia* shrubland Shrubland on lateritic breakaway	9	Likely	Specimens are **3.8-4.3%** divergent from *Antichiropus* 'DIP232' and therefore considered conspecific. Previously recorded at the Project and not known outside of the Project area.
Order: Isopoda (slaters)						
Armadillidae	*Buddelundia* 'Phoenix0392'	4, 15	Low to mid shrubland/grassland Open eucalypt woodland	11	Potential	This specimen is a minimum of **16.1%** divergent from its closest available match and is therefore considered a new species.

Higher order / family	Taxa	Site/s	Habitat/s	No. Specimens	SRE status/ significance	Comments
	Buddelundia 'Phoenix0393'	4	Low to mid shrubland/grassland	1	Data deficient	This specimen is a minimum of **15.4%** divergent from its closest available match and is therefore considered to be a new species.
	Buddelundia 'Phoenix0396'	16	Sheoak and *Acacia* shrubland	5	Potential	This specimen is a minimum of **12.8%** divergent from its closest available match and is therefore considered to be a new species.
	Buddelundia 'Phoenix0150'	1, 14, 15, 19	Creek line Sheoak and *Acacia* shrubland Open eucalypt woodland	9	Potential	This specimen has a divergence of **5.7%** from its closest available match and is therefore considered conspecific.
Philosciidae	Philosciidae 'Phoenix0394'	15, 19	Open eucalypt woodland	3	Data deficient	This specimen is a minimum of **17%** divergent from its closest available match and is therefore considered to be a new species.
Class: Gastropoda, Superorder: Eupulmonata (land snails)						
Succineidae	*Succineidae* 'sp indet.'	14, 15	Sheoak and *Acacia* shrubland Open eucalypt woodland	4	Widespread	Not a target SRE family.



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Study area

SRE habitat rating

- High
- Low
- None

Taxon, status

- *Antichiropus* 'DIP232', likely
- *Buddelundia* 'Phoenix0150', potential
- *Buddelundia* 'Phoenix0392', potential
- *Buddelundia* 'Phoenix0393', data deficient
- *Buddelundia* 'Phoenix0396', data deficient
- Geophilomorpha sp. indet., data deficient
- Henicopidae `sp. voucher NZ796_2023`, widespread
- Lithobiomorpha 'Phoenix0395', data deficient
- Philosciidae 'Phoenix0394', data deficient
- Scolopendromorpha sp. indet., widespread
- Scutigeromorpha sp. indet., widespread
- Succineidae 'sp indet., widespread

Figure 5-8

SRE habitats and recorded SRE taxa

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5.3 SURVEY LIMITATIONS

The limitations of the terrestrial fauna survey have been considered in accordance with EPA (EPA 2020) (Table 5-14).

Table 5-14 Consideration of potential survey limitations

Limitations	Comments
Availability of contextual information at a regional and local scale	Not a limitation. All available previous survey reports and contextual information were accessible.
Competency/experience of the team carrying out the survey	Not a limitation. The survey team has experience conducting terrestrial vertebrate and invertebrate fauna surveys across WA.
Scope and completeness	Not a limitation. The scope of work for a basic and targeted fauna survey was completed.
Proportion of fauna recorded and/or collected, any identification issues	Not a limitation. The proportion of species recorded was expected for the level of survey and was consistent with previous surveys. Some SRE specimens could not be identified to species/ morphospecies level due to taxonomic data deficiency. However, this is not considered to impact the results of the survey.
Access within the study area	Not a limitation. The study area was accessible by vehicle or on foot.
Timing, rainfall, season	Partial limitation. The survey was conducted in an appropriate season for a basic survey in the Southern climatic region (EPA 2020). Heavy rainfall during the survey led to road closures that reduced the overall survey effort, however adequate habitat assessments were still able to be conducted and completion of the scope of work was not affected.
Disturbance that may have affected the results of the survey	Not a limitation. No disturbances affected the results of the survey.

6 DISCUSSION

6.1 VERTEBRATE FAUNA

6.1.1 Habitats

The study area is comprised of relatively small patches and corridors of remnant vegetation, totalling 10.6% of the study area. Most of the study area is cleared and heavily disturbed for agricultural use, roads and plantations. The fragmented nature of the study area and intensive surrounding land use increases accessibility for introduced predators (cat, fox, dog), and exposure to feral flora and fauna species that alter vegetation structure (weeds, rabbit, sheep). The condition of the remnant native vegetation in the study area (very good to degraded) reflects the variable effects of multiple disturbance factors including weed infestation, litter, historical clearing and tracks.

Although the highly disturbed habitats within the study area represent negligible value for significant fauna, they still provide refuge for vertebrate species and may act as a movement corridor between remnants. Isolated planted and remnant eucalypt trees, often occurring within or bordering cleared paddocks, also offer habitat for transiting species, particularly birds. The potential impact of the proposed pipeline footprint on habitats is discussed below in section 6.3.

6.1.2 Carnaby's Cockatoo

Carnaby's Cockatoo is the only Threatened black cockatoo species that is likely to occur within the study area. No evidence of its presence (including foraging evidence, direct sighting or calling) was recorded during the field survey. Additionally, no evidence of breeding or roosting was recorded. The desktop review identified that the species is known the occur within the region and has previously roosted less than 2 km from the study area.

The *Banksia* woodland habitat represents the highest value foraging habitat for Carnaby's Cockatoo within the study area as this habitat contains the highest cover of proteaceous plant species, a primary food source for Carnaby's Cockatoo: however, it is still only considered low to moderate value (habitat quality score of 3), at most. Recent burning (2023) of the *Banksia* woodland at the western end of the study area resulted in an absence of suitable foraging resources (i.e. flowers, fruit, seeds) at the time of the survey. However, many *Banksia* species resprout after fire and it can be expected that over time this patch of habitat will regenerate to provide foraging resources if not subject to further disturbance.

Patches of *Banksia* also occur within the remnant roadside vegetation along Yandanooka Road. These unburnt plants offer a greater abundance of foraging resources; however, due to the high level of degradation of this narrow vegetation corridor and lack of black cockatoo usage evidence, this habitat is considered low value for Carnaby's Cockatoo.

Eight potential nesting trees (eucalypt trees with a DBH ≥500 mm) were recorded in the study area during the survey, with a further 4 recorded within 300 m of the study area. All trees that were able to be identified were *Eucalyptus camaldulensis*, a widespread eucalypt species that occurs along creek lines. None of the potential nesting trees had hollows suitable for black cockatoo breeding. Additionally, many of the remnant trees within paddocks exhibited a sprawling or multi-stemmed growth habit that is unlikely to ever develop a suitable hollow.

The desktop records of Carnaby's Cockatoo indicate that the species occurs within the region and has been known to roost nearby; however, breeding is not known within the local area. The habitat and potential nesting tree assessments undertaken indicate that there is an absence of high-quality foraging habitat and potential breeding hollows within the study area. Given the nearby known roost and presence of potential roosting habitat, it is possible that Carnaby's Cockatoo may roost in the study area on occasion. However, it is likely that Carnaby's Cockatoo are only irregular visitors to the

study area, perhaps during transit to nearby regular roosting sites or more continuous, higher quality vegetation within the region, but are unlikely to breed within the study area.

6.1.3 Malleefowl

No evidence of Malleefowl was recorded in the study area. The moderated suitability scores, which consider the functionality and condition of vegetation, classified 6 sites as moderate suitability. These sites meet at least 3 of the suitability criteria, are not located along a roadside verge and have at vegetation condition score of 'Good' or above.

While Malleefowl has historically been recorded in the wider region, the presence of introduced predators and current intensive surrounding land use would make it difficult for Malleefowl to persist in the study area, regardless of habitat suitability. It cannot be ruled out that Malleefowl may infrequently disperse across the study area, particularly to the less fragmented habitats to the south, though it is highly unlikely that the remnant vegetation in the study area supports foraging or breeding for these potential infrequent individuals.

6.2 SRE INVERTEBRATE FAUNA

6.2.1 Habitats

Habitats that are of high value for SREs are characterised by environmental features that provide restricted microhabitats, such as rocky outcropping, south-facing slopes or deep leaf litter. Low value habitats are typically more widespread and associated with drier environments.

The highest value SRE habitat within the study area is the shrubland on a south-facing breakaway. South-facing slopes provide protection from high temperatures and desiccation, enabling greater levels of moisture retention within the leaf litter. Rocky habitats are of high value to SREs as crevices increase habitat complexity and offer sheltered microhabitats that may give rise to specialised taxa. The combination of the south-facing slope, rocky breakaway and isolation within the wider area result in this habitat having the greatest potential to support specialised or restricted invertebrate taxa.

Creek line habitats are of high value for SREs as they occur in low lying areas and generally have higher moisture levels and vegetation density, offering deep, moist leaf litter. However, the creek lines in the study area intersect cleared paddocks, resulting in a heavily degraded understorey dominated by weeds or invasive grasses. Additionally, many of these drainage lines were inundated at the time of the survey. As such, these areas were downgraded to low potential for SREs.

The shrubland and woodlands habitats are rated as low potential for SREs as they are typically more continuous within the landscape and exhibit less complexity, and therefore are unlikely to provide habitat isolates. These habitats may still support SREs, particularly for groups with low dispersal capabilities (such as mygalomorph spiders and millipedes); however, disturbances such as invasive weed cover and fire reduces the value of these remnant patches for SREs.

6.2.2 SRE records

The survey results indicate that the remnant vegetation in the study area supports a low diversity of SRE invertebrate fauna (8 likely, potential or data deficient taxa from 3 groups). One millipede that is considered the only likely SRE, *Antichiropus* 'DIP232', and three potential SRE isopods, *Buddelundia* 'Phoenix0150', *Buddelundia* 'Phoenix0392' and *Buddelundia* 'Phoenix0396', were collected across 4 habitat types.

Five taxa (4 isopods and 1 centipede) were recorded that had no morphological or genetic matches and are thus considered new species. Of these, two are considered potential SREs and the remaining are known from only a few specimens and are thus considered data deficient. Given that all data deficient taxa were recorded in habitat types that are widespread in the Geraldton Sandplains bioregion (shrubland and woodland), it is highly likely that they are well represented outside of the study area.

6.2.2.1 Centipedes

The taxonomy and distribution of soil centipedes (Geophilomorpha) is poorly understood. The Geophilomorpha 'sp indet.' recorded from 3 specimens in 2 different habitat types has been classified as data deficient due to a failure in genetic sequencing, resulting in a higher order identification only.

Two taxa from the Lithobiomorpha order (stone centipedes) were recorded. Lithobiomorpha 'Phoenix0395', recorded at a single site in low shrubland habitat, is considered a new species as it did not have any genetic matches. The status of this taxa is data deficient on the basis that the order level identification makes it difficult to assess genetic relationships and thus its distribution.

Henicopidae 'sp. voucher NZ796_2023', also from the Lithobiomorpha group, was recorded at 2 sites across *Banksia* and eucalypt woodland habitats. Members of the Henicopidae family are known from southern temperate regions across all continents (Edgecombe *et al.* 2002). This species is conspecific with a taxa also known from New Zealand (Walker 2024) and has also been detected by Phoenix approximately 180 km south of the Project (Phoenix in prep.), and therefore is likely an invasive species and is considered to be widespread.

6.2.2.2 Millipedes

Members of the *Antichiropus* genus are known to exhibit high levels of short-range endemism due to their limited dispersal abilities and restriction to moist environments (Car *et al.* 2013; Harvey 2002).

Antichiropus 'DIP232' was recorded at 3 sites across 2 habitat types (Sheoak and *Acacia* shrubland and lateritic breakaway). The only other known records of this taxa were collected from *Acacia* shrubland during the previous survey for the Project (Phoenix 2024), with the maximum distance between records approximately 12 km. This taxon is a considered a likely SRE based on its current known distribution and occupancy of patchy habitats.

6.2.2.3 Isopods

Isopods exhibit poor dispersal capability and have a high potential to be range restricted, often relying on mesic microhabitats such as dense leaf litter (Judd 2004; Judd & Horwitz 2003).

Three potential SRE isopods, of which 2 are considered new species, were recorded during the survey. Eleven specimens of *Buddelundia* 'Phoenix0392' were recorded at 2 sites across 2 habitat types (Low to mid shrubland/grassland and open eucalypt woodland) and 5 specimens of *Buddelundia* 'Phoenix0396' were recorded at a single site in Sheoak and *Acacia* shrubland. Both of these taxa are potential SREs on the basis that there were multiple specimens recorded from widespread habitat types that are patchy within the study area, and that there are no other regional records.

Buddelundia 'Phoenix0150' was recorded at 4 sites across 3 habitat types (Open eucalypt woodland, Sheoak and *Acacia* shrubland and creek line). This taxa was also previously recorded 12 km away during a previous survey in *Acacia* shrubland (Phoenix 2024), however is still considered a potential SRE due to its small current known distribution.

Buddelundia 'Phoenix0393' and Philosciidae 'Phoenix0394' are considered new species as they have significant divergence from their closest genetic match. These taxa are classified as data deficient due to geographical uncertainty (only known from one or 2 locations).

6.3 PROPOSED PIPELINE ROUTE AND ALTERNATIVE CPF

The pipeline route is proposed to be predominantly adjacent to existing tracks within cleared paddocks, with small sections intersecting remnant vegetation. Although the creek line habitat represents only 1.3% of the study area, this habitat type often crosses existing tracks. Hancock have advised that the pipeline will be drilled using horizontal Directional Drilling (HDD) beneath the intersect with Sand Plain Creek, eliminating any impact on this habitat. Further to this, the minor creek lines intersecting the pipeline route are highly degraded, particularly where they are already intersected by existing tracks. Two of the SRE taxa recorded within creek line habitat were widespread and the single potential SRE taxon recorded was also detected within other habitat types.

One of the pipeline route options at the western end of the study area intersects approximately 1 km of *Banksia* woodland. Hancock have advised that the HDD will also be employed at this location to avoid impact to the woodland.

Although potential Carnaby's Cockatoo breeding or roosting habitat is limited within the study area, the Project should avoid impact to eucalypt woodlands as trees may have the potential to support the species in the future. The pipeline route does not intersect any potential nesting trees or eucalypt woodland, therefore no impact on trees in expected.

The pipeline route is proposed to intersect the lateritic breakaway, a high value SRE habitat that recorded the only likely SRE millipede. This habitat has a restricted extent and is unique in that it offers both a south-facing slope and rocky microhabitats. It is recommended that the pipeline route deviates away from this remnant habitat isolate and instead follows the bend in the existing track.

The footprint of the alternative CPF occurs entirely within a cleared paddock, devoid of native vegetation. Development of this area poses negligible risk to vertebrate fauna and SREs.

6.4 CONCLUSION

The fragmented and degraded remnant habitats present in the study area are of low value for significant vertebrate fauna. Carnaby's Cockatoo may be an irregular visitor; however, this species is unlikely to rely on the limited *Banksia* woodland as an important food source. Carnaby's Cockatoo is not known the breed within the local area and the potential nesting tree assessment indicates that suitable hollows are not present within the study area. The heavily degraded and isolated nature of the remnant habitat patches are also unlikely to be viable for Malleefowl.

The habitats identified in the study area are generally of low value for SREs; however, the lateritic breakaway habitat represents an isolated, unique habitat that may support restricted or specialist species.

The small development footprint of the proposed pipeline route is unlikely to impact significant fauna or SRE invertebrate fauna. Disturbance to potential nesting trees and the rocky breakaway paddock should be avoided.

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Appendix 1 Survey site locations

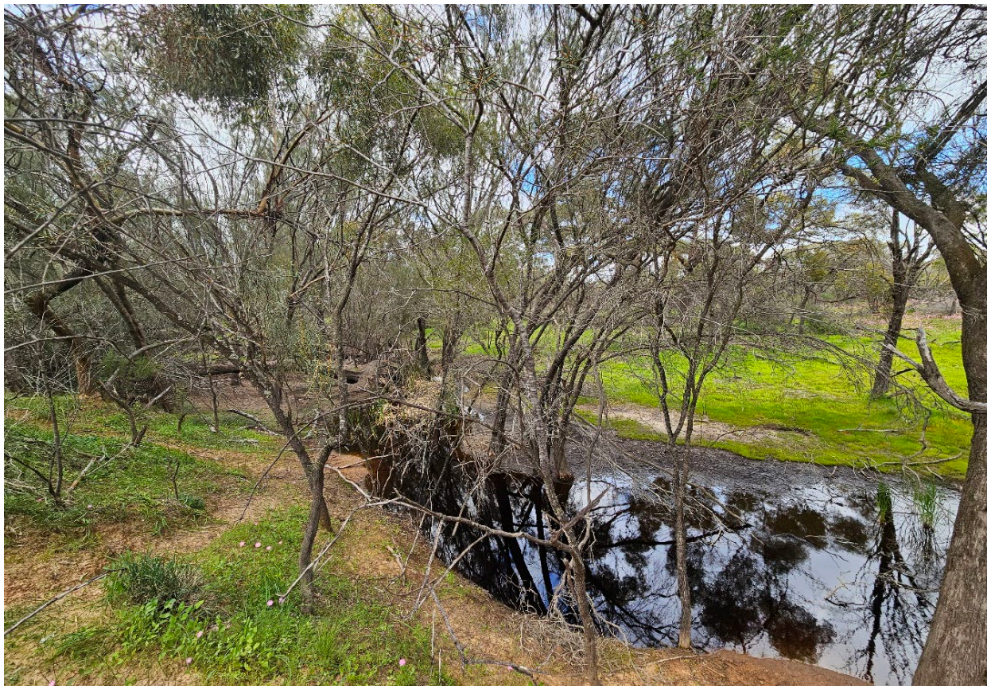
Site name	Latitude	Longitude
Site 01	-29.2528	115.328
Site 02	-29.2427	115.3117
Site 03	-29.3598	115.296
Site 04	-29.3795	115.2969
Site 05	-29.3449	115.1725
Site 06	-29.3447	115.2009
Site 07	-29.3448	115.2302
Site 08	-29.3448	115.2659
Site 09	-29.3451	115.2802
Site 10	-29.3797	115.3069
Site 11	-29.3249	115.2662
Site 12	-29.3237	115.2799
Site 13	-29.3447	115.3027
Site 14	-29.242	115.3464
Site 15	-29.2526	115.3388
Site 16	-29.2636	115.3023
Site 17	-29.2762	115.3031
Site 18	-29.2843	115.3111
Site 19	-29.249	115.3274
Site 20	-29.2567	115.3392
Site 21	-29.2904	115.3012
Site 22	-29.3069	115.3012
Site 23	-29.3434	115.1273
Site 24	-29.4071	115.1718
Site 25	-29.4104	115.0617
Site 26	-29.4103	115.0121
Opp1	-29.3185	115.3011
Opp2	-29.3447	115.2735
Opp3	-29.4103	115.0608
Opp4	-29.3444	115.2185

Appendix 2 Survey site descriptions

Site details			
Site	**Site 01**	**Position (WGS84)**	115.3280, -29.2528
Slope	moderate	**Topography**	drainage line
Soil colour	light-brown	**Soil texture**	clay loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	19 Aug 2025	19 Aug 2025
1	Ultrasonic recording	19 Aug 2025	22 Aug 2025
1	Foraging - SRE	22 Aug 2025	22 Aug 2025
1	Birding	22 Aug 2025	22 Aug 2025
1	Foraging - vertebrates	22 Aug 2025	22 Aug 2025

Site description - visit 1 (19 Aug 2025)			
Eucalyptus and sheoak woodland over acacia shrrubland over grassy, herbaceous understorey on loamy clay soil along a flowing creek.			
Habitat	riparian zone		
Disturbance	erosion channels, evidence of feral animals, weed infestation		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	200	**Litter distribution**	scattered
Tree cover (%)	70	**Litter depth (cm)**	1.0
Shrub cover (%)	30	**Litter cover (%)**	15
Grass cover (%)	60	**Herb cover (%)**	40



Site details			
Site	**Site 02**	**Position (WGS84)**	115.3117, -29.2424
Slope		**Topography**	
Soil colour		**Soil texture**	
Rock cover (%)		**Rock type**	

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Ultrasonic recording	19 Aug 2025	22 Aug 2025
1	Birding	21 Aug 2025	21 Aug 2025
1	Foraging - vertebrates	21 Aug 2025	21 Aug 2025
1	Site description	21 Aug 2025	21 Aug 2025
1	Foraging - SRE	21 Aug 2025	21 Aug 2025

Site description - visit 1 (21 Aug 2025)			
Flowing drainage line bordered by road. Shrubby mid story of sheoak. Understory of invasive grasses and herbs. Sandy-loam soils.			
Habitat	open woodland		
Disturbance	vehicle tracks, weed infestation, historic clearing, evidence of feral animals		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	210	**Litter distribution**	scattered
Tree cover (%)	20	**Litter depth (cm)**	1.0
Shrub cover (%)	60	**Litter cover (%)**	5
Grass cover (%)	70	**Herb cover (%)**	60

Site details			
Site	**Site 03**	**Position (WGS84)**	115.2956, -29.3598
Slope	gentle	**Topography**	undulating plain
Soil colour	brown	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Ultrasonic recording	19 Aug 2025	22 Aug 2025
1	Birding	22 Aug 2025	22 Aug 2025
1	Foraging - vertebrates	22 Aug 2025	22 Aug 2025
1	Site description	22 Aug 2025	22 Aug 2025
1	Foraging - SRE	22 Aug 2025	22 Aug 2025

Site description - visit 1 (22 Aug 2025)			
Open acacia shrubland surrounding rural dam. Extremely sparse acacia trees as over story. Acacia shrubs dispersed across open areas of open invasive grasses and herbs.			
Habitat	shrubland		
Disturbance	weed infestation, vehicle tracks, grazing-medium, evidence of feral animals		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	175	**Litter distribution**	under vegetation
Tree cover (%)	5	**Litter depth (cm)**	1.0
Shrub cover (%)	40	**Litter cover (%)**	1
Grass cover (%)	80	**Herb cover (%)**	50

Site details			
Site	**Site 04**	**Position (WGS84)**	115.2969, -29.3795
Slope	gentle	**Topography**	undulating plain
Soil colour	grey, yellow	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	19 Aug 2025	19 Aug 2025
1	Birding	19 Aug 2025	19 Aug 2025
1	Foraging - vertebrates	19 Aug 2025	19 Aug 2025
1	Foraging - SRE	19 Aug 2025	19 Aug 2025
1	Litter sieve	19 Aug 2025	19 Aug 2025

Site description - visit 1 (19 Aug 2025)			
Low to mid sheoak and acacia shrubland over mixed low shrubs and grasses on sandy soil. No trees. Weeds encroaching from northern paddock.			
Habitat	shrubland		
Disturbance	evidence of feral animals, firebreak, weed infestation		
Vegetation condition	Very Good	**Fire age**	moderate (>5 years)
Total veg. cover (%)	140	**Litter distribution**	under vegetation
Tree cover (%)	0	**Litter depth (cm)**	1.0
Shrub cover (%)	80	**Litter cover (%)**	30
Grass cover (%)	50	**Herb cover (%)**	10

Site details			
Site	**Site 05**	**Position (WGS84)**	115.1725, -29.3449
Slope	gentle	**Topography**	undulating plain
Soil colour	whitish	**Soil texture**	sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	20 Aug 2025	20 Aug 2025
1	Foraging - SRE	20 Aug 2025	20 Aug 2025
1	Birding	20 Aug 2025	20 Aug 2025
1	Foraging - vertebrates	20 Aug 2025	20 Aug 2025
1	Foraging - SRE	20 Aug 2025	20 Aug 2025
1	Burrow excavation	22 Aug 2025	22 Aug 2025

Site description - visit 1 (20 Aug 2025)			
Remnant patch of vegetation surrounded by roads and paddocks. Very little Eucalyptus over story, with a middle story of shrubland, and dense understory of native tussock and woody Vegetation hosted on sandy undulating hills.			
Habitat	shrubland		
Disturbance	litter, vehicle tracks, weed infestation		
Vegetation condition	Very Good	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	91	**Litter distribution**	under vegetation
Tree cover (%)	1	**Litter depth (cm)**	1.0
Shrub cover (%)	70	**Litter cover (%)**	5
Grass cover (%)	15	**Herb cover (%)**	5

Site details			
Site	**Site 06**	**Position (WGS84)**	115.2009, -29.3447
Slope	negligible	**Topography**	undulating plain
Soil colour	grey, whitish	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	20 Aug 2025	20 Aug 2025
1	Birding	20 Aug 2025	20 Aug 2025

Site description - visit 1 (20 Aug 2025)			
Open sheoak woodland and sparse eucalypts over patchy acacia shrubland over tussock grassland and low woody natives over continuous weed cover on loamy sand.			
Habitat	open woodland		
Disturbance	evidence of feral animals, litter, vehicle tracks, weed infestation		
Vegetation condition	Good	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	150	**Litter distribution**	under vegetation
Tree cover (%)	30	**Litter depth (cm)**	1.0
Shrub cover (%)	20	**Litter cover (%)**	15
Grass cover (%)	80	**Herb cover (%)**	20

Site details			
Site	**Site 07**	**Position (WGS84)**	115.2303, -29.3448
Slope	gentle	**Topography**	undulating plain
Soil colour	whitish	**Soil texture**	sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	20 Aug 2025	20 Aug 2025

Site description - visit 1 (20 Aug 2025)			
Verge row remnant veg. Overstory of sheoak, middle story of acacia?, and woody native vegetation and some weeds upon sandy soil. Bordered by road and pasture. Unique patch of acacia dominated shrub.			
Habitat	shrubland		
Disturbance	weed infestation, litter		
Vegetation condition	Good	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	under vegetation
Tree cover (%)	15	**Litter depth (cm)**	3.0
Shrub cover (%)	70	**Litter cover (%)**	25
Grass cover (%)	10	**Herb cover (%)**	5

Site details			
Site	**Site 08**	**Position (WGS84)**	115.2659, -29.3448
Slope	negligible	**Topography**	undulating plain
Soil colour	grey, whitish	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	20 Aug 2025	20 Aug 2025
1	Foraging - SRE	20 Aug 2025	20 Aug 2025
1	Foraging - vertebrates	20 Aug 2025	20 Aug 2025
1	Birding	20 Aug 2025	20 Aug 2025
1	Burrow excavation	20 Aug 2025	20 Aug 2025
1	Litter sieve	20 Aug 2025	20 Aug 2025

Site description - visit 1 (20 Aug 2025)			
Scattered eucalypts over groved banksia (20%) woodland and mixed mid to low shrubland and sparse tussock and continuous but sparse weed and invasive grasses on sandy soil.			
Habitat	shrubland		
Disturbance	evidence of feral animals, vehicle tracks, weed infestation		
Vegetation condition	Good	**Fire age**	moderate (5-10 years)
Total veg. cover (%)	90	**Litter distribution**	scattered
Tree cover (%)	10	**Litter depth (cm)**	1.0
Shrub cover (%)	60	**Litter cover (%)**	20
Grass cover (%)	5	**Herb cover (%)**	15

Site details			
Site	**Site 09**	**Position (WGS84)**	115.2803, -29.3451
Slope	gentle	**Topography**	drainage line
Soil colour	brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

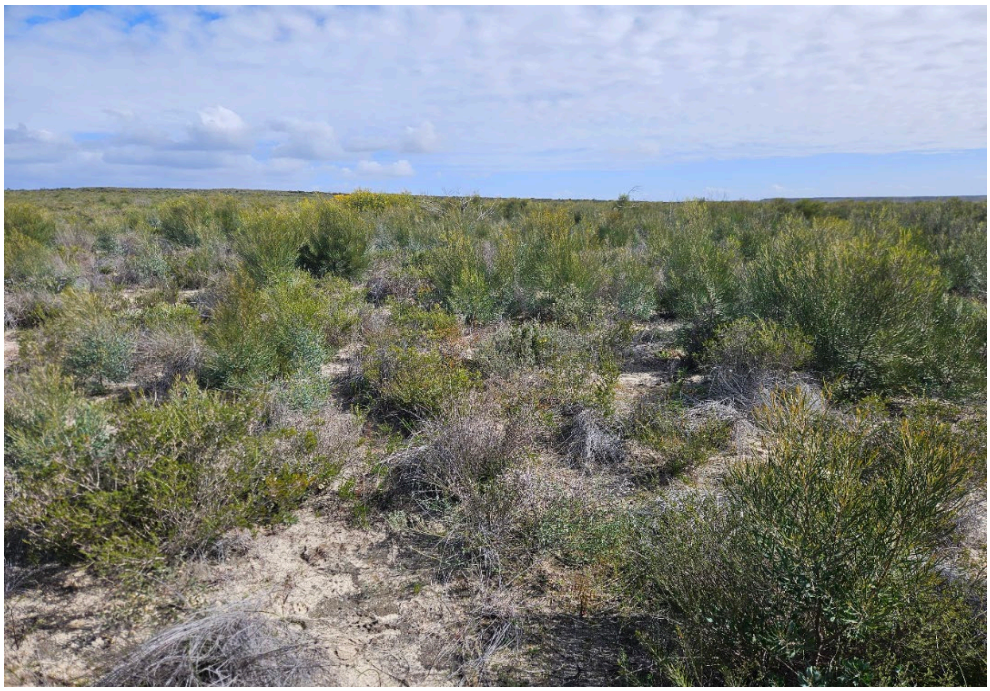
Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	20 Aug 2025	20 Aug 2025
1	Opportunistic sighting	20 Aug 2025	20 Aug 2025

Site description - visit 1 (20 Aug 2025)			
Flowing drainage line. No trees. Acacia shrubland middle story over invasive grasses and herbs. Vegetation hosted on sandy loam soils. Vegetation is remnant and bordered by two roads/tracks.			
Habitat	shrubland		
Disturbance	vehicle tracks, weed infestation, livestock tracks, erosion channels, evidence of feral animals		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	220	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	70	**Litter cover (%)**	0
Grass cover (%)	80	**Herb cover (%)**	70

Site details			
Site	**Site 10**	**Position (WGS84)**	115.3069, -29.3797
Slope	negligible	**Topography**	undulating plain
Soil colour	brown, whitish	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	20 Aug 2025	20 Aug 2025
1	Birding	20 Aug 2025	20 Aug 2025
1	Foraging - vertebrates	20 Aug 2025	20 Aug 2025
1	Foraging - SRE	20 Aug 2025	20 Aug 2025

Site description - visit 1 (20 Aug 2025)			
Low to mid Acacia? Dominant shrubland over tussock grassland and low mixed native shrubs. Small groves of flowering wattle. No trees and very sparse litter.			
Habitat	shrubland		
Disturbance	evidence of feral animals, livestock tracks, weed infestation		
Vegetation condition	Very Good	**Fire age**	moderate (>5 years)
Total veg. cover (%)	72	**Litter distribution**	sparse
Tree cover (%)	0	**Litter depth (cm)**	1.0
Shrub cover (%)	30	**Litter cover (%)**	5
Grass cover (%)	40	**Herb cover (%)**	2



Site details			
Site	**Site 11**	**Position (WGS84)**	115.2663, -29.3247
Slope	negligible	**Topography**	plain
Soil colour	brown-grey, whitish	**Soil texture**	sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	20 Aug 2025	20 Aug 2025

Site description - visit 1 (20 Aug 2025)			
Paddock. No trees. Paddy melons.			
Habitat	herbland / forbland		
Disturbance	evidence of feral animals, grazing-high, historic clearing, large-scale clearing, livestock tracks, vehicle tracks, weed infestation		
Vegetation condition	Completely Degraded	**Fire age**	not evident
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	50	**Herb cover (%)**	50

Site details			
Site	**Site 12**	**Position (WGS84)**	115.2799, -29.3237
Slope	gentle	**Topography**	drainage line
Soil colour	brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	20 Aug 2025	20 Aug 2025
1	Opportunistic sighting	20 Aug 2025	20 Aug 2025

Site description - visit 1 (20 Aug 2025)			
Flowing creek running through paddocks. Isolated eucalypts and acacia shrubs on edges. Continuous weed and invasive grass cover.			
Habitat	riparian zone		
Disturbance	erosion channels, evidence of feral animals, grazing-medium, historic clearing, livestock tracks, vehicle tracks, weed infestation		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	155	**Litter distribution**	sparse
Tree cover (%)	5	**Litter depth (cm)**	1.0
Shrub cover (%)	20	**Litter cover (%)**	5
Grass cover (%)	80	**Herb cover (%)**	50

Site details			
Site	**Site 13**	**Position (WGS84)**	115.3027, -29.3447
Slope	gentle	**Topography**	undulating plain
Soil colour	brown	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	20 Aug 2025	20 Aug 2025
1	Opportunistic sighting	20 Aug 2025	20 Aug 2025

Site description - visit 1 (20 Aug 2025)			
Remnant roadside vegetation. No trees at all. Spotty Acacia shrubs. Understory dominated by invasive grasses and herbs. Sandy/loam soils.			
Habitat	grassland		
Disturbance	weed infestation, vehicle tracks, historic clearing, firebreak		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	120	**Litter distribution**	under vegetation
Tree cover (%)	0	**Litter depth (cm)**	1.0
Shrub cover (%)	15	**Litter cover (%)**	1
Grass cover (%)	95	**Herb cover (%)**	10

Site details			
Site	**Site 14**	**Position (WGS84)**	115.3464, -29.2420
Slope	gentle	**Topography**	undulating plain
Soil colour	brown	**Soil texture**	loamy sand
Rock cover (%)	5	**Rock type**	laterite

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	21 Aug 2025	21 Aug 2025
1	Birding	21 Aug 2025	21 Aug 2025
1	Foraging - vertebrates	21 Aug 2025	21 Aug 2025
1	Foraging - SRE	21 Aug 2025	21 Aug 2025
1	Burrow excavation	21 Aug 2025	21 Aug 2025

Site description - visit 1 (21 Aug 2025)			
Open mixed woodland of predominantly sheoak and acacia over mixed mid to low shrubland over tussock grassland and continuous invasive herbaceous weed and grass cover.			
Habitat	open woodland		
Disturbance	evidence of feral animals, historic clearing, vehicle tracks, weed infestation		
Vegetation condition	Degraded	**Fire age**	moderate (5-10 years)
Total veg. cover (%)	130	**Litter distribution**	sparse
Tree cover (%)	5	**Litter depth (cm)**	1.0
Shrub cover (%)	25	**Litter cover (%)**	2
Grass cover (%)	80	**Herb cover (%)**	20

Site details			
Site	**Site 15**	**Position (WGS84)**	115.3388, -29.2526
Slope	gentle	**Topography**	drainage line
Soil colour	light-brown	**Soil texture**	sandy loam
Rock cover (%)	5	**Rock type**	laterite

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	21 Aug 2025	21 Aug 2025
1	Birding	21 Aug 2025	21 Aug 2025
1	Foraging - vertebrates	21 Aug 2025	21 Aug 2025
1	Foraging - vertebrates	21 Aug 2025	21 Aug 2025
1	Litter sieve	21 Aug 2025	21 Aug 2025

Site description - visit 1 (21 Aug 2025)			
Open eucalypt woodland along a drainage line over patchy mixed shrubs and continuous weed and grass cover. Transitions into sheoak on the upper slopes. Eucalypts more dense further down drainage.			
Habitat	open woodland		
Disturbance	erosion channels, evidence of feral animals, weed infestation		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	180	**Litter distribution**	under vegetation
Tree cover (%)	20	**Litter depth (cm)**	4.0
Shrub cover (%)	10	**Litter cover (%)**	10
Grass cover (%)	80	**Herb cover (%)**	70

Site details			
Site	**Site 16**	**Position (WGS84)**	115.3023, -29.2636
Slope	gentle	**Topography**	undulating plain
Soil colour	light-brown	**Soil texture**	clay loam
Rock cover (%)	20	**Rock type**	laterite

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	21 Aug 2025	21 Aug 2025
1	Foraging - vertebrates	21 Aug 2025	21 Aug 2025
1	Birding	21 Aug 2025	21 Aug 2025
1	Foraging - SRE	21 Aug 2025	21 Aug 2025

Site description - visit 1 (21 Aug 2025)			
Shrubland with scattered eucalypts over patchy low shrubs and invasive weed and grass cover on a rocky slope with larger boulders on gravel on loamy clay.			
Habitat	shrubland		
Disturbance	erosion channels, evidence of feral animals, historic clearing, vehicle tracks, weed infestation		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	142	**Litter distribution**	sparse
Tree cover (%)	2	**Litter depth (cm)**	
Shrub cover (%)	40	**Litter cover (%)**	5
Grass cover (%)	60	**Herb cover (%)**	40

Site details			
Site	**Site 17**	**Position (WGS84)**	115.3030, -29.2764
Slope	steep	**Topography**	breakaway
Soil colour	brown	**Soil texture**	clay loam
Rock cover (%)	40	**Rock type**	laterite

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	21 Aug 2025	21 Aug 2025
1	Birding	21 Aug 2025	21 Aug 2025
1	Foraging - vertebrates	21 Aug 2025	21 Aug 2025
1	Foraging - SRE	21 Aug 2025	21 Aug 2025

Site description - visit 1 (21 Aug 2025)			
Sparse tall shrubs over mixed dense shrubland over tussock grasses and invasive grass cover on a south facing breakaway. Remnant patch between paddocks. Grove of quandong trees.			
Habitat	shrubland		
Disturbance	erosion channels, excavation, historic clearing, litter, vehicle tracks, weed infestation		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	123	**Litter distribution**	sparse
Tree cover (%)	3	**Litter depth (cm)**	1.0
Shrub cover (%)	50	**Litter cover (%)**	2
Grass cover (%)	60	**Herb cover (%)**	10

Site details			
Site	**Site 18**	**Position (WGS84)**	115.3111, -29.2843
Slope	gentle	**Topography**	undulating plain
Soil colour	brown	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	21 Aug 2025	21 Aug 2025
1	Opportunistic sighting	21 Aug 2025	21 Aug 2025

Site description - visit 1 (21 Aug 2025)			
Remnant vegetation along a drainage line bisected by a road. Eucalyptus trees over few acacia shrubs. Understory entirely invasive grasses and herbs. Cattails are densely throughout the creek. Trees too skinny for cockatoos.			
Habitat	riparian zone		
Disturbance	weed infestation, vehicle tracks, historic clearing, evidence of feral animals		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	145	**Litter distribution**	scattered
Tree cover (%)	30	**Litter depth (cm)**	1.0
Shrub cover (%)	20	**Litter cover (%)**	15
Grass cover (%)	90	**Herb cover (%)**	5

Site details			
Site	**Site 19**	**Position (WGS84)**	115.3274, -29.2490
Slope	moderate	**Topography**	undulating plain
Soil colour	brown	**Soil texture**	clay loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	22 Aug 2025	22 Aug 2025
1	Foraging - SRE	22 Aug 2025	22 Aug 2025
1	Opportunistic sighting	22 Aug 2025	22 Aug 2025

Site description - visit 1 (22 Aug 2025)			
Open eucalypt woodland over open low to mid shrubland over continuous dense weed cover. Many dead trees.			
Habitat	open woodland		
Disturbance	evidence of feral animals, litter, weed infestation		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	160	**Litter distribution**	sparse
Tree cover (%)	20	**Litter depth (cm)**	1.0
Shrub cover (%)	20	**Litter cover (%)**	2
Grass cover (%)	30	**Herb cover (%)**	90

Site details			
Site	**Site 20**	**Position (WGS84)**	115.3392, -29.2567
Slope	gentle	**Topography**	seasonally wet area
Soil colour	red-brown	**Soil texture**	sandy clay
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	22 Aug 2025	22 Aug 2025

Site description - visit 1 (22 Aug 2025)			
Dense tall melaleuca shrubland over mixed dense wetlands grasses on seasonally wet clay.			
Habitat	woodland		
Disturbance	evidence of feral animals, vehicle tracks, weed infestation		
Vegetation condition	Good	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	185	**Litter distribution**	under vegetation
Tree cover (%)	80	**Litter depth (cm)**	2.0
Shrub cover (%)	20	**Litter cover (%)**	50
Grass cover (%)	80	**Herb cover (%)**	5

Site details			
Site	**Site 21**	**Position (WGS84)**	115.3012, -29.2904
Slope	negligible	**Topography**	creek
Soil colour	red-brown	**Soil texture**	clay loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	22 Aug 2025	22 Aug 2025

Site description - visit 1 (22 Aug 2025)			
Flowing creekling bordered by reeds and melaleuca shrubs.			
Habitat	riparian zone		
Disturbance	vehicle tracks, weed infestation		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	43	**Litter distribution**	sparse
Tree cover (%)	1	**Litter depth (cm)**	1.0
Shrub cover (%)	10	**Litter cover (%)**	1
Grass cover (%)	30	**Herb cover (%)**	2

Site details			
Site	**Site 22**	**Position (WGS84)**	115.3012, -29.3069
Slope	negligible	**Topography**	creek
Soil colour	red-brown	**Soil texture**	clay loam and laterite
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	22 Aug 2025	22 Aug 2025

Site description - visit 1 (22 Aug 2025)			
Creekling bordered by melaleuca shrubland and invasive grass cover. Small amount of rock outcropping.			
Habitat	shrubland		
Disturbance	historic clearing, vehicle tracks, weed infestation		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	120	**Litter distribution**	under vegetation
Tree cover (%)	0	**Litter depth (cm)**	1.0
Shrub cover (%)	50	**Litter cover (%)**	5
Grass cover (%)	60	**Herb cover (%)**	10

Site details			
Site	**Site 23**	**Position (WGS84)**	115.1273, -29.3434
Slope	gentle	**Topography**	undulating plain
Soil colour	brown, whitish	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	22 Aug 2025	22 Aug 2025
1	Birding	22 Aug 2025	22 Aug 2025
1	Foraging - SRE	22 Aug 2025	22 Aug 2025
1	Foraging - vertebrates	22 Aug 2025	22 Aug 2025

Site description - visit 1 (22 Aug 2025)			
Recently burnt banksia woodland over mixed mid to low shrubland and native grasses on sandy soil. Negligible leaf litter.			
Habitat	woodland		
Disturbance	litter, vehicle tracks		
Vegetation condition	Good	**Fire age**	relatively recent (1-5 years)
Total veg. cover (%)	46	**Litter distribution**	sparse
Tree cover (%)	5	**Litter depth (cm)**	1.0
Shrub cover (%)	20	**Litter cover (%)**	2
Grass cover (%)	20	**Herb cover (%)**	1

Site details			
Site	**Site 24**	**Position (WGS84)**	115.1718, -29.4070
Slope	negligible	**Topography**	plain
Soil colour	brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	22 Aug 2025	22 Aug 2025

Site description - visit 1 (22 Aug 2025)			
Very low remnant shrubland around 4-way intersection. Midstory of acacia shrubs and low native grasses. Sandy-loam soils. South-western corner appears recently burnt (1y)			
Habitat	shrubland		
Disturbance	vehicle tracks		
Vegetation condition	Good	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	110	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	40	**Litter cover (%)**	0
Grass cover (%)	60	**Herb cover (%)**	10

Site details			
Site	**Site 25**	**Position (WGS84)**	115.0616, -29.4104
Slope	gentle	**Topography**	undulating plain
Soil colour	brown	**Soil texture**	sandy loam
Rock cover (%)	20	**Rock type**	limestone

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	22 Aug 2025	22 Aug 2025

Site description - visit 1 (22 Aug 2025)			
Scattered eucalypts over dense tall melaleuca shrubland over weed and invasive grasses on rocky undulating hill.			
Habitat	shrubland		
Disturbance	vehicle tracks, weed infestation		
Vegetation condition	Very Good	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	145	**Litter distribution**	under vegetation
Tree cover (%)	15	**Litter depth (cm)**	1.0
Shrub cover (%)	80	**Litter cover (%)**	5
Grass cover (%)	40	**Herb cover (%)**	10

Site details			
Site	**Site 26**	**Position (WGS84)**	115.0119, -29.4103
Slope	gentle	**Topography**	undulating plain
Soil colour	brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	22 Aug 2025	22 Aug 2025

Site description - visit 1 (22 Aug 2025)			
Remnant vegetation bordering Brand Hwy. Extremely dense acacia and melaleuca shrubland. Understory is comprising invasive grasses and herbs. Invasive vines also present. Sandy-loam soils. Dune systems close by to the West.			
Habitat	shrubland		
Disturbance	weed infestation, vehicle tracks, litter, firebreak		
Vegetation condition	Good	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	150	**Litter distribution**	even/continuous
Tree cover (%)	10	**Litter depth (cm)**	1.0
Shrub cover (%)	90	**Litter cover (%)**	40
Grass cover (%)	40	**Herb cover (%)**	10

Appendix 3 Vertebrate fauna desktop and field survey results

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
Amphibians										
Hylidae	*Litoria adelaidensis*	Slender Tree Frog			*					*
	Litoria caerulea	Green Tree Frog			*					
	Litoria moorei	Motorbike Frog			*					*
Limnodynastidae	*Heleioporus albopunctatus*	Western Spotted Frog			*					
	Heleioporus eyrei	Moaning Frog			*					
	Heleioporus psammophilus	Sand Frog			*					
	Limnodynastes dorsalis	Western Banjo Frog			*			*	*	
	Neobatrachus kunapalari	Kunapalari Frog			*					
	Neobatrachus pelobatoides	Humming Frog			*					
	Neobatrachus sutor	Shoemaker Frog			*					
	Neobatrachus wilsmorei	Plonking Frog			*					
Myobatrachidae	*Crinia pseudinsignifera*	Bleating Froglet			*					*
	Myobatrachus gouldii	Turtle Frog			*					
	Pseudophryne guentheri	Crawling Toadlet			*					*
Birds										
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill			*					
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill			*			*	*	*
	Acanthiza uropygialis	Chestnut-rumped Thornbill			*					
	Aphelocephala leucopsis	Southern Whiteface	VU (EPBC Act)				*			
	Calamanthus campestris	Rufous Fieldwren			*					

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
	Gerygone fusca	Western Gerygone			*			*	*	*
	Hylacola cauta	Shy Groundwren			*			*	*	
	Pyrrholaemus brunneus	Redthroat			*					
	Sericornis maculatus	Spotted Scrubwren			*			*	*	
	Smicrornis brevirostris	Weebill			*			*	*	*
Accipitridae	*Aquila audax*	Wedge-tailed Eagle			*			*		*
	Circus assimilis	Spotted Harrier			*			*		
	Elanus axillaris	Black-shouldered Kite			*					
	Haliastur sphenurus	Whistling Kite			*				*	
	Hieraaetus morphnoides	Little Eagle			*					
	Lophoictinia isura	Square-tailed Kite							*	
	Tachyspiza cirrocephala	Collared Sparrowhawk							*	
	Tachyspiza fasciata	Brown Goshawk			*				*	
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar			*					
Anatidae	*Anas castanea*	Chestnut Teal			*					
	Anas gracilis	Grey Teal			*					*
	Anas superciliosa	Pacific Black Duck			*				*	*
	Aythya australis	Hardhead			*					
	Chenonetta jubata	Australian Wood Duck			*					*
	Cygnus atratus	Black Swan			*					
	Malacorhynchus membranaceus	Pink-eared Duck			*					

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
	Oxyura australis	Blue-billed Duck	P4 (DBCA list)			*				
	Tadorna tadornoides	Australian Shelduck								*
Apodidae	*Apus pacificus*	Fork-tailed Swift	Mig. (EPBC & BC Acts)			*	*			
Ardeidae	*Ardea pacifica*	White-necked Heron								*
	Egretta novaehollandiae	White-faced Heron			*			*		
Artamidae	*Artamus cinereus*	Black-faced Woodswallow			*			*	*	
	Artamus cyanopterus	Dusky Woodswallow			*					
	Artamus minor	Little Woodswallow			*					
	Artamus personatus	Masked Woodswallow			*				*	
	Cracticus nigrogularis	Pied Butcherbird			*			*		
	Cracticus torquatus	Grey Butcherbird			*			*		
	Gymnorhina tibicen	Australian Magpie			*			*		
	Strepera versicolor	Grey Currawong			*				*	
Cacatuidae	*Cacatua pastinator*	Western Long-billed Corella			*					
	Cacatua sanguinea	Little Corella			*			*		
	Calyptorhynchus banksii	Red-tailed Black-Cockatoo			*			*		
	Calyptorhynchus banksii naso	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)			*				
	Eolophus roseicapilla	Galah			*			*	*	*
	Nymphicus hollandicus	Cockatiel			*					
	Zanda latirostris	Carnaby's Cockatoo	EN (EPBC & BC Acts)			*	*	*	*	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike			*			*	*	*

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
	Lalage tricolor	White-winged Triller			*			*		*
Charadriidae	*Charadrius melanops*	Black-fronted Dotterel						*		
	Erythrogonys cinctus	Red-kneed Dotterel			*					
	Vanellus tricolor	Banded Lapwing			*					
Cinclosomatidae	*Psophodes occidentalis*	Western Wedgebill			*					
Columbidae	*Ocyphaps lophotes*	Crested Pigeon			*			*	*	*
	Phaps chalcoptera	Common Bronzewing			*			*	*	*
	Phaps elegans	Brush Bronzewing			*					
	Streptopelia senegalensis	Laughing Dove		*	*			*		
Corvidae	*Corvus coronoides*	Australian Raven			*			*	*	*
	Corvus orru	Torresian Crow			*					
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo			*			*	*	*
	Chalcites basalis	Horsfield's Bronze Cuckoo			*			*	*	*
	Chalcites lucidus	Shining Bronze Cuckoo			*			*		
	Heteroscenes pallidus	Pallid Cuckoo			*			*		*
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird			*			*		
Dicruridae	*Grallina cyanoleuca*	Magpie-lark			*			*	*	*
	Myiagra inquieta	Restless Flycatcher						*		
	Rhipidura albiscapa	Grey Fantail			*			*	*	*
	Rhipidura leucophrys	Willie Wagtail			*			*	*	*
Dromaiidae	*Dromaius novaehollandiae*	Emu			*			*	*	*
Estrildidae	*Taeniopygia castanotis*	Zebra Finch			*					

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
Falconidae	*Falco berigora*	Brown Falcon			*			*	*	
	Falco cenchroides	Australian Kestrel			*			*	*	*
	Falco hypoleucos	Grey Falcon	VU (EPBC & BC Acts)				*			
	Falco longipennis	Australian Hobby			*					
	Falco peregrinus	Peregrine Falcon	OS (BC Act)			*				
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		*	*			*		
	Todiramphus pyrrhopygius	Red-backed Kingfisher			*					
	Todiramphus sanctus	Sacred Kingfisher			*				*	
Hirundinidae	*Cheramoeca leucosterna*	White-backed Swallow			*					
	Hirundo neoxena	Welcome Swallow			*			*	*	*
	Petrochelidon ariel	Fairy Martin			*					
	Petrochelidon nigricans	Tree Martin			*			*	*	*
Laridae	*Anous stolidus*	Common Noddy	Mig. (EPBC & BC Acts)				*			
	Anous tenuirostris melanops	Australian Lesser Noddy	VU (EPBC Act); EN (BC Act)			*	*			
	Chroicocephalus novaehollandiae	Silver Gull			*					
	Hydroprogne caspia	Caspian Tern	Mig. (EPBC & BC Acts)			*	*			
	Larus pacificus	Pacific Gull			*					
	Onychoprion anaethetus	Bridled Tern	Mig. (EPBC & BC Acts)				*			
	Sterna dougallii	Roseate Tern	Mig. (EPBC & BC Acts)				*			

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
	Sternula albifrons	Little Tern	VU/Mig./Mig. (EPBC & BC Acts)				*			
	Sternula nereis nereis	Fairy Tern	VU (EPBC & BC Acts)		*		*			
	Thalasseus bergii	Greater Crested Tern	Mig. (EPBC & BC Acts)			*				
Locustellidae	*Cincloramphus cruralis*	Brown Songlark			*			*		*
	Cincloramphus mathewsi	Rufous Songlark			*			*		*
	Poodytes gramineus	Little Grassbird			*					
Maluridae	*Malurus assimilis*	Purple-backed Fairy-wren			*			*	*	
	Malurus leucopterus	White-winged Fairy-wren			*			*	*	*
	Malurus pulcherrimus	Blue-breasted Fairy-wren			*			*		*
	Malurus splendens	Splendid Fairy-wren			*			*	*	*
Megapodiidae	*Leipoa ocellata*	Malleefowl	VU (EPBC & BC Acts)			*	*			
Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater			*			*		
	Anthochaera carunculata	Red Wattlebird			*			*	*	
	Anthochaera lunulata	Western Little Wattlebird						*		
	Epthianura albifrons	White-fronted Chat			*			*		*
	Epthianura tricolor	Crimson Chat			*					
	Gavicalis virescens	Singing Honeyeater			*			*	*	
	Gliciphila melanops	Tawny-crowned honeyeater			*			*	*	*
	Lichmera indistincta	Brown Honeyeater			*			*	*	*
	Manorina flavigula	Yellow-throated Miner			*			*		
	Melithreptus brevirostris	Brown-headed Honeyeater			*					

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
	Phylidonyris niger	White-cheeked Honeyeater			*			*	*	
	Phylidonyris novaehollandiae	New Holland Honeyeater			*					
	Ptilotula ornata	Yellow-plumed Honeyeater			*					
	Ptilotula penicillata	White-plumed Honeyeater			*					
	Purnella albifrons	White-fronted Honeyeater			*			*		
Meropidae	*Merops ornatus*	Rainbow Bee-eater			*				*	
Motacillidae	*Anthus australis*	Australian Pipit			*			*	*	*
	Motacilla alba	White Wagtail							*	
	Motacilla cinerea	Grey Wagtail	Mig. (EPBC & BC Acts)				*			
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush			*			*	*	*
	Oreoica gutturalis	Crested Bellbird			*			*		
	Pachycephala fuliginosa	Western Whistler			*				*	
	Pachycephala rufiventris	Rufous Whistler			*			*	*	
Pandionidae	*Pandion haliaetus*	Osprey	Mig. (EPBC & BC Acts)			*	*			
Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote			*					
	Pardalotus striatus	Striated Pardalote			*			*		*
Petroicidae	*Drymodes brunneopygia*	Southern Scrub-robin			*					
	Melanodryas cucullata	Hooded Robin			*			*	*	
	Microeca fascinans	Jacky Winter			*					
	Petroica goodenovii	Red-capped Robin			*			*	*	*
	Quoyornis georgianus	White-breasted Robin			*					
Phasianidae	*Coturnix pectoralis*	Stubble Quail			*					

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
	Synoicus ypsilophorus	Brown Quail						*		
Podargidae	*Podargus strigoides*	Tawny Frogmouth			*					
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe			*					*
	Tachybaptus novaehollandiae	Australasian Grebe			*					
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler			*					
Psittaculidae	*Barnardius zonarius*	Australian Ringneck			*			*	*	*
	Melopsittacus undulatus	Budgerigar			*					
	Neophema elegans	Elegant Parrot			*					
	Parvipsitta porphyrocephala	Purple-crowned Lorikeet			*					
	Platycercus icterotis	Western Rosella						*		
	Polytelis anthopeplus	Regent Parrot			*					
Rallidae	*Hypotaenidia philippensis*	Buff-banded Rail			*					
	Tribonyx ventralis	Black-tailed Native-hen			*					*
Rostratulidae	*Rostratula australis*	Australian Painted Snipe	EN (EPBC & BC Acts)				*			
Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	Mig. (EPBC & BC Acts)			*	*			
	Arenaria interpres	Ruddy Turnstone	VU/Mig. (EPBC Act); Mig. (BC Act)			*				
	Calidris acuminata	Sharp-tailed Sandpiper	VU/Mig. (EPBC Act); Mig. (BC Act)			*	*			
	Calidris canutus	Red Knot	VU/Mig. (EPBC Act); EN (BC Act)				*			
	Calidris ferruginea	Curlew Sandpiper	CR/Mig. (EPBC Act); CR (BC Act)				*			

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
	Calidris melanotos	Pectoral Sandpiper	Mig. (EPBC & BC Acts)				*			
	Calidris ruficollis	Red-necked Stint	Mig. (EPBC & BC Acts)			*				
	Limosa lapponica	Bar-tailed Godwit	Mig. (EPBC & BC Acts)			*	*			
	Numenius madagascariensis	Eastern Curlew	CR/Mig./CR (EPBC Act; BC Act)				*			
	Tringa brevipes	Grey-tailed Tattler	Mig. (EPBC & BC Acts) P4 (DBCA list)			*				
	Tringa nebularia	Common Greenshank	EN/Mig. (EPBC Act); Mig. (BC Act)			*	*			
	Tringa stagnatilis	Marsh Sandpiper	Mig. (EPBC & BC Acts)			*				
Strigidae	*Ninox boobook subsp. boobook*	Southern Boobook						*		
Sylviidae	*Acrocephalus australis*	Australian Reed Warbler			*			*		*
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill						*		
	Platalea regia	Royal Spoonbill						*		
	Threskiornis spinicollis	Straw-necked Ibis								*
Turnicidae	*Turnix velox*	Little Button-quail						*		
Tytonidae	*Tyto javanica*	Eastern barn owl						*		
Zosteropidae	*Zosterops lateralis*	Silvereye						*	*	*
Mammals										
Bovidae	*Bos taurus*	European Cattle		*				*	*	
	Capra hircus	Goat		*	*				*	
	Ovis aries	Sheep		*				*		*

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
Camelidae	*Camelus dromedarius*	Dromedary		*				*		
Canidae	*Canis familiaris*	Dog		*	*			*		
	Vulpes vulpes	Red Fox		*	*			*	*	*
Dasyuridae	*Dasyurus geoffroii*	Chuditch	VU (EPBC & BC Acts)			*	*			
	Phascogale tapoatafa wambenger	South-western Brush-tailed Phascogale	CD (BC Act)			*				
	Sminthopsis crassicaudata	Fat-tailed Dunnart			*					
	Sminthopsis granulipes	White-tailed Dunnart			*					
Felidae	*Felis catus*	Cat		*	*					*
Leporidae	*Oryctolagus cuniculus*	Rabbit		*	*			*	*	*
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo			*			*	*	*
	Notamacropus irma	Western Brush Wallaby	P4 (DBCA list)			*				
	Osphranter rufus	Red Kangaroo						*		*
Molossidae	*Austronomus australis*	White-striped Free-tailed Bat								*
Muridae	*Hydromys chrysogaster*	Water-rat	P4 (DBCA list)			*				
	Mus musculus	House Mouse		*	*					
	Notomys alexis	Spinifex Hopping-mouse			*					
	Rattus fuscipes	Western Bush Rat			*					
	Rattus rattus	Black Rat		*	*					
Pseudocheiridae	*Pseudocheirus occidentalis*	Western Ringtail Possum	CR (EPBC & BC Acts)			*				
Pteropodidae	*Pteropus scapulatus*	Little Red Flying-fox			*					

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
Suidae	*Sus scrofa*	Pig		*					*	
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna						*	*	*
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat								*
	Chalinolobus morio	Chocolate Wattled Bat			*					*
	Nyctophilus geoffroyi	Lesser Long-eared Bat			*					*
	Vespadelus regulus	Southern Forest Bat			*					*
Reptiles										
Agamidae	*Ctenophorus adelaidensis*	Southern Heath Dragon			*			*	*	
	Ctenophorus maculatus	Spotted Military Dragon			*				*	
	Ctenophorus nuchalis	Central Netted Dragon			*			*		
	Ctenophorus reticulatus	Western Netted Dragon			*					
	Ctenophorus scutulatus	Lozenge-marked Dragon			*					
	Moloch horridus	Thorny Devil			*					*
	Pogona minor	Dwarf Bearded Dragon						*	*	
Diplodactylidae	*Crenadactylus occidentalis*	Western clawless gecko			*					
	Crenadactylus ocellatus	South-western Clawless Gecko			*					*
	Diplodactylus ornatus	Ornate Stone Gecko			*					
Elapidae	*Echiopsis curta*	Bardick			*			*		
	Elapognathus coronatus	Crowned Snake			*					
	Neelaps calonotos	Black-striped Snake	P3 (DBCA list)			*				
	Notechis scutatus	Tiger Snake							*	

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
	Pseudechis australis	Mulga Snake			*					
	Pseudonaja mengdeni	Western Brown Snake			*					
	Pseudonaja nuchalis	Gwardar			*					
	Simoselaps bertholdi	Jan's Banded Snake			*					
	Simoselaps littoralis	West Coast Banded Snake			*					
	Suta gouldii	Gould's Hooded Snake			*					*
	Suta monachus	Inland Hooded Snake			*					
Gekkonidae	*Gehyra variegata*	Variegated gehyra			*			*		*
	Heteronotia binoei	Bynoe's Gecko			*					
Pygopodidae	*Aprasia clairae*	Batavia Coast Worm Lizard			*					
	Delma fraseri	Fraser's Legless Lizard			*					
	Delma tincta	Excitable Delma			*					
	Lialis burtonis	Burton's Legless Lizard			*			*	*	
	Pletholax gracilis	Keeled Legless Lizard			*					
	Pygopus lepidopodus	Common Scaly-foot			*					
Pythonidae	*Antaresia childreni*	Children's Python			*					
	Aspidites ramsayi	Woma			*					
Scincidae	*Cryptoblepharus buchananii*	Buchanan’s Snake-eyed Skink			*					
	Cryptoblepharus plagiocephalus	Peron's Snake-eyed Skink			*			*		
	Ctenotus fallens	West Coast Ctenotus			*					

Family	Species	Common name	Status	Introduced	Source					This survey
					Dandjoo	DBCA Threatened and Priority Fauna	EPBC Protected Matters	Phoenix database	Other reports	
	Ctenotus pantherinus	Leopard Ctenotus			*			*		
	Cyclodomorphus branchialis	Gilled Slender Blue-tongue Skink	VU (BC Act)			*				
	Cyclodomorphus celatus	Western Slender Blue-tongue			*					
	Egernia stokesii subsp. badia	Western Spiny-tailed Skink	EN/VU (EPBC Act; BC Act)			*	*			
	Lerista distinguenda	South-western Four-toed Slider			*					
	Lerista elegans	Elegant Slider			*					
	Lerista gerrardii	Bold-striped Robust Slider			*					
	Lerista kingi	King's Three-toed Slider			*					
	Lerista planiventralis				*					
	Lerista praepedita	West-coast Worm-slider			*					
	Menetia greyii	Common Dwarf Skink			*					
	Tiliqua occipitalis	Western Blue-tongue			*					
	Tiliqua rugosa	Bobtail			*			*	*	*
Typhlopidae	*Anilios australis*	Southern Blind Snake			*			*		
	Anilios waitii	Beaked Blind Snake			*					
Varanidae	*Varanus caudolineatus*	Stripe-tailed Monitor			*					*
	Varanus gouldii	Bungarra or Sand Monitor			*					

Appendix 4 Short-range endemic invertebrate desktop results

Higher taxon, family	Species	SRE category / cons. status	Proximity to study area (km)	Habitat records
Phylum: Arthropoda, Class: Chilopoda (Centipedes)				
Chilenophilidae	Chilenophilidae `sp. indet`	Data Deficient	85.8	
Geophilidae	Geophilidae `sp. indet`	Data Deficient	50.3	
Henicopidae	Henicopidae `sp. indet`	Data Deficient	61.2	
	Henicops dentatus	Widespread	61.2	Sandstone ridge, under rocks
Henicopidae	*Lamyctes* `sp. indet`	Data Deficient	61.2	
Mecistocephalidae	Mecistocephalidae `sp. indet`	Data Deficient	68.6	
	Mecistocephalus tahitiensis	Widespread	73.8	
Oryidae	*Orphnaeus* `sp. indet`	Data Deficient	85.9	
	Orphnaeus brevilabiatus	Widespread	73.8	
	Oryidae `sp. indet`	Data Deficient	68.6	
Phylum: Arthropoda, Class: Arachnida, Order: Opiliones (harvestmen)				
Neopilionidae	*Ballarra longipalpus*	Widespread	80.2	Under rocks, shaley sandstone
	Megalopsalis `cf. *epizephyros*`	Potential	99.8	
	Megalopsalis `sp. indet.`	Data Deficient	50.3	
	Megalopsalis leptekes	Widespread	106.7	
	Megalopsalis tanisphyros	Widespread	82.0	Wandoo woodland, under sandstone
	Neopilionidae `sp. indet`	Data Deficient	48.3	
	Tercentenarium linnaei	Widespread	72.3	
Triaenonychidae	*Nunciella* `sp. indet`	Data Deficient	20.7	
	Triaenonychidae `sp. indet`	Data Deficient	83.9	
Phylum: Arthropoda, Subphylum: Crustacea, Class: Malacostraca, Order: Isopoda (slaters)				
Armadillidae	*Buddelundia* `sp. 87`	Potential	85.7	
	Buddelundia `sp. indet.`	Data Deficient	4.8	
	Buddelundia 'Phoenix0150'	Potential	6.3	Acacia shrubland
	Buddelundia bipartita	Widespread	70.9	
	Buddelundia cinerascens	Potential	98.7	
	Buddelundia inaequalis	Potential	93.3	
	Buddelundia lateralis	Potential	9.0	
	Buddelundia opaca	Likely	80.2	
	Buddelundia subinermis	Potential	65.3	
	Buddelundia sulcata	Widespread	65.3	
	Cubaris `sp. 2 (Judd 2002)`	Potential	85.2	
	Spherillo `sp. indet.`	Data Deficient	88.2	
Oniscidae	Oniscidae `sp. indet.`	Data Deficient	26.8	
Paraplatyarthridae	*Paraplatyarthrus* `sp. indet.`	Data Deficient	90.0	
Philosciidae	*Haloniscus stepheni*	Widespread	67.9	

Higher taxon, family	Species	SRE category / cons. status	Proximity to study area (km)	Habitat records
	Laevophiloscia `1 complex`	Potential	76.5	
	Laevophiloscia `sp. indet.`	Data Deficient	90.0	
	Laevophiloscia cf. *yalgooensis*	Potential	86.4	
	Philosciidae `sp. indet.`	Data Deficient	81.7	
Porcellionidae	*Porcellionides pruinosus*	Widespread	85.7	
Class: Arachnida, Order: Araneae (spiders), Infraorder: Araneomorphae (modern spiders)				
Salticidae	`*Maratus*` `sp. O`	Data Deficient	72.8	Dense Acacia rostellifera on dunes
	`*Maratus*` *chrysomelas*	Potential	55.6	Banksia/Xylomelum heath
Phylum: Mollusca, Class: Gastropoda, Superorder: Eupulmonata (land snails)				
Bithyniidae	*Gabbia* cf. *kendricki*	Widespread	16.7	
Bothriembryontidae	*Bothriembryon* `sp. indet`	Data Deficient	5.9	
	Bothriembryon bulla	Widespread	81.6	
	Bothriembryon cf. *kendricki*	Potential	63.5	
	Bothriembryon cf. *onslowi*	Potential	79.1	
	Bothriembryon cf. *perobesus*	Potential	39.2	
	Bothriembryon cf. *whitleyi*	Potential	121.8	
	Bothriembryon perobesus	P1/Potential	7.2	Limestone ridge
	Bothriembryon whitleyi	Technically EXTINCT	20.0	Aeolian dune system
Camaenidae	*Basedowena* `sp. indet`	Data Deficient	54.1	
	Basedowena bethana	Widespread	54.1	
	Basedowena cf. *bethana*	Potential	54.1	
	Pleuroxia bethana	Widespread	52.5	Slope above Ellendale Pool
	Sinumelon `sp. indet.`	Data Deficient	63.4	
	Sinumelon vagente	Widespread	62.6	
Charopidae	Charopidae `sp. indet.`	Data Deficient	98.1	
Gastrocoptidae	*Gastrocopta bannertonensis*	Widespread	74.3	Footslope
	Gastrocopta margaretae	Widespread	82.1	Gully Sides; creek bed; livestock tracks
	Gastrocopta `sp. indet.`	Data Deficient	85.7	
Geomitridae	*Cochlicella acuta*	Widespread	53.3	Limestone ridge
	Geomitridae cf. Cernuella	Potential	57.7	
Helicidae	*Theba pisana*	Widespread	53.3	Sand dune; minor channel; livestock tracks
Hygromidae	*Cochlicella* `sp. indet.`	Data Deficient	98.1	
Planorbidae	*Glyptophysa* `sp. indet.`	Data Deficient	17.4	
Punctidae	Punctidae `sp. indet.`	Data Deficient	109.3	
	Westralaoma expicta	Widespread	82.5	Footslope

Higher taxon, family	Species	SRE category / cons. status	Proximity to study area (km)	Habitat records
Pupillidae	*Omegapilla australis*	Widespread	85.7	
	Pupoides adelaidae	Widespread	105.5	
Succineidae	*Succinea* `sp. indet.`	Data Deficient	8.9	
	Succineidae `sp. indet.`	Data Deficient	10.0	
Tomichiidae	*Coxiella glabra*	Widespread	62.6	
Phylum: Arthropoda, Subphylum: Myriapoda, Class: Diplopoda (millipedes)				
Iulomorphidae	Iulomorphidae `sp. indet.`	Data Deficient	1.8	
	Podykipus `Geraldton 1`	Likely	85.7	
	Podykipus `Geraldton 2`	Likely	101.1	
	Podykipus `Geraldton 3`	Likely	85.7	Sand dune
	Podykipus `Geraldton 4`	Likely	85.7	
	Podykipus `Geraldton 5`	Likely	85.7	
	Podykipus `sp. indet`	Data Deficient	7.6	
Paradoxosomatidae	`*Antichiropus*?` `sp. indet.`	Data Deficient	68.4	Under stones in fossil gully
	Akamptogonus novarae	Widespread	48.3	Inside house
	Antichiropus `DIP016, watheroo`	Potential	118.9	
	Antichiropus `DIP064, bellavista`	Potential	96.0	
	Antichiropus `DIP068, buller1`	Potential	89.4	Mixed veg scrubland
	Antichiropus `DIP069, buller2`	Potential	87.5	
	Antichiropus `DIP072, casuarinae`	Potential	36.4	
	Antichiropus `DIP078`	Likely	7.6	Banksia low woodland on sand
	Antichiropus `DIP081`	Likely	50.8	
	Antichiropus `DIP090, *indarra*`	Potential	57.2	
	Antichiropus `DIP093, *hamatus*`	Potential	118.9	
	Antichiropus `DIP095, *howatharra*`	Potential	89.4	Mixed veg scrubland
	Antichiropus `DIP099, *mcmillani*`	Likely	35.1	
	Antichiropus `DIP102, minnivale 1`	Potential	88.7	
	Antichiropus `DIP106, mt lesueur1`	Likely	81.5	
	Antichiropus `DIP107, Mt Lesueur2, ML2`	Likely	75.8	
	Antichiropus `DIP115/DIP199`	Widespread	49.9	Woodland, outcrop, rock

Higher taxon, family	Species	SRE category / cons. status	Proximity to study area (km)	Habitat records
	Antichiropus `DIP121, Tallering 1`	Potential	106.7	
	Antichiropus `DIP128, UR1`	Potential	95.5	
	Antichiropus `DIP136, mobilis`	Potential	38.5	
	Antichiropus `DIP144`	Potential	49.9	Laterite rocks
	Antichiropus `DIP147, koolanooka/PKI/ bulbulus`	Likely	86.1	Cliff base under small rocks
	Antichiropus `DIP153, moonyanooka`	Potential	72.3	
	Antichiropus `DIP169`	Potential	57.5	Banksia low woodland on sand
	Antichiropus `DIP187, bowgada`	Potential	78.9	
	Antichiropus `DIP232`	Likely	6.3	Shrubland
	Antichiropus `sp. indet.`	Data Deficient	35.4	
	Antichiropus sulcatus	Widespread	1.8	Low heath on low lateritic breakaway
	Antichiropus whistleri	Widespread	80.2	Banksia low woodland on sand, under rock
	Paradoxosomatidae `sp. indet.`	Data Deficient	86.1	
Polyxenidae	Polyxenidae `sp. indet.`	Data Deficient	63.5	
	Unixenus mjoebergi	Widespread	82.6	Marri litter
Siphonotidae	Siphonotidae `DIPAAK` `DIP215, lesueuri`	Potential	85.4	
Class: Arachnida, Order: Araneae (spiders), Infraorder: Mygalomorphae (trapdoor spiders)				
Actinopodidae	*Missulena* `Bisevac sp. 1`	Data Deficient	61.2	Laterite & heath
	Missulena `Bisevac sp. 2`	Data Deficient	61.2	
	Missulena `MYG045`	Widespread	108.9	Sand dune
	Missulena `MYG047`	Potential	63.4	
	Missulena `MYG048`	Potential	63.4	
	Missulena `sp 1`	Widespread	75.7	
	Missulena `sp 3`	Widespread	39.9	
	Missulena `sp 6`	Widespread	99.2	
	Missulena `sp 8`	Widespread	36.3	
	Missulena `sp. indet.`	Data Deficient	22.7	
	Missulena gelasinos `sp 5`	Potential	83.7	
	Missulena granulosa	Widespread	10.1	
	Missulena hoggi	Widespread	48.3	Banksia low woodland on sand
	Missulena insignis	Widespread	29.9	
	Missulena minima `sp 1`	Potential	85.0	
	Missulena occatoria	Widespread	35.4	

Higher taxon, family	Species	SRE category / cons. status	Proximity to study area (km)	Habitat records
	Missulena pinguipes	Widespread	92.9	
Anamidae	*Aname* `mainae`	Widespread	9.0	Banksia low woodland on sand
	Aname `mccleeryorum?`	Potential	68.7	
	Aname `MYG633`	Potential	20.0	
	Aname `sp. black wish bone`	Potential	63.6	
	Aname `sp. indet.`	Data Deficient	14.1	
	Aname `sp. wish-bone`	Potential	67.0	
	Aname lillianae	Widespread	70.2	
	Aname mccleeryorum	Widespread	56.2	Wandoo woodland
	Anamidae `sp. indet.`	Data Deficient	85.0	
	Hesperonatalius harrietae	Likely	93.8	Sand dune, gully sides
	Kwonkan `indarra`	Potential	57.2	
	Kwonkan `lakeeganu`	Potential	89.3	
	Kwonkan `MYG060`	Potential	50.3	
	Kwonkan `MYG201`	Potential	95.5	Sand dune
	Kwonkan `MYG981`	Potential	38.1	
	Kwonkan `sp. indet.`	Data Deficient	48.1	
	Proshermacha `armigera?`	Potential	62.1	
	Proshermacha `MYG649`	Potential	101.4	
	Proshermacha `sp. indet.`	Data Deficient	7.6	
	Proshermacha armigera	Confirmed	62.1	
	Proshermacha telaporta	Potential	87.6	Banksia low woodland on sand
	Teyl `MYG693`	Confirmed	62.1	
	Teyl `MYG718`	Potential	86.6	
	Teyl `sp. 2`	Potential	63.4	
	Teyl `sp. 6`	Potential	63.4	
	Teyl `sp. indet.`	Data Deficient	7.6	
	Teyl kwonganensis	Potential	48.3	
	Teyl luculentus	Widespread	56.5	
Barychelidae	`*Idiommata*?` `sp. indet.`	Data Deficient	63.4	
	Barychelidae `sp. indet.`	Data Deficient	63.5	
	Idiommata `flare tip`	Potential	47.3	
	Idiommata `sp. indet.`	Data Deficient	48.3	
	Idiommata blackwalli	Widespread	62.3	Banksia low woodland on sand
	Synothele `MYG202`	Potential	107.0	Gully sides
	Synothele `MYG203`	Potential	92.3	Sand dune
	Synothele `sp. indet.`	Data Deficient	43.2	
	Synothele howi	Widespread	48.1	
Euagridae	*Cethegus* `sp. indet.`	Data Deficient	48.3	

Higher taxon, family	Species	SRE category / cons. status	Proximity to study area (km)	Habitat records
	Cethegus fugax	Widespread	72.6	
Halonoproctidae	*Conothele* `MYG530`	Potential	86.1	
	Conothele `sp. indet.`	Data Deficient	22.7	
Idiopidae	*Bungulla banksia*	Potential	35.4	Banksia low woodland on sand
	Bungulla bertmaini	Widespread	62.3	
	Bungulla bringo	Likely	29.9	Gully with York gum
	Bungulla ferraria	Potential	90.0	
	Bungulla riparia	Confirmed	17.5	Under leaf litter in sand
	Eucyrtops `latior`	Potential	85.7	
	Eucyrtops `sp. indet.`	Data Deficient	85.0	
	Euoplos `MYG792`	Likely	10.5	
	Euoplos `MYG886`	Likely	63.5	
	Euoplos `MYG887`	Likely	85.2	
	Euoplos `sp. indet.`	Data Deficient	22.7	
	Euoplos hoggi	Confirmed	62.6	
	Euoplos mcmillani	Confirmed	48.3	
	Euoplos saplan	Confirmed	85.0	
	Gaius villosus	Widespread	64.2	
	Idiopidae `sp. indet.`	Data Deficient	63.3	
	Idiopidae `sp. indet`	Data Deficient	64.1	
	Idiosoma `BMYG188`	Potential	14.8	
	Idiosoma `BMYG189`	Potential	17.1	
	Idiosoma `castellum`	P4/Potential	60.2	
	Idiosoma `merkanooka spp. group`	Potential	127.7	Acacia/Grevillea open woodland
	Idiosoma `MYG074`	Potential	61.2	Kwongan heath on sand
	Idiosoma `MYG221/MYG188`	Potential	113.2	
	Idiosoma `MYG222/MYG074`	Potential	87.5	
	Idiosoma `MYG757`	Potential	72.3	
	Idiosoma `MYG758`	Potential	87.5	
	Idiosoma `MYG759`	Potential	31.5	
	Idiosoma `MYG761`	Potential	39.9	
	Idiosoma `occidentalis`	Potential	22.7	
	Idiosoma `*rhaphiduca* sp. group`	Potential	47.3	
	Idiosoma `simplex`	Potential	75.8	
	Idiosoma `sp. 1`	Potential	50.3	
	Idiosoma `sp. indet.`	Data Deficient	15.9	
	Idiosoma arenaceum	P3/Potential	29.1	

Higher taxon, family	Species	SRE category / cons. status	Proximity to study area (km)	Habitat records
	Idiosoma clypeatum	P3/Widespread	95.5	
	Idiosoma dandaragan	P2/Confirmed	117.8	
	Idiosoma gardneri	P2/Confirmed	87.5	
	Idiosoma gutharuka	P1/Confirmed	63.4	
	Idiosoma kopejtkaorum	EN/confirmed	97.7	Creekline in York gum woodland
	Idiosoma kwongan	P1/Potential	4.8	Laterite heath
	Idiosoma nigrum	VU/EN	-	
	Idiosoma rhaphiduca	Widespread	50.2	
Theraphosidae	*Selenocosmia* `sp. indet.`	Data Deficient	31.3	
	Selenocosmia stirlingi	Widespread	62.7	
	Selenotholus foelschei	Widespread	62.6	
	Theraphosidae `sp. indet`	Data Deficient	62.1	
Phylum: Arthropoda, Class: Arachnida, Order: Pseudoscorpiones (pseudoscorpions)				
Atemnidae	*Oratemnus* `sp. indet.`	Data Deficient	71.4	
Cheliferidae	*Nannochelifer* `sp. indet.`	Data Deficient	68.3	
	Protochelifer `sp. indet.`	Data Deficient	17.5	
Chernetidae	*Chernetinae* `sp. indet.`	Data Deficient	95.5	
	Nesidiochernes `sp. indet.`	Data Deficient	71.4	
Chthoniidae	*Austrochthonius* `PSE135, pilbara`	Widespread	85.6	
	Austrochthonius `PSE188, similis`	Widespread	73.8	
	Austrochthonius `PSE192, lesueuri`	Widespread	35.0	Sand dune, gully sides
	Austrochthonius `sp. indet.`	Data Deficient	67.1	
	Tyrannochthonius `sp. indet.`	Data Deficient	91.1	
Garypidae	*Synsphyronus* `sp. indet.`	Data Deficient	83.1	
	Synsphyronus mimulus	Widespread	85.9	Under granite rocks
Garypinidae	*Amblyolpium* `sp. indet.`	Data Deficient	71.4	
Geogarypidae	*Geogarypus connatus*	Widespread	71.8	Under eucalypt bark
	Geogarypus taylori	Widespread	86.1	Under dead branch, marri litter
Olpiidae	*Austrohorus* `PSE282`	Potential	83.5	
	Austrohorus `sp. indet.`	Data Deficient	76.9	
	Beierolpium `sp. 8/2`	Widespread	86.6	
	Beierolpium `sp. 8/3`	Widespread	90.0	
	Beierolpium `sp. 8/4`	Widespread	76.9	Sand dune, gully sides
	Beierolpium `sp. indet.`	Data Deficient	61.2	
	Euryolpium `sp. indet.`	Data Deficient	86.1	
	Indolpium `sp. indet.`	Data Deficient	78.7	
	Olpiidae `sp. indet.`	Data Deficient	81.9	

Higher taxon, family	Species	SRE category / cons. status	Proximity to study area (km)	Habitat records
Withiidae	*Withius piger*	Widespread	72.6	
Phylum: Arthropoda, Class: Arachnida, Order: Scorpiones (scorpions)				
Bothriuridae	*Cercophonius* `sp. indet.`	Data Deficient	20.0	
	Cercophonius granulosus	Widespread	76.2	
	Cercophonius michaelseni	Widespread	7.6	Kwongan heath
	Cercophonius sulcatus	Widespread	63.7	Under rock
Buthidae	Buthidae `sp. indet.`	Data Deficient	20.0	
	Isometroides `sp. indet.`	Data Deficient	47.3	
	Isometroides `vescus`	Widespread	45.4	
	Lychas `austroccidentalis`	Widespread	50.3	Open salt lake country
	Lychas `sp. indet.`	Data Deficient	20.0	
	Lychas jonesae	Widespread	45.8	
	Lychas splendens	Widespread	18.2	Under rocks
Urodacidae	*Urodacus* `armatus`	Widespread	9.0	Kwongan (heathlands)
	Urodacus `BSCO071`	Potential	18.6	
	Urodacus `eneabba`	Potential	67.3	
	Urodacus `koolanooka`	Potential	83.0	
	Urodacus `novaehollandiae?`	Potential	63.8	
	Urodacus `SCO016, Mingenew`	Potential	10.9	
	Urodacus `SCO019, Casuarinas`	Potential	36.4	
	Urodacus `sp. indet.`	Data Deficient	22.9	
	Urodacus `Three Springs`	Potential	47.3	
	Urodacus `yaschenkoi spp. group`	Potential	114.5	
	Urodacus hartmeyeri	Widespread	22.9	
	Urodacus hoplurus	Widespread	62.6	
	Urodacus novaehollandiae	Widespread	9.0	Laterite heath
	Urodacus yaschenkoi	Widespread	117.8	

Appendix 5 Fauna species by site matrix

Species	Common name	Opp1	Opp2	Opp3	Opp4	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 08	Site 09	Site 10	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 23
Frogs																							
Crinia pseudinsignifera	Bleating Froglet						1								1			1					
Litoria adelaidensis	Slender Tree Frog							1															
Litoria moorei	Motorbike Frog						1											1					
Pseudophryne guentheri	Crawling Toadlet																		3				
Birds																							
Acanthiza chrysorrhoa	Yellow-rumped Thornbill																	1					
Acrocephalus australis	Australian Reed Warbler																				1		
Anas gracilis	Grey Teal						2	1															
Anas superciliosa	Pacific Black Duck																	1					
Anthus australis	Australian Pipit																			1			
Aquila audax	Wedge-tailed Eagle		1						1														
Ardea pacifica	White-necked Heron														12								
Barnardius zonarius	Australian Ringneck					2	1										1	1					
Cacomantis flabelliformis	Fan-tailed Cuckoo						1				1												
Chalcites basalis	Horsfield's Bronze Cuckoo							1		1						1	1	1	1	1			
Chenonetta jubata	Australian Wood Duck							1															
Cincloramphus cruralis	Brown Songlark									1				1		1							
Cincloramphus mathewsi	Rufous Songlark										1												
Colluricincla harmonica	Grey Shrike-thrush						1					1					1	1					
Coracina novaehollandiae	Black-faced Cuckoo-shrike							2			1												
Corvus coronoides	Australian Raven							1	1	1				1				1		1			1
Dromaius novaehollandiae	Emu								1					1									

Species	Common name	Opp1	Opp2	Opp3	Opp4	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 08	Site 09	Site 10	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 23
Eolophus roseicapilla	Galah								2														
Epthianura albifrons	White-fronted Chat								2								2		1				
Falco cenchroides	Australian Kestrel	2													1								
Gerygone fusca	Western Gerygone																1	1					
Gliciphila melanops	Tawny-crowned honeyeater								1														1
Grallina cyanoleuca	Magpie-lark							1	1	1									1				
Heteroscenes pallidus	Pallid Cuckoo									1							1						
Hirundo neoxena	Welcome Swallow						2			1													
Lalage tricolor	White-winged Triller										1												
Lichmera indistincta	Brown Honeyeater						1			1		1											
Malurus leucopterus	White-winged Fairy-wren								2							5			1	1			2
Malurus pulcherrimus	Blue-breasted Fairy-wren									2		1					1						
Malurus splendens	Splendid Fairy-wren							8										2					
Ocyphaps lophotes	Crested Pigeon																2						
Pardalotus striatus	Striated Pardalote																	1					
Petrochelidon nigricans	Tree Martin													1									
Petroica goodenovii	Red-capped Robin						1	1										1					1
Phaps chalcoptera	Common Bronzewing																					1	
Poliocephalus poliocephalus	Hoary-headed Grebe							1															
Rhipidura albiscapa	Grey Fantail									1								1					
Rhipidura leucophrys	Willie Wagtail							1			1								1				
Smicrornis brevirostris	Weebill					1												1					
Tadorna tadornoides	Australian Shelduck							1															
Threskiornis spinicollis	Straw-necked Ibis							15															

Species	Common name	Opp1	Opp2	Opp3	Opp4	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 08	Site 09	Site 10	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 23
Tribonyx ventralis	Black-tailed Native-hen							20															
Zosterops lateralis	Silvereye																	1					
Mammals																							
Austronomus australis	White-striped Free-tailed Bat					X	X	X															
Chalinolobus gouldii	Gould's Wattled Bat					X	X	X															
Chalinolobus morio	Chocolate Wattled Bat					X																	
Felis catus	Cat																1						
Macropus fuliginosus	Western Grey Kangaroo						1		1	1		1		1			1	5		1			1
Nyctophilus geoffroyi	Lesser Long-eared Bat					X	X	X															
Oryctolagus cuniculus	Rabbit						1			1													
Osphranter rufus	Red Kangaroo																					2	
Ovis aries	Sheep							1				1		1	1								
Tachyglossus aculeatus	Short-beaked Echidna			1																			
Vespadelus regulus	Southern Forest Bat					X	X	X															
Vulpes vulpes	Red Fox																1					1	
Reptiles																							
Crenadactylus ocellatus	South-western Clawless Gecko					2																	
Gehyra variegata	Variegated gehyra						1																
Moloch horridus	Thorny Devil		1																				
Suta gouldii	Gould's Hooded Snake																		1				
Tiliqua rugosa	Bobtail				2								1										
Varanus caudolineatus	Stripe-tailed Monitor																	1					

Appendix 6 Scoring system for the assessment of foraging value of vegetation for black cockatoos (Bamford 2021b)