



PHOENIX

ENVIRONMENTAL SCIENCES

Detailed terrestrial fauna survey for the Wodgina Lithium Project – mine area, airstrip, Breccia borefield and infrastructure corridor

Prepared for Mineral Resources Ltd

October 2024

Final



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EXECUTIVE SUMMARY

Mineral Resources Ltd (MinRes) operates the Wodgina Lithium Project (the Project), located approximately 90 km south of Port Hedland, Western Australia. The Project operates as the MARBL Lithium Operations Pty Ltd, a joint venture between Mineral Resources Ltd and the Albemarle Corporation. MinRes is proposing to increase future production of spodumene at its Wodgina operations, resulting in scoping and design for expansions within existing operational areas at Wodgina.

In October 2023, Phoenix Environmental Sciences Pty Ltd was commissioned by MinRes to undertake a detailed terrestrial fauna survey for the Project to support future approvals. The purpose of the survey was to document the key environmental values in respect to the terrestrial fauna assemblage in accordance with State and Commonwealth regulatory assessment requirements.

The survey was undertaken over 2 trips in autumn covering 4 study area components. The Wodgina mine area, Wodgina airstrip Breccia borefield (northern component) and Breccia borefield infrastructure corridor were surveyed from 14–27 March 2024, and the Breccia borefield (southern component) was surveyed from 17–26 May 2024. The survey scope was to conduct a single season detailed terrestrial fauna survey to collect comprehensive, qualitative data on vertebrate and short-range endemic (SRE) invertebrate fauna species, assemblages and habitats in the study area, and to confirm the presence of significant species likely to occur in the study area.

Five comprehensive terrestrial fauna surveys have been undertaken in the vicinity of the Project, including a detailed terrestrial fauna survey undertaken by Phoenix in 2023 within the Wodgina mine area, Wodgina airstrip and infrastructure corridor. This survey represents an expansion on the previously surveyed area by Phoenix, and is intended to build on the results of the previous survey, together meeting the dual-season survey compliance requirements of the Environmental Protection Authority.

Systematic sampling of terrestrial fauna was undertaken at 11 sites (including 4 previously sampled in the 2023 survey); 9 sites were sampled in March and 2 in May 2024. Avifauna surveys and active diurnal and nocturnal searches were completed at each of these sites. Planned and opportunistic sampling targeting 5 Threatened species, Northern Quoll (Endangered, EN), Pilbara Leaf-nosed Bat (Vulnerable, VU), Ghost Bat (VU), Greater Bilby (VU) and Night Parrot (EN/Critically Endangered, CR) was undertaken across the study area in habitats considered suitable for these species. Invertebrate sampling targeted SRE groups was also completed in conjunction with systematic sampling for vertebrate fauna, as well as at opportunistic sites. A total of 102 sites were sampled during the detailed survey.

The desktop review identified records of 402 vertebrate taxa within the desktop search extent. Of these, 65 are considered conservation significant, comprising 19 listed as Threatened, conservation dependent or specially protected under the *Environmental Protection of Biodiversity and Conservation Act* (EPBC Act) and/or *Biodiversity Conservation Act 2016* (BC Act), 37 avifauna species listed as Migratory under the EPBC Act and BC Act, and a further 13 species are listed as Priority by the Department of Biodiversity, Conservation and Attractions. Sixteen significant vertebrate species have previously been recorded within the study area.

The desktop review also identified records of 10 confirmed, 109 potential and 44 uncertain SRE taxa from within the SRE desktop search extent. One confirmed and 33 potential SRE taxa have previously been recorded within the study area.

A total of 7 broad fauna habitats were identified in the study area, comprising Spinifex stony plain, Spinifex sandplain, Rocky foothills, Drainage line, Rocky ridge and gorge, Stony rises, and Ironstone ridge top. A large proportion (9.6%) of the study area has been subject to disturbance, comprising infrastructure, roads, rail lines, borrow pits, current operations or waste disposal. Most of the study area is represented by 2 habitats: Spinifex stony plains (42.2%) and Rocky foothills (23.8%). The habitat

types identified and mapped in the study area broadly match with those described in previous surveys in the region are typical of the land systems present in the study area. Rocky ridge and gorge, and Ironstone ridge top are relatively restricted at both the local and regional scale. Two major channels of the Turner River intersect the study area in the Breccia borefield infrastructure corridor, and their dendritic tributaries innervate across all components of the study area, excluding the Wodgina airstrip.

The field surveys recorded a total of 155 terrestrial vertebrate species comprising 62 birds, 6 frogs, 27 mammals, and 60 reptiles. All species were expected to occur based on the desktop review except Hill's Sheath-tail-bat, for which the record at Wodgina represents a possible northerly range extension. The assemblage recorded in this survey represents 38.6% of the desktop assemblage. Species accumulation curves generated for all major fauna classes indicated the sampling across the study area was relatively complete and representative of the fauna assemblage of the study area present at the time of the survey.

When the results of this survey are considered in conjunction with the previous 2023 survey of the study area by Phoenix, a total of 177 terrestrial vertebrate species were recorded, comprising 74 birds, 7 frogs, 31 mammals and 65 reptiles, representing 43.8% of the desktop assemblage. All species were native except for 5 introduced mammals, all of which were recorded in both survey phases. The discrepancy between the desktop and survey results is primarily attributable to the reduced diversity of habitats present inside the study area.

Six Threatened and/or Priority species were recorded in the study area during the survey: Northern Quoll (VU), Ghost Bat (VU), Pilbara Leaf-nosed Bat (VU), Greater Bilby (VU), Western Pebble-mound Mouse (Priority (P) 4) and Rufous Grasswren (P4). Likelihood of occurrence assessed for the remaining significant species from the desktop review indicated that no other significant species are likely to occur; and a further 6 may possibly occur.

A total of 180 specimens representing 27 SRE invertebrate taxa were collected in the study area, of which 20 are potential SREs (including 7 new species), 3 are widespread, and 4 are of uncertain SRE status. The assemblage consists of 3 mygalomorph spiders, 3 harvestman, 5 pseudoscorpions, 8 scorpions, and 7 isopods. No confirmed SRE species were recorded within the study area during this survey, and it is unlikely any of the recorded potential SREs are restricted to the study area.

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ACRONYMS AND ABBREVIATIONS

Abbreviation / Acronym	Definition
BoM	Bureau of Meteorology
CAPAD	Collaborative Australian Protected Areas Database
CD	Conservation Dependent
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DSO	Direct Shipping Ore
EIA	Environmental impact assessments
ESA	Environmentally Sensitive Areas
GA	Genotyping Australia
IBRA	Interim Biogeographic Regionalisation of Australia
IBSA	Index of Biodiversity Surveys for Assessment
NES	National Environmental Significance
OS	Species otherwise in need of special protection
PLNB	Pilbara Leaf-nosed Bat
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
SAC	Species accumulation curve
SP	Specially protected
SRE	Short-range endemic
UCL	Unallocated Crown Land
WA	Western Australia
DPIRD	Department of Primary Industries and Regional Development
EN	Endangered
EP	Environmental Protection
EPA	Environmental Protection Authority
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
BC Act	State <i>Biodiversity Conservation Act 2016</i> (BC Act)
EP Act	State <i>Environmental Protection Act 1986</i>
LOO	Likelihood of Occurrence
NRM	Adaptive Natural Resource Management
PES	Phoenix Environmental Sciences
VU	Vulnerable
TEC	Threatened Ecological Community
P1-4	Priority species (1-4)
PIL01	Chichester IBRA subregion

1 INTRODUCTION

Mineral Resources Ltd (MinRes) operates the Wodgina Lithium Project (the Project), located approximately 90 km south of Port Hedland, Western Australia (WA; Figure 1-1). The Project operates as the MARBL Lithium Operations Pty Ltd, a joint venture between MinRes and the Albemarle Corporation. MinRes is proposing to increase future production of spodumene at its Wodgina operations. This has resulted in scoping and design for expansions within existing operational areas at Wodgina. The Project comprises a range of mining infrastructure including open pits, waste landforms, tailings storage facilities, processing and water facilities, infrastructure corridors, and mine support services.

In October 2023, Phoenix Environmental Sciences Pty Ltd (Phoenix) was commissioned by MinRes to undertake a detailed terrestrial fauna survey at Wodgina to support future approvals for the Project. The purpose of the survey was to document the key environmental values with respect to the terrestrial fauna assemblage in accordance with State and Commonwealth regulatory assessment requirements.

The Project is situated in the Shire of Port Hedland and the Eremaean Climatic Region as defined by EPA (2020).

1.1 BACKGROUND

Since its discovery in 1902 and commencement of mining in 1904, Wodgina has been mined for tin, tantalum, niobium, beryllium, iron ore, and lithium, moving through several configurations and owners as market conditions changed and exploration progressed. A range of fauna surveys have been conducted over the life of the mine, the most relevant of which are the 5 detailed (formerly referred to as level 2) surveys (Figure 5-5) discussed in section 5.1.3 and the targeted and monitoring surveys for significant fauna which are detailed in section 4.1.

Phoenix (2024a) undertook a detailed terrestrial fauna survey in spring 2023 for the Project (see section 5.1.3); most of the 2023 study area is encapsulated by the current study area (Figure 5-5). The results of this survey are presented independently of the Phoenix (2024a) spring survey but are discussed collectively in this report as together the 2023 and current survey represent a dual-phase detailed survey in accordance with Environmental Protection Authority (EPA) survey guidelines (EPA 2020).

1.2 SCOPE OF WORK

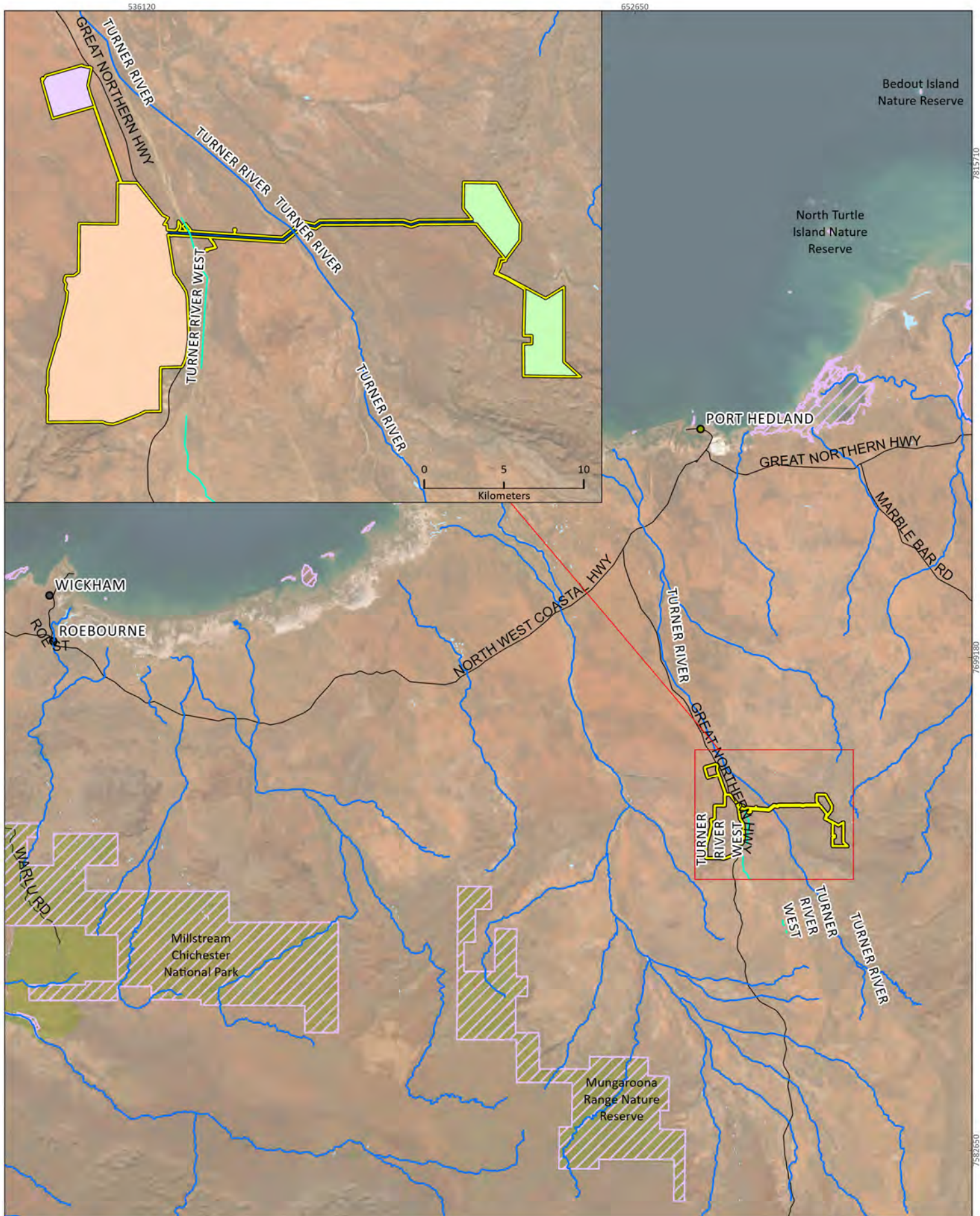
The scope of work for the detailed terrestrial fauna survey was as follows:

- preparation of a detailed plan of field sampling effort, including identification of fauna sites and field sampling methods, developed in consultation with MinRes
- conduct a single season detailed terrestrial fauna survey
 - to collect comprehensive, qualitative data on vertebrate and short-range endemic (SRE) invertebrate fauna species, assemblages and habitats in the study area
 - to confirm the presence of significant species likely to occur in the study area
- preparation of a technical report that is suitable for inclusion in regulatory approval applications.

1.3 STUDY AREA

The study area is made up of 4 components extending approximately 23 km in a north-south orientation and 35 km east-west, covering a total area of 13,138.6 ha:

- Wodgina mine area – areas subject to and surrounding existing operations at the Wodgina mine
- Wodgina airstrip – an area surrounding the existing airstrip to the north of the mine, including the access road to the airstrip
- Breccia borefield – a southern and northern component located east of the Wodgina mine.
- Infrastructure corridor – an east-west infrastructure corridor connecting the mine area and the Breccia borefield, which intersects 2 major channels of the Turner River (Figure 1-1).



Mineral Resources Limited Wodgina Lithium Project

Project No 1630
Date 16/10/2024
Drawn by JL
Map author WP



0 20 40
Kilometers

1:1,154,300 (at A4) GDA 1994 MGA Zone 50

- Study area
- Wodgina airstrip
- Breccia borefield
- Wodgina mine area
- Infrastructure corridor
- Lakes
- DBCA managed land
- 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 VU, EN or CR.

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

- Japan-Australia Migratory Bird Agreement
- 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).

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 future²
- Endangered (EN) – species facing a very high risk of extinction in the wild in the near future²

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

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

- Vulnerable (VU) – species facing a high risk of extinction in the wild in the medium-term future².

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 an adequate understanding of threat levels imposed on them. Species on the Priority fauna list are assigned to one of 4 Priority (P) categories, P1 – P4 , 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 Threatened Ecological Community (TEC) and its listing is otherwise in accordance with the ministerial guidelines.

2.2.3 Other significant fauna

Under the EPA's environmental factor guidelines (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 fauna are defined as animals that display restricted geographic distributions, nominally less than 10,000 km², 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 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 2 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, e.g. 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.

2.2.5 Environmentally Sensitive Areas

Under section 51B of the EP Act, the Minister for Environment may declare by notice either a specified area of the State or a class of areas of the State to be Environmentally Sensitive Areas (ESAs). ESAs are declared in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*, which was gazetted on 8 April 2005 (Government of Western Australia 2005).

ESAs are areas where the vegetation has high conservation value. Several types of areas are declared ESAs including:

- the area covered by vegetation within 50 metres (m) of Threatened flora, to the extent to which the vegetation is continuous with the vegetation in which the Threatened flora is located
- the area covered by a TEC
- a defined wetland (Ramsar wetlands, conservation category wetlands and nationally important wetlands) and the area within 50 m of the wetland
- Bush Forever sites.

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 located in the Chichester subregion (PIL01) of the Pilbara bioregion (Figure 3-1) which is characterised as (Kendrick & McKenzie 2001):

"the northern section of the Pilbara Craton. Undulating Archaean granite and basalt plains include significant areas of basaltic ranges. Plains support a shrub steppe characterised by Acacia inaequilatera over Triodia wiseana (formerly Triodia pungens) hummock grasslands, while Eucalyptus leucophloia tree steppes occur on ranges. Drainage occurs to the north via numerous rivers (e.g. De Grey, Oakover, Nullagine, Shaw, Yule, Sherlock)".

3.2 LAND SYSTEMS AND SURFACE GEOLOGY

The Department of Regional Industries and Regional Development (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 9 land systems (Table 3-1; Figure 3-2).

Table 3-1 Land systems and extent in the study area

Land system	Description	Area (ha)	% of the study area
Capricorn System	Rugged sandstone hills, ridges, stony footslopes and interfluvies supporting low acacia shrublands or hard spinifex grasslands with scattered shrubs.	4,966.5	37.8
Boolgeeda System	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.	2,152.1	16.4
Platform System	Dissected slopes and raised plains supporting shrubby hard spinifex grasslands.	1,828.2	13.9
Uaroo System	Broad sandy plains, pebbly plains and drainage tracts supporting hard and soft spinifex hummock grasslands with scattered acacia shrubs.	1,541.3	11.7
Macroy System	Stony plains and occasional tor fields based on granite supporting hard and soft spinifex shrubby grasslands.	1,381.4	10.5
Talga System	Hills and ridges of greenstone and chert and stony plains supporting hard and soft spinifex grasslands.	734.5	5.6
Rocklea System	Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs.	464.3	3.5
River System	Narrow, seasonally active flood plains and major river channels supporting moderately close, tall shrublands or woodlands of acacias and fringing communities of eucalypts sometimes with tussock grasses or spinifex.	69.5	0.5
Robe System	Low plateaux, mesas and buttes of limonite supporting soft spinifex and occasionally hard spinifex grasslands.	0.8	<0.1

Land system	Description	Area (ha)	% of the study area
Total		13,138.6	100.0

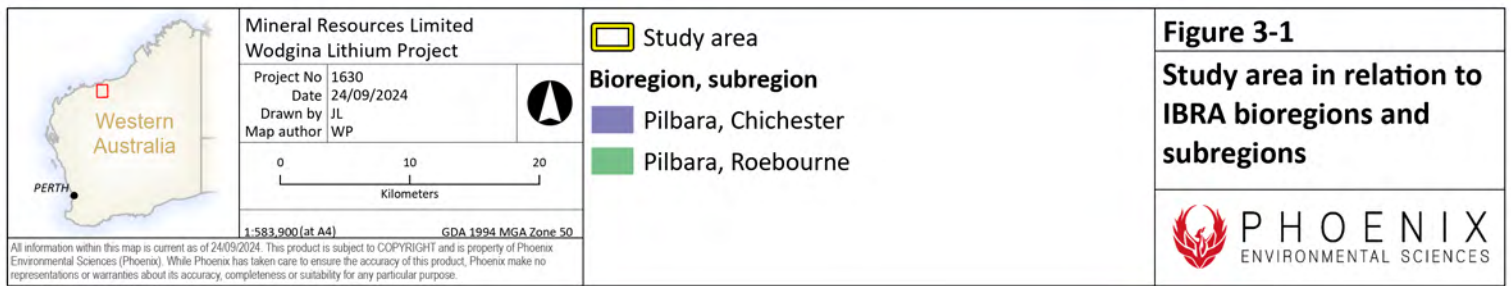
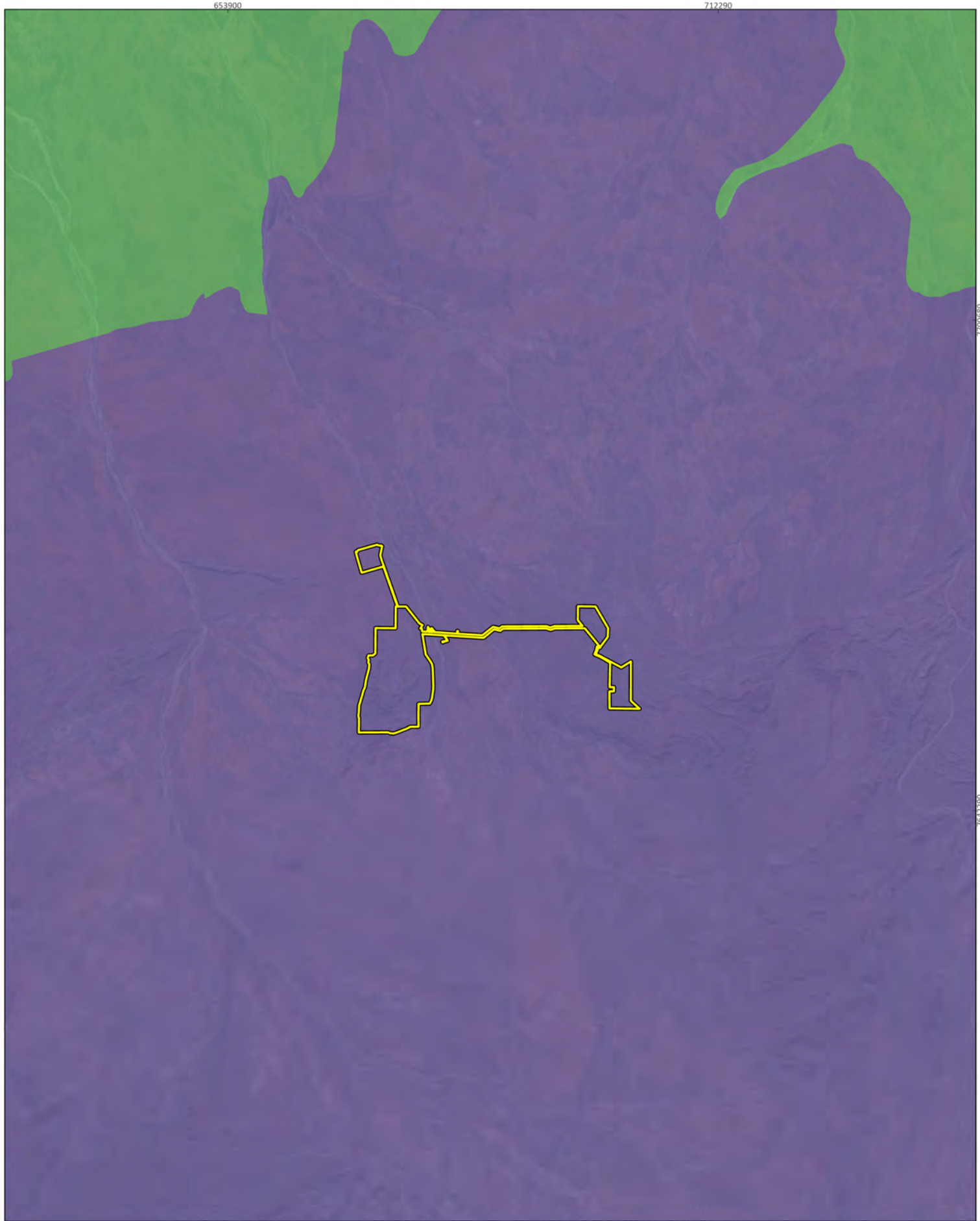
According to the Surface Geology of Australia 1:1,000,000 scale, WA database (Stewart *et al.* 2008), the study area intersects 14 geological formations (Table 3-2; Figure 3-3).

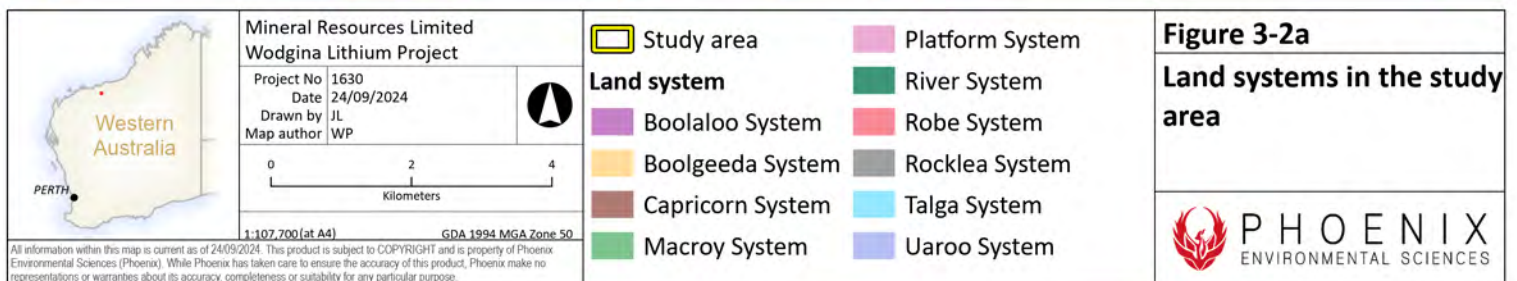
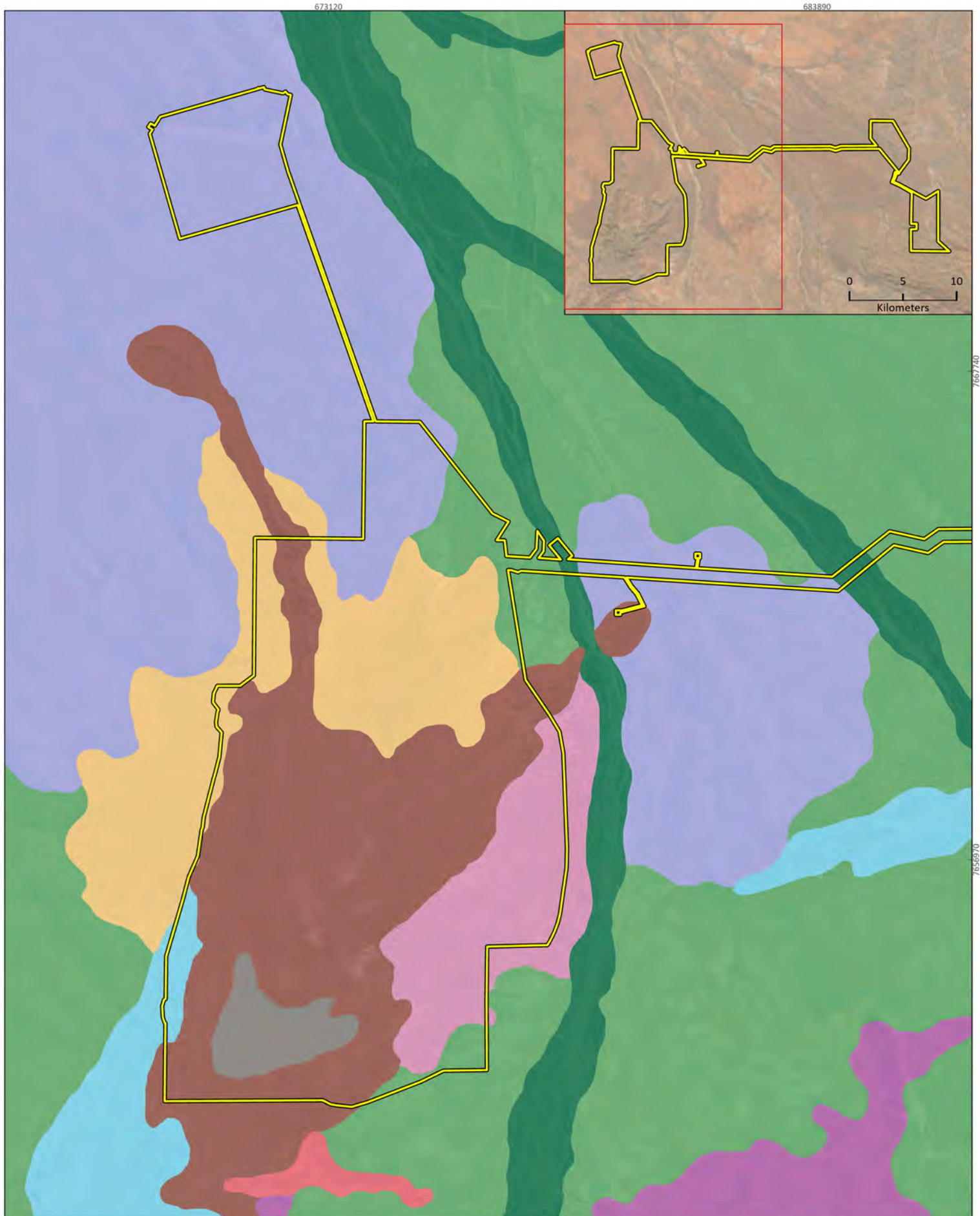
Table 3-2 Surface geology of the study area, extent by deposit type

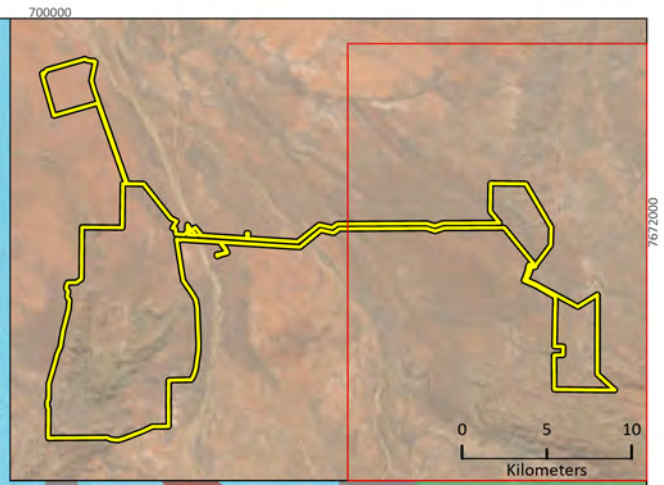
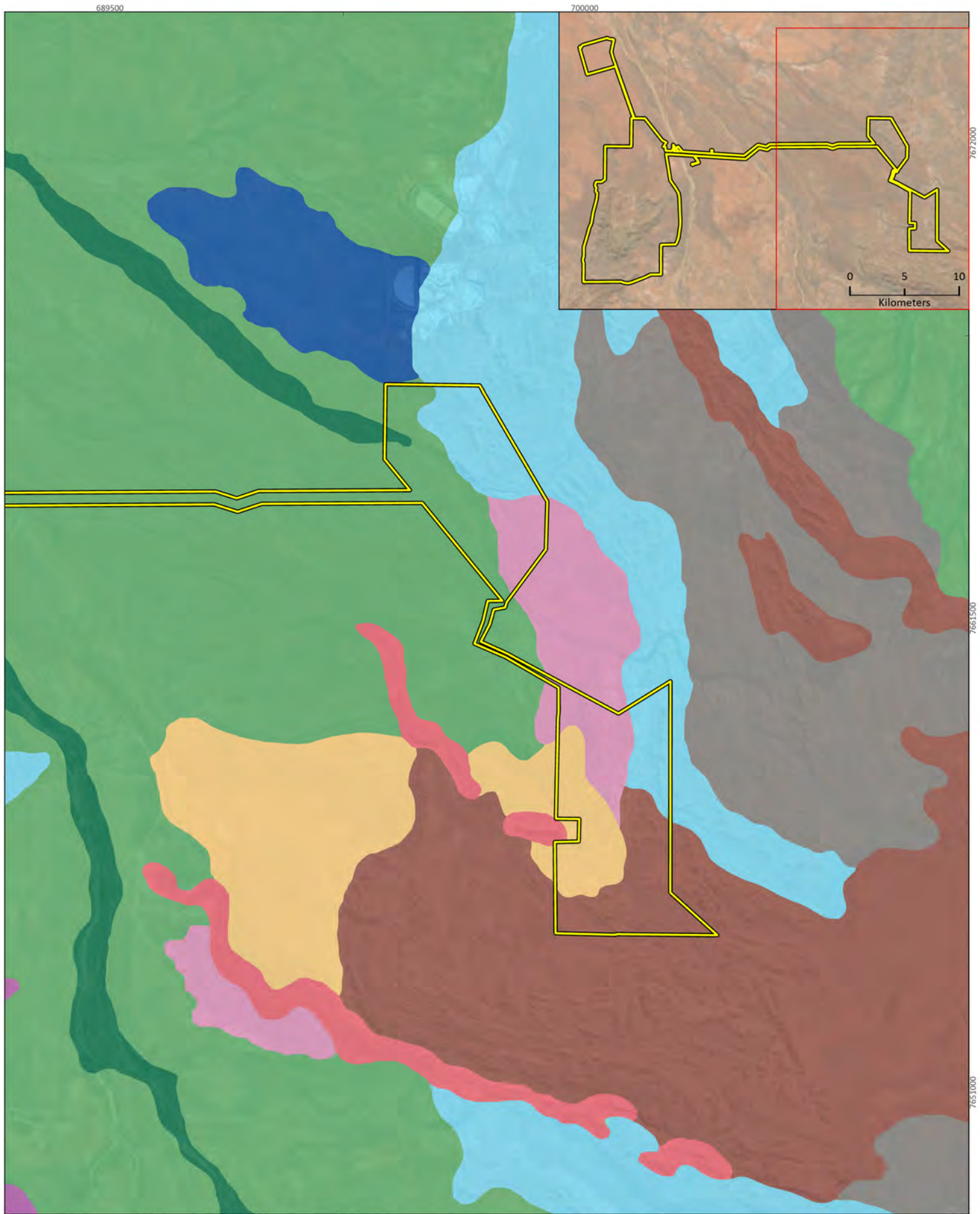
Surface geology	Abv.	Description	Area (ha)	% of the study area
Gorge Creek Group	Acg	Chert, ferruginous chert, banded iron formation, jaspilite; minor siltstone, shale, sandstone, pebbly sandstone, quartzite, polymictic conglomerate, felsic volcaniclastic rock, basalt, ultramafic schist, mafic schist.	2,839.6	21.6
Alluvium 74331	Cza	Reworked or incised sandy alluvium in older stream channels; lateritised alluvium; alluvial terraces above younger alluvium; alluvial and colluvial outwash deposits not in defined channel systems; sand, silt, gravel, clay, evaporites.	2,272.6	17.3
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.	2,227.3	17.0
Sulphur Springs Group	Awu	Felsic to mafic volcanics and volcaniclastic rocks, chert, volcaniclastic sandstone, greywacke, shale, basalt, komatiitic basalt, amphibolite, mafic and ultramafic schist, banded iron formation, quartz-carbonate rock, siltstone.	2,062.4	15.7
Alluvium 38485	Qa	Channel and flood plain alluvium; gravel, sand, silt, clay, locally calcreted.	1,188.1	9.0
Soanesville Group	Awo	Conglomerate, arkosic sandstone, greywacke, lithic arenite, banded iron formation, shale, silicified shale (chert), sandstone, siltstone, quartzite, schist, basalt, mudstone, dacite, tuff, quartz-sericite schist; mafic schist.	766.8	5.8
Numbana Monzogranite	Agm	Porphyritic to equigranular muscovite-biotite monzogranite, leucogranite; weakly foliated to massive; contains xenoliths and rafts of greenstone, granodiorite and other granitoids.	736.8	5.6
Pilbara Supergroup - ultramafic rocks	Aup	Undivided ultramafic rocks, komatiite, pyroxenite, peridotite, local mafic lava, quartzite, and chert; metamorphosed.	397.7	3.0
Sisters Supersuite	Agi	Undifferentiated granitoid intrusions of the Sisters Supersuite; leucogranite (locally schlieric or pegmatitic), monzogranite, granodiorite, tonalite, diorite, tonalitic orthogneiss, rhyolite dykes, pegmatite; interleaved in places.	323.3	2.5
Dalton Suite	Adda	Gabbro, dolerite, dunite, peridotite, serpentine-chlorite schist, serpentinite, metaleucogabbro, metapyroxenite, ultramafic schist; metamorphosed.	221.8	1.7

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
Prepared for Mineral Resources Ltd

Surface geology	Abv.	Description	Area (ha)	% of the study area
Pincunah Monzogranite	Agii	quartz(-feldspar)-phyric hornblende-biotite monzogranite with foliation and phenocryst alignment.	38.5	0.3
Kelly Group - amphibolite	Atk	Amphibolite, mafic schist.	29.2	0.2
Euro Basalt	Abke	Basalt, chert, dolerite, komatiitic basalt, komatiite, amphibolite, basaltic fragmental rock, gabbro, ultramafic to mafic schist, carbonate rock, felsic tuff, shale, sandstone, quartzite, metapyroxenite, serpentinite.	18.2	0.1
Calcrete 38497	Czk	Pisolitic, nodular or massive calcrete; ferruginous inclusions; calcareous cementing of bedrock and transported materials; locally with intercalated chalcedony; as low mounds, in playa lakes, or as valley calcrete; locally dissected and karstified.	16.3	0.1
Total			13,138.6	100.0







Mineral Resources Limited Wodgina Lithium Project

Project No 1630
Date 24/09/2024
Drawn by JL
Map author WP



0 2 4
Kilometers
1:107,700 (at A4) GDA 1994 MGA Zone 50

All information within this map is current as of 24/09/2024. This product is subject to COPYRIGHT and is property of Phoenix Environmental Sciences (Phoenix). While Phoenix has taken care to ensure the accuracy of this product, Phoenix make no representations or warranties about its accuracy, completeness or suitability for any particular purpose.

Study area

Land system

Black System

Boolaloo System

Boolgeeda System

Capricorn System

Macroy System

Platform System

River System

Robe System

Rocklea System

Satirist System

Talga System

Figure 3-2b

Land systems in the study area



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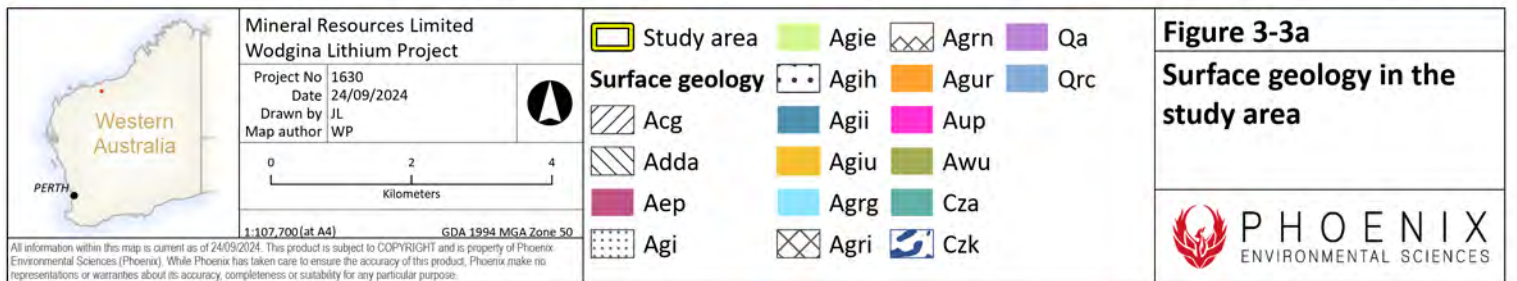
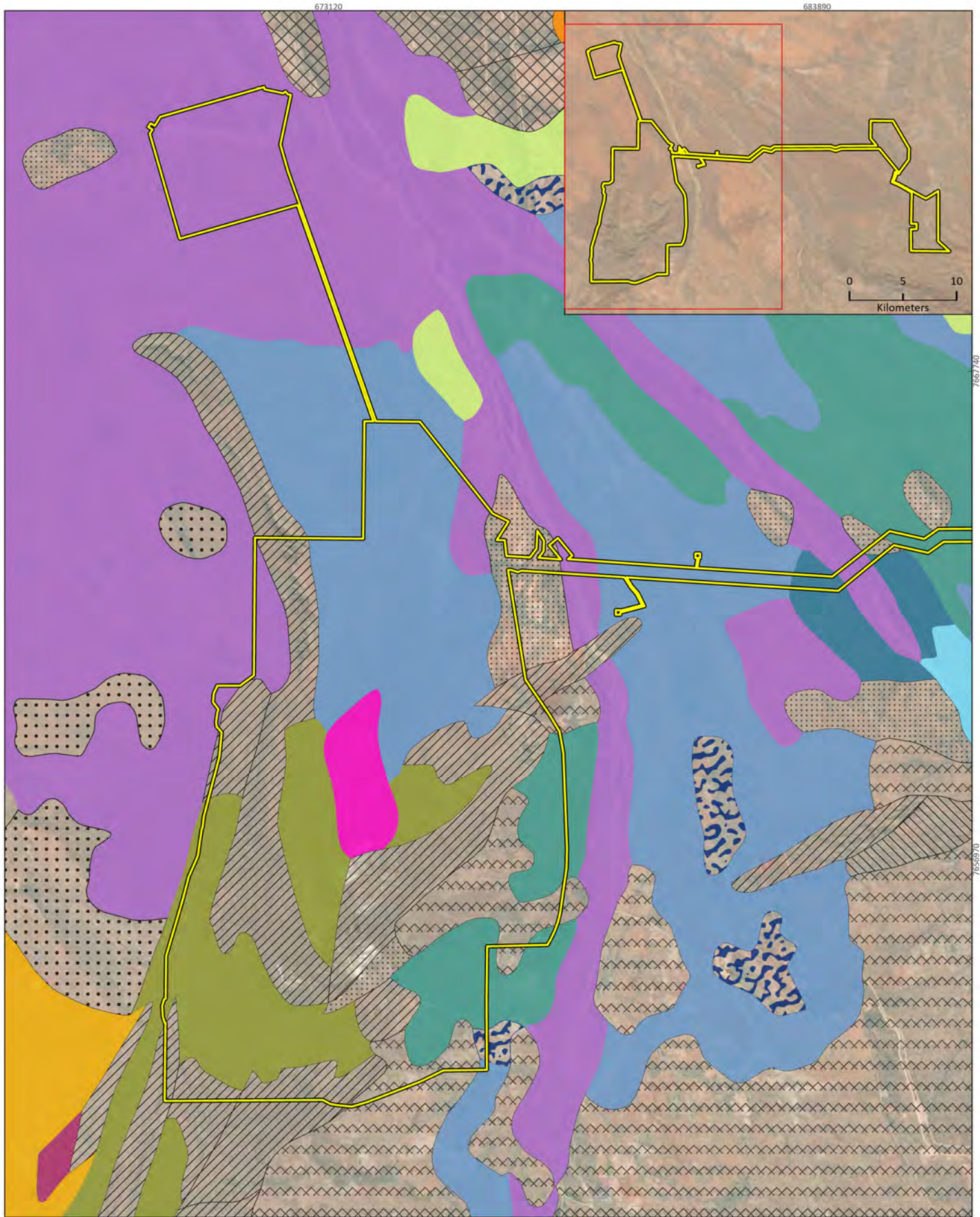


Figure 3-3a
Surface geology in the study area

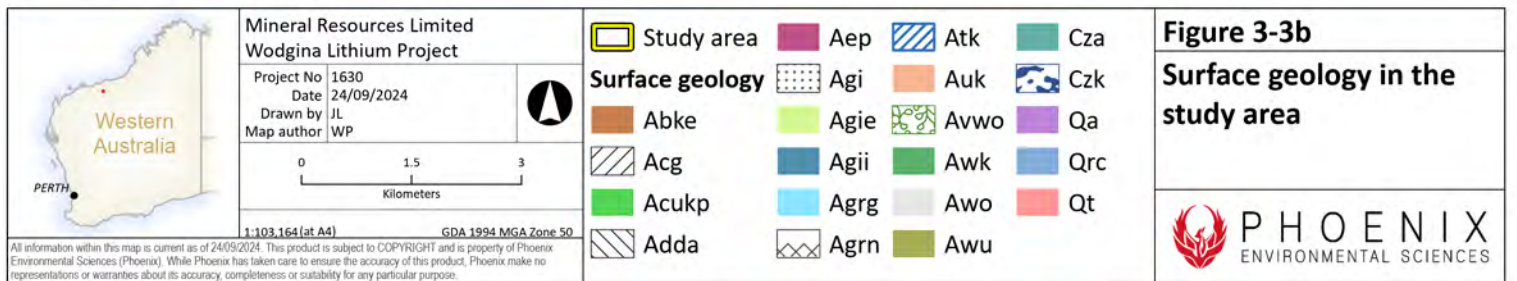
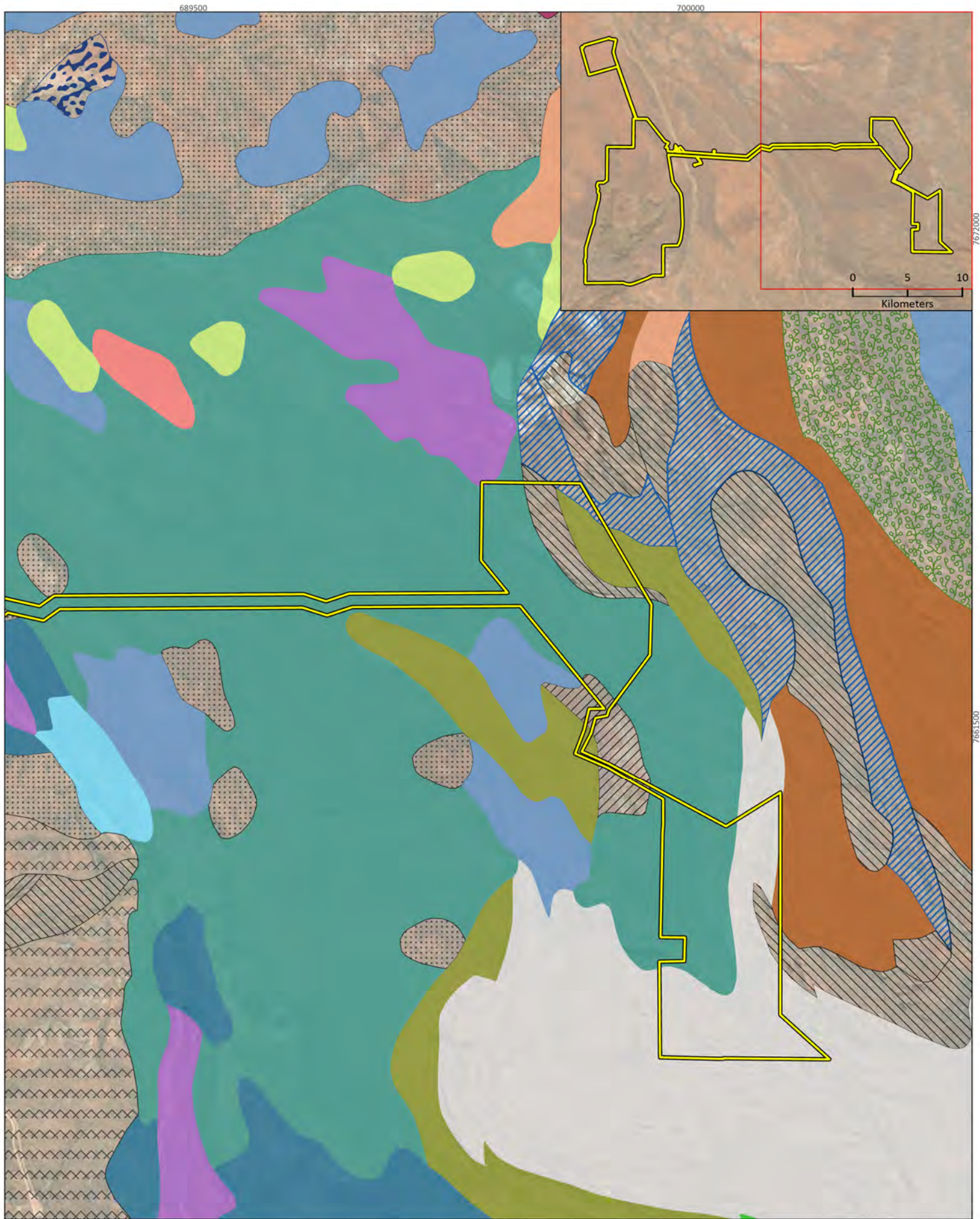


Figure 3-3b

Surface geology in the study area

3.3 CLIMATE AND WEATHER

The climate of the Chichester subregion is described as semi-desert-tropical (Kendrick & McKenzie 2001). The nearest Bureau of Meteorology (BoM) weather station with comprehensive data collection and recent historic climate data is Marble Bar (no. 004106, Latitude: 21.18°S Longitude 119.75°E), located 117 km east of the study area.

Marble Bar records the highest mean maximum monthly temperature (42.1°C) in December (lowest in June, 27.1°C) and the lowest minimum mean monthly temperature (12.1°C) in July (highest in January, 26.5°C). Median annual rainfall is 404.8 mm with January and February recording the highest monthly medians (64.2 and 49.8 mm respectively, Figure 3-4). Cyclonic activity is significant with several systems affecting the coast and hinterland annually (Kendrick & McKenzie 2001).

Daily mean maximum temperatures at Marble Bar in the 12 months preceding the survey were on average slightly warmer than the long-term averages, whereas the mean minimum temperatures more closely reflected the long-term average (Figure 3-4). The total rainfall over the wet season (November 2023 to April 2024) was 74.1 mm higher than the long-term median of 176.7 mm (Figure 3-4).

3.3.1 Survey trip 1 (13 – 27 March 2024)

In the 3 months preceding the first survey (December 2023 to February 2024), the mean maximum temperatures were on average 2.8°C warmer than typical with all months recording a minimum of 1.5°C above the long-term average, and the mean minimum temperature was on average 0.8°C warmer, notably with February showing an increase of 2.1°C compared to the long-term average. Rainfall in the 3 months preceding the first survey period was 49.0 mm (38.6%) lower than the long-term median of 127.0 mm; however, well above average rain fell in the first half of March 2024, with 132.6 mm recorded between 2 and 11 March, just prior to the survey.

Temperatures during the first survey were consistent with the long-term averages with the mean maximum temperature ranging between 32.6 and 39.4°C, and the mean minimum temperature between 21.7°C and 27.9°C (Appendix 7). A total of 38.4 mm of rainfall was recorded at Marble Bar during the survey; while the BoM station records are unlikely to accurately reflect the local precipitation in the study area, several rainfall events were observed throughout the first survey.

3.3.2 Survey trip 2 (17 – 26 May 2024)

In the 3 months preceding the second survey (February to May 2024), the mean maximum temperatures were on average 0.7°C warmer than typical with February recording an average of 4.4°C warmer and March and February recording 1°C and 1.2°C cooler, respectively. The mean minimum temperature was on average 0.6°C warmer, notably with February showing an increase of 2.1°C, March a 0.2°C increase and April a 0.6°C decrease compared to the long-term average. A substantially higher amount of rainfall was recorded in the 3 months preceding the survey (211.8 mm) compared to the long-term median (92.7 mm), most of this (171.0 mm) falling in March.

Temperatures during the second survey were consistent with the long-term averages with the mean maximum temperature ranging between 28.3 and 33.7°C, and the mean minimum temperature between 11.3°C and 18.9°C (not including data from 17-20 May; Appendix 7). The Marble Bar weather station did not record rainfall from 17-21 May, however, records from Marble Bar are unlikely to accurately reflect the local precipitation in the study area at the time of the survey; no rainfall was observed throughout the second survey.

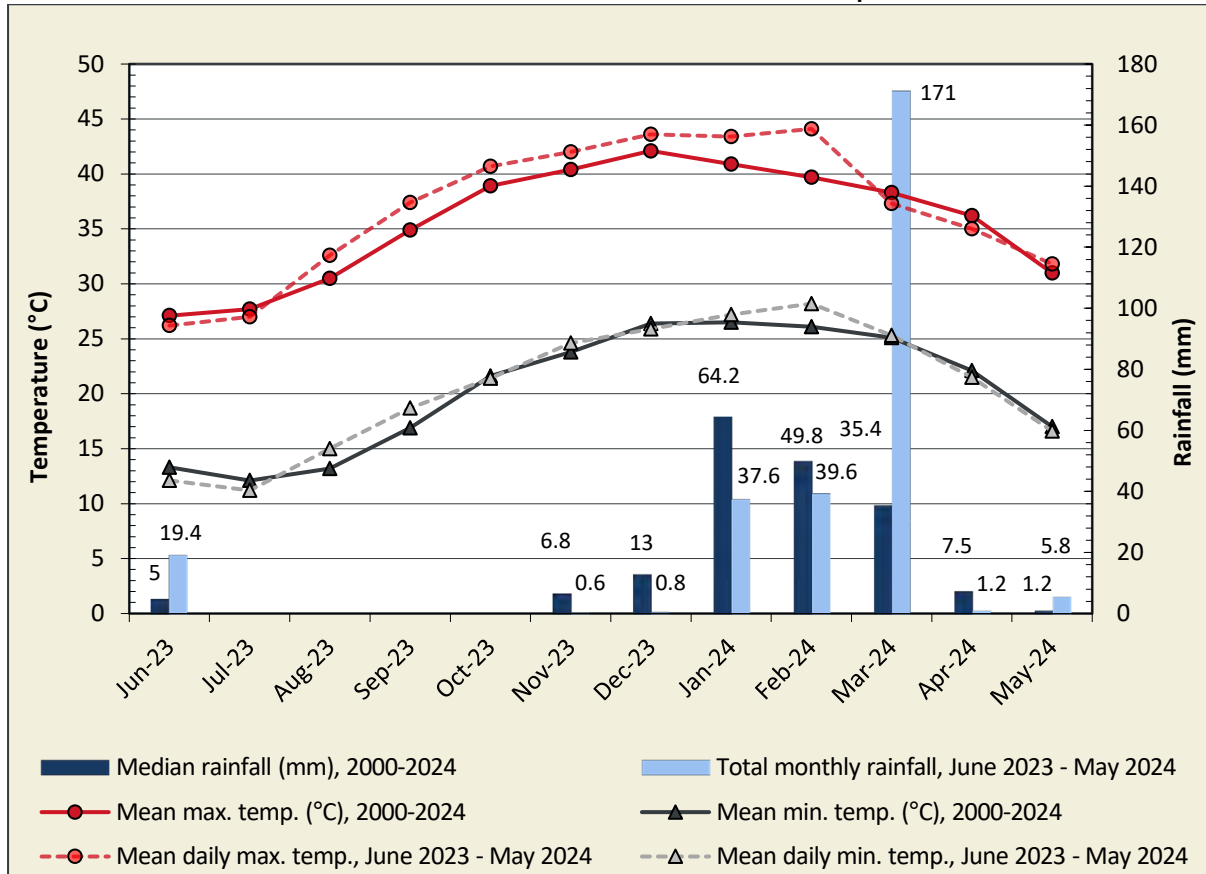


Figure 3-4 Annual climate and weather data for Marble Bar (no. 004106) and mean monthly data for the 12 months preceding the survey (BoM 2024)

3.4 LAND USE

The dominant land use for the PIL01 subregion is grazing of native pastures, Aboriginal lands and Reserves, Unallocated Crown Land (UCL) and Crown Reserves, conservation and mining leases (Kendrick & McKenzie 2001). A summary of land use within the desktop search extent of PIL01, extracted from the Collaborative Australian Protected Areas Database (CAPAD) (DoE 2016a), is provided in Table 3-3; contemporary values may differ marginally from those provided. According to CAPAD, land use within the 40 km desktop search extent is predominately production from relatively natural environments (60.0%) and conservation and natural environments (37.1%), however, the entirety of the latter is subject to unspecified other minimal uses which does not have any formal environmental protection.

According to CAPAD, land use of the study area comprises production from relatively natural environments (79.9%), and conservation and natural environments (19.1%), all of which are subject to unspecified other minimal uses. The study area is located within Kangan Station, a long-running cattle station that is currently stocked. Since its discovery in 1902 and commencement of mining in 1904, Wodgina has been mined for tin, tantalum, niobium, beryllium, iron ore, and lithium, moving through several configurations and owners as market conditions changed and exploration progressed.

Table 3-3 Land use and extent

Land use	Study area		Desktop search extent (40 km)	
	Area (ha)	Area (%)	Area (ha)	Area (%)
Conservation and natural environments	2,513.3	19.1	350,297.1	37.1
Production from relatively natural environments	10,502.1	79.9	566,642.6	60.0
Production from dryland agriculture and plantations			63.0	<0.1
Intensive uses	87.8	0.7	617.5	0.1
Water	35.4	0.3	27,478.7	2.9
Total	13,138.6	100.0	945,098.8	100.0

3.5 CONSERVATION RESERVES AND ESAs

The study area and 40 km desktop search extent do not intersect any conservation reserves or DBCA lands of interest proposed for conservation (DBCA 2022a, b). No ESAs were identified within the 40 km desktop search extent (DWER 2023), however Threatened flora (such as *Quoya zonalis*) has been reported within this desktop search extent (no coordinates available). The nearest conservation reserve is Mungaroona Range Nature Reserve, located approximately 51 km southwest of the study area (Figure 11).

4 METHODS

The detailed 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: Sampling of SRE invertebrate fauna* (EPA 2016b)
- *EPA Technical Guidance: Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020)
- A review of Ghost Bat ecology, threats, and survey requirements (Bat Call WA 2021a)
- A review of Pilbara Leaf-nosed Bat ecology, threats, and survey requirements (Bat Call WA 2021b)
- EPBC Act referral guideline for the endangered Northern Quoll *Dasyurus hallucatus* (DoE 2016b)
- Guideline for the survey and relocation of Bilby in WA (DBCA 2018)
- Interim, guideline for preliminary survey of Night Parrot (*Pezoporus occidentalis*) in WA (DPaW 2017)
- Survey guidelines for Australia's threatened bats (DEWHA 2010)
- Survey guidelines for Australia's threatened birds (DSEWPaC 2010)
- Survey guidelines for Australia's threatened mammals (DSEWPaC 2011c)
- Survey guidelines for Australia's threatened reptiles (DSEWPaC 2011d).

4.1 DESKTOP REVIEW

Searches of several biological databases were undertaken to identify and prepare lists of conservation significant fauna that may occur within the study area (Table 4-1). Database searches that returned species accounts that occur notably outside of the species known range (extralimital) without sufficient supporting evidence were disregarded from the search results, excluding species of conservation significance. Records of species only identified to genus (i.e. *Genus* sp.), returned in database search results were disregarded unless they represented the only record of the genus.

A literature search was conducted for accessible reports for biological surveys conducted within 40 km of the study area (the desktop search extent) to build on the lists developed from the database searches (Table 4-2). The unpublished results of the Phoenix spring 2023 spring detailed terrestrial fauna survey (Phoenix 2024a) are presented to provide a more comprehensive and contemporary overview of the regional vertebrate and SRE assemblage.

Table 4-1 Database searches conducted for the desktop review

Database	Target group/s	Search coordinates and extent
Protected Matters Search Tool (DCCEE 2024a)	EPBC Act Threatened fauna	Study area plus a 40 km buffer
DBC Threatened and Priority Fauna Database (DBC 2023b)	Threatened and Priority fauna	Study area plus a 40 km buffer
Dandjoo Biodiversity Data Repository (DBC 2023a) (Formerly Nature Map)	Fauna records	Study area plus a 40 km buffer
WA Museum Arachnid and Myriapod Database, Mollusca Database (WAM 2023)	Arachnid, myriapod and mollusc SREs	100 km ² search area encompassing the study area between -20.4°S, 117.9°E (northwest corner) and -21.83°S, 119.64°E (southeast corner)
Index of Biodiversity Surveys for Assessment (IBSA) database (IBSA 2024) for nearby survey reports and data	Fauna survey records and data	Study area plus a 40 km buffer

Table 4-2 Survey reports included in the desktop review

Report author	Survey description	Project
360 Environmental (2018)	Targeted significant fauna survey – gas pipeline	Wodgina Gas Pipeline Project
Bamford (2008)	Fauna assessment - tailings storage facility 3	Wodgina Tantalum Mine
Biologic (2018a); (MWH 2014a, 2015a, 2016a); Outback Ecology (2010b, 2011a, 2012d, 2013b); Stantec (2017a)	Annual Northern Quoll monitoring surveys	Wodgina Direct Shipping Ore (DSO) Project
Biologic (2018b); MWH (2014b, 2015b, 2016b, 2017); Outback Ecology (2011b, 2012c, 2013a); Stantec (2017b)	Annual Pilbara Leaf-nosed Bat and Ghost Bat monitoring surveys	Wodgina DSO Project
Mattiske Consulting Pty Ltd (2000)	Flora, vegetation and vertebrate fauna survey (Wodgina expansion)	Wodgina Mine
Outback Ecology (2009)	Detailed (level 2) terrestrial vertebrate fauna survey	Wodgina DSO Project
Outback Ecology (2010a)	Detailed terrestrial vertebrate survey (baseline)	Turner River Hub Project
Outback Ecology (2010c)	Targeted terrestrial snail survey	Wodgina DSO Project
Outback Ecology (2012a)	Targeted significant bat survey	Hercules Project
Outback Ecology (2012b)	Detailed vertebrate fauna survey (baseline)	Hercules Project
Phoenix (2024a)	Detailed terrestrial fauna survey	Wodgina Lithium Project
Rapallo (2017)	Terrestrial fauna desktop and gap analysis	
Stantec (2018a)	Targeted significant bat survey	
Stantec (2018c)	Basic (level 1) and targeted significant fauna survey	
Stantec (2022a)	Targeted significant fauna survey	
Western Wildlife (2020)	Detailed (level 2) vertebrate fauna survey	

4.2 FIELD SURVEY

4.2.1 Survey timing

Field survey dates are provided in Table 4-3.

Table 4-3 Survey dates

Survey type	Season	Dates
Detailed terrestrial fauna survey, trip 1	Autumn	14 – 27 March 2024
Detailed terrestrial fauna survey, trip 2	Autumn	17 – 26 May 2024

4.2.2 Field methods

Field methods for the detailed fauna survey of the study area included:

- habitat assessment (see 4.2.2.1)
- systematic trapping (4.2.2.2)
- active diurnal and nocturnal searches (4.2.2.3)
- avifauna surveys (4.2.2.4)
- bat echolocation recordings (4.2.2.5)
- camera trapping (4.2.2.6)
- targeted survey for Northern Quoll (*Dasyurus hallucatus*, VU) (4.2.2.7)
- targeted survey for Greater Bilby (*Macrotis lagotis*, VU) (4.2.2.8)
- targeted survey for Ghost Bat (*Macroderma gigas*, VU) and Pilbara Leaf-nosed Bat (*Rhinonictis aurantia* (Pilbara); VU) (4.2.2.9)
- targeted survey for Night Parrot (*Pezoporus occidentalis*, CR) (4.2.2.10)
- targeted survey for other significant fauna and associated habitats (4.2.2.11)
- SRE invertebrate sampling (4.2.2.12)

A total of 102 survey sites were sampled, including 11 detailed sites (Figure 4-1; Appendix 1).

4.2.2.1 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 conservation significant terrestrial fauna species were identified based on known habitats of such species within the Pilbara 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. Some systematic sites sampled in the Phoenix (2024a) detailed survey were re-sampled in this survey.

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 (Figure 4-1; Table 4-4).

Fauna habitat mapping of the study area used previous mapping from Stantec (2018b), Western Wildlife (2020) and Phoenix (2024a), in combination with field survey site data and aerial imagery to expand mapping to the current study area. The fauna habitat mapping of the study area which intersects previously mapped areas has been refined to accurately depict the habitats present and their extent, and to contemporise the disturbance footprint of the mine.

Table 4-4 Terrestrial fauna survey effort

Site/s	Site type	Habitat assessment	Diurnal vertebrate searches (hours)	Nocturnal vertebrate searches (hours)	Birding (hours)	Bucket (trap nights)	Pipe (trap nights)	Funnel (trap nights)	Aluminium box (trap nights)	Camera (trap nights)	Ultrasonic recording (nights)	Audio recording (nights)	Bilby plot (#)	1 L dry pitfall (trap nights)	SRE foraging (hours)	Litter sieves (#)
WLP001	FS	1	2.0	2.0	1.3	35	35	140	70		4 (1)			35	2.0	
WLP002	FS	1	2.0	1.0	1.7	35	35	140			4 (1)				2.0	
WLP003	FS	1	1.5	3.0	1.7	35	35	140	70	16 (4)	4 (1)			35	1.5	
WLP004	FS	1	1.0	1.5	1.0	10	10	182	70		4 (1)				1.0	2
WLP005	FS	1	1.0	2.3	2.3	35	35	140	70	12 (3)	4 (1)				1.0	
WLP006	FS	1	1.0	2.0	2.3	35	35	140	70		4 (1)			35	1.0	3
WLP007	FS	1	1.0	2.0	2.0	35	35	140	70		4 (1)			35	1.0	3
WLP008	FS	1	1.5	3.0	2.7	35	35	140	70	10 (2)	4 (1)			35	1.5	3
WLP009	FS	1	1.0	2.3	2.0	35	35	140			4 (1)				1.0	
WLP010	FS	1	2.0	2.0	3.0	35	35	140	70	15 (3)	4 (1)	6			2.0	3
WLP011	FS	1	2.8	2.0	2.3	35	35	140	70		4 (1)	6			2.3	3
WLP012	FS	1										6				
WLP013	FS	1								16 (4)	4 (1)					
WLP014	FS	1								8 (2)	3 (1)					3
WLP015	FS	1								16 (4)	4 (1)					
WLP016	FS											3				
WLP017	FS	1								16 (4)	4 (1)					

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
Prepared for Mineral Resources Ltd

Site/s	Site type	Habitat assessment	Diurnal vertebrate searches (hours)	Nocturnal vertebrate searches (hours)	Birding (hours)	Bucket (trap nights)	Pipe (trap nights)	Funnel (trap nights)	Aluminium box (trap nights)	Camera (trap nights)	Ultrasonic recording (nights)	Audio recording (nights)	Bilby plot (#)	1 L dry pitfall (trap nights)	SRE foraging (hours)	Litter sieves (#)
WLP018	FS	1										6				
WLP019	FS	1								16 (4)						
WLP020	FS	1			0.3					4 (1)						
WLP021	FS	1								4 (1)						
WLP022	FS	1			2.7							6				
WLP023	FS	1								8 (2)	4 (1)					
WLP024	FS	1	1.0		0.7					10 (2)					1.0	
WLP025	FS	1	1.0		1.0					10 (2)	5 (1)				1.0	
WLP026	FS	1	2.0		0.8					15 (3)	3 (1)	3			2.0	3
WLP027	FS	1	1.0		0.7										1.0	
WLP028	FS	1	1.0												1.0	
WLP029	FS	1	1.5							12 (3)	4 (1)				2.0	5
WLP030	FS	1								32 (8)						
WLP031	FS	1								4 (1)						
WLP032	FS	1			1.8					4 (1)	4 (1)					
WLP033	FS	1			0.3					4 (1)						
WLP034	FS	1													0.5	
WLP035	FS	1									4 (1)					

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
Prepared for Mineral Resources Ltd

Site/s	Site type	Habitat assessment	Diurnal vertebrate searches (hours)	Nocturnal vertebrate searches (hours)	Birding (hours)	Bucket (trap nights)	Pipe (trap nights)	Funnel (trap nights)	Aluminium box (trap nights)	Camera (trap nights)	Ultrasonic recording (nights)	Audio recording (nights)	Bilby plot (#)	1 L dry pitfall (trap nights)	SRE foraging (hours)	Litter sieves (#)
WLP036 – WLP059	FS	24														
BP01 – BP22	FS	21	1.3										22			
Opp01 – Opp21			1.0		0.5											
Total		79	26.6	23.1	31.1	360	360	1,582	630	236 (55)	83 (21)	36	22	175	25.1	28

Systematic trapping sites are highlighted in grey; WLP001-WLP009 were sampled in trip one, and WLP010-WLP011 in trip 2 (see section 14.2.1).

Values in parentheses indicate the number of devices deployed to achieve the cumulative survey effort.

FS = Fauna site; TFS = Targeted fauna site.

4.2.2.2 Systematic trapping

Eleven systematic trapping sites were established to capture terrestrial mammals, reptiles and amphibians (including 4 sites previously sampled in the spring 2023 detailed survey; Figure 4-1). Each site comprised 5 'sub-sites' which consisted of a PVC pipe (15 cm diameter x 60 cm depth), a 20 L bucket, 4 funnel traps (75 cm x 18 cm x 18 cm) and 2 aluminium box traps (9 cm x 10 cm x 33 cm). The pipes and buckets were installed flush with the substrate, with a 10 m long, 30 cm high aluminium drift fence bisecting each pit. Funnel traps were positioned at the start and finish of each drift fence, and one on either side of the drift fence in the centre between pitfall traps. Aluminium box traps were placed in vegetation adjacent to the trap lines. Sub-sites were positioned approximately 20 m apart along a 100 m transect.

The aluminium box traps were baited with a universal bait mixture consisting of oats, peanut butter and sardines to attract small mammals. Aluminium box and funnel traps were shrouded with reflective closed cell insulation (R2.5 rated) to provide shade and protection for any captured animals. All traps were given as much shade as possible under/around vegetation. Styrofoam trays and leaf litter were placed in the bottom of all buckets to provide protection from the elements.

Traps were open for 7 consecutive nights and checked within 3 hours of sunrise. The total vertebrate trapping effort for the 11 systematic trapping sites during the surveys was 2,932 trap nights (Table 4-4) where a trap-night is defined as one trap remaining open for one night.

No aluminium box traps were deployed at systematic sites WLP002 and WLP009 due to the lack of adequate shade and protection for trapped animals. Pit traps were supplemented for additional funnel traps at site WLP004 due to the lack of suitable substrate for trap installation.

4.2.2.3 Active diurnal and nocturnal searches

Active searches were undertaken at each systematic and 9 additional sites throughout the study area (Figure 4-1; Table 4-4). Active searches primarily targeted diurnal herpetofauna and mammals from direct sightings and secondary evidence. Searches focused primarily on conservation significant species identified in the desktop review as potentially occurring within the study area, including Northern Quoll (VU), Brush-tailed Mulgara (P4), Western Pebble-mound Mouse (P4), Greater Bilby (VU), Pilbara Olive Python (VU) and Pin-striped Fine-snout Ctenotus (P1).

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 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. A minimum of one person hour was spent actively searching at each systematic site for a total of approximately 26 hours across all sites throughout the field survey (Table 4-4).

Nocturnal searches were undertaken at each systematic site to detect the presence of any nocturnal fauna species that may not be readily trapped using systematic methods. Nocturnal searches were undertaken between sunset and 10 pm. Searches consisted of using head torches to detect animal movement, eye shine, or other evidence of fauna presence. These searches particularly targeted reptiles and mammals, but also nocturnal birds. Approximately 23 person-hours of nocturnal searches were undertaken throughout the field survey.

4.2.2.4 Avifauna surveys

Standardised 20-minute avifauna surveys were undertaken at each of the systematic sites, as well as non-standardised surveys at 8 additional sites throughout the study area (Figure 4-1; 'Birding' in Table

4-4). Some sites were sampled more than others due to their higher perceived fauna values. Avifauna surveys were confined to the habitat type (up to 2 ha) represented by each site to collect assemblage data for each habitat. Sampling was undertaken throughout the day with a focus on periods of higher activity around sunrise and sunset. Surveys consisted of bird recordings from visual sightings and call recognition. A total of 31.1 person-hours of avifauna census was undertaken during the field survey (Table 4-4).

Song Meter SM4 recording devices were deployed at 3 sites (WLP016, WLP010, WLP026) to gather avifauna assemblage data outside of the disturbance period. A total of 9 nights of audio recording data was collected and analysed by Phoenix zoologists ('Audio recording' in Table 4-4).

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

4.2.2.5 Bat echolocation recordings

Song Meter SM4 recording devices were used to record bat echolocation calls at each systematic site (11) and an additional 10 sites during the field survey (Figure 4-1; Table 4-4). Recording devices were deployed at each site for a minimum of 3 nights of recording (range 3 to 5 nights) for between 8 and 12 continuous hours per night ('Ultrasonic recording' in Table 4-4). Devices were aimed at a 45° angle to the ground. The Song Meters were positioned in areas of habitat likely to have increased insect activity and to attract bats (e.g. likely foraging areas or movement corridors) and/or potential roosting sites. A total of 83 nights of bat echolocation recordings were undertaken during the field survey (Table 4-4).

4.2.2.6 Camera trapping

Fifty-five motion-sensitive camera traps baited with universal bait (mixture of rolled oats, peanut butter and sardines) were deployed for 4 to 5 nights at 20 sites throughout the study area (4 systematic sites, 16 additional sites; Table 4-4) in accordance with EPA (2020). They were primarily deployed in areas of suitable habitat for Northern Quoll (see section 4.2.2.7) or Greater Bilby, such as ridgelines, breakaways with overhangs and caves, drainage lines and spinifex sandplain (see sections 4.2.2.7 and 4.2.2.8). Motion-sensitive cameras were also used to gather additional fauna assemblage data, including species typically not recorded using conventional trapping techniques. All cameras deployed were Reconyx Hyperfire 600s with settings configured to take 3 photos and a 5-second video per trigger, at the highest sensitivity. A total of 236 camera trap nights were undertaken throughout the survey (Table 4-4).

4.2.2.7 Targeted surveys for Northern Quoll (*Dasyurus hallucatus*, VU)

Motion-sensitive camera traps were deployed across the study area to target Northern Quoll (VU; Table 4-4). Twelve cameras were deployed at systematic sites (sites WLP003, WLP005, WLP008, WLP010) located within or adjacent to minor paleodrainage channels (i.e. foraging and dispersal habitat), or downhill from exposed rocky ridgeline (i.e. potential denning habitat). The remaining 43 cameras were strategically distributed throughout the Wodgina mine area and Breccia borefield in the Capricorn, Platform, Macroy, River and Talga land systems to target prospective denning, foraging and dispersal habitat outside of systematic survey sites (sites WLP013-015, WLP017, WLP019-021, WLP023-026, WLP029-033). Cameras were deployed for a minimum of 4 nights (in most instances), in accordance with DSEWPaC (2011c). Where cameras were not deployed for 4 nights, additional cameras were deployed elsewhere across the site to supplement the survey effort (number of decives indicated in parentheses, Table 4-4).

4.2.2.8 Targeted surveys for Greater Bilby (*Macrotis lagotis*, VU)

Greater Bilby populations are known to have moving home ranges (Dziminski *et al.* 2020). Detection of secondary evidence including scats, tracks, burrows and diggings is the most reliable technique to determine whether bilbies are currently or were formerly present in an area. The occurrence of fresh scats, definitive tracks and/or multiple concentrated diggings can be indicative of current presence; unclear tracks, burrows, and diggings in the open can indicate potential activity but cannot be used to verify current presence.

The targeted survey for Greater Bilby was undertaken in accordance with the relevant guidance (DBCA 2018). The survey approach utilised a combination of camera trapping (in suitable spinifex sandplain habitat) and 2 ha plots to provide extensive and representative coverage in all suitable habitat types across a large study area.

It is recommended that 2-4 plots be searched per 100 ha, with plot spacing increasing with the size of the study area (DBCA 2018). Linear transects were not used in this survey as areas of suitable habitat are contained within areas predominantly uniform in shape. The standardised 2 ha plot method was used where suitable Greater Bilby habitat was identified. Plots were distributed to include all components of suitable habitat across the study area and encompassed areas where historical records occurred. Suitable habitat was located predominantly around the Wodgina airstrip and within the SB borefield, with a small component of spinifex sandplain located in the infrastructure corridor adjacent to the Turner River. The methods involved searching multiple 2 ha plots for Greater Bilby sign for 25 minutes. Each plot was searched by 2 field zoologists and GPS tracks were recorded.

A total of 22 plots were searched (Figure 4-2; Table 4-4). Locations of secondary evidence were recorded on GPS-enabled devices.

Targeted camera trapping was undertaken at 3 sites (WLP005, 014, 023) in suitable spinifex sandplain habitat associated with the River land system; all sites were situated adjacent to major Drainage line represented by the Turner River (Figure 4-1). Cameras were deployed for 4 nights for a total of 28 nights (Table 4-4).

4.2.2.9 Targeted survey for Ghost Bat (*Macroderma gigas*, VU) and Pilbara Leaf-nosed Bat (*Rhinonictoris aurantia* (Pilbara); VU)

Song Meter SM4 recording devices were used to target Pilbara Leaf-nosed Bat and Ghost Bat within the study area. Recording devices were deployed at 15 sites (including some systematic sites) for a total of 59 nights during the field survey (sites WLP005-WLP008, WLP010, WLP0130WLP017, WLP023, WLP025, WLP026, WLP029, WLP032, WLP035; Figure 4-1). Recording devices were deployed at each site for a minimum of 3 nights of recording (range 3 to 5 nights) for between 8 and 12 continuous hours per night (Table 4-4). The Song Meters were positioned in areas of prospective roosting habitat within the Rocky ridge and gorge habitat and potential foraging habitat represented by Drainage line (i.e the main channels and tributaries of the Turner River).

Additional opportunistic searches along Rocky ridge and gorge habitat were undertaken. Where identified caves had verified occupancy, approximate cave dimensions and characteristics were recorded. Care was taken when entering caves not to disturb any potential roosts.

4.2.2.10 Targeted survey for Night Parrot (*Pezoporus occidentalis*, CR)

Song Meter SM4 recording devices were deployed in areas considered to be the best representation of potential habitat for Night Parrot (EN/CR), e.g. areas of relatively large and extensive old spinifex hummocks (Figure 4-1). Devices were deployed at 4 sites (sites WLP011, WLP012, WLP018, WLP022) for 6 nights, as per the guidelines for Night Parrot survey published by DPaW (2017). The most recent

Night Parrot survey guideline (DBCA 2024a) was not implemented as the survey timing predated the guideline publication.

Devices were placed in the open near suitable spinifex hummocks and set to record continuously from 30 minutes before sunset to 30 minutes after sunrise. Recordings were analysed by Nicholas Leseberg of Adaptive Natural Resource Management (NRM). A total of 24 acoustic recording nights targeting Night Parrot were conducted over the survey (Table 4-4).

4.2.2.11 Targeted survey for other significant fauna and associated habitats

While traversing the study area, the field teams assessed the suitability of habitat for other significant fauna such as Brush-tailed Mulgara (P4), Long-tailed Dunnart (P4), Spectacled Hare-wallaby (P4), Northern Short-tailed Mouse (P4), and Western Pebble-mound Mouse (P4), and significant wetland birds. This included looking for evidence of these species during active searches. Outside of the systematic survey methods, opportunistic observations considered any significant fauna or species of interest potentially occurring throughout the study area.

4.2.2.12 SRE invertebrate sampling

Sampling for SRE invertebrates was conducted at 22 sites (Figure 4-1; Table 4-4), in areas identified as suitable habitats for SREs. Sampling comprised the following methods:

- dry pit trapping
- active foraging
- litter/soil sieving.

Dry pitfall traps deployed to catch vertebrates were also used to sample SRE invertebrate fauna. Traps remained open following setup and specimens were obtained daily as observed. Traps remained open for 7 consecutive nights.

WAEC ethics approval was not obtained for the use of wet pits for this survey. Alternatively, 1 L dry pitfall traps were installed to target microhabitats within the broader habitat at some systematic sites (sites WLP001, 003, 006-008), including those considered high potential SRE habitats. A total of 175 trap nights using 1 L dry pitfall traps was undertaken during the survey (Table 4-4).

Active foraging for SRE invertebrate groups comprised inspection of logs, larger plant debris, the underside of bark of larger trees and the underside of rocks. Methodical searches were conducted amongst the leaf litter of shade-bearing tall shrubs and trees, including raking of litter, and spinifex bases were inspected thoroughly. Rocks and rock crevices were inspected, particularly for pseudoscorpions.

A non-standardised approach was undertaken whereby each systematic site was sampled for a minimum of one person hour (concurrently with active searches for vertebrate fauna). An additional 7 sites (sites WLP024-WLP029, WLP034) were surveyed for SREs for a total search effort of approximately 25 hours during the survey (Table 4-4). 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.

Combined litter/soil sifts were undertaken at 9 sites, with up to 3 sifts (range 2 to 5) conducted at each site dependent on the abundance of leaf litter. In total, 28 sifts were undertaken (Table 4-4). 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 3 stages of decreasing mesh size over a round tray and invertebrates were picked from the sieves and tray with forceps. These samples particularly targeted pseudoscorpions, buthid scorpions, millipedes, centipedes (in particular Geophilomorpha and Cryptopidae), and slaters.

4.2.2.13 SRE potential habitat rating

Fauna habitats were assessed for their potential to support 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 in-tact 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.

4.2.3 SRE taxonomy and status

Initial higher-level (class, order, family) identifications of specimens are undertaken by Phoenix staff in Phoenix's invertebrate laboratory. Final species designations are allocated using specialist morphological and/or molecular sequencing (Table 4-5).

Where possible identifications are compared with reference material from the WA Museum and/or taxonomist reference collections.

Table 4-5 Specialist taxonomists

Person	Title	Taxa
Dr Erich S. Volschenk	Taxonomic consultant, Alacran	Scorpiones, Pseudoscorpiones
Dr Simon Judd	Taxonomic consultant	Isopoda
Sharon Zuiddam	Taxonomic consultant	Opiliones
Anna Jacks	Invertebrate zoologist, Phoenix	Selenopidae spiders, Chilopoda, Gastropoda, Isopoda, Diplopoda

Genomic analysis was undertaken for all specimens for which morphological identification did not provide sufficient taxonomic resolution. A total of 45 specimens were sent for molecular analyses, comprising 5 mygalomorph spiders, 20 scorpions, 6 harvestmen, 11 isopods and 3 pseudoscorpions. Of these, 42 produced a successful sequence (mygalomorph spider, harvestmen, isopod, pseudoscorpion, scorpion). Tissue from each specimen was obtained in Phoenix's laboratory and sequenced by Genotyping Australia.

Sequences were edited and analysed using Genius 2022.2. 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, then the 2 longest sequences were retained and the shorter conspecific sequences were discarded. Where megablast results yielded families differing from the morphological assessment, then additional sequences were obtained from GenBank, representing the morphological taxonomic assessment. If all of the resulting blast sequences represented organisms from a different taxonomic class, sequences were discarded as likely contamination.

SRE specimens collected during the survey have been lodged with the WA Museum.

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 km², 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 4 categories based on the WA Museum criteria (Table 4-6).

Table 4-6 Short-range endemic categories

SRE category	Criteria
Confirmed	Distribution < 10,000 km ² . The taxonomy of the group is well known (but not necessarily published); the 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.
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) both widespread and restricted in distribution.
Widespread	Distribution >10,000 km ² .
Uncertain	Taxonomy cannot be resolved to species-level (e.g. indeterminate species designations due to sex, life stage or damage) and therefore species distribution remains uncertain).

4.2.4 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 the current known range of species, suitable habitat within the study area and home range of species does not intersect the study area based on known records
- unlikely – study area outside the current known range of species or no suitable habitat present in the study area.

4.2.5 Analysis of survey completeness

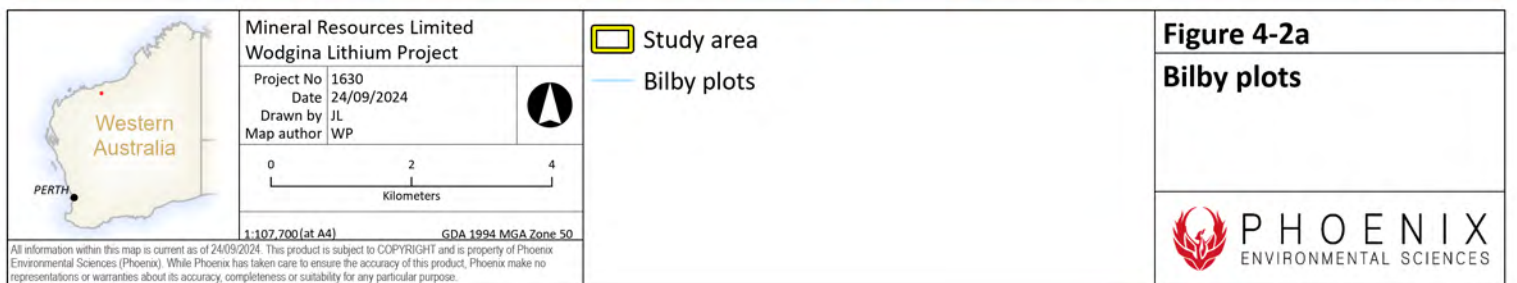
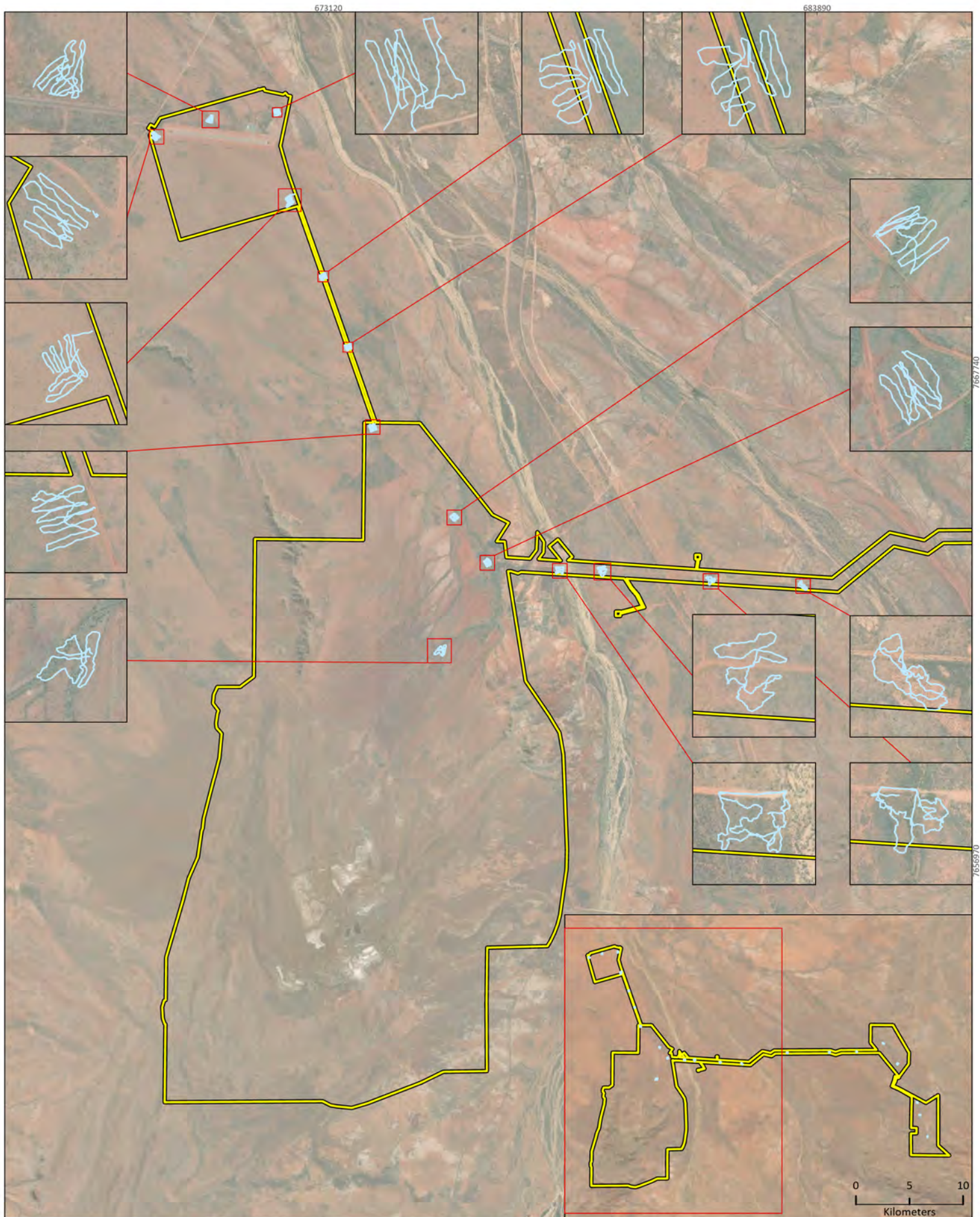
Species accumulation curves were produced on a samples and presence/absence basis using PRIMER V6 (Clarke & Gorley 2006) to obtain an estimate of survey completeness (e.g. whether the collection adequately represents the vertebrate fauna assemblage of the study area) for all relevant survey methods completed across systematic sites within the study area (overall and per class; reptiles and amphibians were grouped). Curves included the estimated number of species based on observed data (Sobs) and several species richness estimators (Chao1, Jackknife and Bootstrap) to predict the total number of species present in the study area during the survey that could be recorded using the same survey techniques.

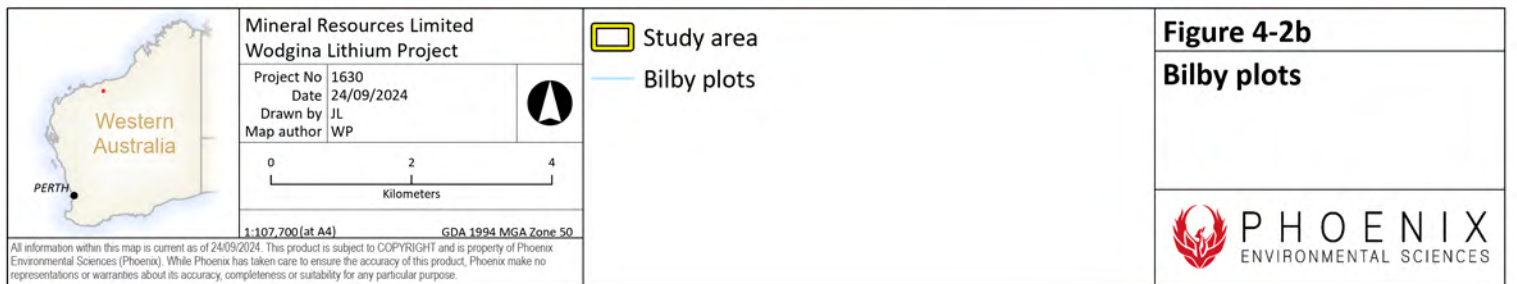
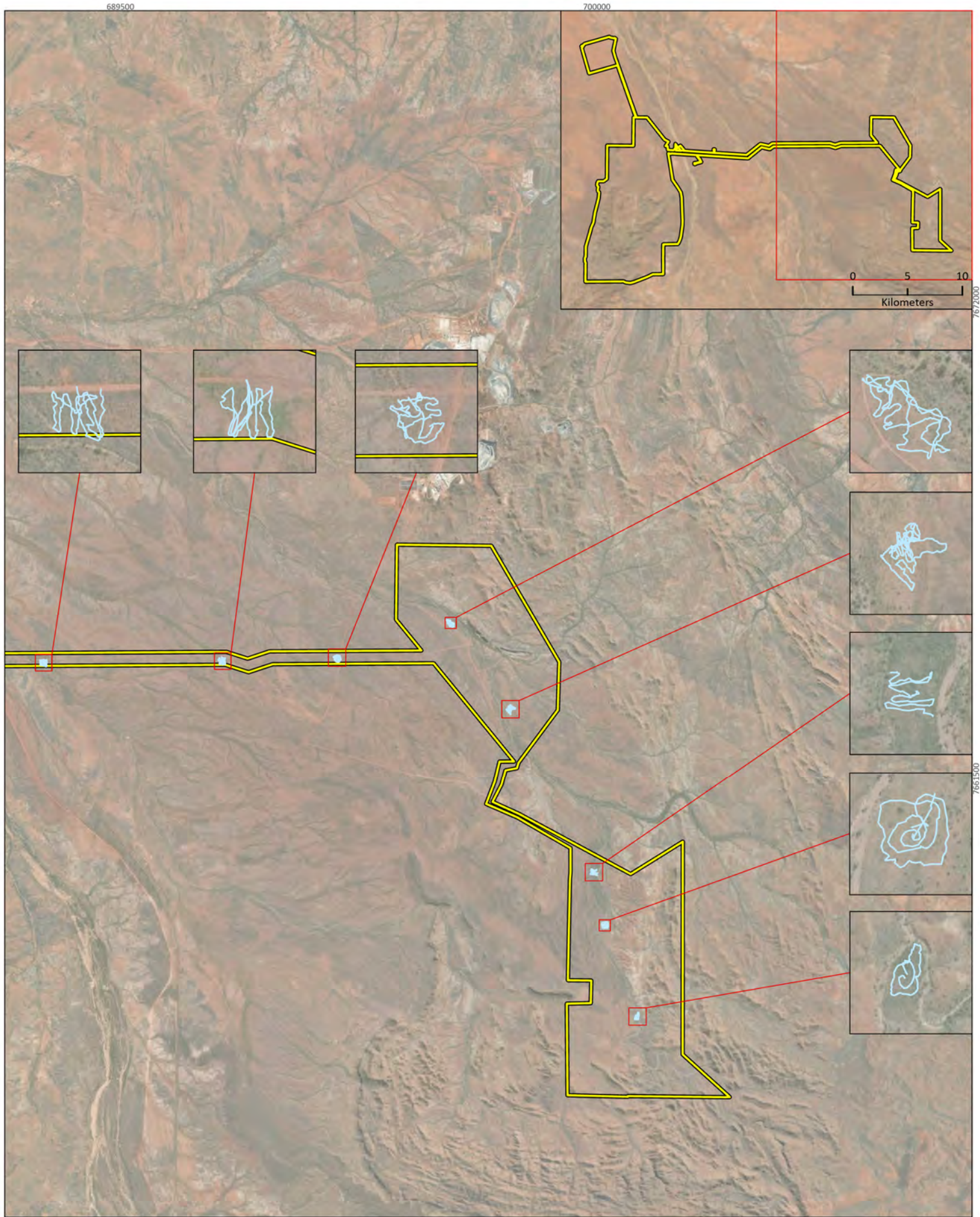
4.2.6 Survey personnel

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 and WAEC license (Table 4-7).

Table 4-7 Survey personnel

Name	Permit	Qualifications	Role/s
Simon Pynt	Fauna taking (biological assessment) licence no. BA27000863. Authorisation to take or disturb threatened species licence TFA 2223-0278. Scientific Use Licence no. U304/2022-2024.	BSc Zoology	Project management and logistics, field survey (supervisor)
Paula Strickland		MSc Zoology and Conservation Biology	Field survey (supervisor), data management and analysis
Caitlin Nagle		MSc Zoology and Conservation Biology	Field survey
Kerryn Fox		MSc Veterinary Science	Field survey
Will Purser		MSc Biological Sciences (Zoology)	Project management and logistics, field survey, data management and analysis, reporting
Patrick Williams		MSc Environmental Sciences	Field survey
Brendan Thomson		BSc Environmental Management	Field survey
Anna Jacks		BSc Environmental Sciences	Invertebrate taxonomy
Karen Crews		BSc (Hons) Environmental Biology	Reporting
Brigitte Kovar		BSc Geographical Information Systems	Data management, cartography
Bob Bullen		Bat Call WA	Ultrasonic recorder analysis
Nicholas Leseberg		Adaptive NRM	Audio recorder analysis





5 RESULTS

5.1 DESKTOP REVIEW

5.1.1 Vertebrate fauna

The desktop review identified records of 402 vertebrate taxa within the desktop search extent. The list comprised 10 frogs, 119 reptiles, 217 birds (including one naturalised species) and 56 mammals (including 10 introduced) (Table 5-1; Appendix 3). Of the 402 vertebrate taxa returned, 214 have locatable records within the desktop search extent, and the remaining 188 taxa are from sources that do not provide record locations (such as Dandjoo Biodiversity Data Repository, formerly NatureMap, and EPBC Protected Matters Search Tool) and include instances where suitable habitat either may, is likely or known to occur but the species has not necessarily been observed.

Table 5-1 Summary of terrestrial fauna desktop results

Class	Native	Introduced	Total	% Total
Amphibians	10	0	10	2.5
Birds	216	1	217	54.0
Mammals	46	10	56	13.9
Reptiles	119	0	119	29.6
Total	391	11	402	100.0

Sixty-five significant vertebrate species were identified in the desktop review, including 19 species listed as Threatened or OS under the EPBC Act and/or BC Act and 13 species listed as Priority by DBCA (Table 52). Thirty-seven avifauna species are listed as Migratory under the EPBC Act and BC Act, including 4 of the Threatened species and one Priority species (Table 5-2).

Sixteen significant vertebrate species have previously been recorded within the study area (Figure 5-1):

- Brush-tailed Mulgara (*Dasycercus blythi*, P4), 5 records from Wodgina airstrip (south of the airstrip) in 2015 from spinifex sandplain. Records sourced from the Threatened and Priority Fauna Database (DBCA 2024b).
- Common Sandpiper (*Actitis hypoleucos*, Mig.), 3 records from Wodgina mine area (north of the mine) adjacent to drainage and an artificial water source. Records sourced from the Western Wildlife (2020) detailed survey.
- Fork-tailed Swift (*Apus pacificus*, Mig.), one record from Wodgina mine area on the Great Northern Highway in 2014. Records sourced from the Threatened and Priority Fauna Database (DBCA 2024b).
- Ghost Bat (*Macroderma gigas*, VU), many records over repeated survey efforts and monitoring programs, predominantly situated among the rocky ridge and gorges, drainage and rocky foothills within Wodgina mine area (Biologic 2018b; DBCA 2024b; MWH 2014b, 2015b, 2016b; Outback Ecology 2009, 2011b, 2012a, c, 2013a; Stantec 2017b, 2018a, b, 2022a). Three known diurnal roosts and 3 potential maternity roosts in the Wodgina mine area (Figure 5-2).
- Greater Bilby (*Macrotis lagotis*, VU), 8 records from Wodgina mine area (north of the mine), Wodgina airstrip, and the infrastructure corridor, along the Turner River. Records sourced from the Threatened and Priority Fauna Database (DBCA 2024b), Phoenix (2024a) detailed survey and 360 Environmental (2018) targeted survey.

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- Grey Falcon (*Falco hypoleucos*, VU), 4 records from 2 locations in Wodgina mine area; one northwest of the mine on the plains adjacent to the rocky foothills and gorges in 2015 (DBCA 2024b), and 3 unpublished records east of the mine in drainage situated adjacent to the Great Northern Highway in 2024 (pers. comms. Dave Brown, Senior Environmental Advisor at Wodgina Lithium Mine).
- Long-tailed Dunnart (*Antechinomys longicaudata*, P4), 5 records from Wodgina mine area, west of the mine situated among the rocky ridges and gorges, in 2009 and 2012. Records sourced from the Threatened and Priority Fauna Database (DBCA 2024b) and Outback Ecology (2009) detailed survey.
- Northern Leaf-nosed Bat (*Hipposideros stenotis*, P2), 5 records from Wodgina mine area in 2012, situated among the rocky hills and gorges west of the mine, as well as in now developed areas. Records sourced from the Threatened and Priority Fauna Database (DBCA 2024b). Possibly a misidentification of the Pilbara Leaf-nosed Bat as considerably outside of the species known range, otherwise extralimital.
- Northern Quoll (*Dasyurus hallucatus*, VU), many records from Wodgina mine area over repeated survey efforts and monitoring programs, predominately situated amongst the rocky hills and gorges, drainage, spinifex stony plains, ironstone ridgetops and rocky foothills. Records sourced from the Threatened and Priority Fauna Database (DBCA 2024b), among other reports (360 Environmental 2018; Biologic 2018a; MWH 2014a, 2015a, 2016a; Outback Ecology 2009, 2010b, 2011a, 2012d, 2013b; Phoenix 2024a; Stantec 2017a, 2018b, 2022b).
- Peregrine Falcon (*Falco peregrinus*, OS), 2 records from Wodgina mine area, northwest and west of the mine in 2013, situated in the rocky ridges and gorges, and rocky foothills. Records sourced from the Threatened and Priority Fauna Database (DBCA 2024b).
- Pilbara Leaf-nosed Bat (*Rhinonictis aurantia* (Pilbara), VU), many records over repeated survey efforts concentrated in the rocky ridges and gorges throughout Wodgina mine area, as well as the isolated dendritic drainage channels of the Turner River within the infrastructure corridor. Records sourced from the Threatened and Priority Fauna Database (DBCA 2024b), among other reports (MWH 2014b, 2015b, 2016b, 2017; Outback Ecology 2009, 2011b, 2012c, 2013a; Phoenix 2024a; Stantec 2017b, 2018b, 2022a; Western Wildlife 2020). Transitory diurnal roost in Wodgina mine area, with several permanent diurnal roosts also known from the wider desktop extent (Figure 5-2).
- Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*, VU), 2 records from Wodgina mine area; one situated in drainage north-northeast of the Wodgina village in 2011 (DBCA 2024b), and one unpublished record from Wodgina village in 2024 (pers. comms. Dave Brown, Senior Environmental Advisor at Wodgina Lithium Mine).
- Spectacled Hare-wallaby (mainland) (*Lagorchestes conspicillatus* subsp. *leichardti*, P4), 17 records from 3 locations including in spinifex sandplain within Wodgina airstrip in 2015, rocky foothills within Wodgina mine area (north of the mine) in 2018 and Breccia borefield in 1992. Records sourced from the Threatened and Priority Fauna Database (DBCA 2024b).
- Western Pebble-mound Mouse (*Pseudomys chapmani*, P4), many records over repeated survey efforts, predominately from Wodgina mine area, situated in the rocky foothills and spinifex stony plains habitat around the mine, as well as Wodgina airstrip and the infrastructure corridor adjacent to the Turner River (360 Environmental 2018; DBCA 2024b; Outback Ecology 2009; Phoenix 2024a; Stantec 2018b, 2022b; Western Wildlife 2020).
- Wood Sandpiper (*Tringa glareola*, Mig.), one record from Wodgina mine area, situated in a minor drainage channel on the northern boundary of the mine. Records sourced from the Western Wildlife (2020) detailed survey.

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- Rufous Grasswren (*Amytornis whitei* subsp. *whitei*, P4), 2 records from Wodgina mine area, situated in the rocky ridge and gorge adjacent to the eastern boundary of the mine. Records sourced from the Western Wildlife (2020) detailed survey.

Table 5-2 Significant vertebrate fauna identified in the desktop review

Species	Status	Proximity to study area	Habitat
Migratory birds (37)			
<i>Actitis hypoleucos</i> Common Sandpiper	Mig. (EPBC & BC Acts)	Inside study area	Found across all Australian states. Never occurs in large flocks, mostly singly. Occurs in littoral and grassland habitats including small ponds, large inlets and mudflats where they forage on the shore usually close to the vegetation. In WA, the species is mostly coastal with some inland records (Geering <i>et al.</i> 2007).
<i>Apus pacificus</i> Fork-tailed Swift	Mig. (EPBC & BC Acts)	Inside study area	A non-breeding visitor to all states and territories of Australia (Higgins 1999). It occurs in a wide range of dry or open habitats, including riparian woodlands, tea-tree (<i>Melaleuca</i>) swamps, low scrub, heathland, saltmarsh, grassland and spinifex sandplains, open farmland and inland and coastal sand dunes (DSEWPaC 2011a). It is uncommon to moderately common in the northwest (DCCEEW 2023b).
<i>Arenaria interpres</i> Ruddy Turnstone	Mig. (EPBC & BC Acts)	31.6 km N	Usually found in coastal regions containing exposed rocks. They are also found in tidal pools and beaches. They are known to be found on sandy beaches, clay ridges, and occasionally in estuaries, harbours, and lagoons. They have been recorded on sewage ponds and on mudflats (DCCEEW 2023b).
<i>Calidris acuminata</i> Sharp-tailed Sandpiper	Mig. (EPBC & BC Acts)	31.6 km N	One of the most common Australian shorebirds. It occurs on saline wetlands such as coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (DCCEEW 2023b).
<i>Calidris ferruginea</i> Curlew Sandpiper	CR/Mig./CR (EPBC Act; BC Act)	*	In Australia, the species is strictly Migratory and occurs in large numbers. Predominately occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand (DCCEEW 2023b).
<i>Calidris melanotos</i> Pectoral Sandpiper	Mig. (EPBC & BC Acts)	*	An uncommon solitary shorebird found in wetlands, inland as well as on the coast. Occurs on shallow fresh to saline wetlands, usually coastal or near coastal but occasionally further inland, such as coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains, and artificial wetlands. Prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation (DCCEEW 2023b).
<i>Calidris ruficollis</i> Red-necked Stint	Mig. (EPBC & BC Acts)	31.6 km N	Mostly found in coastal areas. Also occurs in saltworks, sewage farms, saltmarsh, and ephemeral or permanent shallow wetlands inland or near the coast (DCCEEW 2023b).
<i>Calidris subminuta</i> Long-toed Stint	Mig. (EPBC & BC Acts)	*	They occupy in a variety of wetlands. Appearing to favour shallow, freshwater, and brackish wetlands including river floodplains, sewage ponds, swamps, and lagoons. They are also known to occupy muddy shorelines, weeds, sedges and occasionally stunted samphire. They are known to occupy permanent wetlands and artificial lakes (DCCEEW 2023b).
<i>Calidris tenuirostris</i> Great Knot	CR/Mig./CR (EPBC Act; BC Act)	*	They usually occupy sheltered coastal habitats, mudflats, and sandflats such as inlets, bays, harbours, estuaries, and lagoons. They are known to occupy reefs and rock platforms as well as shorelines and mangroves. There are also records in swamps near the coast, salt lakes and non-tidal lagoons (DCCEEW 2023b).

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Species	Status	Proximity to study area	Habitat
<i>Charadrius leschenaultii</i> Greater Sand Plover	VU/Mig./VU (EPBC Act; BC Act)	*	Utilises coastal and estuarine environments. They typically occupy sheltered sandy or muddy beaches as well as intertidal sandbanks, mudflats, reefs, and rock platforms. They have occasional records occupying saltworks, salt lakes marginal saltmarshes and brackish swamps (DCCEEW 2023b).
<i>Charadrius veredus</i> Oriental Plover	Mig. (EPBC & BC Acts)	5.1 km N	Oriental Plovers spend a few weeks in coastal habitats such as estuarine mudflats, sandbanks, sandy/rocky ocean beaches, nearby reefs, or near coastal grasslands. They then disperse further inland, where they occur in sparsely vegetated plains or recently burnt open areas (DCCEEW 2024b).
<i>Chlidonias leucopterus</i> White-winged Black Tern	Mig. (EPBC & BC Acts)	*	Typically occurs in wetland environments such as brackish, saline, and coastal areas. They are also known to occupy sheltered areas such as estuaries, harbours, and lagoons. Particularly, those with sandflats and mudflats (DCCEEW 2023b).
<i>Fregata ariel</i> Lesser Frigatebird	Mig. (EPBC & BC Acts)	31.6 km N	It is usually seen in tropical or warmer waters off northern WA, Northern Territory, Queensland, and northern New South Wales.
<i>Gallinago stenura</i> Pin-tailed Snipe	Mig. (EPBC & BC Acts)	*	Usually found on the edges of swamps, ponds, and lakes with vegetation available. They have also been found in open claypans and arid parts of the overall species range. They have been recorded in sewage ponds and less often in intertidal wetlands (DCCEEW 2023b).
<i>Gelochelidon nilotica</i> Gull-billed Tern	Mig. (BC Act)	*	Gull-billed Terns are found in freshwater swamps, brackish, and salt lakes, beaches, estuarine mudflats, floodwaters, sewage farms, irrigated croplands, and grasslands. They are only rarely found over the ocean.
<i>Glareola maldivarum</i> Oriental Pratincole	Mig. (EPBC & BC Acts)	35.1 km N	Inhabits open plains, floodplains, or short grassland, wetlands, saltworks, and sewage farms. May also occur along the coast, inhabiting beaches, mudflats and islands, or around coastal lagoons.
<i>Hirundo rustica</i> Barn Swallow	Mig. (EPBC & BC Acts)	*	Inhabits open country in coastal lowlands and, in, or over freshwater wetlands, woodland, shrublands, and tussock grassland.
<i>Hydroprogne caspia</i> Caspian Tern	Mig. (EPBC & BC Acts)	31.6 km N	Found in sheltered coastal habitats and near coastal terrestrial wetlands (DAWE 2022).
<i>Limosa lapponica</i> Bar-tailed Godwit	Mig. (EPBC & BC Acts)	*	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 2023b).
<i>Motacilla cinerea</i> Grey Wagtail	Mig. (EPBC & BC Acts)	*	Uses a large array of habitats. A small wagtail that is a vagrant visitor to Australia that inhabits fast-flowing streams and rivers (IUCN 2019).
<i>Motacilla tschutschensis</i> Eastern Yellow Wagtail	Mig. (EPBC & BC Acts)	*	Uncommon but regular visitor to Pilbara; primarily inhabit a range of damp or wet habitats with low vegetation including damp meadows, marshes, waterside pastures, and sewage farms (IUCN 2019; Johnstone <i>et al.</i> 2013).
<i>Numenius madagascariensis</i> Eastern Curlew	CR/Mig./CR (EPBC Act; BC Act)	*	Australia's largest and most elusive shorebird. Little information is available on this species given this species' shyness and records taking flight at the first sign of disturbance (DCCEEW 2023b).

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Species	Status	Proximity to study area	Habitat
<i>Numenius minutus</i> Little Curlew	Mig. (EPBC & BC Acts)	*	They spend the non-breeding season in northern Australia from Port Hedland to the Queensland coast (DoEE 2018).
<i>Numenius phaeopus</i> Whimbrel	Mig. (EPBC & BC Acts)	*	Usually found on intertidal mudflats and sheltered coastal areas. They have also been found in other waterbodies including harbours, lagoons, estuaries, rivers, and mangroves. Occasionally they are found in sandy and rocky beaches or intertidal areas (DCCEEW 2023b).
<i>Onychoprion anaethetus</i> Bridled Tern	Mig. (EPBC & BC Acts)	*	They occupy subtropical and tropical sea environments including islands, coral cays with adequate vegetation, and continental islands but are rarely recorded on inshore continental waters. They have been reported breeding on mainland WA (DCCEEW 2023b).
<i>Pandion cristatus</i> Osprey	Mig. (EPBC & BC Acts)	29.0 km S	Present across most of coastal Australia. Littoral but follows major rivers far inland from the coast.
<i>Plegadis falcinellus</i> Glossy Ibis	Mig. (EPBC & BC Acts)	*	Predominantly inhabits terrestrial wetlands, foraging in shallow water over a soft substrate or on grassy or muddy verges of wetlands providing a variety of water depths. Inland, freshwater wetlands are preferred, especially permanent or ephemeral waterbodies on floodplains and shallow swamps with abundant aquatic flora (Johnstone <i>et al.</i> 2013; Marchant & Higgins 1990).
<i>Pluvialis fulva</i> Pacific Golden Plover	Mig. (EPBC & BC Acts)	31.6 km N	Typically inhabits coastal environments and occasionally can be found in wetlands, mudflats, and sandflats in sheltered areas. They have been found on islands, sand, and coral cays. They have been recorded in terrestrial environments, usually near waterbodies and paddock areas (DCCEEW 2023b).
<i>Pluvialis squatarola</i> Grey Plover	Mig. (EPBC & BC Acts)	*	Inhabits coastal areas, typically those that are sheltered, such as embayments, and estuaries, although they are also known to occupy rocky coasts and platforms. Occasionally they are found in inland waterbodies (DCCEEW 2023b).
<i>Sterna hirundo</i> Common Tern	Mig. (EPBC & BC Acts)	*	They occur in marine, coastal, and pelagic environments and are usually observed in coastal waters in beaches, platforms and sheltered areas including harbours and estuaries (DCCEEW 2023b).
<i>Sternula albifrons</i> Little Tern	Mig. (EPBC & BC Acts)	*	Inhabit a variety of aquatic environments including estuaries, lagoons, sheltered coastal areas, lakes, bays, and harbours. Particularly those with sandbanks or splits and exposed ocean beaches. This species is widespread but favours offshore continental islands or coral cays (DCCEEW 2023b).
<i>Thalasseus bergii</i> Crested Tern	Mig. (EPBC & BC Acts)	31.6 km N	Occurs in temperate and tropical environments in South Africa and Australia. They are found in coastal areas including low-lying rocky, sandy, and coral islands. They are often found on open shores and less often found in tidal creeks and inland waterbodies (ALA 2023).
<i>Tringa brevipes</i> Grey-tailed Tattler	Mig. EPBC and BC Acts; P4 DBCA list	31.6 km N	Moderately common migrant to coasts and islands, mainly Aug-Apr but present in all months; tidal mudflats, reef flats, mangrove creeks, sandy beaches, saltwork ponds, sewage ponds and brackish lagoons (Johnstone <i>et al.</i> 2013).
<i>Tringa glareola</i> Wood Sandpiper	Mig. (EPBC & BC Acts)	Inside study area	The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes (DoEE 2018).

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Species	Status	Proximity to study area	Habitat
<i>Tringa nebularia</i> Common Greenshank	Mig. (EPBC & BC Acts)	31.6 km N	Found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity, including coastal mudflats, saltmarsh, and mangroves; occurs in Pilbara Aug-Jun (DoEE 2019; Johnstone <i>et al.</i> 2013).
<i>Tringa stagnatilis</i> Marsh Sandpiper	Mig. (EPBC & BC Acts)	*	The Marsh Sandpiper occurs along the Western Australian coast and throughout parts of eastern Australia. It inhabits coastal and inland wetlands, estuarine, and mangrove mudflats, beaches, swamps, lakes and several other types of wetlands (Morcombe 2004).
<i>Xenus cinereus</i> Terek Sandpiper	Mig. (EPBC & BC Acts)	*	Found primarily in coastal areas and inland wetlands of the Pilbara and Kimberley regions (DCCEEW 2023b).
Non-migratory birds (8)			
<i>Amytornis whitei</i> subsp. <i>whitei</i> Rufous Grasswren	P4 (DBCA list)	Inside study area	Occurs in spinifex habitat associations on red rocky ridges and slopes in the Pilbara region in WA. Prefers tall and dense spinifex hummocks with or without shrubs or light tree cover.
<i>Erythrotriorchis radiatus</i> Red Goshawk	VU (EPBC & BC Acts)	*	Occurs in tropical and temperate climates in coastal and sub-coastal forested lands of northern Australia. This species also uses riverine areas as well as areas with high biodiversity. Large trees are required for nesting within 1 km of permanent water sources (DCCEEW 2023b).
<i>Falco hypoleucos</i> Grey Falcon	VU (BC Act)	Inside study area	In the Pilbara, mostly recorded from the coastal plain between the De Grey and Ashburton Rivers. Their preferred habitat comprises lightly wooded coastal and riverine plains, creek lines, shrublands, and open grasslands (Johnstone & Storr 1998).
<i>Falco peregrinus</i> Peregrine Falcon	OS (BC Act)	Inside study area	Preferred habitat includes cliffs and wooded watercourses. Nesting occurs mainly on cliff recesses, granite outcrops, quarries and in trees with old raven or Wedge-tailed Eagle nests (Johnstone & Storr 1998).
<i>Pezoporus occidentalis</i> Night Parrot	EN/CR (EPBC Act; BC Act)	*	Appears to favour areas of dense vegetation comprising old-growth (often > 50 years unburnt) spinifex (<i>Triodia</i> spp.), especially hummocks that are ring-forming (stage 5) for roosting and nesting. Such areas may also be associated with dense chenopod shrubs, paleodrainage channels and stony plains (pers. comms Nicholas Leseberg). It is thought that spinifex hummocks that are <40-50 cm in height are not likely to provide adequate shelter for roosting and nesting (DPaW 2017).
<i>Polytelis alexandrae</i> Princess Parrot	P4 (DBCA list)	*	Inhabit inland sandy deserts including sandy dunes and flats and feed on seeds and flowers; irruptive, dispersing widely after favourable breeding conditions. Occurs in open savannah woodlands and shrublands, and frequents <i>Eucalyptus</i> or <i>Allocasuarina</i> trees in riverine or littoral areas (DCCEEW 2023b). Often found in close association with spinifex grasslands.
<i>Rostratula australis</i> Australian Painted Snipe	EN (EPBC & BC Acts)	*	Inhabits shallow terrestrial fresh-brackish wetlands, including temporary, and permanent lakes, swamps, and claypans, waterlogged grassland, or saltmarsh, dams, rice crops, sewage farms, and bore drains.
<i>Sternula nereis</i> subsp. <i>nereis</i> Fairy Tern	VU (EPBC & BC Acts)	*	They nest on sheltered, sandy beaches. They have also been known to occur on the edges of offshore, estuaries, islands, wetlands and other areas of the mainland coastline (DCCEEW 2023b).
Mammals (13)			

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Species	Status	Proximity to study area	Habitat
<i>Antechinomys longicaudata</i> Long-tailed Dunnart	P4 (DBCA list)	Inside study area	Found in WA across a large portion of WA, mostly in arid and semi-arid rocky inland deserts. They typically inhabit rugged rocky landscapes and occasionally in more open countries consisting of exposed rock and stony soils with hummock grasses and shrubs, flat-topped hills, sparse Mulga over spinifex (<i>Triodia</i>), lateritic plateaux, and sandstone ranges and breakaways (Burbidge <i>et al.</i> 2008; WAM 2021).
<i>Dasycercus blythi</i> Brush-tailed Mulgara	P4 (DBCA list)	Inside study area	Subject to taxonomic ambiguity due to recent changes in nomenclature; Mulgaras formerly comprised a species complex before recognition of their reproductive isolation and species delineation (with associated morphological differences), thereafter described as the Crest-tailed Mulgara (<i>Dasycercus cristicauda</i>) and Brush-tailed Mulgara (<i>D. blythi</i>) (Woolley 2006). Evidence from areas of sympatry in Central Australia indicates habitat differences between the 2 species of Mulgara; <i>D. blythi</i> mostly on sandplains and gibber plains, but also in dune swales (Pavey <i>et al.</i> 2011; Woolley 2005; Woolley <i>et al.</i> 2013), digging their burrows at the base of spinifex tussocks in the flats between low sand dunes (Van Dyck & Strahan 2008).
<i>Dasyurus hallucatus</i> Northern Quoll	EN (EPBC & BC Acts)	Inside study area	Occur in a variety of habitats across their range including rocky areas, eucalypt woodlands, rainforests, shrubland, sandy areas, grasslands, and desert. Critical habitat is defined as habitats where they are least exposed to threats or least likely to be in the future (e.g. refugia), including offshore islands and rocky areas, with rugged rocky habitats such as gorges, gullies, escarpments, boulder fields, small caves, major drainage lines and treed creeklines critical for denning and shelter (DCCEEW 2023b; DoE 2016b; Hill & Ward 2010). They forage in nearby grasslands and creeklines/drainage systems
<i>Hipposideros stenotis</i> Northern Leaf-nosed Bat	P2 (DBCA list)	Inside study area (out of range)	Found in rugged rocky areas such as sandstone cliffs, escarpments, boulder country, gorges, and waterholes bordered by paperbark trees. Roosts in boulder piles, crevices, road culverts, old mines, shallow caves, and semi-shaded sites along cliff lines. Forages in a range of vegetation types close to escarpments and other rocky areas, including eucalypt open forests and woodlands and grasslands (Armstrong <i>et al.</i> 2021).
<i>Lagorchestes conspicillatus leichardti</i> Spectacled Hare-wallaby (mainland)	P4 (DBCA list)	Inside study area	Once widespread in Australia, the distribution of the Spectacled Hare-wallaby has contracted northwards and is now found in northern Queensland, the Northern Territory and northern WA (Kimberley and a small section of the Pilbara) (Burbidge 2004; Van Dyck & Strahan 2008). In WA, habitat is dominated by spinifex, where large hummocks are available.
<i>Lagorchestes conspicillatus</i> subsp. <i>conspicillatus</i> Barrow Island Spectacled Hare-wallaby	VU (EPBC & BC Acts)	* (out of range)	Restricted to Borrow Island (Van Dyck <i>et al.</i> 2013).
<i>Leggadina lakedownensis</i> Northern Short-tailed Mouse, Lakeland Downs Mouse, Kerakenga	P4 (DBCA list)	27.5 km S	Occupies a variety of habitats including open hummock and tussock grasslands, <i>Acacia</i> shrubland and savannah woodland (Aplin <i>et al.</i> 2016).

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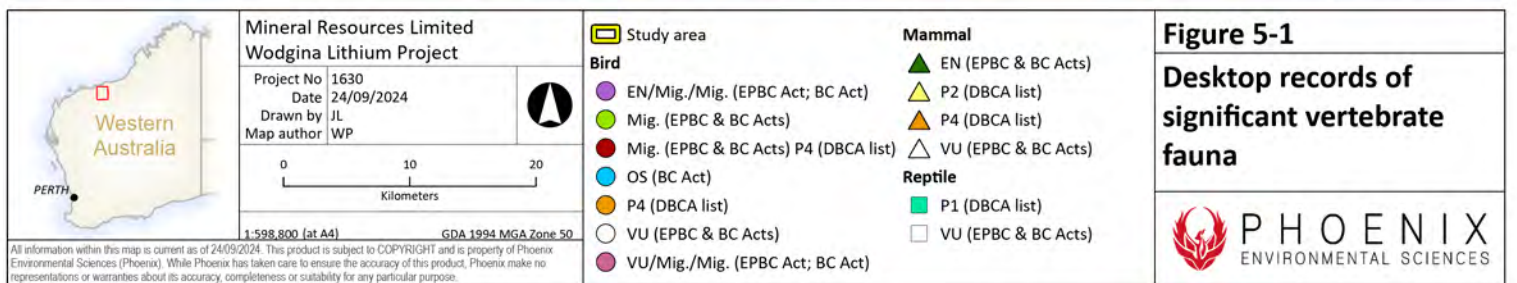
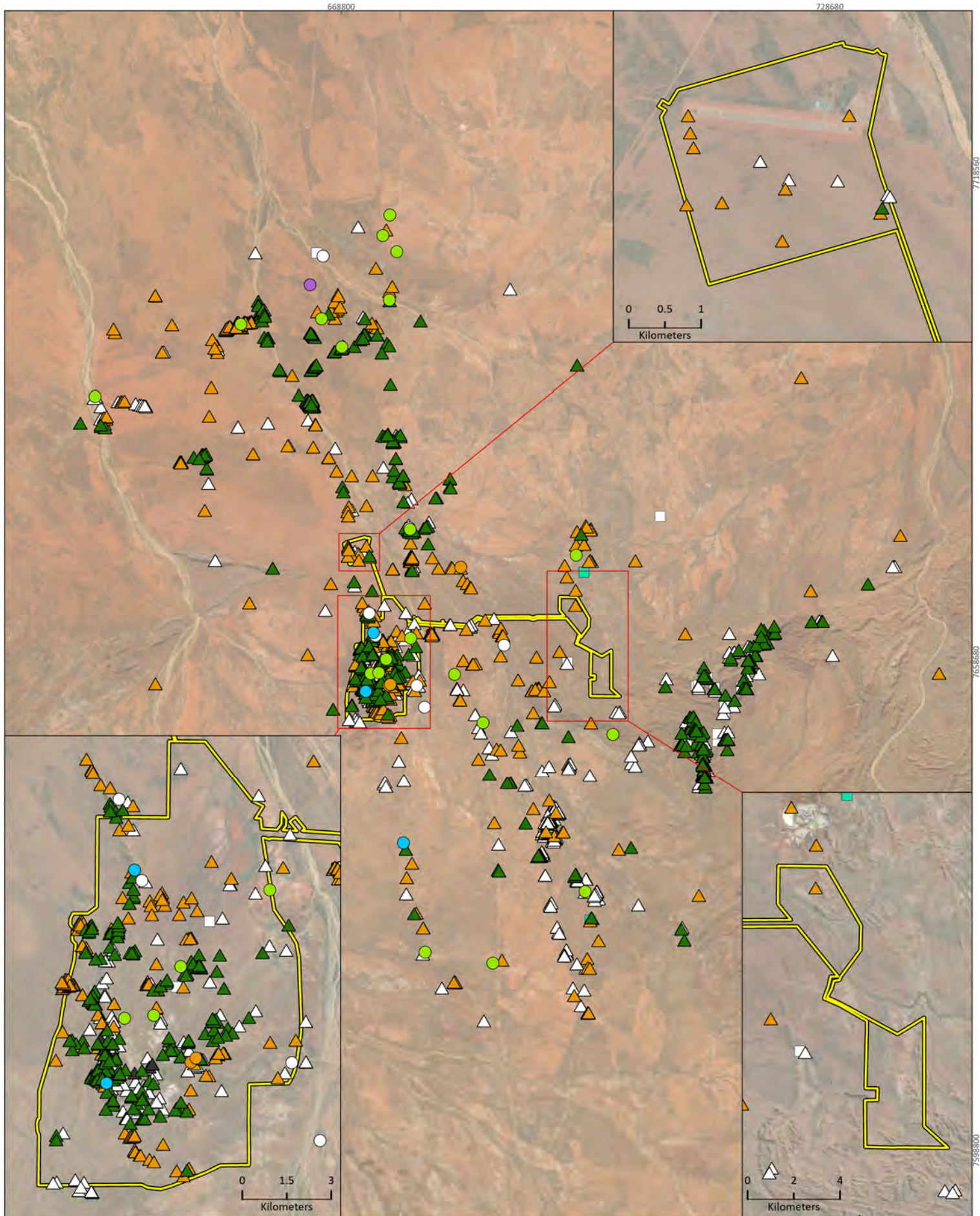
Species	Status	Proximity to study area	Habitat
<i>Macroderma gigas</i> Ghost Bat	VU (EPBC & BC Acts)	Inside study area	Prefers to roost in caves beneath bluffs of low, rounded hills composed of Marra Mamba geology, within rock piles of granite in the Pilbara and sandstone elsewhere, and in adits of abandoned mines (Bullen 2021a). Critical habitat is defined as deep caves, rock crevices and disused mine adits that may be used for roosting. They may also opportunistically use shallow caves, shelters and overhangs (Bullen 2021a). Little known of the species foraging ecology; observed foraging in areas surrounding roost sites (up to 12 km away). In the Pilbara, mostly found foraging among productive plain areas with thin mature woodland over patchy/clumped <i>Triodia</i> spp. hummock grass and watercourses (Bullen 2021a).
<i>Macrotis lagotis</i> Greater Bilby	VU (EPBC & BC Acts)	Inside study area	Bilby prefers hummock grassland in plains and alluvial areas, <i>Triodia</i> and <i>Acacia</i> on sand plains and dune systems, open tussock grassland on uplands and hills, and Mulga woodland/shrubland on ridges and rises (DCCEEW 2023b; Pavey 2006) but areas where it is now regionally extinct include many other (mostly open / exposed) habitat types.
<i>Ozimops cobourgianus</i> North-western Free-tailed Bat	P1 (DBCA list)	*	Restricted range that appears to favour mangroves and adjoining areas in small spouts, crevices, and dead branches of mangroves. This species is relatively data deficient (Australian Museum 2020).
<i>Osphranter robustus</i> subsp. <i>isabellinus</i> Barrow Island Euro	VU (EPBC & BC Acts)	* (out of range)	Restricted to Barrow Island (Van Dyck <i>et al.</i> 2013).
<i>Pseudomys chapmani</i> Western Pebble-mound Mouse	P4 (DBCA list)	Inside study area	Found in areas of rocky, hummock grassland with little or no soil and an overstorey of <i>Acacia</i> (Burbidge 2016). Mounds are located on the gentle slopes of rocky ranges covered in rocky mulch, hard spinifex and sparse trees and shrubs (<i>Eucalyptus</i> , <i>Senna</i> , <i>Acacia</i> , and <i>Ptilotus</i>). They are also often found near <i>Acacia</i> -dominated drainage lines.
<i>Rhinonictis aurantia</i> (Pilbara) Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	Inside study area	Roosts in caves and mine adits with stable, warm and humid microclimates in the Hamersley and Chichester Ranges (Bullen 2021b). Critical habitat is defined as caves and mine adits (horizontal shafts) with stable, warm and humid microclimates (Bullen 2021b; Van Dyck & Strahan 2008), but temporary roosts such as crevices and tree hollows may be used in warm and humid conditions, allowing greater dispersal during the wet season. The roosting site is often at depth in mines; in small crevices within caves, usually those ascending between sedimentary rock layers; and with associated groundwater seeps (Armstrong 2000). Permanent pools are also listed as critical habitat as they are considered essential to prevent roost abandonment (Bullen 2021b). Foraging habitat is diverse and includes almost all productive and semi-productive habitats, including spinifex hummock grasslands covering low hills and shallow gullies, small watercourses among granite-boulder terrain, water pools and low shrubs in ironstone gorges (Bullen 2021b).
Reptiles (6)			
<i>Anilius ganei</i> Gane's Blind Snake (Pilbara)	P1 (DBCA list)	3.2 km N	Little is known about the habitat preferences of this species; however, most records are from moist gorges and gullies (Wilson & Swan 2021).
<i>Ctenotus angusticeps</i> Airlie Island Ctenotus	P3 (DBCA list)	*	The Airlie Island Ctenotus is known from approximately 12 locations in northwest WA (DoEE 2018). On the mainland it generally inhabits the landward fringe of salt marsh communities in samphire shrubland or marine couch grassland (Maryan <i>et al.</i> 2013) in the intertidal zone along mangrove (Grey Mangrove (<i>Avicennia marina</i>) with occasional Red

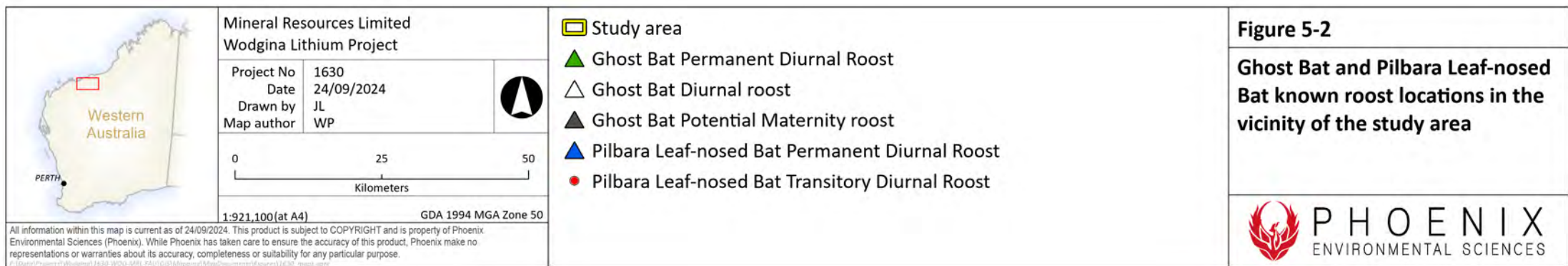
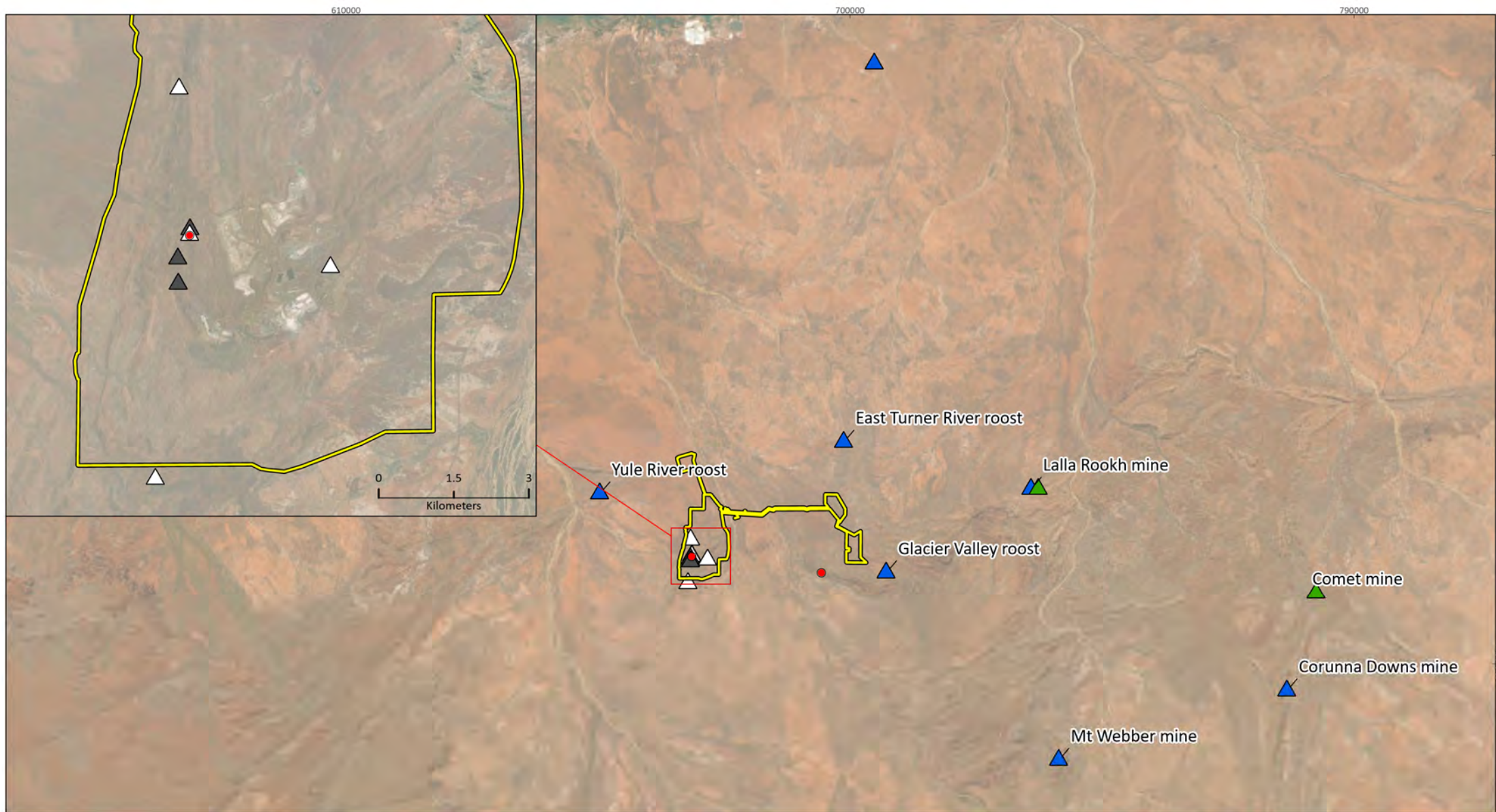
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Species	Status	Proximity to study area	Habitat
			Mangrove (<i>Rhizophora stylosa</i>) margins; however, subtle differences in vegetation/topography exist among sites where the species has been recorded (Biologic 2012).
<i>Ctenotus nigrilineatus</i> Pin-striped Fine-snout Ctenotus	P1 (DBCA list)	27.5 km S	Found on spinifex plains adjacent to granite outcrops near watercourses in the hilly interior of the Chichester Range (Doughty <i>et al.</i> 2011; Wilson & Swan 2021), and also recorded from Tom Price.
<i>Liasis olivaceus</i> subsp. <i>barroni</i> Pilbara Olive Python	VU (EPBC & BC Acts)	Inside study area	Mainly associated with areas of permanent pooling water near rocky habitats, such as gullies, gorges and rocky ranges or boulder sites. Rocky crevices and rocky areas are considered important habitats for this species (DCCEEW 2023b).
<i>Liopholis kintorei</i> Great Desert Skink	VU (EPBC & BC Acts)	*	Inhabits arid sandflats, paleodrainage channels and clay-based or loamy soils vegetated with spinifex. Vegetation assemblages vary across their range (Dennings 2015). In WA, they are found in the central and western deserts (Wilson & Swan 2021). Critical habitat has not been defined due to an incomplete distributional dataset on the species (McAlpin 2001).
<i>Pogona minor</i> subsp. <i>minima</i> Abrolhos dwarf bearded dragon	VU (BC Act)	(out of range)	Restricted to the Houtman Abrolhos Islands (Wilson & Swan 2021).

* Dandjoo Biodiversity Data Repository and EPBC Protected Matters Search do not return species record locations and include instances where suitable habitat may occur, but the species has not necessarily been observed.

Rows highlighted in grey are species that have been recorded within the study area, or within a 10 km radius.





5.1.2 SRE invertebrate fauna

The desktop review identified records of 10 confirmed and 109 potential SRE taxa from within the SRE desktop search area (Table 5-3; Figure 5-3). A further 44 taxa of uncertain SRE status were identified, as well as 43 taxa from SRE groups that have a known range that exceeds 10,000 km² (e.g., widespread species).

The desktop records indicate one confirmed (scorpion), 33 potential (11 isopods, 2 mygalomorph spiders, one harvestman, 9 pseudoscorpions, 8 scorpions and 2 selenopid spiders) and 12 uncertain (2 gastropods, 2 isopods, one mygalomorph spiders, 5 pseudoscorpions, one scorpion and one selenopid spiders) SRE taxa have previously been recorded within the study area, mainly from within the Wodgina mine area (Figure 5-3):

- 2 gastropods
 - `genus nov.` `sp. nov.` (potential), WAM (2023) record
Unidentified gastropod from an undescribed genus, known from 198 records in the desktop search extent, including inside the study area and to the east. Records have been collected from ridgelines, rocky outcropping, gullies and gorges.
 - `genus nov.` cf. `sp. nov Z` (potential), WAM (2023) record
Unidentified gastropod from an undescribed genus, known from 60 records in the desktop search extent. Known from inside of the study area, but most records are situated east. Records have been collected from ridgeline and rocky foothills and drainage.
- 13 isopods
 - *Acanthodillo* `sp. indet` (potential), WAM (2023) record
Twenty-five specimens within the desktop search extent including 3 records from within the study area northeast of the mine. Records outside of the study area range from 5.5 - 53.7 km from the boundary. Recorded from a diverse number of habitats including drainage, ridgelines, shrubland, gullies and sandy plains.
 - Armadillidae `Phoenix0204` (potential), Phoenix (2024a) record
Twelve specimens within the desktop search extent, all located inside the study area northeast of Wodgina village. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from a drainage line.
 - Armadillidae `Phoenix0205` (potential), Phoenix (2024a) record
Two specimens within the desktop search extent, both recorded from inside the study area south and north of the mine. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from a drainage line and rocky foothills.
 - Armadillidae `Phoenix0206` (potential), Phoenix (2024a) record
One specimen within the desktop search extent, recorded from inside the study area north of the mine. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from a drainage line.
 - *Buddelundia* `Phoenix0200` (potential), Phoenix (2024a) record
Thirty-four specimens within the desktop search extent, all recorded from 2 locations inside the study area northeast of Wodgina Village and from the Turner River (along the infrastructure corridor). This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from a drainage line and spinifex stony plain.
 - *Buddelundia* `Phoenix0201` (potential), Phoenix (2024a) record

Two specimens within the desktop search extent, recorded from 2 locations inside the study area approximately 150 m apart, situated north of the mine. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from a drainage line.

- *Buddelundia* `Phoenix0202` (potential), Phoenix (2024a) record

Twelve specimens within the desktop search extent, all recorded from 2 locations inside the study area, Wodgina airstrip and northeast of Wodgina village. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from spinifex sandplain and spinifex stony plain.

- *Buddelundia* `Phoenix0203` (potential), Phoenix (2024a) record

Three specimens within the desktop search extent, all recorded from 2 locations inside the study area north of the mine and northeast of Wodgina village. This new taxon recorded in the Phoenix (2024a) detailed survey was sampled from drainage lines.

- *Buddelundia* `Phoenix0207` (potential), Phoenix (2024a) record

One specimen within the desktop search extent, recorded south of the mine. This new taxon recorded in the Phoenix (2024a) detailed survey was sampled from rocky foothills.

- *Buddelundia* `sp. 17` (potential), WAM (2023) record

Eleven specimens within the desktop search extent. Two records within the study area northwest of the mine, the remaining recorded up to 75 km from the study area boundary. Previously recorded from ridgelines, spinifex sandplain, drainage, eucalypts woodland, shrubland and granite outcropping.

- *Buddelundia* `sp. 31` (potential), WAM (2023) record

Ten specimens within the desktop search extent. Five records inside the study area west, northwest and southwest of the mine were recorded from rocky foothills and drainage lines. Remaining records up to 18.9 km from the study area boundary where they have also been recorded from granite outcropping.

- *Buddelundia* `sp. indet` (uncertain), WAM (2023) record

Unidentified *Buddelundia* taxa recorded from 27 specimens from inside and outside of the study area. Records outside the study area range between <1.0 to 84.3 km from the boundary.

- *Laevophiloscia* `sp. indet` (uncertain), WAM (2023) record

Unidentified *Laevophiloscia* taxa recorded from 6 specimens from inside and outside the study area. Records outside the study area range between 11.1 to 30.0 km from the boundary.

- 3 mygalomorph spiders

- *Aname* `MYG373` (potential), Phoenix (2024a) record

Fourteen specimens recorded from 5 locations within the desktop search extent, including 12 records inside the study area recorded from spinifex stony plain and drainage line. Records outside of the study area are situated approximately 70 km north (Port Hedland) and were collected from sandplain.

- *Aname* `MYG682` (potential), WAM (2023) record

One specimen was identified within the desktop search extent from inside the study area. Recorded from spinifex stony plain north of the mine.

- *Synothele* `sp. indet` (uncertain), WAM (2023) record

Unidentified *Synothele* taxa recorded from 9 specimens within the desktop search extent. One record inside the study area north of the mine from spinifex stony plain. Remaining records are located up to 90 km from the study area boundary.

- one harvestman
 - *Dampetrus* `DNA09` (potential), Phoenix (2024a) record
Four specimens recorded from one site inside the study area north of the mine. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from drainage line.
- 14 pseudoscorpions
 - `PSEAAB` `sp. indet` (uncertain), WAM (2023) record
One specimen within the desktop search extent, recorded from drainage inside the study area north-northwest of the mine.
 - *Atemnidae* `Phoenix0094` (potential), Phoenix (2024a) record
One specimen within the desktop search extent, located inside the study area north-west of the mine. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from drainage line.
 - *Austrohorus* `sp. indet` (potential), WAM (2023) record
Unidentified *Austrohorus* taxa known from 70 specimens within the desktop search extent. Known from inside and outside of the study area.
 - *Beierolpium* `sp. 8/4 lge` (potential), WAM (2023) record
Twenty-eight specimens within the desktop search extent. One specimen has been collected inside the study area from a ridgeline northwest of the mine. Remaining records up to 62.7 km from the study area boundary. Has previously been recorded from open *Eucalyptus* woodland and rocky outcropping.
 - *Beierolpium* `sp. indet` (uncertain), Phoenix (2024a) record
Unidentified *Beierolpium* taxa known from 79 specimens within the desktop search extent. Known from inside and outside of the study area.
 - *Indolpium* `long chelal hand` (potential), WAM (2023) record
One specimen within the desktop search extent, collected inside the study area from a ridgeline northeast of the mine.
 - *Indolpium* `sp. indet` (uncertain), WAM (2023) record
Unidentified *Indolpium* taxa known from 2,476 records within the desktop search extent. Known from inside and outside of the study area.
 - Olpiidae `Phoenix0196` (potential), Phoenix (2024a) record
Two specimens within the desktop search extent, both inside the study area north and south of the mine. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from rocky foothills and drainage line.
 - Olpiidae `Phoenix0197` (potential), Phoenix (2024a) record
Forty-nine specimens within the desktop search extent, all located inside the study area north and south of the mine. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from drainage and rocky foothills.
 - Olpiidae `Phoenix0198` (potential), Phoenix (2024a) record
Thirty-one specimens within the desktop search extent, all located inside the study area north of the mine and from the Turner River (along the infrastructure corridor). This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from drainage line.

- Olpiidae `Phoenix0199` (potential), Phoenix (2024a) record
One specimen within the desktop search extent, collected from the Turner River (along the infrastructure corridor). This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from drainage line.
- Olpiidae `sp. indet` (uncertain), Phoenix (2024a) record
Unidentified Olpiidae taxa were recorded from 2 specimens in the Phoenix (2024a) detailed survey. The family Olpiidae is known from inside and outside of the study area and is widespread in the desktop search extent.
- *Oratemnus* `sp. indet` (uncertain), WAM (2023) record
Unidentified *Oratemnus* taxa known from 70 records within the desktop search extent. Known from inside and outside of the study area.
- *Synsphyronus* `PSE128` (potential), WAM (2023) record
Sixteen specimens within the desktop search extent inside and outside of the study area. Records inside the study area are situated west and northwest of Wodgina Mine. Specimens have been collected from ridgelines and gullies.
- 10 Scorpiones
 - *Lychas* `bituberculatus complex` (potential), WAM (2023) record
Seventy-three specimens within the desktop search extent, including inside and outside of the study area. Records inside the study area are concentrated south and west of Wodgina mine. Specimens have been collected from ridgeline, stony rises, granite outcropping, gullies and drainage channels.
 - *Lychas* `hairy tail complex` (potential), WAM (2023) record
One-hundred-sixty-eight specimens within the desktop search extent, known from inside and outside of the study area. Records inside the study area are concentrated south, west and northwest of the mine. Records have been collected from ridgelines, rocky foothills, drainage channels, gullies and granite outcropping.
 - *Lychas* `Phoenix0193` (potential), Phoenix (2024a) record
Two specimens within the desktop search extent, both collected from the Turner River (along the infrastructure corridor). This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from drainage line.
 - *Lychas* `Phoenix0194` (potential), Phoenix (2024a) record
Four specimens within the desktop search extent, all collected from one location north of the mine. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from drainage line.
 - *Lychas* `Phoenix0195` (potential), Phoenix (2024a) record
Three specimens within the desktop search extent, all collected from Wodgina airstrip and from the Turner River (along the infrastructure corridor). This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from spinifex grassland and drainage line.
 - *Lychas* `SCO024` (potential), Phoenix (2024a) record
Three specimens within the desktop search extent, all collected from 2 locations along the infrastructure corridor. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from drainage lines (including the Turner River).
 - *Lychas* `SCO046` (potential), Phoenix (2024a) record

Two specimens within the desktop search extent, collected from Wodgina airstrip and Wodgina mine area. This new taxon recorded during the Phoenix (2024a) detailed survey was sampled from spinifex sandplain and drainage line.

- *Lychas* `sp. indet` (uncertain), WAM (2023) record
Unidentified *Lychas* taxa known from 105 specimens within the desktop search extent. Known from inside and outside of the study area.
- *Urodacus* `Pilbara 5` (potential), WAM (2023) record
Five specimens within the desktop search extent, all collected north of the mine. Known from inside and outside of the study area. Recorded from spinifex stony plains, *Acacia* shrubland and drainage line.
- *Urodacus uncinus* (confirmed), WAM (2023) record
Ten specimens within the desktop search extent. Known from inside and outside of the study area. Records inside the study area are situated along the infrastructure corridor (east of the Turner River); all other records located within 4.3 km of the study area. Has previously been recorded from drainage line and the adjacent spinifex stony plains.
- 3 selenopid spiders
 - *Karaops* `aurizon` (potential), WAM (2023) record
Six specimens within the desktop search extent. Known from inside and outside of the study area. Records in the study area are situated on a ridgeline north of the mine.
 - *Karaops* `sp. indet` (uncertain), WAM (2023) record
Unidentified *Karaops* taxa known from 26 specimens within the desktop search extent. Known from inside and outside of the study area.
 - *Karaops nyiyaparli* (potential), WAM (2023) record
Two specimens within the desktop search extent, both collected from a ridgeline and spinifex stony plain at the base of rocky foothills. Known from inside and outside of the study area.

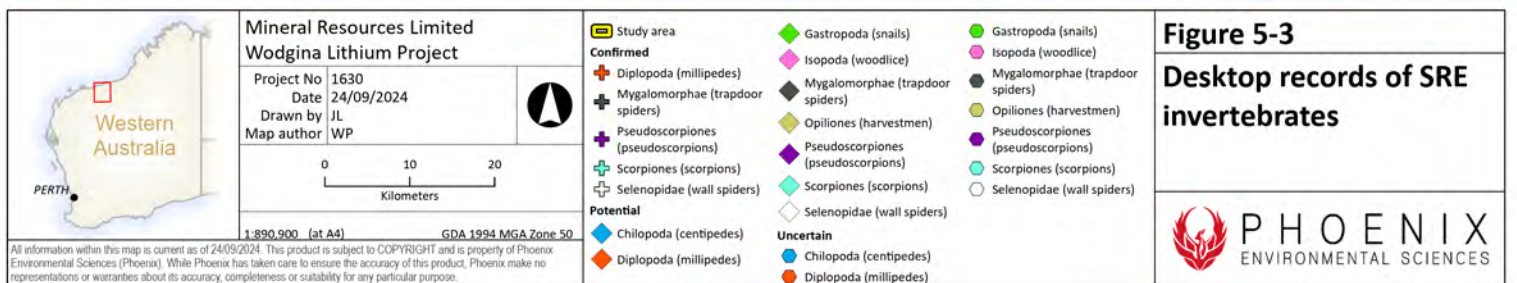
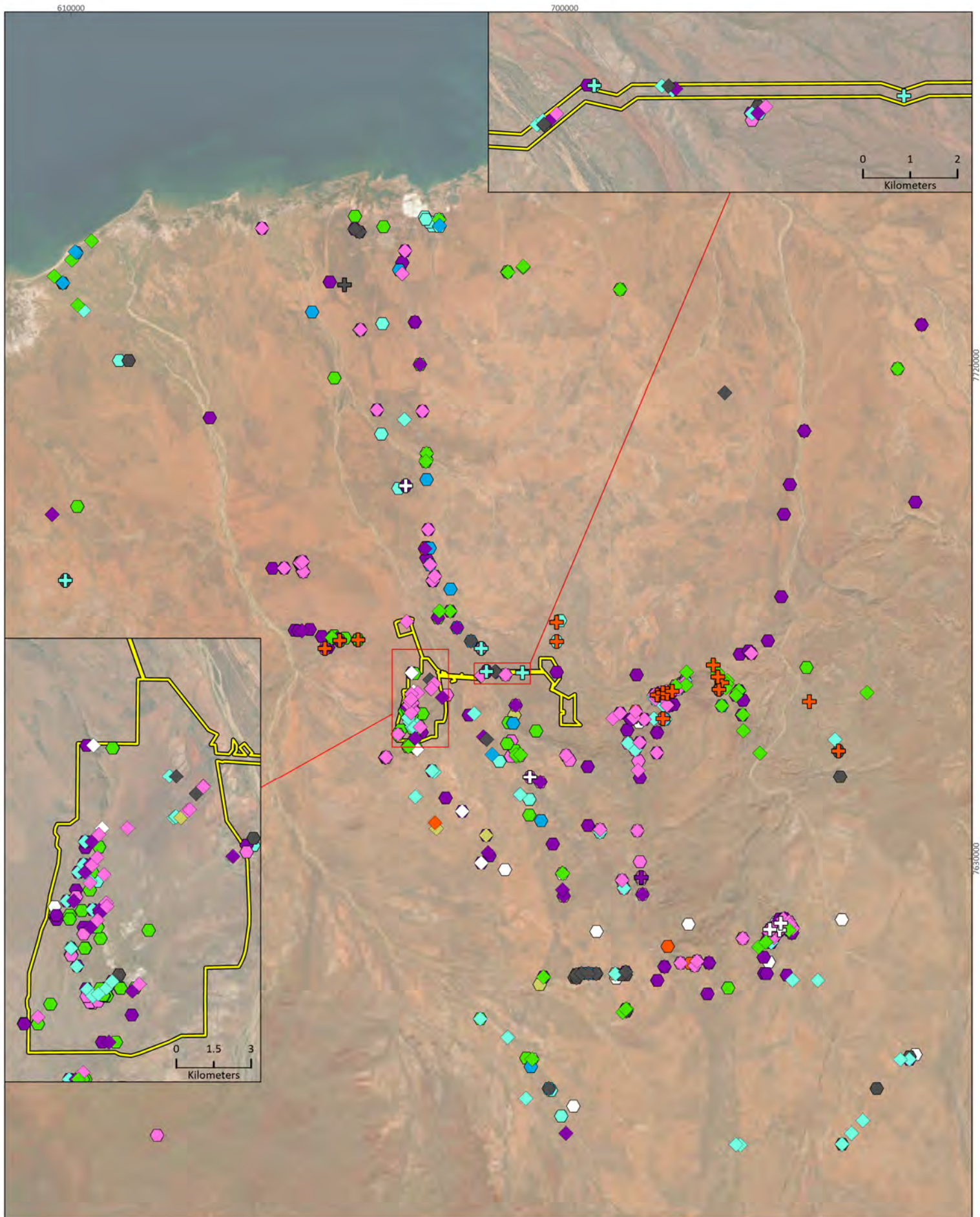
Of the 119 taxa confirmed or potential SRE taxa, 16 are named species; *Aname mcalpinei*, *Antichiropus apricus*, *A. forcipatus*, *Eremopeas interioris*, *Feaella tealei*, *Karaops kariyarra*, *K. nyamal*, *K. nyiyaparli*, *Pilbarascutigera incola*, *Quistrachia turneri*, *Rhagada richardsonii*, *R. tescorum*, *Spherillo wodgina*, *Urodacus lunatus*, *U. uncinus* and *U. varians*. The remaining 103 comprise taxa named only to morphospecies codes as applied by the WA Museum or are not identified to confirmed species-level (e.g. "sp." or "cf."). The majority of taxa records of uncertain SRE status are unidentifiable ("sp. indet.", e.g. female or juvenile specimens) or could not be identified to species or morphospecies and may represent new species or other species listed in the same genus where records exist (Table 5-3). The 10 confirmed SRE taxa, includes 4 millipedes, 2 selenopids, and one each of trapdoor spider, scorpion and pseudoscorpion (Table 5-4).

Table 5-3 Summary of SRE taxa identified in the desktop review

Group (higher classification)	SRE status				Total	% total
	Confirmed	Potential	Uncertain	Widespread		
Selenopidae (wall spiders)	2	2	1		5	2.4
Mygalomorphae (trapdoor spiders)	1	21	8	8	38	18.4
Opiliones (harvestmen)		2	1		3	1.5
Pseudoscorpiones (pseudoscorpions)	1	28	17	5	51	24.8
Scorpiones (scorpions)	2	23	2	17	44	21.4
Chilopoda (centipedes)		1	4	1	6	2.9
Diplopoda (millipedes)	4	2	2	2	10	4.9
Gastropoda (snails)		13	5	3	21	10.2
Isopoda (woodlice)		17	4	7	28	13.6
Total	10	109	44	43	206	100.0

Table 5-4 Confirmed SRE identified in the desktop review

Family	Taxon	No. of specimens in the desktop search extent	Nearest record
Class: Diplopoda (millipedes) (4)			
Paradoxosomatidae	<i>Antichiropus</i> `DIP033, wodgina`	5	7.3 km W
	<i>Antichiropus</i> `DIP037, balfour1`	11	41.9 km E
	<i>Antichiropus apricus</i>	1	25.8 km E
	<i>Antichiropus forcipatus</i>	59	3.2 km N
Infraorder: Mygalomorphae (trapdoor spiders) (1)			
Anamidae	<i>Aname mcalpinei</i>	1	61.8 km NNE
Order: Pseudoscorpiones (pseudoscorpions) (1)			
Feaellidae	<i>Feaella tealei</i>	6	26.0 km E
Order: Scorpiones (scorpions) (2)			
Urodacidae	<i>Urodacus lunatus</i>	2	60.7 km WNW
	<i>Urodacus uncinus</i>	10	Inside study area
Superfamily: Selenopidea (wall spiders) (2)			
Selenopidae	<i>Karaops kariyarra</i>	2	11.1 km S
	<i>Karaops nyamal</i>	5	50.9 km SE



5.1.3 Literature review

5.1.3.1 Fauna habitat

Habitat mapping was previously undertaken by Stantec (2018b) during a basic (formerly level 1) and targeted fauna survey for the Project in July 2018. Nine broad fauna habitats were identified during that survey, comprising Spinifex stony plain; Rocky foothills; Spinifex sandplain; Drainage line; Rocky ridge and gorge; Ironstone ridge top; Stony rises; Shrubland over spinifex; and Low vegetation with ephemeral areas. A considerable portion of the mapped study was subject to mining-related disturbances. Seven of these habitats intersect the current study area, not including low vegetation with ephemeral areas, and shrubland over spinifex (Table 5-5).

More recently, habitat mapping was undertaken by Phoenix (2024a) during a detailed (formerly level 2) terrestrial fauna survey for the Project, in October 2023. The Stantec (2018b) habitat mapping was used to inform the Phoenix (2024a) habitat mapping. Seven broad fauna habitats were identified during the field survey, comprising Spinifex stony plains; Spinifex sandplain; Rocky foothills; Drainage line; Rocky ridge and gorge; Stony rises; and Ironstone ridge top. A small proportion of the area was subject to mining-related disturbances (Table 5-5).

A total of 2,508.5 ha (19.1 %) of the study area has been mapped by the previous surveys. Since almost the entirety of the Phoenix (2024a) study area is encompassed by the study area, all Phoenix (2024a) fauna habitats occur in the study area (Table 5-5; Figure 5-4).

Table 5-5 Phoenix (2024) and Stantec (2018b) habitat mapping summaries for the Project

Fauna habitat	Stantec (2018)		Phoenix (2024)			
	Area (ha) of mapped area	% of mapped area	Area (ha) of mapped area	% of mapped area	Area (ha) of study area	% of study area
Disturbance	536.3	8.5	43.6	1.7	42.8	0.3
Drainage line	334.3	5.3	138.8	5.5	138.4	1.1
Ironstone ridge top	339.4	5.4	13.5	0.5	13.5	0.1
Low vegetation with ephemeral areas						
Rocky foothills	1,415.4	22.4	382.4	15.2	382.4	2.9
Rocky ridge and gorge	401.9	6.4	57.9	2.3	57.9	0.4
Shrubland over spinifex						
Spinifex sandplain	765.1	12.1	414.0	16.4	409.6	3.1
Spinifex stony plain	2,343.1	37.1	1,431.9	56.8	1,427.2	10.9
Stony rise	175.2	2.8	36.7	1.5	36.7	0.3
Total	6,310.7	100.0	2,518.7	100.0	2,508.5	19.1

Rows highlighted in grey indicate fauna habitat types recorded in the Stantec (2018) survey that do not intersect the study area.

5.1.3.2 Fauna assemblage

Five comprehensive terrestrial fauna surveys have been undertaken for the Project, all of which intersect some component of the study area. These include a single-phase level 2 (detailed) terrestrial fauna survey undertaken from 20 April – 2 May 2009 (autumn) by Outback Ecology (2009); a 2-phase terrestrial fauna survey undertaken from 9 April – 30 May (autumn) and 3 September – 23 October 2010 (spring) by Outback Ecology (2010a); a single-phase detailed terrestrial fauna survey undertaken

from 17 – 28 March 2011 (autumn) by Outback Ecology (2012b); and a 2-phase detailed terrestrial fauna survey undertaken from the 8 – 19 April (autumn) and 16 – 26 October 2019 (spring) by Western Wildlife (2020). All surveys were undertaken in accordance with the relevant guidelines applicable at the time of the survey.

The results of these surveys and regional knowledge on the significant fauna assemblage have triggered numerous targeted surveys (360 Environmental 2018; Stantec 2018c, 2022a) and the development of significant fauna monitoring programs for the Project, including for Northern Quoll (Biologic 2018a; MWH 2014a, 2015a, 2016a; Outback Ecology 2010b, 2011a, 2012d, 2013b; Stantec 2017a), Pilbara Leaf-nosed Bat, and Ghost Bat (Biologic 2018b; MWH 2014b, 2015b, 2016b, 2017; Outback Ecology 2011b, 2012c, 2013a; Stantec 2017b).

More recently, a single-phase detailed terrestrial fauna survey was undertaken from 28 September – 11 October 2023 (spring) by Phoenix (2024a). This survey also included a reconnaissance survey undertaken from 15 – 19 June 2023 and a wet-pit retrieval trip undertaken from 29 – 30 November 2023.

The study areas and systematic site locations of each of the historic detailed surveys are mapped in Figure 5-5.

The Outback Ecology (2009) detailed terrestrial vertebrate survey for the Wodgina DSO Project recorded a total of 90 vertebrate species (Appendix 3) from a survey effort of 2,184 trap nights (dry pitfall, aluminium box, funnel and cage traps), as well as 54 person-hours of active survey effort (diurnal and nocturnal foraging, birding, targeted searches) and 25 nights of ultrasonic recording at additional targeted sites (Table 5-7); the summarised survey effort does not account for the subsequent targeted survey detailed in the report which was undertaken from 24 July – 3 August 2009. The recorded assemblage included 2 amphibians, 45 birds, 25 reptiles and 18 mammals (including 2 introduced, Appendix 3).

The Outback Ecology (2010a) detailed terrestrial vertebrate survey for the Turner River Hub Project recorded a total of 95 vertebrate species (Appendix 3) from a total survey effort of 2,184 trap nights (dry pitfall, aluminium box, funnel and cage traps), as well as approximately 36 hours of active survey effort (diurnal and nocturnal foraging, birding, targeted searches) and an unknown number of ultrasonic recording nights and camera trap nights (Table 5-7). The recorded assemblage included 1 amphibian, 41 birds, 33 reptiles and 20 mammals (including 4 introduced, Appendix 3).

The Outback Ecology (2012b) detailed terrestrial vertebrate survey for the Hercules Project recorded a total of 85 vertebrate species (Appendix 3) from a total survey effort of 1,456 trap nights (dry pitfall, aluminium box, funnel and cage traps), as well as 24.2 hours of active survey effort (diurnal and nocturnal foraging, birding, targeted searches), 13 nights of ultrasonic recordings and an unknown number of camera trap nights (Table 5-7). The recorded assemblage included 3 amphibians, 39 birds, 31 reptiles and 12 mammals (including 1 introduced, Appendix 3).

The Western Wildlife (2020) detailed terrestrial vertebrate survey for the Wodgina Lithium Project recorded a total of 163 vertebrate species (Appendix 3) from a total systematic survey effort of 3,480 trap nights (dry pitfall, aluminium box, funnel and cage traps), as well as 68 hours of active survey effort (nocturnal foraging at targeted sites, birding, potentially diurnal foraging), 31 nights of acoustic recordings at targeted sites, 26 nights of ultrasonic records (inc. 12 at systematic sites and 14 at targeted sites) and 377 camera trap nights (across 83 targeted sites) (Table 5-7). The recorded assemblage included 5 amphibians, 76 birds, 57 reptiles and 25 mammals (including 4 introduced, Appendix 3).

The Phoenix (2024a) detailed terrestrial fauna survey for the Wodgina Lithium Project recorded a total of 121 vertebrate species (Appendix 2) from a total systematic survey effort of 1,610 trap nights (dry pitfall, aluminium box, funnel and cage traps), as well as 39.6 hours of active survey effort (nocturnal foraging, birding, diurnal foraging), 6 nights of acoustic recordings, 28 nights of ultrasonic records (including 20 at systematic sites and 8 at targeted sites), 75 camera trap nights (20 nights at systematic sites and 55 nights at targeted sites) (Table 5-7, Appendix 1). An additional 12 search plots were

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
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undertaken in the north of the study area where suitable habitat for the Greater Bilby was located. The recorded vertebrate fauna assemblage included one amphibian, 53 birds, 42 reptiles and 25 mammals (including 5 introduced, Appendix 3).

Together, these 5 detailed surveys have recorded a total of 210 vertebrate species in the vicinity of the study area, comprising 5 amphibians, 94 birds, 77 reptiles and 34 mammals (Appendix 3).

The Phoenix (2024a) survey also recorded a diverse assemblage of SRE invertebrates including 20 potential (8 isopods, one mygalomorph spider, one harvestman, 5 pseudoscorpions and 5 scorpions) and 2 Uncertain (both pseudoscorpions) taxa from a total systematic survey effort of 420 dry pitfall trap nights and 2,105 wet pitfall trap nights (1,040 at systematic sites and 1,065 at targeted sites), as well as 8.1 hours of SRE foraging (5.4 hours at systematic sites and 2.7 hours at targeted sites) and 18 litter sieves (12 at systematic sites and 6 at targeted sites). Of these, 14 had significant divergence from their closest match on available genetic databases and are considered species new to science, comprising 4 pseudoscorpions, 2 scorpions and 8 isopods.

Table 5-6 Summary of recorded terrestrial vertebrate fauna from relevant surveys

	Outback Ecology (2009)		Outback Ecology (2010a)		Outback Ecology (2012b)		Western Wildlife (2020)		Phoenix (2024a)		Total	
	Total	% total	Total	% total	Total	% total	Total	% total	Total	% total	Total	% total
Amphibians	2	2.2	1	1.1	3	3.5	5	3.1	1	0.8	5	2.4
Reptiles	25	27.8	33	34.7	31	36.5	57	35.0	42	34.7	77	36.7
Birds	45	50.0	41	43.2	39	45.9	76	46.6	53	43.8	94	44.8
Mammals	18	20.0	20	21.1	12	14.1	25	15.3	25	20.7	34	16.2
Total	90	100.0	95	100.0	85	100.0	163	100.0	121	100.0	210	100.0

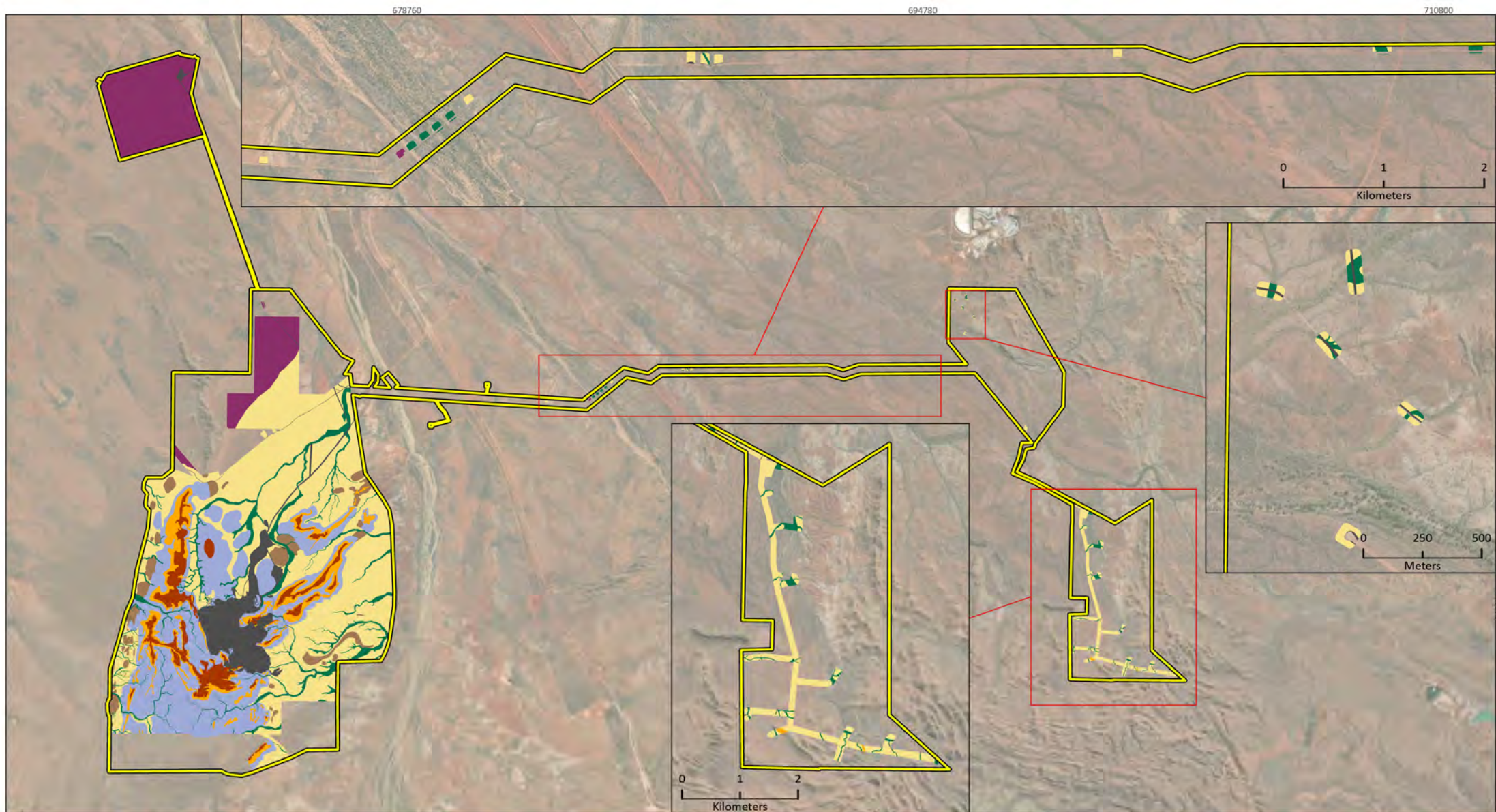
Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
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Table 5-7 Previous detailed vertebrate fauna survey effort for Wodgina mine

Survey (2009-2019)	Site	Bucket (trap nights)	Pipe (trap nights)	Funnel (trap nights)	Aluminium box (trap nights)	Cage (trap nights)	Active foraging (hours)	Birding (hours)	Nocturnal foraging (hours)	Acoustic recording (nights)	Ultrasonic recording (nights)	Camera (trap nights)	SRE foraging (hours)	Litter sieves (#)	Wet pitfall (trap nights)
Wodgina DSO Project (Outback Ecology 2009)	WOD01	35	35	140	140	14	2	2	2						
	WOD02	35	35	140	140	14	2	2	2						
	WOD03	35	35	140	140	14	2	2	2						
	WOD04	35	35	140	140	14	2	2	2						
	WOD05	35	35	140	140	14	2	2	2						
	WOD06	35	35	140	140	14	2	2	2						
	Total	210	210	840	840	84	12	12	12		25				
Turner River Hub (Outback Ecology 2010a)	H-F-1	35/35	35/35	140/140	140/140	14/14	~2/2	~2/2	~2/2		?	?			
	H-F-2	35/35	35/35	140/140	140/140	14/14	~2/2	~2/2	~2/2		?	?			
	H-F-3	35/35	35/35	140/140	140/140	14/14	~2/2	~2/2	~2/2		?	?			
	Total	210	210	840	840	84	~12	~12	~12		?	?			
Hercules Project (Outback Ecology 2012b)	Site01	35	35	140	140	14	1.5	2.3	1.5						
	Site02	35	35	140	140	14	1.5	2.3	1.5						
	Site03	35	35	140	140	14	1.5	2.3	1.5						
	Site04	35	35	140	140	14	1.5	2.3							
	AN01 - 06										13	?			
	Total	140	140	560	560	56	6	9.2	4.5		13	?			
Wodgina Lithium Project (Western Wildlife 2020)	WL site 01	42/42	24/24	70/70	140/140	14/14		2/2			1/1				
	WL site 02	42/42	24/24	70/70	140/140	14/14		2/2			1/1				
	WL site 03	42/42	24/24	70/70	140/140	14/14		2/2			1/1				
	WL site 04	42/42	24/24	70/70	140/140	14/14		2/2			1/1				
	WL site 05	42/42	24/24	70/70	140/140	14/14		2/2			1/1				
	WL site 06	42/42	24/24	70/70	140/140	14/14		2/2			1/1				

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
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Survey (2009-2019)	Site	Bucket (trap nights)	Pipe (trap nights)	Funnel (trap nights)	Aluminium box (trap nights)	Cage (trap nights)	Active foraging (hours)	Birding (hours)	Nocturnal foraging (hours)	Acoustic recording (nights)	Ultrasonic recording (nights)	Camera (trap nights)	SRE foraging (hours)	Litter sieves (#)	Wet pitfall (trap nights)		
	Quoll 1-2				280												
	Total	504	288	840	1,960	168	?	24	44	31	6/6 (14)	377					
Wodgina Lithium Project (Phoenix 2024a)	WOD001	35	35	140	70		0.7	0.7	2				0.7	3	260		
	WOD002	35	35	140			1.3	0.7	2					1.3		260	
	WOD003	35	35	140	70		0.7	0.7	2					3	0.7	3	260
	WOD004	35	35	140	70		0.7	0.7	3					4	4	0.7	
	WOD005	35	35	140	70		0.7	1	4	6	3/6	6	0.7	3			
	WOD006	35	35	140	70		1.3	2	3		7	7	1.3	3			
	WOD007-055, Opp001-014						7.0	3.4	2.0		8	55	2.7	6	1,065		
	Total	210	210	840	350	0	12.4	9.2	18	6	28	75	8.1	18	2,105		





**Mineral Resources Limited
Wodgina Lithium Project**

Project No	1630
Date	27/09/2024
Drawn by	JL
Map author	WP



0 4.5 9
Kilometers

1:160,200(at A4) GDA 1994 MGA Zone 50

- Study area

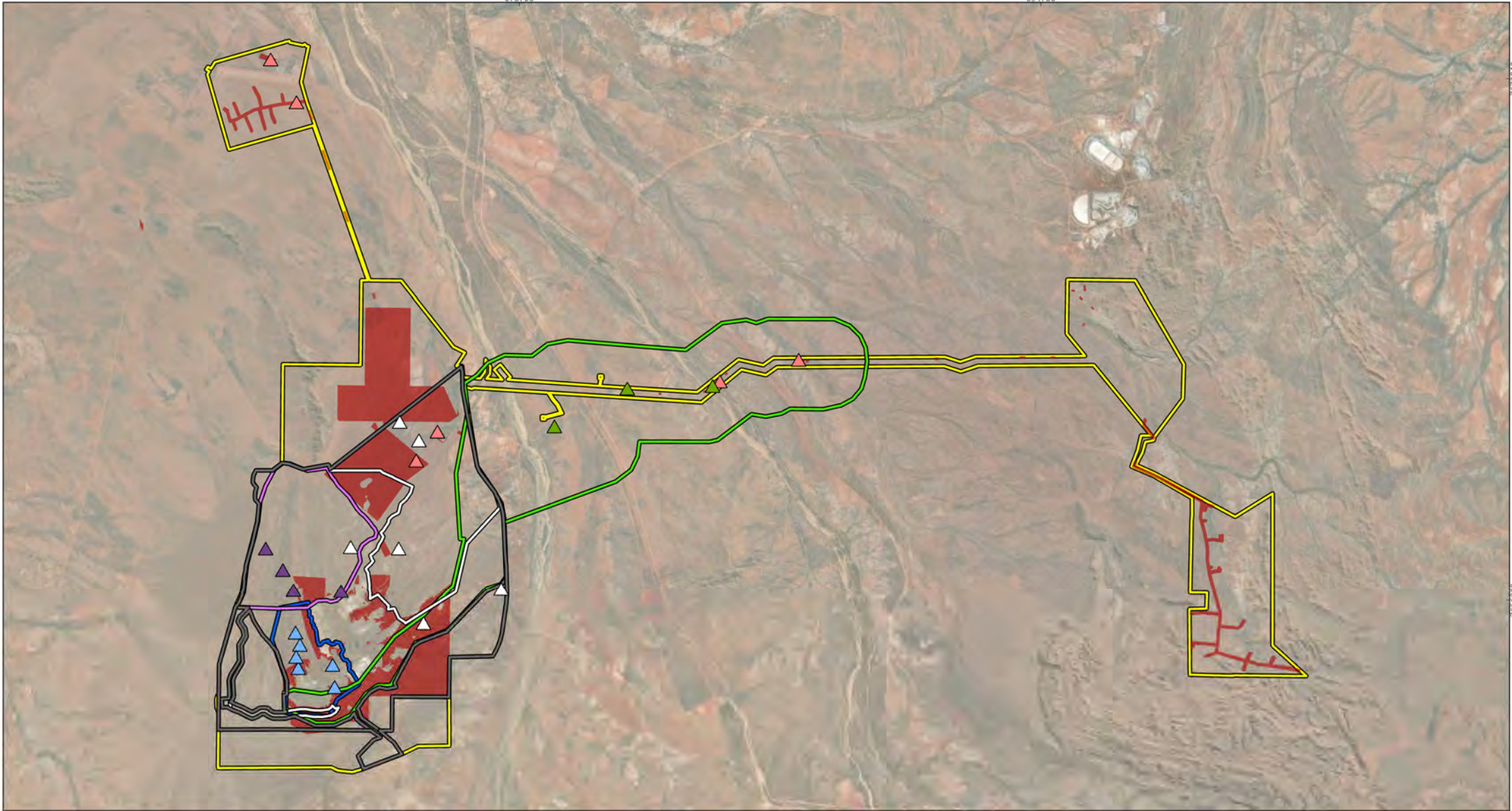
Habitat

 - Disturbance
 - Drainage Line
 - Ironstone Ridge Top
 - Rocky Foothills
 - Rocky Ridge and Gorge
 - Spinifex Sandplain

- Spinifex Stony Plain
 - Stony Rises

Figure 5-4

Phoenix (2024) and Stantec (2018) habitat mapping intersecting the study area



Mineral Resources Limited Wodgina Lithium Project		
Project No	1630	
Date	25/09/2024	
Drawn by	JL	
Map author	WP	
1:160,200(at A4) GDA 1994 MGA Zone 50		

All information within this map is current as of 25/09/2024. This product is subject to COPYRIGHT and is property of Phoenix Environmental Sciences (Phoenix). While Phoenix has taken care to ensure the accuracy of this product, Phoenix make no representations or warranties about its accuracy, completeness or suitability for any particular purpose.

Study area	Systematic sites, Phoenix (2024)
Phoenix (2024) study area	Systematic sites, Outback Ecology (2009)
Outback Ecology (2009) study area	Systematic sites, Outback Ecology (2010)
Outback Ecology (2010) study area	Systematic sites, Outback Ecology (2012)
Outback Ecology (2012) study area	Systematic sites, Western Wildlife (2019-2020)
Stantec (2018) study area	
Western Wildlife (2020) study area	

Figure 5-5
Previous study areas and systematic sampling sites

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5.1.3.3 Significant fauna

The previous detailed terrestrial fauna surveys for the Project (Outback Ecology 2009, 2010a, 2012b; Phoenix 2024a; Western Wildlife 2020) have recorded a total of 12 significant vertebrate fauna (Table 5-8). Of these species, 8 are currently state and/or nationally listed under the EPBC Act and/or BC Act (as of May 2024).

Table 5-8 Significant vertebrate fauna recorded in previous surveys for the Project

Species	Status (2024)	Outback Ecology (2009)		Outback Ecology (2010a)		Outback Ecology (2012b)		Western Wildlife (2020)		Phoenix (2024a)	
		Status	Rec. ²	Status	Rec. ²	Status	Rec. ²	Status	Rec. ²	Status	Rec. ²
<i>Actitis hypoleucos</i> Common Sandpiper	Mig.							Mig.	✓	Mig.	
<i>Tringa glareola</i> Wood Sandpiper	Mig.							Mig.	✓	Mig.	
<i>Burhinus grallarius</i> Bush Stone-curlew	NL ¹			P4	✓			Not listed	✓	Not listed	✓
<i>Ardeotis australis</i> Australian Bustard	NL ¹			P4	✓			Not listed	✓	Not listed	✓
<i>Merops ornatus</i> Rainbow Bee-eater	NL ¹	Mig.	✓	Mig.	✓	Mig.	✓	Not listed	✓	Not listed	✓
<i>Acrocephalus australis</i> Australian Reed-warbler	NL ¹					Mig.	✓			Not listed	
<i>Rhinonicteris aurantia</i> Pilbara Leaf-nosed Bat	VU	VU/S1	✓	VU/S1	✓	VU/S1	✓	VU	✓	VU	✓
<i>Macroderma gigas</i> Ghost Bat	VU	P4	✓	P4	✓	P4	✓			VU	
<i>Dasycercus hallucatus</i> Northern Quoll	VU	EN/S1	✓	EN/S1	✓	EN/S1	✓	VU	✓	VU	✓
<i>Antechinomys longicaudata</i> Long-tailed Dunnart	P4	P4	✓							P4	✓
<i>Pseudomys occidentalis</i> Western Pebble-mound Mouse	P4	P4	✓	P4	✓	P4	✓	P4	✓	P4	✓
<i>Amytornis whitei</i> subsp. <i>whitei</i> Rufous Grasswren	P4									P4	✓

Species highlighted in grey are no longer of conservation significant (as of December 2023). ¹NL – not listed.

²Rec. – recorded.

5.2 FIELD SURVEY

5.2.1 Vertebrate fauna

5.2.1.1 Habitats

Seven broad fauna habitat types were identified in the study area, comprising Spinifex stony plains, Spinifex sandplain, Rocky foothills, Drainage line, Rocky ridge and gorge, Stony rises and Ironstone ridge top (Table 5-9; Figure 5-6).

The most extensive habitat type was Spinifex stony plain which covered 5,546.3 ha (42.2%) of the study area and was most prolific in the Wodgina mine area (north and east of the mine), nearly continuous throughout the infrastructure corridor, and widespread throughout Breccia borefield. Rocky foothills was the next most extensive, covering 3,131.0 ha (23.8%) of the study area, encircling the mine and the ridgelines on its edges, as well as throughout the eastern extent of the Breccia borefield. Spinifex sandplain was mostly restricted to the northern extent of the study area within Wodgina airstrip and extending south into the Wodgina mine area, as well as the terraces of the Turner River within the infrastructure corridor (1,277.9 ha, 9.7%).


Drainage lines were extensive across the study area (843.6 ha, 6.4%); 2 major channels of the Turner River intersect the infrastructure corridor, and its' dendritic tributaries innervate throughout the intervening Spinifex stony plains habitat and dissect the interfluvies of the Rocky foothills within the Wodgina mine area and Breccia borefield. The remaining 8.2% of the study area (excluding disturbance) consists of Rocky ridge and gorge (681.1 ha, 5.2%), Stony rises (169.1 ha, 1.3%) and Ironstone ridge top (227.7 ha, 1.7%). Rocky ridge and gorge, and Rocky foothills both contain rocky overhangs and caves which are important habitat features for several significant species.

A large proportion of the study area has been subject to disturbance, mostly represented by the Wodgina mine but also associated infrastructure, roads, rail lines, borrow pits or waste disposal (1,261.9 ha, 9.6%).


Of the 84 site descriptions completed across the study area, fauna habitat quality was assessed as excellent at 36 sites, very good at 33 sites, good at 11 sites, poor at 2 sites and degraded at 2 sites (Appendix 2). Some areas of fauna habitat quality was affected by fire; 41 (48.8%) of the sites were identified as being burnt within 5 years (Appendix 2) and large areas of spinifex grassland across several habitat types (primarily Spinifex Stony Plain, Rocky foothills and the Spinifex sandplain within Wodgina airstrip) had minimal vegetation cover.

Higher than average local precipitation preceding the survey and during the survey resulted in water pooling along Drainage Lines, most notably in the channels of the Turner River where some areas were partially inundated. No natural permanent pools were identified in the study area, aside from within abandoned mine pits in the Breccia borefield.



Table 5-9 Extent and description of each fauna habitat in the study area

Habitat type	Site/s	Description	Extent in the study area and % of the study area	Representative photograph
Spinifex stony plain	WLP (003, 004, 011, 012, 018, 020, 022, 028, 043 045, 046, 051, 054, 056, 058) BP (05, 10, 11, 14), Opp (06, 09, 13, 14, 15, 16, 17, 18, 19) WOD (003, 006, 011, 012, 028, 029, 031, 032, 038, 040, 041, 043, 047, 048), BP (001, 003, 004, 005, 007, 008, 010), Opp (007, 012, 013, 014)	<p>Widely distributed throughout Wodgina mine area, along the infrastructure corridor and throughout Breccia borefield.</p> <p>Mixed-stage hard spinifex (<i>Triodia spp.</i>) hummock grassland on a stony/gravelly substrate. May also have scattered <i>Eucalyptus</i> and low stands or isolated shrubs of <i>Acacia</i> and <i>Hakea</i>.</p> <p>Large areas of this habitat type were burnt in the past few years; the spinifex there was often low and patchy (generally stage 1 to 2).</p> <p>Associated with the Boolgeeda, Capricorn, Macroy and Platform land systems.</p> <p>Suitable nesting and foraging habitat for Western Pebble-mound Mouse; suitable foraging habitat for Peregrine Falcon, Grey Falcon and Ghost Bat; potentially suitable for Oriental Plover, Oriental Pratincole, Long-tailed Dunnart and Pin-striped Fine-snout Ctenotus; low suitability for Night Parrot. Fork-tailed Swift could occur aerially, independent of habitat type.</p>	5,546.3 ha (42.2%)	



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Habitat type	Site/s	Description	Extent in the study area and % of the study area	Representative photograph
Spinifex sandplain	WLP (001, 002, 005), BP (01-04, 07, 09, 17, 18), Opp (01, 02) WOD (001, 002, 044, 045, 046, 052, 055), BP (006, 011, 012)	<p>Limited in extent to Wodgina airstrip, Wodgina mine area (north of the mine) and terraces of the major channels of the Turner River within the infrastructure corridor.</p> <p>Mixed-stage hard spinifex (<i>Triodia spp.</i>) hummock grassland on a sandy substrate. May also have scattered <i>Eucalyptus</i> and low stands or isolated shrubs of <i>Acacia</i> and <i>Hakea</i>.</p> <p>Large areas of this habitat type were burnt in the past few years, particularly around the Wodgina airstrip, resulting in the spinifex being often low and patchy (generally stage 1-2).</p> <p>Mostly associated with the Uaroo land system and banks of the River system.</p> <p>Suitable habitat for Brush-tailed Mulgara, Greater Bilby; Northern Short-tailed Mouse, Pin-striped Fine-snout Ctenotus and Spectacle Hare-wallaby (mainland); suitable foraging habitat for Ghost Bat, Grey Falcon and Peregrine Falcon; potentially suitable habitat for Oriental Plover Oriental Pratincole. Fork-tailed Swift could occur aerially, independent of habitat type.</p>	1,277.9 ha (9.7%)	



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Habitat type	Site/s	Description	Extent in the study area and % of the study area	Representative photograph
Rocky foothills	WLP (017, 038, 053, 055, 057), Opp (12, 21) WOD (013, 014, 015, 018, 021, 022, 025, 026) Opp009	<p>Occurs in Wodgina mine area (around the mine pits and south of the mine) and throughout the Breccia borefield. Mostly occurs adjacent to the Rocky ridge and gorge habitat, as well as the Spinifex stony plains. Interfluvies among this habitat are highly innervated by drainage tributaries in Breccia borefield.</p> <p>Mixed-stage hard spinifex (<i>Triodia spp.</i>) hummock grassland on rocky slopes. May also have scattered <i>Eucalyptus</i> and low stands or isolated shrubs of <i>Acacia</i> and <i>Hakea</i>.</p> <p>Large areas of this habitat type were burnt in the past few years and the spinifex was often low and patchy (generally stage 1 - 2).</p> <p>Associated with Capricorn, Platform, Rocklea and Talga land systems.</p> <p>Suitable foraging habitat for Northern Quoll, Pilbara Leaf-nosed Bat, Peregrine Falcon, Grey Falcon. Potentially suitable habitat for Long-tailed Dunnart, Spectacle hare-wallaby (mainland) and Western Pebble-mound Mouse. Fork-tailed Swift could occur aerially, independent of habitat type.</p>	3,131.0 ha (23.8%)	
Drainage line	WLP (006, 007, 008, 009, 010, 014, 016, 021, 023, 025, 026, 027, 031, 032, 033, 035, 036, 040, 044, 050, 059), BP (12, 13, 19-22), Opp (08, 11, 20) WOD (004, 005, 007, 008, 009, 019, 023, 035, 036, 039, 042, 051) BP (002, 009)	<p>Major channels of the Turner River are restricted to the infrastructure corridor; moderate drainage channels and dendritic tributaries innervate throughout the Breccia borefield, infrastructure corridor and Wodgina mine area. The Turner River intersects the infrastructure corridor approximately 13 km northeast of the mine and the Turner River West approximately 7 km northeast.</p> <p>Often contains a more complex vegetation structure than the surrounding landscape including a denser understory with significantly more vegetation cover. The vegetation mainly consisted of tall fringing <i>Eucalyptus</i> trees over shrubs of <i>Acacia</i>, <i>Hakea</i>, <i>Melaleuca</i>, and <i>Senna</i> over mixed spinifex and invasive buffelgrass. Some of the minor drainage channels were burnt in the past few years resulting in reduced vegetation cover.</p> <p>Major channels associated with the River land system; dendritic tributaries innervate the Boolgeeda, Capricorn, Macroy, Platform, Rocklea and Talga land systems.</p>	843.6 ha (6.4%)	


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Habitat type	Site/s	Description	Extent in the study area and % of the study area	Representative photograph
		Suitable foraging and dispersal habitat for Pilbara Olive Python, Northern Quoll, Pilbara Leaf-nosed Bat, and Ghost Bat. Potentially suitable breeding habitat for Grey and Peregrine Falcons. Potentially suitable habitat for Osprey and Red Goshawk after significant rainfall. Fork-tailed Swift could occur aerially, independent of habitat type.		<p align="center">Site WLP014</p>  <p align="center">Site WOD009</p>
Rocky ridge and gorge	<p>WLP (013, 015, 019, 029, 030, 034, 037, 041, 042, 048)</p> <p>WOD (016, 017, 020, 024, 050), Opp011</p>	<p>Limited extent in Wodgina mine area, along the outside of the mine pits, as well as isolated ranges south and north of the mine and Breccia borefield.</p> <p>Hard spinifex hummocks on steep rocky slopes with ironstone outcroppings, crevices, caves, and overhangs. May also have scattered <i>Eucalyptus</i> and low stands or isolated shrubs of <i>Acacia</i> and <i>Hakea</i>.</p> <p>Large areas of this habitat type were burnt in the past few years and the spinifex was often low and patchy.</p> <p>Mostly associated with the Capricorn land system, isolated areas throughout Talga, Rocklea and Macroy land systems.</p> <p>Suitable foraging and roosting/denning habitat for Northern Quoll, Pilbara Leaf-nosed Bat and Ghost Bat. Suitable foraging and potentially nesting habitat for Peregrine Falcon. Suitable foraging habitat for Grey Falcon. Suitable habitat</p>	681.1 ha (5.2%)	

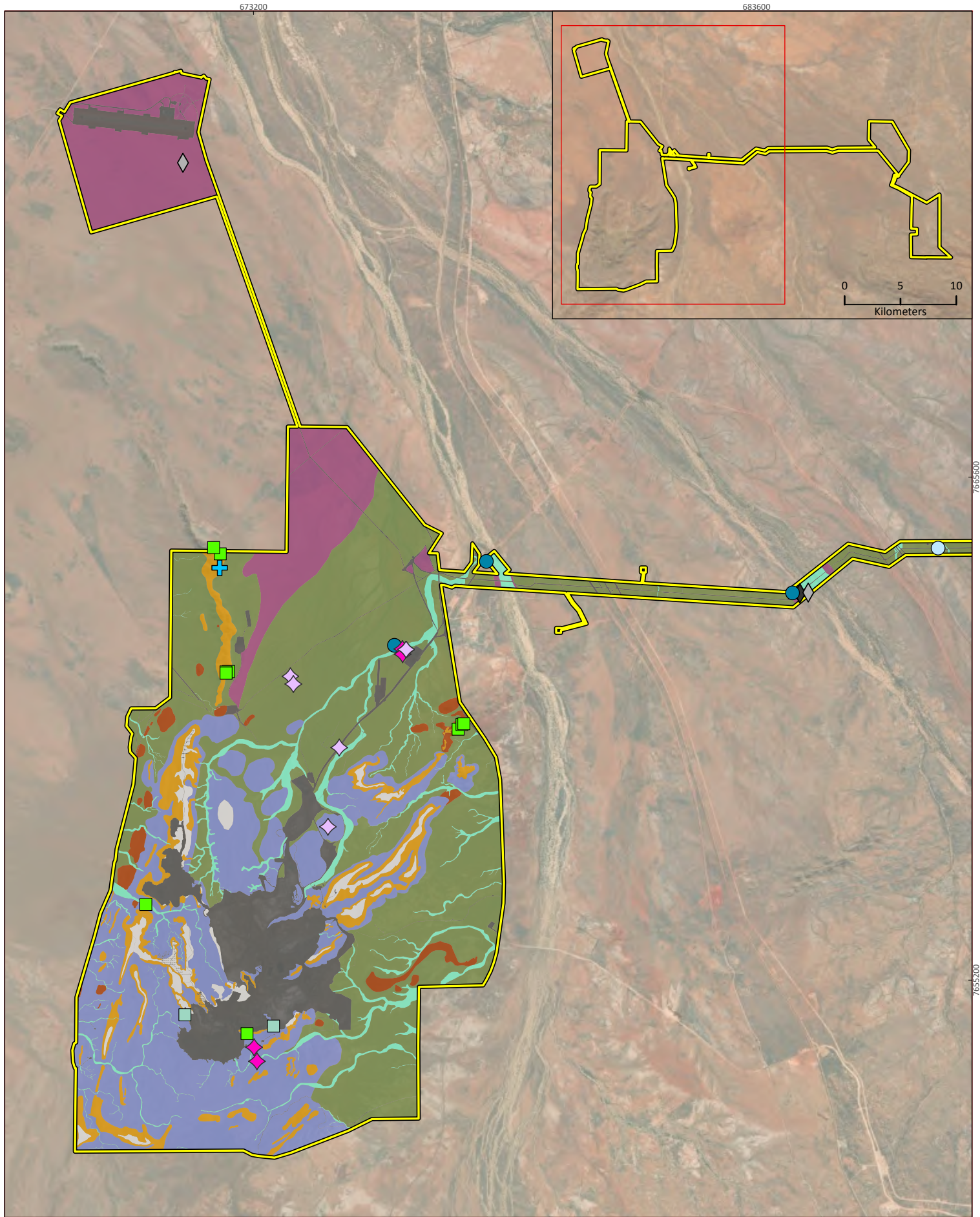
Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
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Habitat type	Site/s	Description	Extent in the study area and % of the study area	Representative photograph
		for Long-tailed Dunnart and Ganes Blind Snake. Fork-tailed Swift could occur aerially and independent of habitat type.		
Stony rises	<i>WOD (010, 027)</i>	<p>Limited extent in Wodgina mine area, to the north, east and west of the mine, and isolated areas throughout the Breccia borefield.</p> <p>Hard spinifex hummocks on rolling stony hills with rocky outcrops. May also have scattered <i>Eucalyptus</i> and low isolated shrubs of <i>Acacia</i>, <i>Senna</i>, and <i>Hakea</i>.</p> <p>Large areas of this habitat type were burnt in the past few years and the spinifex was often low and patchy.</p> <p>Associated with Boolgeeda, Capricorn, Platform and Talga land systems.</p> <p>Suitable foraging habitat for Northern Quoll and Ghost Bat. Suitable nesting habitat for Western Pebble-mound Mouse. Suitable habitat for Long-tailed Dunnart and Spectacled Hare-wallaby. Fork-tailed Swift could occur aerially, independent of habitat type.</p>	169.1 ha (1.3%)	
Ironstone ridge top	None	<p>Limited extent in Wodgina mine area, along the edges of the mine pits and south of the mine.</p> <p>Hard spinifex hummocks on flat or gently sloped, rocky ridge tops with scattered low shrubs. The habitat is very exposed with limited vegetation cover.</p> <p>Associated with the Capricorn land system.</p> <p>Suitable foraging habitat for Ghost Bat, Northern Quoll, Peregrine Falcon and Grey Falcon. Fork-tailed Swift could occur aerially, independent of habitat type.</p>	227.7 ha (1.7%)	

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Habitat type	Site/s	Description	Extent in the study area and % of the study area	Representative photograph
Disturbance	WLP (024, 039), Opp (03, 04, 05, 10) <i>WOD (033, 034), Opp008</i>	Areas cleared for infrastructure, including roads, rail lines, borrow pits, current operations, waste disposal, or otherwise disturbed habitat.	1,261.9 ha (9.6%)	
Total			13,138.6 ha (100%)	

Significant vertebrate fauna returned in database searches whose known distribution does not intersect the study area (Table 5-12) have not been discussed. Sites in bold are situated outside of the study area. Italicised sites were sampled in the spring 2023 survey (Phoenix 2024a).



Mineral Resources Limited Wodgina Lithium Project

Project No 1630
Date 4/10/2024
Drawn by JL
Map author WP



0 1.5 3
Kilometers

1:101,000(at A4) GDA 1994 MGA Zone 50

- Study area
- Habitat
 - Disturbance
 - Drainage Line
 - Ironstone Ridge Top
 - Rocky Foothills
 - Rocky Ridge and Gorge
 - Spinifex Sandplain
 - Spinifex Stony Plain
 - Stony Rises

Autumn (2024) Phoenix survey (current survey)

Species, status

- Bilby, VU (EPBC & BC Acts)
- Ghost Bat, VU (EPBC & BC Acts)
- Northern Quoll, EN (EPBC & BC Acts)
- Pilbara Leaf-nosed Bat, VU (EPBC & BC Acts)
- Western Pebble-mound Mouse, P4 (DBCA list)

Spring (2023) Phoenix survey

Species, status

- Bilby, VU (EPBC & BC Acts)
- Northern Quoll, EN (EPBC & BC Acts)
- Pilbara Leaf-nosed Bat, VU (EPBC & BC Acts)
- Western Pebble-mound Mouse, P4 (DBCA list)

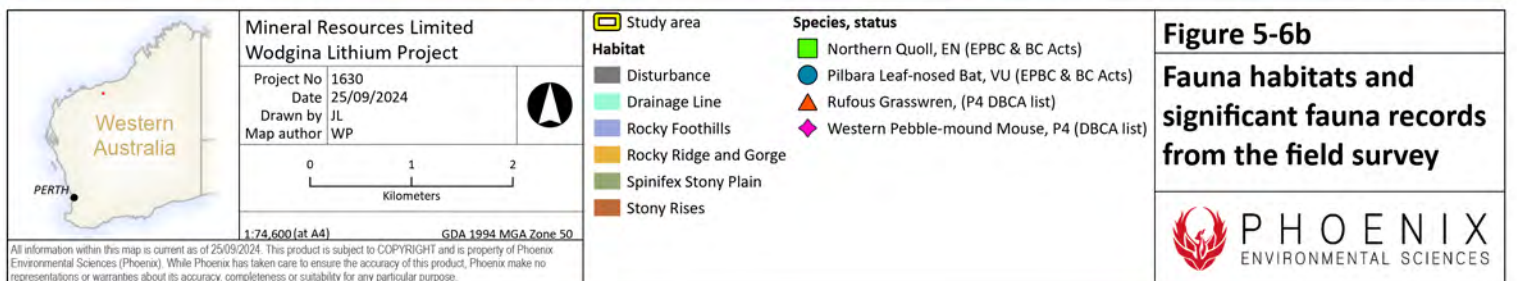
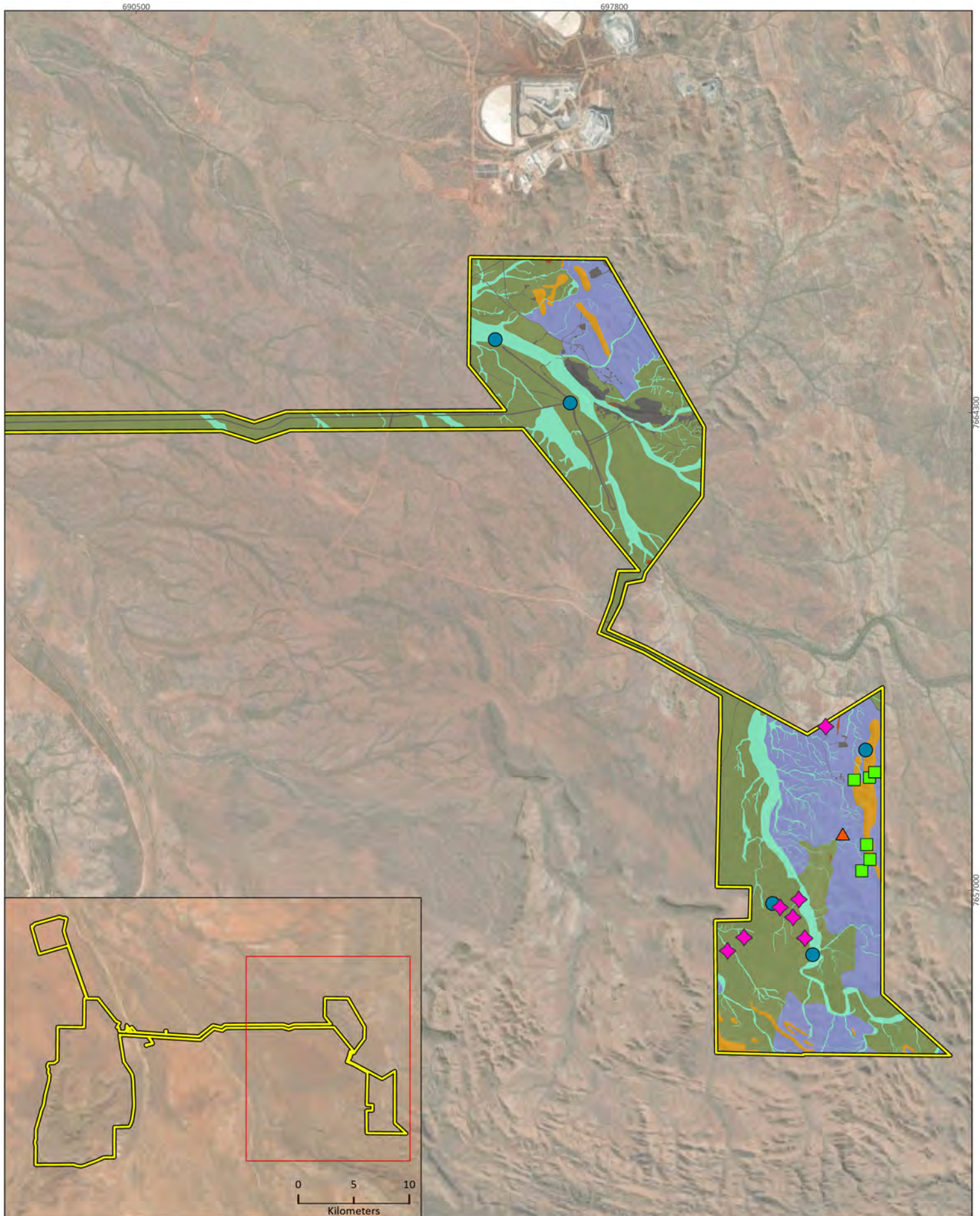
Figure 5-6a

Fauna habitats and significant fauna records from the field survey



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5.2.1.2 Assemblage

A total of 155 terrestrial vertebrate species representing 60 families and 110 genera were recorded in the study area during the field surveys (Appendix 3). The assemblage included 150 native species and 5 introduced species.

The recorded assemblage represents 38.6% of the species identified in the desktop review (Table 5-10).

Table 5-10 Number of vertebrate species recorded in the survey in comparison to desktop results, by group

Group	No. species identified in the desktop review		No. species recorded in the survey		
	Total	% Total	Total	% Total	% of the desktop class assemblage
Amphibians	10	2.5	6	3.9	60.0
Birds	217	54.0	62	40.0	28.6
Mammals	56	13.9	27	17.4	48.2
Reptiles	119	29.6	60	38.7	50.4
Total	402	100.0	155	100.0	38.6

The 6 amphibians recorded in the field surveys included ground and tree frogs (Hylidae, Limnodynastes, Pelodyadidae). The 60 reptiles recorded included 10 snakes (Elapidae, Pythonidae, Typhlopidae), 5 legless lizards (Pygopodidae), 11 geckoes (Carphodactylidae, Diplodactylidae, Gekkonidae), 22 skinks (Scincidae), 7 goannas (Varanidae) and 5 dragons (Agamidae). The 22 native mammal taxa recorded included 5 carnivorous marsupials (Dasyuridae), 3 macropods (Macropodidae), 4 rodents (Muridae), one monotreme (Tachyglossidae), one perameloidea (Thylacomyidae) and 8 microchiropteran bats (Emballonuridae, Megadermatidae, Rhinonycteridae, Vespertilionidae). Birds from 19 non-passerine families (32 species) and 14 passerine families (30 species) were recorded. Honeyeaters (Meliphagidae) were the most diverse of the bird families, with 7 species recorded. A total of 5 introduced mammals (cattle, dog, horse, cat and house mouse) were recorded.

One species was recorded during the field survey that was not identified in the desktop review as expected to occur, Hill's Sheath-tail-bat (*Taphozous hilli*). Records in the study area include a mixture of definitive records and instances where the call diagnostics between *T. hilli* and *T. georgianus* could not be discerned. The study area occurs outside of the currently recognised range of *T. hilli* (Van Dyck *et al.* 2013). ALA (2024) has some extralimital records north of the species' currently recognised range. The species has not been recorded within the vicinity of the Project using accessible data sources; however, it is not listed as a Threatened or Priority species under the EPBC and/or BC Acts.

Species richness ranged from 22 - 55 between systematic sites (Figure 5-7, Appendix 5). Species accumulation curves (SAC) generated using the 3 species richness estimators (Chao1, Jackknife1, Bootstrap) in comparison to the observed values in the survey (Sobs) indicate that the proportion of vertebrate fauna recorded was adequate in representing the vertebrate fauna assemblage of the study area (Figure 5-8). For most taxa groups, the curves under the Jackknife2 and Chao2 models are levelling off (reaching asymptote), indicating that sampling is relatively complete, i.e. a high proportion of the vertebrate taxa present in the study area at the time of the survey were recorded. The total of 402 species identified in the desktop review include those that are only seasonally active or present, excluded from the study area based on habitat preferences, are naturally rare or are infrequent visitors. Model-based curves indicate that up to 86.6% of the detectable species were recorded, with a maximum of approximately 179 detectable species likely to have been present at the

time of the survey. The richness of each model (Chaos2, Jackknife2, Bootstrap) stabilises in most instances, indicating confidence in the SAC outputs.

The SAC for avifauna reaches asymptotes under the Chaos2 model and is approaching asymptote under the remaining models, indicating that sampling of this fauna component was nearly complete. The total of 217 avifauna taxa identified in the desktop review includes numerous summer migrant, vagrant, irruptive or sparsely distributed rare species that are likely to have been absent during the survey. Model-based curves indicate that up to 81.1% of the detectable species were recorded, with a maximum of approximately 72 detectable species at the time of the survey. This represents the highest proportion of expected species richness to be recorded across the vertebrate fauna classes (excluding amphibians, which have not been assessed as a separate class).

The SACs for mammals show some curves have reached asymptote (Jackknife2 and Chaos2) while others are still approaching asymptote, indicating that the sampling of this group was relatively complete. Many mammal species are naturally rare or irruptive but are more limited in dispersal than birds. As such, these species are more likely to be resident year-round but can be difficult to detect. Model-based curves indicate that up to 87.1% of the detectable species were recorded, with a maximum of approximately 31 detectable species expected to occur.

The SAC for reptiles and amphibians (collectively herpetofauna) shows some curves have reached asymptote (Jackknife2 and Chaos2) while others are still approaching asymptote, indicating that the sampling of this group was relatively complete. Similar to mammals, some reptiles can be rare and hard to detect but are still likely to be resident with their activity levels largely corresponding to environmental parameters (such as temperature, humidity, etc). The activity levels and ability to detect desert frogs are associated with their proximity to water sources, the presence of recent precipitation and ambient temperature. Model-based curves indicate that up to 88.0% of the detectable species were recorded, with a maximum of approximately 75 detectable species expected to occur.

An additional 22 species were detected opportunistically outside of systematic survey methods which have not been factored into the SACs.

The most speciose habitats surveyed were Drainage lines (121 species; 3 frogs, 45 reptiles, 52 birds and 21 mammals), followed by Spinifex stony plains (81 species; 2 frogs, 27 reptiles, 40 birds and 12 mammals) and Spinifex sandplain (77 species; 4 frogs, 32 reptiles, 27 birds and 14 mammals; Figure 5-7).

Figure 5-7 Species richness per systematic site

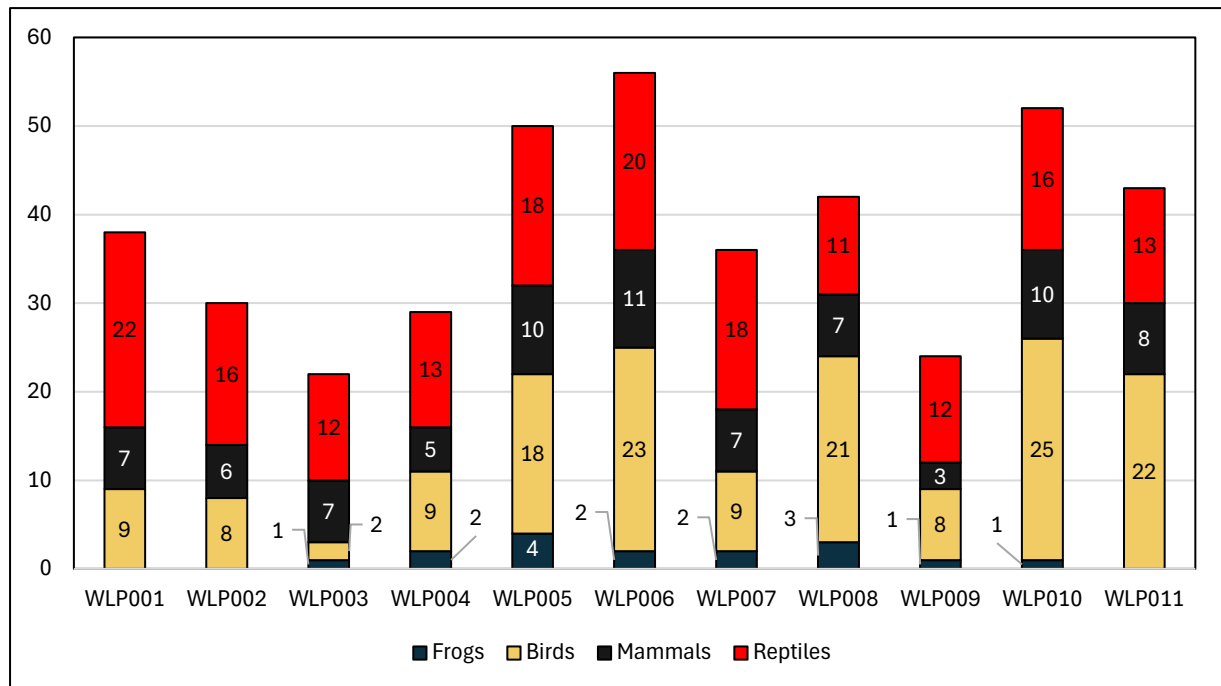
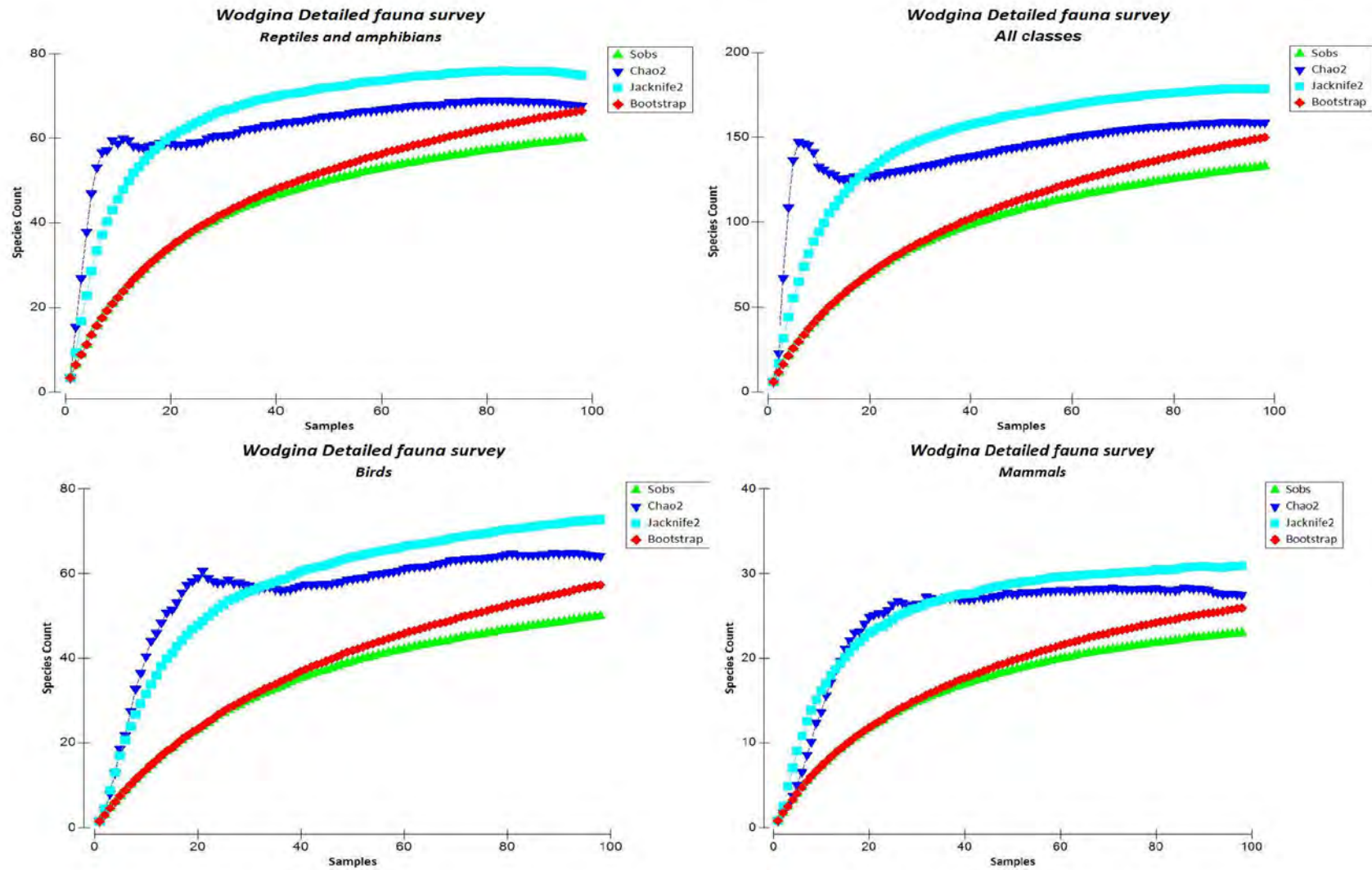


Figure 5-8 Species accumulation curve for vertebrate fauna



5.2.1.3 Significant vertebrate fauna


Four Threatened and 2 Priority vertebrate fauna were recorded in the current survey: Pilbara Grasswren (P4); Northern Quoll (VU) Ghost Bat (VU), Greater Bilby (VU), Pilbara Leaf-nosed Bat (VU) and Western Pebble-mound Mouse (P4) (Table 5-11; Figure 5-6).

Threatened and Priority fauna records were reported to DBCA via the licencing return system.



The likelihood of occurrence assessment (section 4.2.4) for the remaining significant species identified in the desktop review (section 5.1.3.3) determined none are likely to occur in the study area, 6 may occur and 45 are unlikely to occur. Three of the 45 significant species considered unlikely to occur have previously been recorded in the study area: Common Sandpiper, Wood Sandpiper and Northern Leaf-nosed Bat (refer to Table 5-12 for discussion). To date, 16 significant vertebrate species have been recorded in the study area across the current and previous surveys. Of the 44 species considered unlikely to occur, 30 have distributions that do not intersect the study area and their occurrence would be considered a range extension or extralimital record (highlighted in red in Table 5-12).

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Table 5-11 Details of significant vertebrate fauna recorded during the field survey

Species	Status	Distribution and ecology	Survey records	Photograph
<i>Amytornis whitei</i> subsp. <i>whitei</i> Rufous Grasswren	P4 (DBCA list)	The nominate subspecies <i>A. w. whitei</i> is restricted to spinifex habitat associations on red rocky ridges and slopes in the Pilbara and prefers tall and dense spinifex hummocks with or without shrubs or light tree cover. Semi-gregarious, foraging on the ground between spinifex hummocks. Erratic and flushed easily when disturbed.	One record (site Opp21) from a direct sighting in Rocky foothills habitat.	No photo.
<i>Dasyurus hallucatus</i> Northern Quoll	EN (EPBC & BC Acts)	<p>The Northern Quoll is the smallest of the 4 Australian quoll species and is a solitary carnivorous marsupial found in the northern parts of Australia (Hill & Ward 2010). The current distribution is discontinuous across northern Australia, with 3 recognised subspecies forming core populations in rocky and/or high rainfall areas (Hill & Ward 2010) across Queensland, the Northern Territory and WA.</p> <p>This primarily nocturnal species makes its dens in rock crevices, tree holes, or occasionally termite mounds. They occur in a variety of habitats across their range including rocky areas, eucalypt woodlands, rainforests, shrubland, sandy areas, grasslands, and desert.</p> <p>Opportunistic foragers that feed on a broad range of items, switching dietary resources according to season and availability (Oakwood 2000, 2008; Pollock 1999) including small mammals, reptiles, birds, carrion and fruit.</p> <p>Also recorded in the Phoenix (2024a) detailed survey.</p>	Seventeen records (sites WLP003, 015, 019, 027, 030, 031, 041) from camera traps and fresh scat in Rocky ridge and gorge, Rocky Foothills, Drainage line and Stony rises habitat.	

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Species	Status	Distribution and ecology	Survey records	Photograph
<i>Macroderma gigas</i> Ghost Bat	VU (EPBC & BC Acts)	<p>The Ghost Bat is endemic to northern Australia and is the largest microchiropteran species in Australia.</p> <p>It prefers to roost in caves beneath bluffs of low, rounded hills composed of Marra Mamba geology, within rock piles of granite in the Pilbara and sandstone elsewhere, and in adits of abandoned mines (Bullen 2021a).</p> <p>There is little confirmed knowledge on the species foraging habitat; they have been observed foraging in areas surrounding roost sites (up to 12 km away). In the Pilbara, mostly found foraging among productive plain areas with thin mature woodland over patchy/clumped <i>Triodia</i> spp. hummock grass and watercourses on sand or stony ground (Augusteyn <i>et al.</i> 2018; Bullen 2021a). Strictly carnivorous, feeding on other bats, frogs, small birds, lizards, spiders and large insects (Bullen 2021a; Churchill 2008; Richards <i>et al.</i> 2008); the Pilbara population has a diet mostly comprising small mammals and birds (Claramunt <i>et al.</i> 2019). Proficient visual and auditory hunters unlike other microchiropteran bats (Bullen 2021a; Richards <i>et al.</i> 2008).</p>	<p>One record (WLP048) from a direct sighting (flushed from a cave – photo provided) in Rocky ridge and gorge habitat.</p> <p>Cave measurements ~25 x 4 x4 m.</p>	
<i>Macrotis lagotis</i> Greater Bilby	VU (EPBC & BC Acts)	<p>The Greater Bilby is a rabbit-sized marsupial that originally occupied over 70% of the Australian mainland. It now occurs in less than 20% of its original range (Southgate 1990), with remaining WA populations contracting to the drier and less fertile areas of its former range predominantly in the Great Sandy and Gibson Desert.</p> <p>Habitat preferences include hummock grassland on plains and alluvial areas, <i>Triodia</i> and <i>Acacia</i> on sand plains and dune systems, open tussock grassland on uplands and hills, and Mulga woodland/shrubland on ridges and rises (DCCEEW 2023b; Pavey 2006)</p> <p>Highly mobile with large, moving home ranges. Greater Bilby have been recorded using many burrows (up to 18) over a few month period (Moseby & O'Donnell 2003).</p> <p>Omnivorous, diet consists of invertebrates such as larvae, termites, ants, grasshoppers, spiders and beetles, and other items such as seeds, bulbs, and fungi (DCCEEW 2023a).</p> <p>Also recorded in the Phoenix (2024a) detailed survey.</p>	<p>Two records (sites WLP005) recorded from scat in Spinifex sandplain (adjacent to the Turner River)</p>	

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Species	Status	Distribution and ecology	Survey records	Photograph
<i>Pseudomys chapmani</i> Western Pebble-mound Mouse	P4 (DBCA list)	<p>The Western Pebble-mound Mouse is widespread in the ranges of the central and southern Pilbara and extends into the Little Sandy Desert Ranges.</p> <p>Habitat preferences include rocky, hummock grasslands with little or no soil and an overstorey of <i>Acacia</i> (Burbidge 2016). Mounds are typically located on the gentle slopes of rocky ranges. The presence of suitably sized gravel and pebbles is a distribution-limiting factor for this species.</p> <p>Also recorded in the Phoenix (2024a) detailed survey.</p>	<p>Eleven records (sites WLP006, 009, 011, 055, Opp13, Opp15, Opp17) from old nests and direct sightings (captured in pipe trap) in Spinifex Stony Plain, Rocky Footslopes and Drainage line habitat.</p>	
<i>Rhinioncteris aurantia</i> Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	<p>The Pilbara Leaf-nosed Bat is endemic to Australia and has a range stretching from the Pilbara region of WA to Queensland. The Pilbara form, however, is restricted to the Pilbara region where it roosts in caves and abandoned mine adits with stable, warm and humid microclimates.</p> <p>Also recorded in the Phoenix (2024a) detailed survey.</p>	<p>One-hundred twelve ultrasonic detections (sites WLP005, 006, 008, 011, 023, 025, 029, 032) from in Drainage line, Spinifex stony plains and Rocky ridge and gorge.</p>	No photo.

Table 5-12 Likelihood of occurrence for significant vertebrate fauna identified in the desktop review

Species	Status	Likelihood of occurrence	Habitats						
			Drainage line	Ironstone ridge top	Rocky foothills	Rocky ridge and gorge	Spinifex sandplain	Spinifex stony plain	Stony rise
Migratory birds (37)									
<i>Actitis hypoleucos</i> Common Sandpiper	Mig. (EPBC & BC Acts)	Recorded/Unlikely; previously recorded in the study area. Within known distribution; however, there is no suitable wetland habitat within the study area. Record is likely a bird passing through as study area is of no value to the species.							
<i>Apus pacificus</i> Fork-tailed Swift	Mig. (EPBC & BC Acts)	Recorded; previously recorded in the study area. Occurs mostly independent of terrestrial habitat.	•	•	•	•	•	•	•
<i>Arenaria interpres</i> Ruddy Turnstone	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – typically coastal. No suitable wetland habitat within the study area.							
<i>Calidris acuminata</i> Sharp-tailed Sandpiper	Mig. (EPBC & BC Acts)	Unlikely; within current known distribution; however, there is no suitable wetland habitat within the study area.							
<i>Calidris ferruginea</i> Curlew Sandpiper	CR/Mig./CR (EPBC Act; BC Act)	Unlikely; within current known distribution; however, there is no suitable wetland habitat within the study area.							
<i>Calidris melanotos</i> Pectoral Sandpiper	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – no suitable wetland habitat within the study area.							
<i>Calidris ruficollis</i> Red-necked Stint	Mig. (EPBC & BC Acts)	Unlikely; within current known distribution; however, there is no suitable wetland habitat within the study area.							
<i>Calidris subminuta</i> Long-toed Stint	Mig. (EPBC & BC Acts)	Unlikely; within current known distribution; however, there is no suitable wetland habitat within the study area. Frequent but uncommon vagrant to Australia, likely under-represented due to delineation with <i>C. ruficollis</i> .							
<i>Calidris tenuirostris</i> Great Knot	CR/Mig./CR (EPBC Act; BC Act)	Unlikely; outside current known distribution – typically coastal. No suitable wetland habitat within the study area.							

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Species	Status	Likelihood of occurrence	Habitats						
			Drainage line	Ironstone ridge top	Rocky foothills	Rocky ridge and gorge	Spinifex sandplain	Spinifex stony plain	Stony rise
<i>Charadrius leschenaultii</i> Greater Sand Plover	VU/Mig./VU (EPBC Act; BC Act)	Unlikely; outside current known distribution – typically coastal. No suitable wetland habitat within the study area.							
<i>Charadrius veredus</i> Oriental Plover	Mig. (EPBC & BC Acts)	Possible; previously recorded in the study area.					•	•	
<i>Chlidonias leucopterus</i> White-winged Black Tern	Mig. (EPBC & BC Acts)	Unlikely; outside the current known distribution – typically coastal. No suitable marsh habitat within the study area.							
<i>Fregata ariel</i> Lesser Frigatebird	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – predominately marine, usually pelagic.							
<i>Gallinago stenura</i> Pin-tailed Snipe	Mig. (EPBC & BC Acts)	Unlikely; typically coastal – no suitable wetland habitat within the study area.							
<i>Gelochelidon nilotica</i> Gull-billed Tern	Mig. (BC Act)	Unlikely; within current known distribution – most common on the coastline, occasionally recorded inland. No suitable wetland habitat within the study area.							
<i>Glareola maldivarum</i> Oriental Pratincole	Mig. (EPBC & BC Acts)	Possible; within current known distribution, suitable open plain habitat within the study area, nearest record located 35 km north.					•	•	
<i>Hirundo rustica</i> Barn Swallow	Mig. (EPBC & BC Acts)	Unlikely; study area on the southern edge of current known distribution, mainly known from coastal plains and wetland regions.							
<i>Hydroprogne caspia</i> Caspian Tern	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – typically coastal in the Pilbara region. No suitable wetland habitat within the study area.							
<i>Limosa lapponica</i> Bar-tailed Godwit	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – typically coastal. No suitable wetland habitat within the study area.							
<i>Motacilla cinerea</i> Grey Wagtail	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – rare vagrant to northern Australia. The Turner River after significant rainfall would provide suitable habitat.	•						

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Species	Status	Likelihood of occurrence	Habitats						
			Drainage line	Ironstone ridge top	Rocky foothills	Rocky ridge and gorge	Spinifex sandplain	Spinifex stony plain	Stony rise
<i>Motacilla tschutschensis</i> Eastern Yellow Wagtail	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – rare but regular summer migrant to northern Australia (mostly Broome, WA to Darwin, NT).							
<i>Numenius madagascariensis</i> Eastern Curlew	CR/Mig./CR (EPBC Act; BC Act)	Unlikely; outside current known distribution – typically coastal. No suitable wetland habitat within the study area							
<i>Numenius minutus</i> Little Curlew	Mig. (EPBC & BC Acts)	Unlikely; on the south edge of current known distribution – no suitable wetland habitat or seasonally inundated grassland within the study area.							
<i>Numenius phaeopus</i> Whimbrel	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – no suitable wetland habitat within the study area.							
<i>Onychoprion anaethetus</i> Bridled Tern	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – typically coastal.							
<i>Pandion cristatus</i> Osprey	Mig. (EPBC & BC Acts)	Possible; within current known distribution, nearby records (<30 km), study area close to coast and intersects major seasonal river (Turner River).	●						
<i>Plegadis falcinellus</i> Glossy Ibis	Mig. (EPBC & BC Acts)	Unlikely; within current known distribution – no suitable wetland habitat in the study area.							
<i>Pluvialis fulva</i> Pacific Golden Plover	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – typically coastal. No suitable wetland habitat in the study area.							
<i>Pluvialis squatarola</i> Grey Plover	Mig. (EPBC & BC Acts)	Unlikely; outside the current known distribution – strictly coastal, utilising large tidal flats.							
<i>Sterna hirundo</i> Common Tern	Mig. (EPBC & BC Acts)	Unlikely; outside the current known distribution – strictly coastal, typically marine.							
<i>Sternula albifrons</i> Little Tern	Mig. (EPBC & BC Acts)	Unlikely; outside the current known distribution – strictly coastal, typically marine.							

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Species	Status	Likelihood of occurrence	Habitats						
			Drainage line	Ironstone ridge top	Rocky foothills	Rocky ridge and gorge	Spinifex sandplain	Spinifex stony plain	Stony rise
<i>Thalasseus bergii</i> Crested Tern	Mig. (EPBC & BC Acts)	Unlikely; outside the current known distribution – strictly coastal, typically marine.							
<i>Tringa brevipes</i> Grey-tailed Tattler	Mig. EPBC and BC Acts; P4 DBCA list	Unlikely; outside the current known distribution – typically coastal. No suitable wetland habitat within the study area.							
<i>Tringa glareola</i> Wood Sandpiper	Mig. (EPBC & BC Acts)	Recorded/Unlikely; previously recorded in the study area. Within known distribution; however, there is no suitable wetland habitat in the study area. Record is likely a bird passing through as study area is of no value to the species.							
<i>Tringa nebularia</i> Common Greenshank	Mig. (EPBC & BC Acts)	Unlikely; within current known distribution – no suitable wetland habitat in the study area.							
<i>Tringa stagnatilis</i> Marsh Sandpiper	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – typically coastal in the Pilbara region utilising tidal flats, and inland wetlands in the east of its distribution.							
<i>Xenus cinereus</i> Terek Sandpiper	Mig. (EPBC & BC Acts)	Unlikely; outside current known distribution – typically coastal, utilises wetlands, in particular large tidal flats.							
Non-migratory birds (8)									
<i>Amytornis whitei</i> subsp. <i>whitei</i> Rufous Grasswren	P4 (DBCA list)	Recorded; current survey.			•	•			
<i>Erythrotriorchis radiatus</i> Red Goshawk	VU (EPBC & BC Acts)	Unlikely; within current known distribution – typically occurs in higher rainfall areas across Northern Australia (southwest Kimberley to southeast Queensland), suitable habitat may occur in the region, no permanent water in the study area.	•						

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Species	Status	Likelihood of occurrence	Habitats						
			Drainage line	Ironstone ridge top	Rocky foothills	Rocky ridge and gorge	Spinifex sandplain	Spinifex stony plain	Stony rise
<i>Rostratula australis</i> Australian Painted Snipe	EN (EPBC & BC Acts)	Unlikely; outside current known distribution – no suitable wetland habitat in the study area.							
<i>Falco hypoleucos</i> Grey Falcon	VU (BC Act)	Recorded; previously recorded in the study area.	•	•	•	•	•	•	•
<i>Falco peregrinus</i> Peregrine Falcon	OS (BC Act)	Recorded; previously recorded in the study area.	•	•	•	•	•	•	•
<i>Pezoporus occidentalis</i> Night Parrot	EN/CR (EPBC Act; BC Act)	Unlikely; on the northern edge of the species high priority zone, minimal fire-isolated roosting habitat, and no foraging habitat.	•					•	•
<i>Polytelis alexandrae</i> Princess Parrot	P4 (DBCA list)	Unlikely; outside current known distribution – occurs further inland with core distribution across the Great Sandy Desert.					•		
<i>Sternula nereis</i> subsp. <i>nereis</i> Fairy Tern	VU (EPBC & BC Acts)	Unlikely; outside current known distribution – coastal/pelagic.							
Mammals (13)									
<i>Antechinomys longicaudata</i> Long-tailed Dunnart	P4 (DBCA list)	Recorded; previously recorded in the study area.			•	•		•	
<i>Dasyercus blythi</i> . Brush-tailed Mulgara	P4 (DBCA list)	Recorded; previously recorded in the study area.					•		
<i>Dasyurus hallucatus</i> Northern Quoll	EN (EPBC & BC Acts)	Recorded; current survey.	•	•	•	•			•
<i>Hipposideros stenotis</i> Northern Leaf-nosed Bat	P2 (DBCA list)	Recorded/Unlikely; previously recorded in the study area. Outside current known distribution; occurs across the Kimberley and Top End. Likely a misidentification of <i>R. aurantia</i> , otherwise extralimital records.	•		•	•		•	•
<i>Lagorchestes conspicillatus</i> subsp. <i>leichardti</i>	P4 (DBCA list)	Recorded; previously recorded in the study area.					•	•	•

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Species	Status	Likelihood of occurrence	Habitats						
			Drainage line	Ironstone ridge top	Rocky foothills	Rocky ridge and gorge	Spinifex sandplain	Spinifex stony plain	Stony rise
Spectacled Hare-wallaby (mainland)									
<i>Lagorchestes conspicillatus</i> subsp. <i>conspicillatus</i> Barrow Island Spectacled Hare-wallaby	VU (EPBC & BC Acts)	Unlikely; outside current known distribution – distribution is restricted to Barrow Island.							
<i>Leggadina lakedownensis</i> Northern Short-tailed Mouse, Lakeland Downs Mouse, Kerakenga	P4 (DBCA list)	Possible; within current known distribution, nearby records (<30 km), suitable spinifex grasslands and stony plains in study area.					•		
<i>Macroderma gigas</i> Ghost Bat	VU (EPBC & BC Acts)	Recorded; current survey.	•	•	•	•			•
<i>Macrotis lagotis</i> Greater Bilby	VU (EPBC & BC Acts)	Recorded; current survey.	•				•		
<i>Ozimops cobourgiensis</i> North-western Free-tailed Bat	P1 (DBCA list)	Unlikely; on the edge of current known distribution, no nearby records, no suitable mangrove habitat in the study area.							
<i>Osphranter robustus</i> subsp. <i>isabellinus</i> Barrow Island Euro	VU (EPBC & BC Acts)	Unlikely; outside current known distribution – distribution is restricted to Barrow Island.							
<i>Pseudomys chapmani</i> Western Pebble-mound Mouse	P4 (DBCA list)	Recorded; current survey.			•			•	•
<i>Rhinonicteris aurantia</i> (Pilbara) Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	Recorded; current survey.	•		•	•			

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Species	Status	Likelihood of occurrence	Habitats						
			Drainage line	Ironstone ridge top	Rocky foothills	Rocky ridge and gorge	Spinifex sandplain	Spinifex stony plain	Stony rise
Reptiles (6)									
<i>Anilius ganei</i> Gane's Blind Snake (Pilbara)	P1 (DBCA list)	Possible; known from limited records but within current known distribution, suitable moist gully and gorge habitat, recorded very close to the study area.	●			●			
<i>Ctenotus angusticeps</i> Airlie Island Ctenotus	P3 (DBCA list)	Unlikely; study area on the edge of known distribution, no nearby records, mainland population typically coastal occurring on mudflats vegetated with samphire which does not occur in the study area.							
<i>Ctenotus nigrilineatus</i> Pin-striped Fine-snout Ctenotus	P1 (DBCA list)	Possible; known from limited records, study area on the edge of known distribution, nearby record (<30 km), suitable spinifex plain habitat and watercourses in the study area.	●				●	●	●
<i>Liasis olivaceus</i> subsp. <i>barroni</i> Pilbara Olive Python	VU (EPBC & BC Acts)	Recorded; previously recorded in the study area.	●			●			
<i>Liopholis kintorei</i> Great Desert Skink	VU (EPBC & BC Acts)	Unlikely; outside current known distribution.	●				●	●	
<i>Pogona minor</i> subsp. <i>minima</i> Abrolhos dwarf bearded dragon	VU (BC Act)	Unlikely; outside current known distribution – distribution is restricted to the Houtman Abrolhos islands.							

Rows highlighted in grey are species that have been recorded within 10 km of the study area and/or recorded during the survey; rows highlighted in red are species whose known distribution does not intersect the study area.

Species that are restricted to offshore islands have been listed in the Likelihood of Occurrence (LOO) table but disregarded from the habitat assessment.

5.2.2 SRE invertebrate fauna

5.2.2.1 Habitats

Three of the 7 fauna habitats mapped in the study area were considered high potential for SREs (Figure 59; Table 513), which together cover approximately 4,655.7 ha (35.4% of the study area). High potential SRE habitats are associated with the Rocky ridge and gorges, Rocky foothills and Drainage lines. These habitats are exemplified by high amounts of habitat complexity, the presence of suitable microhabitats that act as climatically buffered refugia, as well as providing comparatively mesic conditions to the surrounding environment, others of which are often depauperated across the intervening landscape. The Spinifex Stony Plain and Sandplain, Rocky foothills, Stony rises and Ironstone Ridgetop have low potential to support SREs due to a lack of suitable microhabitats and moisture (in the absence of recent precipitation), and their extent and continuity with the broader landscape.

Table 5-13 Extent and description of each SRE habitat in the study area

Habitat type	Site/s	Description	SRE habitat rating	Extent in the study area and % of the study area
Spinifex Stony Plain	WLP (003, 004, 011, 012, 018, 020, 022, 028, 043, 045, 046, 051, 054, 056, 058) BP (05, 10, 11, 14), Opp (06, 09, 13, 14, 15, 16, 17, 18, 19) WOD (003, 006, 011, 012, 028, 029, 031, 032, 038, 040, 041, 043, 047, 048), BP (001, 003, 004, 005, 007, 008, 010), Opp (007, 012, 013, 014)	Low habitat complexity. Flat, extensive and continuous with the broader region. Highly exposed. Low incidence of moisture, depauperated amount of microhabitats.	Low	5,546.3 ha (42.2%)
Rocky foothills	WLP (017, 038, 053, 055, 057), Opp (12, 21) WOD (013, 014, 015, 018, 021, 022, 025, 026) Opp009	Rocky outcrops with large rocks and boulders, and an abundance of refugia created climatically buffered microhabitats with comparatively mesic environments. Protected from the elements and fire. South-facing topologies of higher SRE value.	High	3,131.0 ha (23.8%)
Spinifex sandplain	WLP (001, 002, 005), BP (01-04, 07, 09, 17, 18), Opp (01, 02) WOD (001, 002, 044, 045, 046, 052, 055), BP (006, 011, 012)	Low habitat complexity. Flat, extensive and continuous throughout the study area and broader region. Highly exposed and permeable substrate. Low incidence of moisture and depauperated amount of microhabitats.	Low	1,277.9 ha (9.7%)
Drainage line	WLP (006, 007, 008, 009, 010, 014, 016, 021, 023, 025, 026, 027, 031, 032,	Higher incidence of water creating a locally mesic environment. Complex topographic and vegetative	High	843.6 ha (6.4%)

Habitat type	Site/s	Description	SRE habitat rating	Extent in the study area and % of the study area
	033, 035, 036, 040, 044, 050, 059), BP (12, 13, 19-22), Opp (08, 11, 20) <i>WOD (004, 005, 007, 008, 009, 019, 023, 035, 036, 039, 042, 051) BP (002, 009)</i>	assemblage. Areas of deep leaf litter and sandy to gravelly substrates. Climatically buffered microhabitats retain moisture during prolonged dry periods, providing more suitable conditions for SRE groups.		
Rocky ridge and gorge	WLP (013, 015, 019, 029, 030, 034, 037, 041, 042, 048) <i>WOD (016, 017, 020, 024, 050), Opp011</i>	Rocky ridgelines and gorges with steep faces, large rocks, and boulders create climatically buffered refugia that are protected from the elements and fire, and can retain moisture. Regionally isolated.	High	681.1 ha (5.2%)
Ironstone ridge top	None	Exposed, minimal vegetation cover and availability of refugia. Low incidence of moisture and suitability for SRE groups.	Low	227.7 ha (1.7%)
Stony rises	<i>WOD (010, 027)</i>	Exposed with little vegetation and presence of refugia. Low incidence of moisture. Extensive and well connected throughout the study area and surrounding landscape.	Low	169.1 ha (1.3%)
Disturbance	WLP (024, 039), Opp (03 , 04, 05, 10) <i>WOD (033, 034), Opp008,</i>	Land has been cleared for Project-related infrastructure.	None	1,261.9 ha (9.6%)

Sites in bold are situated outside of the study area. Italicised sites were sampled in the spring 2023 survey (Phoenix 2024a).

5.2.2.2 SRE records

A total of 180 specimens representing 27 taxa from SRE groups were collected within the study area (Figure 5-9; Table 5-15). This assemblage comprised:

- 3 mygalomorph spiders
- 8 scorpions
- 5 pseudoscorpions
- 3 harvestmen
- 1 land snail
- 7 isopods.

Of these, no taxa are confirmed SREs, 20 are Potential, 3 are Widespread (e.g. not SRE) and 4 are of Uncertain SRE status due to not being able to allocate a species-level identification (Table 5-14).

Of the 27 taxa from SRE groups, 23 species were identified to species or morphospecies code as applied by the WA Museum. Of these, 7 had significant divergence from their closest matches on GenBank and are considered new species.

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Thirteen of the 23 recognised taxa were identified in the desktop review; 12 taxa were recorded in the field survey but were not returned in the desktop review: *Aname* 'Phoenix0247', *Aureocrypta* 'Phoenix0248', *Dampetrus* 'Phoenix0243', *Anatemnus* 'Phoenix0094', *Atemnidae* 'Phoenix0245', *Olpiidae* 'Phoenix0244', *Lychas* 'Phoenix0242', *Lychas* 'SCO039', *Lychas* 'SCO052', *Buddelundia* 'Phoenix0200', *Buddelundia* 'Phoenix0246', *Buddelundia* 'Phoenix0249'.

Four taxa were unidentifiable ("sp. indet.", e.g. female or juvenile specimens) or could not be identified to species or morphospecies and may represent undescribed taxa, known species or other species listed in the same genus where records exist. One of these taxa was not represented by other identifiable congeners and is therefore regarded as a distinct species.

Between 2 and 8 taxa were recorded at each site (Table 5-15). Sites located in Drainage line recorded the highest SRE diversity. In particular, site WLP003 recorded the highest number of specimens (20), followed by WLP006 and WLP007 which each recorded 11 specimens. Fourteen species were found across multiple sites, and 11 were found across more than one habitat type, including 10 in both high and low potential SRE habitats, whereas some are only known from a single site.

No significant invertebrate taxa were recorded in the field survey, and none were identified in the desktop review.

Table 5-14 Summary of SRE taxa identified in the field survey

Group (higher classification)	SRE status				Total
	Confirmed	Potential	Uncertain	Widespread	
Mygalomorphae (trapdoor spiders)		2		1	3
Scorpiones (scorpions)		7	1		8
Pseudoscorpiones (pseudoscorpions)		3		2	5
Opiliones (harvestmen)		2	1		3
Gastropoda (Land snails)			1		1
Isopoda (Woodlice)		6	1		7
Total	0	20	4	3	27

Table 5-15 Specimens from SRE groups recorded in the field survey

Higher order/ Family	Taxa	Site/s	Habitat/s	No. specimens	SRE status	Comments
Class: Arachnida, Infraorder: Mygalomorphae (Trapdoor spiders) (3)						
Anamidae	<i>Aname mellosa</i>	WLP001, 002, 003, 004, 006, 007, 008	Spinifex sandplain, Spinifex Stony Plain, Drainage line	19	Widespread	Recorded from 7 sites in low and high potential SRE habitat. Described in 2012. Widely distributed in the Pilbara region. Also recorded in Phoenix (2024a) detailed survey
Anamidae	<i>Aname</i> 'Phoenix0247'	WLP001	Spinifex sandplain	1	Potential	Recorded at one site in low potential SRE habitat. Specimen is 14.4% divergent from closest available match on GenBank (<i>Aname vernonorum</i>). New species
Barychelidae	<i>Aurecocypta</i> 'Phoenix0248'	WLP011	Spinifex Stony Plain	2	Potential	Recorded at one site in low potential SRE habitat. Specimens are a minimum of 10.2% divergent from closest available match on GenBank (<i>Aurecocypta MYG319</i>) and 10% divergent from PES genetic database (<i>Synothele</i> 'karara'). New species
Class: Arachnida, Order: Opiliones (Harvestmen) (3)						
Assamiidae	<i>Dampetrus</i> 'DNA09'	WLP003	Spinifex Stony Plain	5	Potential	Recorded at one site in low potential SRE habitat. Specimens are conspecific with others recorded in the Phoenix (2024a) detailed survey, and 2% divergent from specimens collected at the East Pilbara Independent Rail Project. Also recorded in Phoenix (2024a) detailed survey
Assamiidae	<i>Dampetrus</i> 'Phoenix0243'	WLP007	Drainage line	1	Potential	Recorded at one site in high potential SRE habitat. Specimen is 10.5% divergence from closest match on GenBank (<i>Dampetrus</i> 'OPI001'). New species
Opiliones	Opiliones sp. indet	WLP004, 007	Spinifex Stony Plain, Drainage line	4	Uncertain	Recorded from 2 sites in low and high potential SRE habitat. Specimens from WLP004 are conspecific but unidentifiable beyond Order. Specimen from WLP007 potentially contaminated. A dive diversity of <i>Opiliones</i> was recorded in the survey; however, other congeners were recorded at the same

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Higher order/ Family	Taxa	Site/s	Habitat/s	No. specimens	SRE status	Comments
						site for some of the specimens. Potentially represents taxa already recorded in the study area.
Class: Arachnida, Order: Pseudoscorpiones (Pseudoscorpions) (5)						
Atemnidae	<i>Anatemnus</i> 'Phoenix0094'	WLP010	Drainage line	2	Widespread	Recorded at one site in high potential SRE habitat. Conspecific with <i>Anatemnus</i> sp. Biologic-PSEU081 and 0.5 divergent from specimens collected in Phoenix (2024a) detailed survey. Known range exceeds >200 km. Also recorded in Phoenix (2024a) detailed survey
Atemnidae	Atemnidae 'Phoenix0245'	WLP006	Drainage line	1	Potential	Recorded at one site in high potential SRE habitat. Conspecific with Atemnidae 'Biologic-PSEU096' (5.8% divergent).
Garypidae	<i>Synsphyronus</i> <i>xynus</i>	WLP011	Spinifex Stony Plain	1	Widespread	Specimen is 0.9% divergent from closest match on GenBank and is considered conspecific. Described in 2021 and is widespread in the Pilbara region.
Olpiidae	Olpiidae 'Phoenix0244'	WLP029	Rocky ridge and gorge	2	Potential	Recorded at one site in high potential SRE habitat. Specimen is 9.5% divergent from closest match on GenBank (<i>Olpiidae</i> WAMT114849). New species
Olpiidae	Olpiidae 'Phoenix0197'	WLP001	Spinifex sandplain	1	Potential	Recorded at one site in low potential SRE habitat. Specimen is 11.7% divergent from closest match on GenBank (<i>Indolpium</i> – Biologic PSEU079). Also recorded in Phoenix (2024a) detailed survey
Class: Arachnida, Order: Scorpiones (Scorpions) (8)						
Buthidae	<i>Lychas</i> 'Phoenix0194'	WLP008, 009	Drainage line	6	Potential	Recorded at 2 sites in high potential SRE habitat. Sequenced specimens are 10% divergent from closest match on GenBank (<i>Isometroides</i> SCO010) and 9.8% divergence from closest match on PES genetic database (<i>Isometroides</i> 'Pilbara1'). Also recorded in Phoenix (2024a) detailed survey

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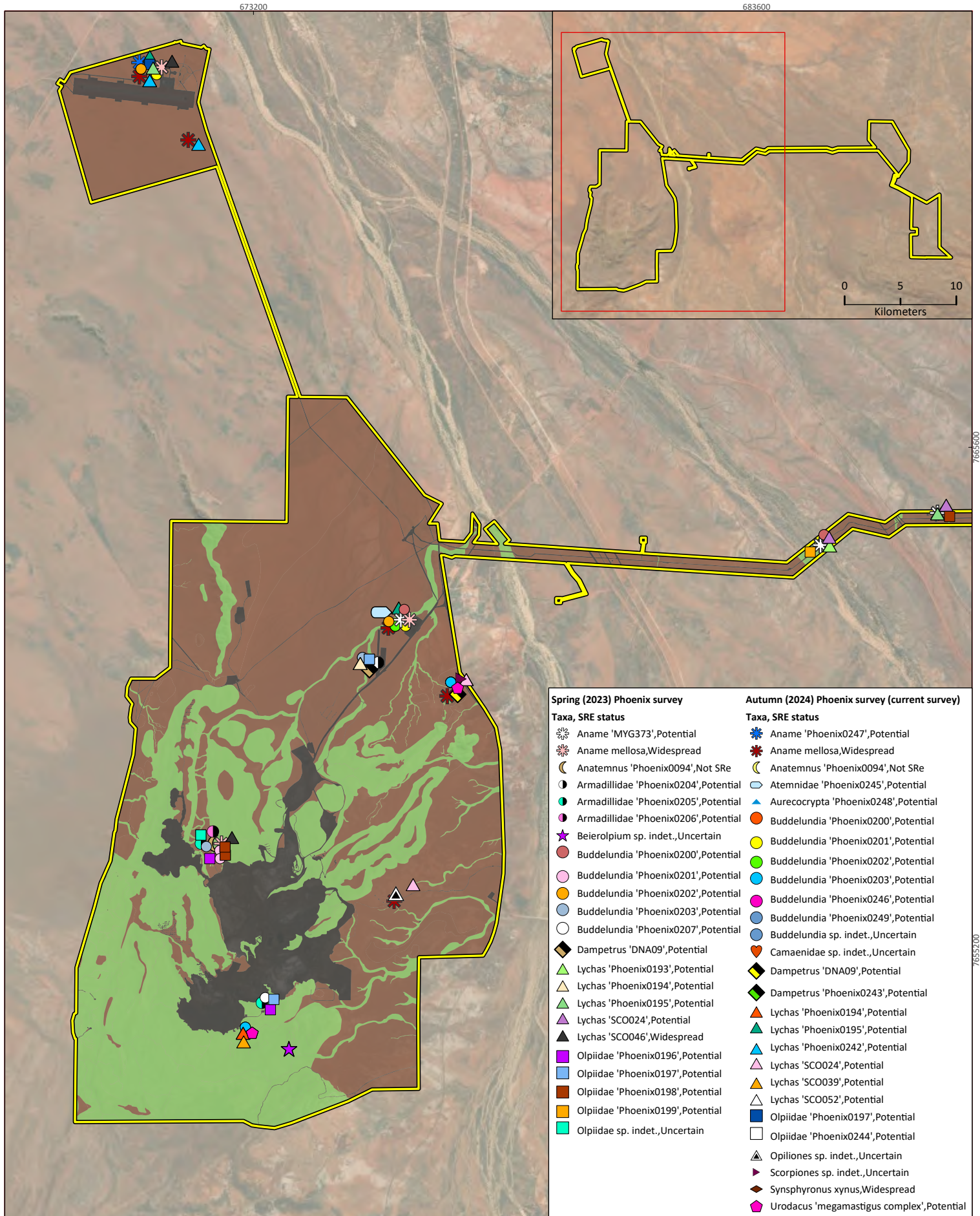
Higher order/ Family	Taxa	Site/s	Habitat/s	No. specimens	SRE status	Comments
Buthidae	<i>Lychas</i> 'Phoenix0195'	WLP001, 006	Spinifex sandplain, Drainage line	3	Potential	Recorded at 2 sites in low and high potential SRE habitat. Specimens are a minimum of 9.4% divergent from closest match on GenBank (<i>Lychas SCO046</i>) and 9.3% divergent from PES genetic database (<i>Urodacus</i> 'multipunctatus complex', collected from Marillana region). Also recorded in Phoenix (2024a) detailed survey
Buthidae	<i>Lychas</i> 'Phoenix0242'	WLP001, 002	Spinifex sandplain	3	Potential	Recorded at 2 sites in low potential SRE habitat. Specimens are a minimum of 9.4% divergent from closest match on GenBank (<i>Lychas Biologic-SCOR012</i>) and 9.6% divergence from closest match on PES genetic database (L 'SCO039' complex, collected from Marillana region). New species
Buthidae	<i>Lychas</i> 'SCO024'	WLP003, 004, 007, 008	Spinifex Stony Plain, Drainage line	7	Potential	Recorded at 4 sites in low and high potential SRE habitats. Sequences specimens were a maximum of 4.3% divergent (2.4-4.3%) from closest match on GenBank and closest match on PES genetic database (<i>L bituberculatus</i> complex, recorded in the Marillana region); conspecific with <i>Lychas</i> 'SCO024'. Also recorded in Phoenix (2024a) detailed survey
Buthidae	<i>Lychas</i> 'SCO039'	WLP009, 011	Spinifex Stony Plain, Drainage line	2	Potential	Recorded at 2 sites in low and high potential SRE habitat. Specimens were between 9.0-9.9% divergent from closest match on GenBank and 3.7-4.4% divergent from closet match on PES genetic database which is considered conspecific (<i>Lychas</i> 'SCO039, collected from the Marillana region).
Buthidae	<i>Lychas</i> 'SCO052'	WLP007, 008	Drainage line	2	Potential	Recorded at 2 sites in high potential SRE habitat. Specimens were 6.2-6.4% divergent from closest match on GenBank and are considered conspecific.
Urodacidae	<i>Urodacus</i> 'megamastigus complex'	WLP003, 007, 009, 010	Spinifex stony plains, Drainage line	9	Potential	Recorded at 4 sites in low and high potential SRE habitats. Sequences specimens were between 6.2-7.8% divergent from closest match on GenBank, and between 4.3-7.3% divergent from closest match on PES genetic database. Cannot be delineated from <i>Urodacus</i> 'megamastigus complex'.

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Higher order/ Family	Taxa	Site/s	Habitat/s	No. specimens	SRE status	Comments
Scorpiones	Scorpiones sp. indet.	WLP003, 010	Spinifex Stony Plain, Drainage line	3	Uncertain	Recorded at 2 sites in low and high potential SRE habitat. Specimens failed to align. Diverse assemblage of Scorpiones recorded in the survey, including 2 additional taxa recorded in Phoenix (2024a). Two other taxa recorded at the same sites: <i>Urodacus</i> 'megamastigus complex' and <i>Lychas</i> 'SCO024'. Likely represents a taxa already sampled from the study area.
Class: Gastropoda (Snails) (1)						
Camaenidae	Camaenidae sp. indet.	WLP029	Rocky ridge and gorge	2	Uncertain	Recorded at one site in high potential SRE habitat. No other congeners recorded in the current survey or Phoenix (2024a). Diverse assemblage of Camaenidae taxa recorded in the desktop search extent, most awaiting descriptions.
Class: Malacostraca, Order: Isopoda (Woodlice) (7)						
Armadillidae	<i>Buddelundia</i> 'Phoenix0200'	WLP011	Spinifex Stony Plain	1	Potential	Recorded at one site in low potential SRE habitat. Specimen was 8.8% divergent from closest match on GenBank (<i>Buddelundia SJ 56 DNA</i>) and 9.9% divergent from closest match on PES genetic database (<i>Buddelundia</i> Phoenix0130, collected from Wonmunna). Also recorded in Phoenix (2024a) detailed survey
Armadillidae	<i>Buddelundia</i> 'Phoenix0201'	WLP001, 006	Drainage line, Spinifex sandplain	10	Potential	Recorded at 2 sites in low and high potential SRE habitats. Specimen was 10.9% divergent from closest match on GenBank (<i>Buddelundiinae NYI01</i>). Also recorded in Phoenix (2024a) detailed survey
Armadillidae	<i>Buddelundia</i> 'Phoenix0202'	WLP006	Drainage line	3	Potential	Recorded at one site in high potential SRE habitat. Sequenced specimen was 10.9% divergent from closest match on GenBank (<i>Buddelundia-Biologic-ISOP049</i>). Also recorded in Phoenix (2024a) detailed survey
Armadillidae	<i>Buddelundia</i> 'Phoenix0203'	WLP003, 008, 009	Spinifex Stony Plain, Drainage line	76	Potential	Recorded at 3 sites in low and high potential SRE habitats. Sequenced specimens were between 9.3-10.2% divergent from closest match on GenBank (<i>Buddelundia SJ 10MA</i>) and between 8.6-9.6% divergent from closest match on PES genetic database (<i>Buddelundia</i> Phoenix0152).

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Higher order/ Family	Taxa	Site/s	Habitat/s	No. specimens	SRE status	Comments
						Also recorded in Phoenix (2024a) detailed survey
Armadillidae	<i>Buddelundia</i> 'Phoenix0246'	WLP007, 011	Spinifex Stony Plain, Drainage line	2	Potential	Recorded at 2 sites in low and high potential SRE habitats. Taxonomic specialists have determined these specimens to represent a new species based on morphological assessment. New species
Armadillidae	<i>Buddelundia</i> 'Phoenix0249'	WLP007, 029	Rocky ridge and gorge, Drainage line	11	Potential	Recorded at 2 sites in high potential SRE habitat. Taxonomic specialists have determined these specimens to represent a new species based on morphological assessment. New species
Armadillidae	<i>Buddelundia</i> sp. indet.	WLP011	Drainage line	1	Uncertain	Recorded at one site in high potential SRE habitat. Specimen failed to align. A diverse assemblage of <i>Buddelundia</i> taxa was recorded in the survey, including an additional taxa recorded in Phoenix (2024a). Two other <i>Buddelundia</i> taxa have been recorded from the same site: <i>Buddelundia</i> 'Phoenix0246' and <i>Buddelundia</i> 'Phoenix0200'. Likely represents a taxa previously recorded in the study area.



Mineral Resources Limited
Wodgina Lithium Project

Project No 1630
Date 4/10/2024
Drawn by JL
Map author WP



0 1.5 3
Kilometers

1:101,000(at A4) GDA 1994 MGA Zone 50

Study area

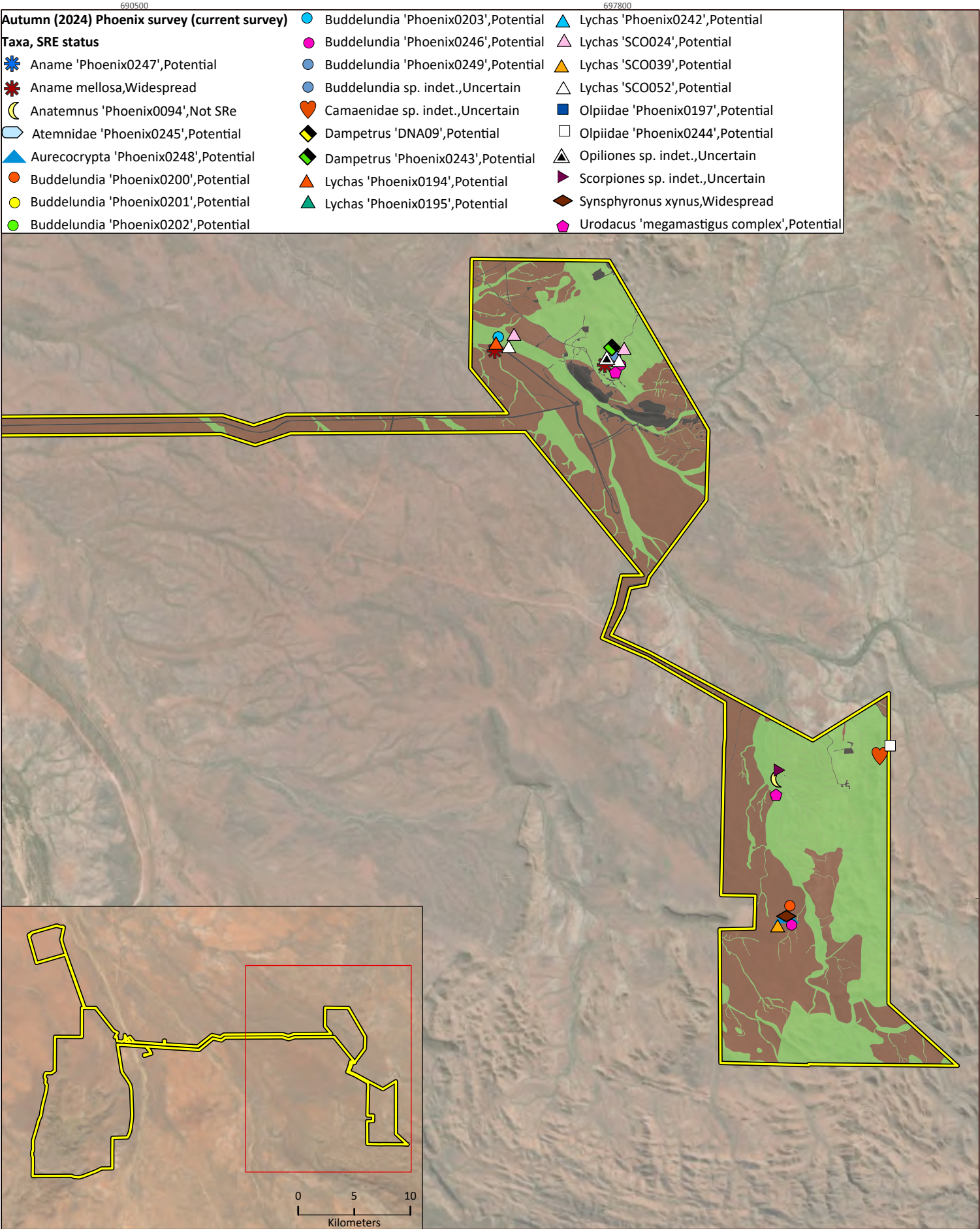
SRE habitat rating

- High
- Low
- None

Figure 5-9a

**SRE habitats and
recorded SRE taxa**





5.3 SURVEY LIMITATIONS

The limitations of the terrestrial fauna survey have been considered in accordance with EPA (2016a) (Table 5-16).

Table 5-16 Consideration of potential survey limitations

Limitations	Comments
Availability of contextual information at a regional and local scale	No limitation, many prior surveys have been conducted in the region and locality.
Competency/experience of the team carrying out the survey	No limitation, the survey team has experience conducting detailed and targeted fauna surveys in the Pilbara region of WA, and also previously for Wodgina Lithium Mine.
Scope and completeness	<p>The scope was appropriate for the purpose of the survey. All aspects of the scope were completed.</p> <p>The mine area, Wodgina airstrip and Infrastructure corridor have undergone a dual-phase detailed survey in which 4 of the 7 surveys sites were sampled during both phases of the survey. The Breccia borefield has undergone a single-phase detailed survey. Additional targeted work has been completed across all components of the study area. For lower impact areas such as the borefield, Infrastructure corridor and airfield, a minimum of a single-phase detailed survey with supplementary targeted methods is considered adequate in detailing the fauna assemblage and values, whereas higher impact areas such as the mine area warrants additional survey effort which has been demonstrated by implementing a dual-phase detailed survey with supplementary targeted methods.</p>
Proportion of fauna recorded and/or collected, any identification issues	<p>All recorded vertebrate fauna were identified. This survey recorded ~39% of the vertebrate species identified in the desktop review. When considered with the results of the Phoenix (2024) survey, 43.8% of the vertebrate species identified in the desktop review were detected. A 55.9% overlap (99 species) in the vertebrate fauna assemblage was recorded between both survey phases.</p> <p>SACs (for this survey) indicated all fauna groups were adequately sampled. The SACs for the spring 2023 survey (Phoenix 2024a) indicated the sampling for reptiles and mammals was relatively complete, whereas the sampling for birds was incomplete.</p> <p>An additional 6 frogs, 24 reptiles, 6 mammals and 21 birds were recorded in this survey compared to the spring 2023 survey, bringing the combined total for the surveys to 7 frogs, 74 birds, 31 mammals and 65 reptiles. The total assemblage exceeds previous estimations in Phoenix (2024a) for all fauna groups (excluding amphibians). In consideration of this survey's SACs indicating that all fauna groups were adequately sampled, the total survey effort expended over both survey phases and the resultant assemblage is considered representative of the study area.</p> <p>All but 4 of the 27 invertebrates collected were identified to species-level; however, 7 represented species new to science</p>

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Limitations	Comments
	with only 16 recognised taxa being recorded (11 of which were recorded for the first time in the Phoenix 2023 survey).
Access within the study area	Access within some components of the study area were limited, in particular the southern ranges of the Rocklea and Capricorn land systems.
Timing, rainfall, season	<p>The surveys were conducted in early and late autumn in accordance with EPA (2020).</p> <p>Higher than average temperatures and limited shelter resulted in some trapping equipment not being deployed in the first survey (sites WLP002, WLP009) due to ethical concerns relating to heat exposure and high mortality rates of trapped fauna.</p> <p>Both surveys were conducted within the optimal survey period for all fauna groups. Significant rainfall over the wet season, as well as sporadic showers during the first survey, created optimal survey conditions for all fauna groups (EPA 2020).</p>
Disturbance that may have affected the results of the survey	Widespread disturbance was noted across the study area including grazing and soil compaction from cattle, and a recent fire (<3 years). The fire resulted in extensive vegetation loss, particularly on spinifex plains in the vicinity of the mine and airstrip, where regenerating spinifex was very short and offered little shelter for fauna.

6 DISCUSSION

6.1 VERTEBRATE FAUNA

6.1.1 Fauna habitats

The habitat types identified and mapped in the study area align with those described in previous surveys for the Project (Table 5-5) and adjacent to the study area, and are typical of the land systems that comprise the majority of the study area (Table 3-1).

None of the habitats identified are explicitly restricted to the study area. Most habitats limited in extent within the study area (i.e. Drainage line), occur extensively in the immediate vicinity surrounding the study area and across the broader landscape. The Ironstone ridge top and Rocky ridge and gorge habitats are exceptions, which while are not restricted to the study area, are limited at both the local and regional scales. Their occurrence is largely confined to topographically complex landscapes, such as the Pilbara craton, and therefore have the potential to limit the distribution of significant fauna which are dependent on them such as Ghost Bat, Northern Quoll and Pilbara Leaf-nosed Bat. Land systems in the study area that typically boast these landscape features include the Capricorn and Talga systems, which also occur throughout the wider desktop search area, among other systems that are exemplified by similar features such as the Black, Oakover and Ruth land systems (Schoknecht & Payne 2011) (Figure 3-2).

Habitats in the region that would provide critical habitat for significant vertebrates identified in the desktop review include Rocky ridge and gorge and Drainage line. Habitats within the study area most likely to represent important life history components (e.g., used for breeding, dispersal, refuge and foraging) for significant vertebrate species are those with high productivity, structural complexity and/or locally mesic conditions. Rocky ridge and gorge represent the highest value fauna habitat in the study area, on the account of it not only representing critical habitat for some of the significant species identified in the desktop review, but more specifically its suitability to support denning habitat for Northern Quoll, and roosting sites for Ghost Bat and Pilbara Leaf-nosed Bat.

Inclusive of the dendritic channels that dissect the Rocky ridge and gorge habitats, the seasonally active Drainage lines of the Turner River which intersect the Infrastructure Corridor and its dendritic tributaries that innervate the study area provide productive foraging grounds and dispersal corridors throughout the broader landscape, in addition to creating locally mesic environments compared to the surrounding landscape (during the summer wet season and in the absence of recent precipitation). When associated with topographically complex landscapes such as gorge systems, this can provide important habitat for significant species such as Pilbara Olive Python and Gane's Blind Snake. Drainage lines further provide localised areas of increased species richness and are important on a more regional landscape scale, and as such are also considered high value fauna habitat.

The remaining fauna habitats identified in the study area are largely exemplified by a spinifex-dominated vegetation assemblage on sand or stony plains. They tend to be relatively structurally simple and of comparatively lower productivity and significance regarding fauna life history components compared to the high value habitats. However, they do provide habitat for some specialist fauna assemblages that are unlikely to be found in the higher value habitats, including the conservation significant fauna Brush-tailed Mulgara, Greater Bilby, Spectacled Hare-Wallaby and Western Pebble-mound Mouse. Recent fires in the region had burnt some portions of these habitats, affecting the amount of large and mature spinifex hummocks in some habitat types that provide shelter from predators and climatically buffered microhabitats in more exposed environments.

6.1.2 Fauna assemblage

The desktop review identified 402 vertebrate taxa potentially occurring in the study area, of which 65 are either State and/or Nationally listed species of conservation significance (section 5.1.1, Table 5-2). Of these, only 36 of the species have distributions that intersect the location of the study area and are relevant to the survey (Table 5-12). The field survey recorded 155 terrestrial vertebrate species, comprising 6 amphibians, 62 birds, 27 mammals and 60 reptiles. All but one of the recorded species were expected to occur based on the results of the desktop review (e.g. species distributions, records and habitats); the only species recorded but not identified in the desktop review was the Hill's Sheath-tail Bat (*Taphozous hilli*). The Hill's Sheath-tail Bat's currently accepted distribution does not intersect the study area or desktop search extent (Menkhorst *et al.* 2017). However, ALA (2024) has verified records of the species occurring north of its currently accepted distribution in the general vicinity of the study area. This discrepancy in database and field survey assemblages is likely due to either regional data deficiencies, edge effects or improved environmental conditions resulting in extralimital records. The species is not State or Nationally listed under the EPBC Act or BC Act.

While the recorded fauna assemblage only represents 38.6% of the desktop assemblage (Table 5-10), many of the taxa identified in the review are only seasonally active/present, excluded from the study area based on habitat preferences, are naturally rare/infrequent visitors, or are Threatened species restricted to island arks. The wider desktop search extent contains a further 11 land systems which include a diverse collection of habitat types, some of which are exemplified by habitat types that occur within the study area, but others that host more specialist or niche-restricted fauna, such as extensive calcrete platforms and plains, dune systems, gilgaid clay plains and alluvial plains. The desktop search extent further intersects near the coastline where coastal-restricted species, such as many shorebirds identified in the desktop review, are more likely recorded outside of their range (Table 5-12). The forecasted species richness of the study area is often overestimated when considering these factors. This is exemplified by the avifauna assemblage recorded, in which only 62 of the 217 (28.6%) bird species potentially occurring were recorded. Furthermore, the incidence of several bird species is partially dependent on environmental factors including the long-term climatic cycles (i.e., El Niño and La Niña), the local precipitation, the timing of the survey and the location of the study area relative to the coastline.

When the assemblage recorded in this survey is considered collectively with that of the spring 2023 detailed survey (Phoenix 2024a), the assemblage represents 44.0% of the desktop assemblage (Table 6-1). Together, the field surveys recorded 177 terrestrial vertebrate species, comprising 7 amphibians, 74 birds, 31 mammals (including 5 introduced species) and 65 reptiles from a total survey effort of 4,542 trap nights, 39.8 hours of avifauna census, 40.5 hours of diurnal vertebrate foraging, 41.1 hours of nocturnal vertebrate foraging, 311 camera trap nights, 111 nights of ultrasonic recordings, 42 nights of audio recordings and 37 bilby plots (Table 4-4; Appendix 10). This increased species richness recorded in the study area is largely owing to the increased survey effort, the sampling expended over a greater period of time and climatic variables (i.e local precipitation preceding and during the survey, temperature, etc), and the size of the area surveyed. There was lower than expected overlap in the assemblage recorded between both survey phases with 99 species (55.9%) represented by 41 birds, 21 mammals and 37 reptiles (Appendix 3). Twenty-one species were only recorded in the spring 2023 survey, including one frog, 5 reptiles, 3 mammals and 12 birds; whereas 57 species were only recorded in the autumn 2024 survey, represented by 6 frogs, 24 reptiles, 6 mammals and 21 birds (Appendix 3). The disparity in the fauna assemblage recorded between survey phases reiterates the natural rarity and non-uniform distribution of some species, the importance of dual-phase surveys to sample over a greater time period, and the influence of environmental variables (such as local precipitation; Figure 3-6) on the detectable species richness of a region. This is particularly noticeable in the frog assemblage detected where 6 of the 7 species recorded (85.7%) were only recorded in the second survey phase after a productive wet season.

Table 6-1 Comparisons in vertebrate fauna assemblage recorded in desktop review and Phoenix surveys (spring 2023 and autumn 2024)

	Desktop assemblage		Spring 2023 Phoenix (2024a)		Autumn 2024 (this survey)		Spring 2023/autumn 2024 Phoenix (2023/2024)	
	No.	% of the desktop assemblage	No.	% of the desktop assemblage	No.	% of the desktop assemblage	No.	% of the desktop assemblage
Amphibians	10	2.5	1	10.0 (0.2)	6	60.0 (1.5)	7	70.0 (1.7)
Birds	217	54.0	53	23.9 (13.2)	62	28.6 (15.4)	74	34.1(18.4)
Mammals	56	13.9	25	44.6 (6.2)	27	48.2 (6.7)	31	55.4 (7.7)
Reptiles	119	29.6	42	35.3 (10.4)	60	50.4 (14.9)	65	54.6 (16.2)
Total	402	100.0	121	30.1	155	38.6	177	44.0

Values in parentheses indicate the overall % of desktop assemblage irrespective of class.

SACs generated indicate the survey was mostly adequate in sampling and representing the regional vertebrate fauna assemblage potentially occurring in the study area (Figure 5-9). The SAC for all groups reaches asymptote under most models, indicating that sampling was largely complete. Localised abiotic factors can influence the levels of detectability for species groups, such as reptiles where factors including temperature, humidity and moonlight have been shown to contribute to their activity levels (Thompson *et al.* 2007; Weaver 2011). Depending on the timing of the survey, environmental variables like this can have a measurable impact on the level of species diversity recorded, and as such there are optimal periods when surveys should be conducted where possible (EPA 2020). Both phases of the survey were undertaken during the recommended time period for detailed surveys in the Eremaean climatic region, in accordance with EPA (2020). Mean maximum and minimum temperatures were mostly warmer than the long-term average in the months preceding and during the March 2024 survey, and rainfall was significantly higher during the survey, making for optimal survey conditions. The same climatic parameters were relatively consistent with long-term averages for the May 2024 survey, however were measurably lower to the March survey due to being later in the survey season. However, conditions were still considered good for undertaking comprehensive fauna surveys.

The vertebrate fauna assemblage and richness varied between habitat types and systematic sites (Figure 5-8). The most productive habitat sampled was Drainage line (121 species), followed by Spinifex stony plains (81 species) and Spinifex sandplain (77 species). The high level of diversity in the Drainage line habitat is likely due to the overall complexity of the habitat and the high incidence of water compared to the surrounding habitats. Unsurprisingly, the sites that recorded the highest species richness (sites WLP005, WLP006 and WLP010) were situated within or adjacent to major drainage channels and tributaries of the Turner River. However, some habitats were disproportionately sampled using systematic trapping due to the complexity of site installation and as such, the overall richness reported is not a comparable value between habitats.

Six significant vertebrate species were recorded in the survey: Rufous Grasswren (P4), Northern Quoll (VU), Ghost Bat (VU), Greater Bilby (VU), Western Pebble-mound Mouse (P4) and Pilbara Leaf-nosed Bat (VU) (Table 5-11); all of these species excluding the Pilbara Grasswren and Ghost Bat were also recorded in the spring 2023 survey. An additional 10 conservation significant species have previously been recorded in the study area: Common Sandpiper (Mig.), Fork-tailed Swift (Mig.), Wood Sandpiper (Mig.), Grey Falcon (VU), Peregrine Falcon (OS), Long-tailed Dunnart (P4), Brush-tailed Mulgara (P4), Spectacled Hare-wallaby (mainland) (P4), Pilbara Olive Python (VU) and Northern Leaf-nosed Bat (VU) (Table 5-12). Six other significant vertebrate species were determined to possibly occur including

Oriental Plover (Mig.) Oriental Pratincole (Mig.), Osprey (Mig.), Gane's Blind Snake (P1), Pin-striped Fine-snout Ctenotus (P1) and Northern Short-tailed Mouse (P4).

The study area does contain critical habitat for significant species either recorded during this survey or previous survey efforts, as defined by state or federal legislation, conservation advice or recovery plans (refer to section 2). Other habitats within the study are likely used by these fauna on a variable basis. The study area does not represent critical or important habitat to the 45 additional significant vertebrate species identified as unlikely to occur. No vertebrate species are restricted (endemic) to the study area, with the majority of their distributions occurring outside the subregion.

The study area and immediate vicinity have been subject to a rich number of surveys characterising both the conservation significant and non-significant fauna assemblage of the region. The significant vertebrate species identified as recorded and/or previously recorded during these survey efforts are discussed below.

6.1.3 Significant fauna

6.1.3.1 Brush-tailed Mulgara (*Dasyercus blythi*; P4; Previously recorded)

The Brush-tailed Mulgara was not recorded in the current survey but has previously been recorded in 2015 (1 record) and 2018 (4 records) around the Wodgina airstrip by DBCA (2023b) and 360 Environmental (2018), respectively. These historic records are all situated in Spinifex sandplain. Numerous records occur in the wider desktop search extent, including a small cluster of records to the east of the Turner River and south of the infrastructure corridor.

Brush-tailed Mulgaras are small, burrowing carnivorous marsupials (family Dasyuridae) endemic to Australia. They inhabit areas in association with spinifex on sandplains and sand ridges, often between rolling hills, where they utilise several burrows within their home range which are typically situated at the base of spinifex hummocks (Van Dyck *et al.* 2013). There is no critical habitat defined for Brush-tailed Mulgara.

The species has formerly been subject to taxonomic ambiguity due to changes in nomenclature; Mulgaras formerly comprised a species complex before recognition of their reproductive isolation and species delineation (with associated morphological differences), thereafter described as the Crest-tailed Mulgara (*Dasyercus cristicauda*) and Brush-tailed Mulgara (*D. blythi*) (Woolley 2006). Considering the taxonomic revision and complexity in nomenclature, Mulgaras have been the subject of taxonomic uncertainty in some areas of their distribution. However, all Mulgara records within the desktop search extent represent *D. blythi* despite this ambiguity.

It is likely that the Brush-tailed Mulgara uses some portions of the Spinifex sandplain habitat throughout the study area. Despite spinifex-dominant vegetation associations being prevalent across multiple fauna habitats across the study area, only sandplain provides suitable digging substrate for burrowing. Suitable and higher quality habitat is widespread beyond the boundaries of the study area.

6.1.3.2 Fork-tailed Swift (*Apus pacificus*; Mig.; Previously recorded)

The Fork-tailed Swift was not recorded in this survey but has previously been recorded in 2014 by DBCA (2023b). A single animal was sighted in Spinifex stony plains northeast of the Wodgina mine (adjacent to the Great Northern Highway). There are several other records in the desktop search extent, recorded from 1998-2022.

The Fork-tailed Swift is a non-breeding visitor to all Australian states and territories, migrating from northeast Asia and arriving in Australia between October to November and departing around April (Menkhurst *et al.* 2017). They are generally considered more abundant above inland plains, however can occur in a wide range of dry and open habitat (DSEWPac 2011a) but mostly occur independent of

terrestrial habitat. The species is protected under the EPBC Act in accordance with the Bonn, CAMBA and ROKAMBA international agreements for migratory species.

Fork-tailed Swifts may forage aerially anywhere across the study area without utilising any specific habitat. It is not specifically dependent on any one aspect of the study area.

6.1.3.3 Ghost Bat (*Macroderma gigas*; VU; Recorded)

Ghost Bat was recorded in the current survey at site WLP048 from Rocky ridge and gorge; one individual was visually sighted when flushed from a cave following inspection. There are numerous records of Ghost Bats in the desktop search extent. A large number of these records intersect the study area, which have been documented during previous surveys for the Project (detailed, targeted and monitoring surveys from 2009 to 2022). Most records are concentrated in the rocky ridgeline that extends west and south of the Wodgina mine, as well as the locally associated dendritic drainage channels. Several isolated records also occur in the ridgeline west, south and east of the Breccia borefield.

The ridgelines within Wodgina mine area (surrounding the mine) contain 3 known potential maternity roosts and 3 diurnal roosts (Figure 5-2). Another diurnal roost is present on a ridgeline approximately 0.3 km south of the edge of the Wodgina mine area (Figure 5-2). Regionally, there are 2 well known permanent diurnal roosts, both occurring in disused mine adits; Lalla Rookh mine (approximately 65 km east-northeast of the Wodgina mine) and Comet mine (approximately 115 km east of the mine; Figure 5-2) (Bat Call WA 2021a). These sites are important refuge and source populations for the region (Bat Call WA 2021a).

The Rocky foothills and Rocky ridge and gorge habitats provide suitable roosting areas for Ghost Bats. Despite a deficit in foraging habitat knowledge, unpublished data from the Pilbara suggest Ghost Bats forage over productive plains with thin mature woodland over tussock and/or hummock grasses on sand or stony substrates (Bat Call WA 2021a). Drainage lines are known to provide suitable dispersal and foraging habitat; however, other habitats in the study area are likely used for foraging (Table 5-12); their detection in these habitats however, when situated away from roosting sites, is difficult as their foraging strategy primarily uses visual and auditory sensory input, and less frequently use echolocation (Bat Call WA 2021a).

Critical habitat for the species is defined as any Category 1 or 2 cave, and any Category 3 caves when in direct association with a Category 2 cave (apartment block). Isolated Category 3 caves are considered important for the long-term preservation of the species in the region, and Category 4 caves are not considered important (Table 6-2).

The cave detected at site WLP048 had approximate dimensions of 25 m depth, 4 m width and 4 m height, opening from a narrow aperture deep from in the face of the ridgeline before the ceiling giving way to an open cavity. A slight but consistent incline captures the surrounding ambient heat and created a humid microclimate, representing ideal roosting conditions for Ghost Bat. Foraging remains and scat was prevalent, concentrated towards the back of the cave. The cave is located approximately 6.7 km north of mine. During a successive visit (May 2024), no Ghost Bats were sighted. In consideration of these observations, the cave likely represents a Category 2 diurnal roost (cf. Table 6-2). It is recommended that this cave be incorporated into any future monitoring requirements, as it is displaced from mining operations but in close enough proximity to potentially show signs of disturbance from Project-related operations.

Table 6-2 Bat Call WA Ghost Bat Cave Habitat Classifications (Bat Call WA 2021c)

Category	Description	Significance*
Category 1	Diurnal roost caves with permanent Ghost Bat occupancy. Caves and historical underground mines	Must all be assumed to be maternity caves and are critical habitat for the species.

Category	Description	Significance*
	(adits and declines) that are used continuously as diurnal roosts by large numbers of Ghost Bats for long periods.	
Category 2	Diurnal roost caves with regular occupancy. Caves that are used regularly as diurnal roosts by small numbers of Ghost Bats but not continuously. These tend to be deep caves with ceiling heights in rear chambers of at least 1.5 m allowing multiple roosting opportunities out of reach of predators. These caves typically have several other caves, shelters, and overhangs within a few hundred metres.	Must be assumed to be capable of supporting one or more reproducing females and their offspring. These caves are critical habitat for the species.
Category 3	Roost caves with occasional occupancy. Caves that are occasionally used as diurnal roosts and as nocturnal roosts for feeding and resting more frequently.	When directly associated with a Category 2 cave, they form an apartment block grouping that is considered critical habitat. Isolated caves are important habitat for the long-term preservation of the species in the area.
Category 4	Nocturnal roost caves with opportunistic usage. This may be anything from a single foraging visit to a longer visit with a resting period or possibly a feeding session.	These caves are not important habitat for the long-term preservation of the species in the area.

6.1.3.4 Greater Bilby (*Macrotis lagotis*; VU; Recorded)

Greater Bilby was recorded in the current survey at site WLP005 from Spinifex sandplain; 2 individual scats were recorded, including one which was considered relatively fresh. Greater Bilby has previously been recorded in the study area, including throughout Spinifex sandplain in the Wodgina airstrip by DBCA (2023b), 360 Environmental (2018) and Phoenix (2024a) from 2015-2023. Greater Bilby was also recorded at the same location as this survey in spring 2023 (Phoenix 2024a), however the evidence is considered more recent. The species has been well-documented throughout the wider desktop region from 1970-2022; a large number of records are located approximately 23 km southeast of the study area.

The Greater Bilby is a solitary, medium-sized burrowing marsupial formerly widespread across much of Australia (DBCA 2023b; Threatened Species Scientific Committee 2016; Van Dyck *et al.* 2013). In WA, indigenous populations are mostly restricted to the Gibson Desert, Little Sandy Desert, Great Sandy Desert, and areas of the Pilbara and southern Kimberley (Threatened Species Scientific Committee 2016). These populations mostly occur in open tussock grasslands on uplands and hills, Mulga woodland/shrubland on ridges and rises, and hummock grassland in plains and alluvial areas (Threatened Species Scientific Committee 2016; Woinarski *et al.* 2014). These habitats are normally characterised as being of low relief with light to medium soils that are often sandy, ideal for burrow excavation. Greater Bilby have a moving home range which can vary considerably in size between locations (Moseby & O'Donnell 2003). There is no critical habitat defined for the Greater Bilby.

Survey evidence suggests Greater Bilby utilise the Spinifex sandplain habitat and areas of major drainage in the study area, with the most recent evidence located along the Infrastructure Corridor. Due to the scarcity of evidence, they are likely either sparsely distributed, in very low numbers or intermittently present where the study area forms part of the species broader moving home range. Other fauna habitats within the study area boasting a spinifex-dominated vegetation assemblage with a rocky stratum are unlikely to support Greater Bilby. Suitable Greater Bilby habitat is widespread in the region.

6.1.3.5 Grey Falcon (*Falco hypoleucos*; VU; Previously recorded)

The Grey Falcon was not recorded in this survey but has previously been recorded from the Wodgina mine area in Rocky ridge and gorge to the north of the mine (1 record) by a survey in 2015 (DBCA 2023b), and more recently in Drainage line to the east of the mine in 2024 (pers. comms. Dave Brown, senior environmental advisor at Wodgina). Grey Falcons have been recorded more widely throughout the desktop search extent from 1979-2017, with most occurrences being in close proximity to the study area and predominately in association with the Turner River and its tributaries.

The Grey Falcon has a broad but scattered distribution across Australia with the extent of their distribution intersecting all mainland states and territories (Menkhorst *et al.* 2017). They are more frequently recorded on the coast than inland, often in association with wooded plains and watercourses (Garnett *et al.* 2011) where suitable nesting habitats occur (such as large trees along drainage lines). As top-order predators, they naturally occur in low densities across their range. They forage widely in open habitats and therefore could occur aerially over any habitat within the study area. Major Drainage lines and tributaries of the Turner River provide the most important habitat within the study area, and may provide suitable nesting conditions. There is no critical habitat defined for the Grey Falcon.

Suitable foraging and nesting habitat is widespread in the region and none are expected to be resident due to the low incidence of major drainage line intersecting the study area.

6.1.3.6 Long-tailed Dunnart (*Antechinomys longicaudata*; P4; Previously recorded)

The Long-tailed Dunnart was not recorded in this survey but has previously been recorded from the Wodgina mine area by Outback Ecology (2009) and an unknown survey in 2012 (DBCA 2023b) in Rocky ridge and gorge, and Drainage line to the west of the mine.

The Long-tailed Dunnart has been the subject of recent taxonomic interest (Westerman *et al.* 2023) in which it was considered more closely related to the Kultarr (*Antechinomys lanigar*) than other Dunnarts (*Sminthopsis* spp). It has a distribution spanning the arid and semi-arid interior of WA and the Northern Territory (Van Dyck *et al.* 2013). Long-tailed Dunnarts are rock specialists, preferring landscapes exemplified by complex topographies including exposed rock and stony soils vegetated with hummock-forming grasses and shrubs, flat-topped hills, sparse Mulga over spinifex lateritic plateaux, and sandstone ranges and breakaways (Burbidge *et al.* 2008; WAM 2021). They occasionally occur in ecotones adjacent to their preferred habitat. There is no critical habitat defined for the Long-tailed Dunnart.

Much of their preferred habitat locally intersects land systems including the Capricorn and Talga systems, and are typically regionally restricted to topographically complex landforms such as the Pilbara craton. Suitable habitat does occur both in the immediate vicinity surrounding the study area, and in the broader landscape.

6.1.3.7 Northern Lead-nosed Bat (*Hipposideros stenotis*; P2; Previously recorded/Unlikely)

Several records of the Northern Leaf-nosed Bat were returned from the Threatened and Priority fauna database (DBCA 2023b). The distribution of the Northern Leaf-nosed Bat in WA is restricted to the Kimberley region, northeast of Broome, and continues across the Top End (Van Dyck *et al.* 2013). While the Northern Leaf-nosed Bat occupies a similar niche to the Pilbara Leaf-nosed Bat, records within the desktop search extent are likely misidentifications of the Pilbara Leaf-nosed Bat.

6.1.3.8 Northern Quoll (*Dasyurus hallucatus*; VU; Recorded)

Northern Quoll was recorded during the current survey from 7 sites (17 records; sites WLP003, WLP015, WLP019, WLP027, WLP030, WLP031, WLP041) from camera traps, secondary evidence (scat) and an opportunistic direct sighting in Rocky ridge and gorge, Rocky foothills, Drainage line and Stony rises.

Habitat critical to the survival of Northern Quoll is exemplified by rocky habitats such as ranges, escarpments, mesas, gorges, breakaways, boulder fields, major drainage lines or treed creek lines. These habitat characteristics provide shelter for breeding, and refuge from predation, fire and potential poisoning from Cane Toads (DoE 2016b). Structurally diverse woodland or forest areas contains large diameter trees, termite mounds or hollow logs; offshore islands where Northern Quoll currently occupy (e.g. Koolan Island), as well as these dispersal and foraging habitats associated with connecting populations are important for the long-term survival of the Northern Quoll, are also considered critical habitat (DoE 2016b). Foraging and dispersal habitat is recognised as any areas comprised primarily of native vegetation that occurs in the immediate vicinity (e.g. within 1 km) of shelter habitat, quoll records or land dominated by native vegetation that is connected to shelter habitat within the species range (DoE 2016b).

The Northern Quoll has been widely documented across the study area in previous surveys (detailed, targeted and monitoring between 2009 and 2023), with the majority of records located in Rocky ridge and gorge and Rocky foothills habitat within the Wodgina mine area. Regionally, records are clustered around development projects where sampling is most intense, such as mines (e.g. Mt Dove mine, Indee station, North Star mine and Abydoes mine) and in rocky areas along linear developments such as rail lines (e.g. along the Roy Hill, FMG, and BHP rail lines).

The study area almost certainly hosts a resident breeding population of Northern Quoll. It is likely they utilise all Rocky foothills, and Rocky ridge and gorge habitat for denning, foraging and dispersal, and Drainage line for foraging and dispersal. Target mining deposits often coincide with Northern Quoll denning habitat and the species can be locally displaced when these habitats are developed. Suitable Northern Quoll habitat is locally widespread and there are several well established populations in the region.

6.1.3.9 Peregrine Falcon (*Falco peregrinus*; OS; Previously recorded)

The Peregrine Falcon was not recorded in this survey but has previously been recorded at 2 locations inside the Wodgina mine area in 2013 among the rocky ridgeline west of the mine (DBCA 2023b). A depauperate number of records were identified in the wider desktop search extent, with 2 records from 2000 and 2002.

The Peregrine Falcon is a widespread, highly mobile species distributed over much of Australia, but is rarely encountered (Menkhorst *et al.* 2017). They have specific nesting requirements including the established nests of other species, hollow trees and rocky outcrops; however, they generally favour high-elevation sites, in particular the recesses of cliff faces. They forage over a diverse range of habitats and maintain a foraging range of 20-30 km² (DSEWPac 2011b; Garnett *et al.* 2011). There is no critical habitat defined for the Peregrine Falcon.

They are considered likely to occasionally forage within and in the vicinity of the study area. They may also nest in Drainage line and Rocky ridge and gorge habitat where steep cliff faces or suitable tall trees are present. There may be residents within and nearby the study area. Suitable foraging habitat is extremely widespread in the immediate and broader region with suitable nesting habitat largely confined to high-elevation cliffs, ridgelines and treed watercourses which occur beyond the boundaries of the study area.

6.1.3.10 Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia* (Pilbara); VU; Recorded)

The Pilbara Leaf-nosed Bat was recorded in the current survey using ultrasonic detection at 8 sites within the study area (sites WLP005, WLP006, WLP008, WLP011, WLP023, WLP025, WLP029, WLP032), from a total of 112 detections located in Rocky ridge and gorge, Drainage line and Spinifex stony plain. Most of these detections (97) were recorded on consecutive nights from site WLP032, situated in a major eastern tributary of the Turner River in the Breccia borefield (southern component).

Records of the Pilbara Leaf-nosed Bat in this survey range from approximately 5-30 km from the mine; however, it has been widely recorded throughout the current study area in previous surveys (detailed, targeted and monitoring from 2009 to 2023). The majority of these records are located in the Wodgina mine area, west of the mine, throughout the Rocky ridge and gorge habitat which contains a known transient diurnal roost (Figure 5-1; Figure 5-2), and the associated drainage lines. The species has been well-documented more widely throughout the desktop search extent, with numerous records concentrated to the east of the Breccia borefield, around the Abydoes and Iron Bridge mines. No permanent diurnal roosts have been recorded in the study area, and it is likely that caves within the Wodgina mine area are only used as non-critical nocturnal refuges (Stantec 2018b). The source of foraging Pilbara Leaf-nose Bats in the study area is likely the Yule River permanent diurnal roost, located approximately 22 km west of the Wodgina mine, and the Glacier Valley permanent diurnal roost, located approximately 4.3 km east-southeast of the Breccia borefield.

Other permanent diurnal roosts in the region include Corunna Downs mine site (~115 km east-southeast of the Wodgina mine), Mt Webber mine site (~75 km southeast), Lalla Rookh mine (~65 km east-northeast), the East Turner River roost (~35 km northeast; Figure 5-2) (Stantec 2018b; Umbrello *et al.* 2022).

Critical habitat for the Pilbara Leaf-nosed Bat, as defined by Bat Call WA (2021b), includes Category 1, 2 and 3 caves (Table 6-3), as well as permanent pools close to permanent diurnal roosts (all known diurnal roosts are located <9 km from permanent pools). Category 4 caves are also considered important for the species persistence in a local area.

The Rocky foothills and Rocky ridge and gorge habitats are both exemplified by topographically complex geologies containing caves, crevices and overhangs which may provide suitable roosting habitat and potentially support permanent or semi-permanent water sources which represent critical foraging habitat. Despite no natural water sources being identified in the current survey, previous surveys in the vicinity have recorded several permanent and semi-permanent water sources in the Rocky ridge and gorge habitat. The inundated abandoned mine pits in the Breccia borefield (northern component) are situated approximately 14 km from the Glacier Valley permanent diurnal roost and as such do not represent critical habitat. It is likely that Pilbara Leaf-nosed Bats utilise Drainage line, Rocky ridge and gorge and Rocky foothills for foraging and dispersal, and potentially the Rocky ridge and gorge and Rocky foothills for roosting. This species is well-documented in the wider region, with several major source colonies situated outside of the study area.

Table 6-3 Bat Call WA Pilbara Leaf-nosed Bat Cave Habitat Classifications (Bat Call WA 2021b)

Category	Description	Significance*
Category 1	Category 1 permanent roosts are maternity roosts where seasonal presence of young is proven. These often have large colonies present. Both categories are considered as critical habitat that is essential for the daily and long-term survival of the PLNB.	Considered as critical habitat that is essential for the daily and long-term survival of the PLNB. Based on wet season presence, these must also be classed as maternal sites, and these often have smaller colonies present.

Category	Description	Significance*
Category 2	Category 2 permanent roosts are occupied year round but without the proven presence of young.	Considered as critical habitat that is essential for the daily and long-term survival of the PLNB. Based on wet season presence, these must also be classed as maternal sites, and these often have smaller colonies present.
Category 3	These are used diurnally during some part of the year, but not occupied year round. They may be used during the breeding cycle and also may facilitate long distance dispersal in the region, particularly in the autumn. They are often associated with a nearby Category 1 or 2 permanent roost as a 'satellite' roost, that together make up a colony.	Considered as critical habitat that is essential for the long-term survival of the PLNB.
Category 4	These are occupied or entered at night for resting, feeding or other purposes, with perching not a requirement. Most moderately deep caves and shallow abandoned mines fall into this category	These are not considered critical habitat but are important for persistence in a local area.

PLNB – Pilbara Leaf-nosed Bat.

6.1.3.11 Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*; VU; Previously recorded)

The Pilbara Olive Python was not recorded in this survey but has previously been recorded in the Wodgina mine area on 2 instances, including a record in 2011 from an unknown survey in Spinifex stony plains north of the mine (DBCA 2023b), and more recently a verified record from the Wodgina mine village in 2024 (pers. comms. Dave Brown, Senior Environmental Advisor at Wodgina mine). There are a large number of records from 2011 to 2017, situated southeast of the Breccia borefield among the Rocky ridges and gorges dissected by drainage, near to the Iron Bridge and Abydoes mines, with a more recent record in 2022 from 3 km west of Breccia borefield.

The Pilbara Olive Python is the sister subspecies to its more widely distributed counterpart *L. o. olivaceus*, and represents an isolated population restricted to the ranges, gorges and escarpments of the Pilbara and Gascoyne regions of WA (Wilson & Swan 2021). They are often associated with permanent water pools in which they are adapt to utilising for foraging (DCCEEW 2024c; Wilson & Swan 2021). Radiotelemetry of the Pilbara Olive Python suggests that they have large, sexually dimorphic home ranges (DCCEEW 2024c). Critical habitat for the species as defined by DoE (2013) includes “areas that are necessary for activities such as foraging, breeding, roosting, or dispersal”.

Suitable habitat in the study area is correlated with the Rocky ridge and gorges and associated Drainage line habitats. Given the large home range of the species, and their ability to traverse long distances, it is likely that the Pilbara Olive Python occasionally utilises portions of the study area for foraging and dispersal, potentially including the inundated areas of the disused mine pits in the Breccia borefield. The presence of permanent water bodies amongst complex Rocky Gorge habitat is considered important habitat for the species and is likely a determining factor in whether any are continuously present, however they are not expected to occur in high numbers.

High-quality, deeply incised gorge systems and escapements are extensive within the immediate region surrounding the study area which provide important habitat for the species.

6.1.3.12 Rufous Grasswren (*Amytornis whitei* subsp. *whitei*; P4; Recorded)

Rufous Grasswren was recorded in the current survey from the direct observation of one individual at site Opp21, located in Rocky foothills in the Breccia borefield (southern component). The species has also been recorded in the Wodgina mine area, east of the mine (Western Wildlife 2020).

The Rufous Grasswren was recently delineated from the widely distributed *A. striatus*, from which it was formerly a species complex (Black *et al.* 2020). The species group includes 4 phenotypically, geographically and ecologically distinct populations. They prefer spinifex habitat associations on red rocky ridges and slopes in the Pilbara region, tending to utilise tall and dense spinifex hummocks with or without shrubs or light tree cover.

There is no critical habitat listed for the Rufous Grasswren. Suitable habitat in the study area comprises Rocky ridge and gorge, and Rock foothills. They are likely to be frequently present in the study area; however, are expected to occur in low numbers. The species is not restricted to the study area, and suitable spinifex-vegetated ridgelines occur extensively within the immediate regions surrounding the study area.

6.1.3.13 Spectacled Hare-wallaby (mainland)(*Lagorchestes conspicillatus* subsp. *leichardti*; P4; Previously recorded)

The Spectacled Hare-Wallaby was not recorded in this survey but has previously been recorded in Spinifex sandplain and Rocky ridge and gorge (adjacent to Rocky foothills) in the study area (32 records). Most records occur in the Breccia borefield, and isolated records also occur in the Wodgina mine area and Wodgina airstrip. The species is well-documented in the wider desktop search extent (DBCA 2023b).

The Spectacled Hare-wallaby is naturally rare in WA, with a scattered distribution in the Kimberley and Pilbara regions. They require large, mature spinifex hummocks for shelter and are introduced predators including cats and foxes, and to altered, frequent fire regimes which prevent the development of suitably large spinifex hummocks (Van Dyck & Strahan 2008).

The Spectacled Hare-wallaby is likely still present across the study area where spinifex-dominated habitat types occur; however, is expected to be low in numbers. The extensive burn scar from fires in recent years has likely reduced the suitability of habitat across much of the study area.

6.1.3.14 Western Pebble-mound Mouse (*Pseudomys chapmani*; P4; Recorded)

The Western Pebble-mound Mouse was recorded from 7 sites (11 records; sites WLP006, WLP009, WLP011, WLP055, Opp13, Opp15, Opp17) from one systematic capture and 10 nests in Spinifex stony plains, Rocky foothills and Drainage line. In previous surveys (detailed, targeted, basic), Western Pebble-mound Mice have been recorded extensively throughout the study area and surrounding habitats. While primarily recorded in Spinifex stony plains, they have also been recorded from Ironstone ridge top and Rocky foothills habitat.

The Western Pebble-mound Mouse is endemic to the non-coastal, central and eastern parts of the Pilbara region of WA (Van Dyck *et al.* 2013) and is patchily distributed across their range. Suitable habitat is characterised by low stony hills; they prefer gentle, sparsely vegetated slopes of rocky ranges (Morris & Burbidge 2008) including areas vegetated by spinifex, *Senna*, *Acacia* and *Ptilotus* with a sparse canopy of eucalypts (Van Dyck *et al.* 2013). They construct above-ground mounds of pebbles and stones overlaying a subterranean burrow system (Dunlop & Pound 1981; Van Dyck *et al.* 2013) which are occupied by multiple individuals at a time (Anstee *et al.* 1997). The availability of suitable-sized stones and pebbles for mound construction is a primary component determining habitat

suitability and is such a distribution-limiting factor. In these habitats, mounds may be found in large numbers but not all active and occupied simultaneously (Anstee 1996). The species home range differs between sexes and are up to 20 ha with core-area ranges up to 1 ha (Anstee *et al.* 1997).

They are almost certainly breeding residents of the study area; however, suitable habitat is extensive and continuous beyond the boundaries of the study area, and suitable habitat is widespread throughout the broader Pilbara region.

6.1.3.15 Migratory shorebirds (Mig; Previously recorded/Unlikely)

No Migratory shorebirds were recorded during the current survey. Two species have previously been recorded in the study area during the Western Wildlife (2020) detailed survey: Common Sandpiper (*Actitis hypoleucos*; Mig) and Wood Sandpiper (*Tringa glareola*, Mig.). Records of these species were documented in Drainage line, Rocky foothills (adjacent to a tributary of the Turner River) and a water storage dam north of Wodgina mine. The LOO assessment (Table 5-12) indicated there is no suitable habitat for Migratory shorebirds in the study area. Previous records of these species are likely infrequent visitors passing through and are not expected to be resident in the study area.

6.2 SRE INVERTEBRATE FAUNA

6.2.1 SRE habitats

Three SRE habitats are considered high potential to support SRE taxa due to their general characteristics, relative isolation or restricted distribution within the landscape. These habitats collectively make up 35.4% of the study area and include Rocky foothills (23.8%), Rocky ridge and gorge (5.2%) and Drainage line (6.4%). The primary channels of the Turner River represent the higher value areas of the Drainage line habitat intersecting the study area. Rocky ridge and gorge is limited in extent in the study area and the broader region. The remaining fauna habitats identified in the study area are considered low potential to support SRE taxa.

The Rocky foothills habitat is highly exposed and has little vegetation cover or leaf litter; however, contain crevices, rock piles, and incised minor drainage tributaries which offer suitable refugia to desiccant-prone SRE groups. These microhabitats are not uniformly distributed within the habitat type, mainly occurring near the transition to Rocky ridge and gorge habitat.

Drainage lines provide dense, structurally complex vegetation communities, often with transported drifts of leaf litter. Drainage line provides a locally mesic considered in an otherwise mostly dry intervening landscape. Temporary pooling of water occurs along the major channels and tributaries of the Turner River following significant rainfall. Many of the study areas drainage lines show evidence of disturbance from livestock and weed infestation.

The Rocky ridge and gorge habitat offers higher habitat complexity and availability of refugia than much of the otherwise flat, semi-arid landscape. The south-facing slopes of the topographically complex ridgeline with gorges and gullies provide climatically buffered environments which have the potential to support damp microhabitats suitable for SRE groups due to reduced sun exposure and subsequent moisture retention, and its limited extent and connectedness within the study area that may restrict dispersal of SRE taxa.

6.2.2 SRE assemblage

The desktop review identified recorded of 206 invertebrate taxa from SRE groups, comprising 10 confirmed and 109 potential SREs (see section 5.1.2). A further 44 taxa identified are of uncertain SRE status due to unresolved taxonomy, preventing reliable deductions on their distribution. An additional 43 widespread taxa were identified as part of the desktop review. One confirmed (*Urodacus uncinus*, 2 records) and 33 potential SRE taxa from the desktop review have records that intersect the study area (see section 5.1.2). The *U. uncinus* records inside the study area are situated in the infrastructure corridor (east of the Turner River), with a further 8 records occurring at 2 locations in close proximity to the infrastructure corridor. The next closest record of a confirmed SRE, *Antichiropus forcipatus* (millipede), is situated approximately 3.2 km north of Breccia borefield, followed by *Antichiropus* 'DIP033 wodgina' (millipede), situated approximately 8.3 km west of Wodgina airstrip. Most confirmed SRE taxa records range from approximately 45 to 58 km east of the Wodgina mine, located around Atlas Iron's Abydoes Mine.

Thirteen of the 23 recognised taxa collected in the field survey were identified in the desktop review; *Buddelundia* 'Phoenix0203', *B.* 'Phoenix0202', *B.* 'Phoenix0201', *B.* 'Phoenix0200', *Lychas* 'SCO024', *L.* 'Phoenix0195', *L.* 'Phoenix0194', Ophiidae 'Phoenix0197', *Dampetrus* 'DNA09', Ophiidae 'Phoenix0197', *Synsphyronus xynus*, *Dampetrus* 'DNA09' and *Aname mellosa*. However, 11 (47.8%) of these taxa were recorded for the first time during the Phoenix (2024a) survey. Fifteen of the 23 recognised taxa (43.5%) successfully sequenced from the current survey were able to be genetically matched to existing specimens, and 7 taxa are considered new to science. The spring 2023 survey (Phoenix 2024a) recorded 14 taxa which were considered new to science, bringing the total number of new taxa recorded during the spring 2023 and autumn 2024 surveys to 21. This assemblage is

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
Prepared for Mineral Resources Ltd

comprised of 2 mygalomorph spiders, 5 pseudoscorpions, 3 scorpions, 10 isopods and one harvestman; all taxa are regarded as potential SREs (Table 6-4). The large number of new species is possibly due to the lack of publicly available molecular reference material required to match specimens to existing species or morphologically defined morphospecies. The above result indicates that this study area and general vicinity has been subject to a depauperated survey effort for SRE fauna.

Given the lack of taxonomic knowledge and molecular reference material available for pseudoscorpions, scorpions, and some groups of isopods, it is possible any of the species from the field survey have been collected regionally and only identified morphologically, limiting the ability of molecular identification to classify them to species-level.

Overall, the study area comprises extensive and mostly continuous low prospectivity SRE habitat, with the Drainage line, Rocky ridge and gorge and their associated rocky lower slopes providing the highest potential SRE value within the study area. No confirmed SRE species were recorded within the study area, and it is unlikely any of the recorded potential SREs are restricted to the study area as habitat of all the records is continuous outside of the study area.

Table 6-4 New SRE taxa recorded in the spring 2023 and autumn 2024 surveys

Family	Taxa	Spring 2023 (Phoenix 2024a)	Autumn 2024 (current survey)
Class: Arachnida, Infraorder: Mygalomorphae (Trapdoor spiders) (2)			
Anamididae	<i>Aname</i> 'Phoenix0247'		•
Barychelidae	<i>Aurecocypta</i> 'Phoenix0248'		•
Class: Arachnida, Order: Pseudoscorpiones (Pseudoscorpions) (5)			
Olpidae	Olpidae 'Phoenix0244'		•
	Olpidae 'Phoenix0196'	•	
	Olpidae 'Phoenix0197'	•	•
	Olpidae 'Phoenix0198'	•	
	Olpidae 'Phoenix0199'	•	
Order: Scorpiones (scorpions) (3)			
Buthidae	<i>Lychas</i> 'Phoenix0194'	•	•
	<i>Lychas</i> 'Phoenix0195'	•	•
	<i>Lychas</i> 'Phoenix0242'		•
Class: Arachnida, Order: Opiliones (1)			
Assamiidae	<i>Dampetrus</i> 'Phoenix0243'		•
Class: Malacostraca, Order: Isopoda (Woodlice) (10)			
Armadillidae	Armadillidae 'Phoenix0204'	•	
	Armadillidae 'Phoenix0205'	•	
	Armadillidae 'Phoenix0206'	•	
	<i>Buddelundia</i> 'Phoenix0200'	•	•
	<i>Buddelundia</i> 'Phoenix0201'	•	•
	<i>Buddelundia</i> 'Phoenix0202'	•	•
	<i>Buddelundia</i> 'Phoenix0203'	•	•
	<i>Buddelundia</i> 'Phoenix0207'	•	
	<i>Buddelundia</i> 'Phoenix0246'		•
	<i>Buddelundia</i> 'Phoenix0249'		•

6.3 CONCLUSION

All habitats identified during the survey are consistent with those recorded from previous surveys conducted within and adjacent to the study area. Most habitats within the study area are widespread in the region, with the exception of Ironstone ridge top and Rocky ridge and gorge.

Rocky ridge and gorge habitat represents high value fauna habitat, due to its suitability for Northern Quoll denning, and Pilbara Leaf-nosed Bat, and Ghost Bat roosting. Drainage lines are also regarded as high value fauna habitat that provide important foraging and dispersal opportunities for many conservation significant fauna. The faunal assemblage of the study area is typical of the region and consists mostly of species distributed throughout the Pilbara.

The SRE assemblage was smaller than expected from the expansive desktop and consisted mainly of isopods, pseudoscorpions, and scorpions. The survey recorded a large number of new species, and a high proportion of the new taxa recorded in the Phoenix (2024) survey were re-sampled this survey. The large number of new species is possibly due to the lack of publicly available molecular reference material required to match specimens to existing species or morphologically defined morphospecies. However, the SRE habitats that occur within the study area are mostly continuous and relatively extensive outside the study area.

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Appendix 1 Survey site locations

Site name	Site type	Latitude	Longitude	Site name	Site type	Latitude	Longitude
Autumn 2024 (current survey)							
BP01	Fauna site	-21.0368	118.6294	WLP009	Fauna site	-21.2117	118.6685
BP02	Fauna site	-21.0332	118.6407	WLP010	Fauna site	-21.1610	118.9281
BP03	Fauna site	-21.0488	118.6578	WLP011	Fauna site	-21.1798	118.9298
BP04	Fauna site	-21.0941	118.6760	WLP012	Fauna site	-21.1237	118.7502
BP05	Fauna site	-21.1116	118.6936	WLP013	Fauna site	-21.1559	118.6573
BP06	Fauna site	-21.1218	118.7251	WLP014	Fauna site	-21.1202	118.7793
BP07	Fauna site	-21.1214	118.7151	WLP015	Fauna site	-21.1390	118.6626
BP08	Fauna site	-21.124	118.7674	WLP016	Fauna site	-21.1200	118.7787
BP09	Fauna site	-21.0315	118.6550	WLP017	Fauna site	-21.2237	118.6805
BP10	Fauna site	-21.1206	118.7007	WLP018	Fauna site	-21.1239	118.6975
BP11	Fauna site	-21.1142	118.8082	WLP019	Fauna site	-21.1171	118.6609
BP12	Fauna site	-21.1147	118.8463	WLP020	Fauna site	-21.1049	118.6947
BP13	Fauna site	-21.1055	118.8936	WLP021	Fauna site	-21.1697	118.6861
BP14	Fauna site	-21.1232	118.9065	WLP022	Fauna site	-21.1983	118.6945
BP15	Fauna site	-21.123	118.7481	WLP023	Fauna site	-21.1177	118.7155
BP16	Fauna site	-21.1127	118.8705	WLP024	Fauna site	-21.1096	118.9015
BP17	Fauna site	-21.0779	118.6706	WLP025	Fauna site	-21.1122	118.9056
BP18	Fauna site	-21.0642	118.6653	WLP026	Fauna site	-21.2123	118.6385
BP19	Fauna site	-21.1378	118.6913	WLP027	Fauna site	-21.1825	118.6470
BP20	Fauna site	-21.1555	118.9251	WLP027	Fauna site	-21.1776	118.9329
BP21	Fauna site	-21.1841	118.9349	WLP028	Fauna site	-21.1940	118.9273
BP22	Fauna site	-21.1660	118.9280	WLP029	Fauna site	-21.1578	118.9431
Opp01	Fauna site	-21.0903	118.6754	WLP030	Fauna site	-21.1601	118.9420
Opp02	Fauna site	-21.1021	118.6822	WLP031	Fauna site	-21.1745	118.9416
Opp03	Fauna site	-21.0826	118.8831	WLP032	Fauna site	-21.1864	118.9359
Opp04	Fauna site	-21.1609	118.6776	WLP033	Fauna site	-21.1655	118.9271
Opp05	Fauna site	-21.1826	118.6739	WLP034	Fauna site	-21.1965	118.9294
Opp06	Fauna site	-21.1225	118.7387	WLP036	Fauna site	-21.1183	118.9000
Opp07	Fauna site	-21.1077	118.903	WLP037	Fauna site	-21.0957	118.8929
Opp08	Fauna site	-21.1047	118.8954	WLP038	Fauna site	-21.0993	118.9055
Opp09	Fauna site	-21.1449	118.6581	WLP039	Fauna site	-21.0934	118.9043
Opp10	Fauna site	-21.1060	118.8990	WLP040	Fauna site	-21.0907	118.8994
Opp11	Fauna site	-21.1788	118.6691	WLP041	Fauna site	-21.2064	118.6674
Opp12	Fauna site	-21.1505	118.9397	WLP042	Fauna site	-21.1815	118.6916
Opp13	Fauna site	-21.1840	118.9326	WLP043	Fauna site	-21.1370	118.6763
Opp14	Fauna site	-21.1838	118.9166	WLP044	Fauna site	-21.1893	118.6391
Opp15	Fauna site	-21.1840	118.9236	WLP045	Fauna site	-21.1655	118.6477
Opp16	Fauna site	-21.1505	118.9295	WLP046	Fauna site	-21.1549	118.6478
Opp17	Fauna site	-21.1858	118.9212	WLP047	Fauna site	-21.1137	118.8274
Opp18	Fauna site	-21.1596	118.9211	WLP048	Fauna site	-21.1195	118.6609
Opp19	Fauna site	-21.1539	118.9225	WLP049	Fauna site	-21.0996	118.8929

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
Prepared for Mineral Resources Ltd

Site name	Site type	Latitude	Longitude	Site name	Site type	Latitude	Longitude
Opp20	Fauna site	-21.1997	118.9213	WLP050	Fauna site	-21.1304	118.9088
Opp21	Fauna site	-21.1694	118.9387	WLP051	Fauna site	-21.1867	118.922
WLP001	Fauna site	-21.0318	118.6461	WLP052	Fauna site	-21.1928	118.9203
WLP002	Fauna site	-21.0436	118.6559	WLP053	Fauna site	-21.1606	118.9332
WLP003	Fauna site	-21.1469	118.7086	WLP054	Fauna site	-21.1743	118.9281
WLP004	Fauna site	-21.1853	118.6985	WLP055	Fauna site	-21.1547	118.9352
WLP005	Fauna site	-21.1228	118.7763	WLP056	Fauna site	-21.1726	118.9372
WLP006	Fauna site	-21.1343	118.6968	WLP057	Fauna site	-21.1721	118.933
WLP007	Fauna site	-21.1036	118.904	WLP058	Fauna site	-21.1458	118.9125
WLP008	Fauna site	-21.1019	118.8879	WLP059	Fauna site	-21.1915	118.9391

Spring 2023 (Phoenix 2024a)

BP001	Targeted fauna site	-21.1529	118.673	WOD016	Targeted fauna site	-21.2052	118.6765
BP002	Targeted fauna site	-21.1198	118.7804	WOD017	Targeted fauna site	-21.2050	118.6726
BP003	Targeted fauna site	-21.1275	118.6882	WOD018	Targeted fauna site	-21.2104	118.6542
BP004	Targeted fauna site	-21.1372	118.6789	WOD019	Targeted fauna site	-21.2131	118.6659
BP005	Targeted fauna site	-21.1399	118.6742	WOD020	Targeted fauna site	-21.2004	118.6573
BP006	Targeted fauna site	-21.0439	118.6507	WOD021	Targeted fauna site	-21.2031	118.6549
BP007	Targeted fauna site	-21.1525	118.6836	WOD022	Targeted fauna site	-21.1765	118.6628
BP008	Targeted fauna site	-21.1251	118.6975	WOD023	Targeted fauna site	-21.1756	118.6604
BP009	Targeted fauna site	-21.1456	118.6904	WOD024	Targeted fauna site	-21.1829	118.6577
BP010	Targeted fauna site	-21.1231	118.776	WOD025	Targeted fauna site	-21.1785	118.6582
BP011	Targeted fauna site	-21.0436	118.6434	WOD026	Targeted fauna site	-21.1816	118.6588
BP012	Targeted fauna site	-21.0504	118.6447	WOD027	Fauna site	-21.1676	118.6822
Opp001	Individual specimen	-21.0853	118.7708	WOD028	Fauna site	-21.1353	118.6976
Opp002	Individual specimen	-21.0416	118.6438	WOD029	Fauna site	-21.1031	118.8874
Opp003	Individual specimen	-21.0381	118.6432	WOD030	Fauna site	-21.1121	118.9145
Opp004	Individual specimen	-21.1661	118.6777	WOD031	Fauna site	-21.0936	118.8850
Opp005	Fauna site	-21.1645	118.6792	WOD032	Fauna site	-21.0954	118.8870
Opp006	Fauna site	-21.1226	118.7403	WOD033	Fauna site	-21.093	118.888
Opp007	Fauna site	-21.1772	118.6589	WOD034	Fauna site	-21.0983	118.8903
Opp008	Fauna site	-21.1441	118.6923	WOD035	Fauna site	-21.1126	118.8698
Opp009	Fauna site	-21.1759	118.6564	WOD036	Fauna site	-21.114	118.8052
Opp010	Individual specimen	-21.1506	118.6682	WOD037	Fauna site	-21.1133	118.8448
Opp011	Individual specimen	-21.2048	118.6761	WOD038	Fauna site	-21.1177	118.7825
Opp012	Individual specimen	-21.1396	118.6742	WOD039	Fauna site	-21.1203	118.7795
Opp013	Individual specimen	-21.1528	118.6841	WOD040	Fauna site	-21.123	118.776
Opp014	Individual specimen	-21.1411	118.6748	WOD041	Fauna site	-21.1236	118.7629
WOD001	Fauna site	-21.0317	118.6467	WOD042	Fauna site	-21.1352	118.7042
WOD002	Fauna site	-21.0435	118.6545	WOD043	Fauna site	-21.1412	118.6748
WOD003	Fauna site	-21.1344	118.6972	WOD044	Fauna site	-21.0784	118.6089
WOD004	Fauna site	-21.1425	118.691	WOD045	Fauna site	-21.0314	118.6448
WOD005	Fauna site	-21.1196	118.7805	WOD046	Fauna site	-21.0438	118.654

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
Prepared for Mineral Resources Ltd

Site name	Site type	Latitude	Longitude	Site name	Site type	Latitude	Longitude
WOD006	Fauna site	-21.1134	118.8037	WOD047	Fauna site	-21.1531	118.924
WOD007	Fauna site	-21.1781	118.6603	WOD048	Fauna site	-21.1832	118.9211
WOD008	Fauna site	-21.1766	118.6602	WOD049	Fauna site	-21.1455	118.9145
WOD009	Fauna site	-21.1981	118.6897	WOD050	Fauna site	-21.214	118.6775
WOD010	Fauna site	-21.1983	118.6932	WOD051	Fauna site	-21.1761	118.6603
WOD011	Fauna site	-21.1874	118.6895	WOD052	Fauna site	-21.0471	118.659
WOD012	Fauna site	-21.1854	118.6987	WOD053	Fauna site	-21.06	118.6641
WOD013	SRE site	-21.2062	118.6727	WOD054	Fauna site	-21.0756	118.6692
WOD014	Fauna site	-21.2147	118.6758	WOD055	Fauna site	-21.0977	118.6779
WOD015	Targeted fauna site	-21.1977	118.6628				

Sites highlighted in grey are systematic sites sampled in both the spring 2023 and autumn 2024 surveys

Site details			
Site	BP01	Position (WGS84)	118.6294 -21.0368
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	clay loam, sand
Rock cover (%)	0	Rock type	none

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	23 Mar 2024	23 Mar 2024
1	Quadrat	23 Mar 2024	23 Mar 2024

Site description - visit 1 (23 Mar 2024)			
Scattered Eucalyptus trees over Acacia tumida and mixed low shrubs over stage 1 - 2 hard spinifex grassland on red brown clay loam with a thin layer of sand.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks)		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	68.0	Litter distribution	sparse
Tree cover (%)	2.0	Litter depth (cm)	0.0
Shrub cover (%)	5.0	Litter cover (%)	1.0
Grass cover (%)	60.0	Herb cover (%)	1.0



Site details			
Site	BP02	Position (WGS84)	118.6407 -21.0332
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	clay loam, sand, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	22 Mar 2024	22 Mar 2024
1	Quadrat	22 Mar 2024	22 Mar 2024

Site description - visit 1 (22 Mar 2024)			
Scattered Corymbia over low Acacia, Grevillea and mixed low shrubs over stage 1 - 2 hard spinifex grassland on red brown clay loam with a thin layer of sand and patchy ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks)		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	84.0	Litter distribution	sparse
Tree cover (%)	3.0	Litter depth (cm)	0.0
Shrub cover (%)	20.0	Litter cover (%)	1.0
Grass cover (%)	60.0	Herb cover (%)	1.0



Site details			
Site	BP03	Position (WGS84)	118.6578 -21.0488
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	clay loam, gravel, sand
Rock cover (%)	0	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	23 Mar 2024	23 Mar 2024
1	Quadrat	23 Mar 2024	23 Mar 2024

Site description - visit 1 (23 Mar 2024)			
Scattered Eucalyptus and Corymbia over Grevillea, Acacia and mixed low shrubs over fragmented stage 1 - 2 hard spinifex grassland on red brown clay loam with a thin layer of sand and patches of ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	66.0	Litter distribution	under vegetation
Tree cover (%)	5.0	Litter depth (cm)	0.0
Shrub cover (%)	5.0	Litter cover (%)	2.0
Grass cover (%)	55.0	Herb cover (%)	1.0



Site details			
Site	BP04	Position (WGS84)	118.6760 -21.0941
Slope	negligible	Topography	plain
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	Quadrat	25 Mar 2024	25 Mar 2024
1	Opportunistic sighting	25 Mar 2024	25 Mar 2024
1	Site description	25 Mar 2024	25 Mar 2024

Site description - visit 1 (25 Mar 2024)			
Isolated Eucalyptus over low Acacia shrubs over stage 2 - 3 hard spinifex grassland on red brown sandy clay soil.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks), evidence of feral animals		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	80.0	Litter distribution	sparse
Tree cover (%)	0.0	Litter depth (cm)	0.0
Shrub cover (%)	30.0	Litter cover (%)	1.0
Grass cover (%)	50.0	Herb cover (%)	0.0



Site details			
Site	BP05	Position (WGS84)	118.6936 -21.1117
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	sandy clay, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Quadrat	25 Mar 2024	25 Mar 2024
1	Site description	25 Mar 2024	25 Mar 2024

Site description - visit 1 (25 Mar 2024)			
Scattered Eucalyptus concentrated along minor drainage over low mixed Acacia shrubs over stage 2 - 3 hard spinifex hummocks with invasive pasture grasses on red brown sandy clay. Transition to stony plain with stage 1 - 2 hard spinifex away from the drainage.			
Habitat	grassland		
Disturbance	exploration (drill pads and access tracks), weed infestation, livestock tracks		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	94.0	Litter distribution	sparse
Tree cover (%)	3.0	Litter depth (cm)	0.0
Shrub cover (%)	20.0	Litter cover (%)	1.0
Grass cover (%)	70.0	Herb cover (%)	1.0



Site details			
Site	BP06	Position (WGS84)	118.7251 -21.1218
Slope	negligible	Topography	plain
Soil colour	light-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	24 Mar 2024	24 Mar 2024
1	Quadrat	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Scattered Corymbias over Hakeas and mixed Acacia over predominantly stages 2 - hard spinifex grassland on a sandy clay plain.			
Habitat	spinifex grassland		
Disturbance	vehicle tracks, grazing-low, evidence of feral animals		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	65.0	Litter distribution	under vegetation
Tree cover (%)	1.0	Litter depth (cm)	1.0
Shrub cover (%)	2.0	Litter cover (%)	5.0
Grass cover (%)	60.0	Herb cover (%)	2.0



Site details			
Site	BP07	Position (WGS84)	118.7151 -21.1214
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	sandy loam, clay
Rock cover (%)	0	Rock type	none

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	24 Mar 2024	24 Mar 2024
1	Quadrat	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Scattered Corymbia over Acacia and stage 3 - 4 hard spinifex hummocks on sandy clay loam plain.			
Habitat	shrubland		
Disturbance	vehicle tracks		
Vegetation condition	Very Good	Fire age	moderate (>5 years)
Total veg. cover (%)	63.0	Litter distribution	under vegetation
Tree cover (%)	2.0	Litter depth (cm)	1.0
Shrub cover (%)	30.0	Litter cover (%)	5.0
Grass cover (%)	30.0	Herb cover (%)	1.0



Site details			
Site	BP08	Position (WGS84)	118.7674 -21.1240
Slope	negligible	Topography	plain
Soil colour	light-brown, red-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	24 Mar 2024	24 Mar 2024
1	Quadrat	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Scattered Eucalyptus and mixed Acacia including Acacia stellaticeps over stage 2 - 3 hard spinifex grassland on light brown sandy plain.			
Habitat	spinifex grassland		
Disturbance	evidence of feral animals, vehicle tracks, weed infestation		
Vegetation condition	Very Good	Fire age	moderate (>5 years)
Total veg. cover (%)	87.0	Litter distribution	under vegetation
Tree cover (%)	5.0	Litter depth (cm)	1.0
Shrub cover (%)	15.0	Litter cover (%)	2.0
Grass cover (%)	65.0	Herb cover (%)	2.0



Site details			
Site	BP09	Position (WGS84)	118.6550 -21.0315
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	clay loam, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Quadrat	22 Mar 2024	22 Mar 2024
1	Site description	22 Mar 2024	22 Mar 2024

Site description - visit 1 (22 Mar 2024)			
Isolated Corymbia over low Acacia tumida shrubland with scattered Grevillea over stage 1 - 2 hard spinifex grassland on red brown clay loam plain with ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks)		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	88.0	Litter distribution	sparse
Tree cover (%)	2.0	Litter depth (cm)	0.0
Shrub cover (%)	30.0	Litter cover (%)	1.0
Grass cover (%)	55.0	Herb cover (%)	1.0



Site details			
Site	BP10	Position (WGS84)	118.7007 -21.1206
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	sandy clay, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Quadrat	25 Mar 2024	25 Mar 2024
1	Site description	25 Mar 2024	25 Mar 2024

Site description - visit 1 (25 Mar 2024)			
Scattered Acacia and Hakea shrubs over stage 3 - 4 hard spinifex on red brown sandy clay soil with ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks), livestock tracks, litter, weed infestation		
Vegetation condition	Very Good	Fire age	moderate (>5 years)
Total veg. cover (%)	76.0	Litter distribution	sparse
Tree cover (%)	0.0	Litter depth (cm)	0.0
Shrub cover (%)	5.0	Litter cover (%)	1.0
Grass cover (%)	70.0	Herb cover (%)	1.0



Site details			
Site	BP11	Position (WGS84)	118.8075 -21.1154
Slope	gentle	Topography	undulating plain
Soil colour	red-brown	Soil texture	sandy clay, sandy loam, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Quadrat	23 Mar 2024	23 Mar 2024
1	Site description	23 Mar 2024	23 Mar 2024

Site description - visit 1 (23 Mar 2024)			
Isolated Eucalyptus over shrubland of mixed Acacia over hard spinifex hummocks on red brown sandy clay loam with ironstone gravel and cobbles. Wide, low drainage line to the south.			
Habitat	shrubland		
Disturbance	grazing-low, livestock tracks, weed infestation, exploration (drill pads and access tracks)		
Vegetation condition	Good	Fire age	moderate (>5 years)
Total veg. cover (%)	82.0	Litter distribution	sparse
Tree cover (%)	1.0	Litter depth (cm)	1.0
Shrub cover (%)	30.0	Litter cover (%)	1.0
Grass cover (%)	50.0	Herb cover (%)	1.0



Site details			
Site	BP12	Position (WGS84)	118.8463 -21.1147
Slope	gentle	Topography	undulating plain
Soil colour	red-brown	Soil texture	sand, clay loam, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	23 Mar 2024	23 Mar 2024
1	Quadrat	23 Mar 2024	23 Mar 2024
1	Opportunistic sighting	23 Mar 2024	23 Mar 2024

Site description - visit 1 (23 Mar 2024)			
Isolated Eucalyptus over shrubland of mixed Acacia over hard spinifex and pasture grasses on red brown sandy clay loam with ironstone gravel. Spinifex on north side more recently burnt.			
Habitat	shrubland		
Disturbance	grazing-low, livestock tracks, weed infestation		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	74.0	Litter distribution	under vegetation
Tree cover (%)	3.0	Litter depth (cm)	2.0
Shrub cover (%)	40.0	Litter cover (%)	5.0
Grass cover (%)	30.0	Herb cover (%)	1.0



Site details			
Site	BP13	Position (WGS84)	118.8936 -21.1055
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	clay loam, gravel
Rock cover (%)	0	Rock type	none

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	22 Mar 2024	22 Mar 2024
1	Quadrat	22 Mar 2024	22 Mar 2024
1	Foraging - vertebrates	22 Mar 2024	22 Mar 2024

Site description - visit 1 (22 Mar 2024)			
Scattered mallee Eucalyptus over Hakea, Senna and low Acacia shrubs over stage 2 - 3 hard spinifex on a red brown clay loam and laterite plain adjacent to minor drainage line.			
Habitat	shrubland		
Disturbance	current operations, erosion channels, exploration (drill pads and access tracks), grazing-low, litter, livestock tracks, vehicle tracks		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	63.0	Litter distribution	under vegetation
Tree cover (%)	3.0	Litter depth (cm)	1.0
Shrub cover (%)	15.0	Litter cover (%)	5.0
Grass cover (%)	40.0	Herb cover (%)	5.0



Site details			
Site	BP14	Position (WGS84)	118.9074 -21.1226
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	loamy sand
Rock cover (%)	0	Rock type	none

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Quadrat	22 Mar 2024	22 Mar 2024
1	Foraging - vertebrates	22 Mar 2024	22 Mar 2024
1	Site description	22 Mar 2024	22 Mar 2024

Site description - visit 1 (22 Mar 2024)			
Scattered mallee Eucalyptus over mixed shrubland with Acacia and Senna over stage 2 - 3 soft spinifex hummocks on sandy clay loam plain adjacent to major drainage.			
Habitat	shrubland		
Disturbance	evidence of feral animals, historic clearing		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	37.0	Litter distribution	under vegetation
Tree cover (%)	1.0	Litter depth (cm)	1.0
Shrub cover (%)	20.0	Litter cover (%)	3.0
Grass cover (%)	15.0	Herb cover (%)	1.0



Site details			
Site	BP15	Position (WGS84)	118.7481 -21.1230
Slope	negligible	Topography	drainage line
Soil colour	red-brown	Soil texture	sandy clay, sand
Rock cover (%)	0	Rock type	none

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	24 Mar 2024	24 Mar 2024
1	Quadrat	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Corymbia over Acacia stellaticeps and Hakea over stages 2 - 4 soft spinifex situated adjacent to minor drainage.			
Habitat	shrubland		
Disturbance	evidence of feral animals, vehicle tracks		
Vegetation condition	Excellent	Fire age	moderate (>5 years)
Total veg. cover (%)	52.0	Litter distribution	under vegetation
Tree cover (%)	1.0	Litter depth (cm)	1.0
Shrub cover (%)	20.0	Litter cover (%)	5.0
Grass cover (%)	30.0	Herb cover (%)	1.0



Site details			
Site	BP16	Position (WGS84)	118.8705 -21.1127
Slope	gentle	Topography	drainage line
Soil colour	red-brown	Soil texture	clay loam, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	22 Mar 2024	22 Mar 2024
1	Quadrat	22 Mar 2024	22 Mar 2024

Site description - visit 1 (22 Mar 2024)			
Scattered Eucalyptus over Senna and Acacia over spinifex hummocks, mixed herbs and grasses on red brown clay loam plain covered with ironstone gravel and quartz cobbles.			
Habitat	shrubland		
Disturbance	erosion channels, current operations, grazing-low, large-scale clearing, livestock tracks, vehicle tracks		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	80.0	Litter distribution	under vegetation
Tree cover (%)	15.0	Litter depth (cm)	2.0
Shrub cover (%)	20.0	Litter cover (%)	10.0
Grass cover (%)	40.0	Herb cover (%)	5.0



Site details			
Site	BP17	Position (WGS84)	118.6706 -21.0779
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	clay loam, gravel, sand
Rock cover (%)	0	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	23 Mar 2024	23 Mar 2024
1	Quadrat	23 Mar 2024	23 Mar 2024

Site description - visit 1 (23 Mar 2024)			
Scattered Eucalyptus and Corymbia over Acacia tumida, Eucalyptus saplings and mixed low shrubs over stage 1 - 2 hard spinifex grassland on red brown clay loam with a thin layer of sand and ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks), vehicle tracks		
Vegetation condition	Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	78.0	Litter distribution	under vegetation
Tree cover (%)	2.0	Litter depth (cm)	1.0
Shrub cover (%)	20.0	Litter cover (%)	5.0
Grass cover (%)	55.0	Herb cover (%)	1.0



Site details			
Site	BP18	Position (WGS84)	118.6653 -21.0642
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	clay loam, gravel, sand
Rock cover (%)	0	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	23 Mar 2024	23 Mar 2024
1	Quadrat	23 Mar 2024	23 Mar 2024

Site description - visit 1 (23 Mar 2024)			
Scattered Eucalyptus and Corymbia over Acacia tumida, Eucalyptus saplings and mixed low shrubs over stage 1 - 2 hard spinifex grassland on red brown clay loam with a thin a layer of sand and ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	livestock tracks, vehicle tracks, exploration (drill pads and access tracks)		
Vegetation condition	Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	58.0	Litter distribution	under vegetation
Tree cover (%)	2.0	Litter depth (cm)	0.0
Shrub cover (%)	5.0	Litter cover (%)	2.0
Grass cover (%)	50.0	Herb cover (%)	1.0



Site details			
Site	BP19	Position (WGS84)	118.6912 -21.1379
Slope	gentle	Topography	drainage line
Soil colour	red-brown	Soil texture	clay loam, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	24 Mar 2024	24 Mar 2024
1	Quadrat	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Open Eucalyptus woodland over Hakea and Acacia over spinifex, invasive herbs and grasses on red brown clay loam along minor drainage channel with a surface layer of ironstone and quartz cobbles.			
Habitat	open woodland		
Disturbance	erosion channels, evidence of feral animals, grazing-high, large-scale clearing, litter, livestock tracks, vehicle tracks, weed infestation		
Vegetation condition	Degraded	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	65.0	Litter distribution	transported
Tree cover (%)	10.0	Litter depth (cm)	2.0
Shrub cover (%)	20.0	Litter cover (%)	5.0
Grass cover (%)	20.0	Herb cover (%)	15.0



Site details			
Site	BP20	Position (WGS84)	118.9252 -21.1555
Slope	negligible	Topography	plain
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	21 May 2024	21 May 2024
1	Quadrat	21 May 2024	21 May 2024

Site description - visit 1 (21 May 2024)			
Spinifex grassland on lower tier/levy of moderate drainage. Predominantly stage 5 senescent hard spinifex grassland with patches of moderately dense mid Acacia trachycarpa shrubs on red brown clay loam soil.			
Habitat	spinifex grassland		
Disturbance	evidence of feral animals, livestock tracks		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	126.0	Litter distribution	under vegetation
Tree cover (%)	10.0	Litter depth (cm)	1.0
Shrub cover (%)	25.0	Litter cover (%)	5.0
Grass cover (%)	90.0	Herb cover (%)	1.0



Site details			
Site	BP21	Position (WGS84)	118.9349 -21.1842
Slope	negligible	Topography	plain
Soil colour	light-brown, red-brown	Soil texture	alluvium, clay loam, gravel / alluvial
Rock cover (%)	0	Rock type	none

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	22 May 2024	22 May 2024
1	Quadrat	22 May 2024	22 May 2024

Site description - visit 1 (22 May 2024)			
Mid Corymbia hamersleyana trees over mid to tall Acacia tumida over scattered patches of dense Acacia stellaticeps over long unburnt stage 5 spinifex hummock grassland on loamy clay with alluvial gravel, smooth pebbles and cobbles.			
Habitat	spinifex grassland		
Disturbance	livestock tracks		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	151.0	Litter distribution	under vegetation
Tree cover (%)	45.0	Litter depth (cm)	1.0
Shrub cover (%)	30.0	Litter cover (%)	5.0
Grass cover (%)	75.0	Herb cover (%)	1.0



Site details			
Site	BP22	Position (WGS84)	118.9280 -21.1660
Slope	negligible	Topography	riparian zone
Soil colour	light-brown, red-brown	Soil texture	clay loam, gravel / alluvial, loam
Rock cover (%)	0	Rock type	none

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	21 May 2024	21 May 2024
1	Quadrat	21 May 2024	21 May 2024

Site description - visit 1 (21 May 2024)			
Spinifex grassland on lower tier/levy of moderate drainage. Predominantly stage 5 senescent hard spinifex grassland. Patches of moderately dense mid Acacia trachycarpa shrub on red brown clay loam soil.			
Habitat	spinifex grassland		
Disturbance	evidence of feral animals, livestock tracks		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	126.0	Litter distribution	under vegetation
Tree cover (%)	5.0	Litter depth (cm)	0.0
Shrub cover (%)	40.0	Litter cover (%)	3.0
Grass cover (%)	80.0	Herb cover (%)	1.0



Site details			
Site	Opp10	Position (WGS84)	118.8990 -21.1060
Slope	steep	Topography	ridgeline
Soil colour	red-brown	Soil texture	clay loam
Rock cover (%)	60	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Birding	25 Mar 2024	25 Mar 2024
1	Foraging - vertebrates	25 Mar 2024	25 Mar 2024
1	Site description	25 Mar 2024	25 Mar 2024

Site description - visit 1 (25 Mar 2024)			
Scattered Hakea over spinifex grassland along moderate ridgeline, with some Ficus in front of overhangs and crevices on red brown clay loam hillslope.			
Habitat	spinifex grassland		
Disturbance	erosion channels, exploration (drill pads and access tracks), litter		
Vegetation condition	Very Good	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	60.0	Litter distribution	scattered
Tree cover (%)	0.0	Litter depth (cm)	1.0
Shrub cover (%)	15.0	Litter cover (%)	5.0
Grass cover (%)	40.0	Herb cover (%)	5.0



Site details			
Site	Opp11	Position (WGS84)	118.6689 -21.1791
Slope	gentle	Topography	drainage line
Soil colour	red-brown	Soil texture	clay loam, gravel
Rock cover (%)	10	Rock type	ferrous - ironstone, ferrous - BIF

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Birding	24 Mar 2024	24 Mar 2024
1	Site description	24 Mar 2024	24 Mar 2024
1	Opportunistic sighting	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Scattered Eucalyptus over stage 4 - 5 long unburnt hard spinifex hummocks with several weeds in rocky drainage line adjacent to mining area.			
Habitat	open woodland		
Disturbance	current operations, erosion channels, evidence of feral animals, grazing-high, large-scale clearing, litter, livestock tracks, weed infestation, vehicle tracks		
Vegetation condition	Degraded	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	95.0	Litter distribution	under vegetation
Tree cover (%)	10.0	Litter depth (cm)	1.0
Shrub cover (%)	5.0	Litter cover (%)	5.0
Grass cover (%)	60.0	Herb cover (%)	20.0



Site details			
Site	Opp20	Position (WGS84)	118.9213 -21.1997
Slope	gentle	Topography	drainage line
Soil colour	light-brown	Soil texture	loamy sand
Rock cover (%)	5	Rock type	calcrete, ferrous - BIF, ferrous - ironstone, granite - rocks

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	22 May 2024	22 May 2024
1	Opportunistic sighting	22 May 2024	22 May 2024

Site description - visit 1 (22 May 2024)			
Corymbia hamersleana and other ornamental Eucalyptus over Acacia tumida, Grevellia, and Senna on brown loamy sand drainage line surrounded by rocky hard spinifex hills with some small breakaways.			
Habitat	shrubland		
Disturbance	evidence of feral animals		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	57.0	Litter distribution	transported
Tree cover (%)	10.0	Litter depth (cm)	1.0
Shrub cover (%)	20.0	Litter cover (%)	2.0
Grass cover (%)	25.0	Herb cover (%)	2.0



Site details			
Site	Opp21	Position (WGS84)	118.9387 -21.1694
Slope	gentle	Topography	foot slope
Soil colour	brown, red-brown	Soil texture	clay, clay loam
Rock cover (%)	5	Rock type	basalt, calcrete, ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	23 May 2024	23 May 2024
1	Opportunistic sighting	23 May 2024	23 May 2024

Site description - visit 1 (23 May 2024)			
Widely scattered <i>Corymbia hamersleyana</i> and <i>Eucalyptus</i> over scattered <i>Acacia inaequilatera</i> over mixed low shrubs over predominantly stage 3 hard spinifex grassland with patchy herbs (weeds) on clay loam with some exposed pillow basalt, shale and calcrete with floating cobbles.			
Habitat	spinifex grassland		
Disturbance	weed infestation		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	76.0	Litter distribution	under vegetation
Tree cover (%)	5.0	Litter depth (cm)	0.1
Shrub cover (%)	10.0	Litter cover (%)	0.1
Grass cover (%)	60.0	Herb cover (%)	1.0



Site details			
Site	WLP001	Position (WGS84)	118.6472 -21.0322
Slope	negligible	Topography	plain
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	15 Mar 2024	15 Mar 2024
1	Ultrasonic recording	15 Mar 2024	19 Mar 2024
1	Elliot trap (small)	15 Mar 2024	22 Mar 2024
1	Funnel	15 Mar 2024	22 Mar 2024
1	Pipe	15 Mar 2024	22 Mar 2024
1	Bucket	15 Mar 2024	22 Mar 2024
1	Opportunistic sighting	15 Mar 2024	15 Mar 2024
1	Dry pitfall trap	15 Mar 2024	22 Mar 2024
1	Birding	21 Mar 2024	21 Mar 2024
1	Foraging - nocturnal	22 Mar 2024	22 Mar 2024
1	Foraging - vertebrates	25 Mar 2024	25 Mar 2024
1	Foraging - vertebrates	25 Mar 2024	25 Mar 2024
1	Birding	25 Mar 2024	25 Mar 2024
1	Foraging - SRE	25 Mar 2024	25 Mar 2024
1	Foraging - SRE	25 Mar 2024	25 Mar 2024

Site description - visit 1 (15 Mar 2024)			
Scattered Eucalyptus, Corymbia and Acacia over stage 1 - 3 hard spinifex hummock grassland on red brown clay loam with thin layer of overlying sand. No rocks or gravel present.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	82.0	Litter distribution	under vegetation
Tree cover (%)	2.0	Litter depth (cm)	1.0
Shrub cover (%)	20.0	Litter cover (%)	5.0
Grass cover (%)	60.0	Herb cover (%)	0.0



Site details			
Site	WLP002	Position (WGS84)	118.6543 -21.0435
Slope	negligible	Topography	plain
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	15 Mar 2024	15 Mar 2024
1	Bucket	15 Mar 2024	22 Mar 2024
1	Pipe	15 Mar 2024	22 Mar 2024
1	Funnel	15 Mar 2024	22 Mar 2024
1	Opportunistic sighting	15 Mar 2024	15 Mar 2024
1	Ultrasonic recording	15 Mar 2024	19 Mar 2024
1	Birding	18 Mar 2024	18 Mar 2024
1	Birding	21 Mar 2024	21 Mar 2024
1	Foraging - nocturnal	22 Mar 2024	22 Mar 2024
1	Foraging - vertebrates	25 Mar 2024	25 Mar 2024
1	Foraging - vertebrates	25 Mar 2024	25 Mar 2024
1	Birding	25 Mar 2024	25 Mar 2024
1	Foraging - SRE	25 Mar 2024	25 Mar 2024
1	Foraging - SRE	25 Mar 2024	25 Mar 2024

Site description - visit 1 (15 Mar 2024)			
Sparse Hakea, Grevillia and Atriplex over stage 1 - 2 hard spinifex grassland on red brown clay loam with no rocks or gravel.			
Habitat	spinifex grassland		
Disturbance	livestock tracks		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	57.0	Litter distribution	sparse
Tree cover (%)	1.0	Litter depth (cm)	0.0
Shrub cover (%)	5.0	Litter cover (%)	0.0
Grass cover (%)	50.0	Herb cover (%)	1.0



Site details			
Site	WLP003	Position (WGS84)	118.7086 -21.1469
Slope	gentle	Topography	foot slope
Soil colour	red-brown	Soil texture	sandy clay, gravel
Rock cover (%)	2	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	16 Mar 2024	16 Mar 2024
1	Bucket	16 Mar 2024	23 Mar 2024
1	Pipe	16 Mar 2024	23 Mar 2024
1	Funnel	16 Mar 2024	23 Mar 2024
1	Elliot trap (small)	16 Mar 2024	23 Mar 2024
1	Dry pitfall trap	16 Mar 2024	23 Mar 2024
1	Ultrasonic recording	16 Mar 2024	20 Mar 2024
1	Birding	17 Mar 2024	17 Mar 2024
1	Camera trap	20 Mar 2024	24 Mar 2024
1	Camera trap	20 Mar 2024	24 Mar 2024
1	Camera trap	20 Mar 2024	24 Mar 2024
1	Camera trap	20 Mar 2024	24 Mar 2024
1	Foraging - nocturnal	23 Mar 2024	23 Mar 2024
1	Foraging - SRE	25 Mar 2024	25 Mar 2024
1	Foraging - vertebrates	25 Mar 2024	25 Mar 2024
1	Birding	25 Mar 2024	25 Mar 2024

Site description - visit 1 (16 Mar 2024)			
Spinifex grassland with minor drainage at the foot slope of rocky ridge line. Isolated Eucalyptus over Acacia tumida, mulga form Acacia sp. and Senna over stages 3 - 5 spinifex hummocks with patches of pasture grass on red brown sandy clay with large gravel.			
Habitat	spinifex grassland		
Disturbance	grazing-low, livestock tracks, litter, weed infestation		
Vegetation condition	Very Good	Fire age	moderate (>5 years)
Total veg. cover (%)	78.0	Litter distribution	under vegetation
Tree cover (%)	1.0	Litter depth (cm)	1.0
Shrub cover (%)	15.0	Litter cover (%)	5.0
Grass cover (%)	60.0	Herb cover (%)	2.0



Site details			
Site	WLP004	Position (WGS84)	118.6986 -21.1848
Slope	moderate	Topography	breakaway
Soil colour	red-brown	Soil texture	sandy clay, loam, gravel
Rock cover (%)	40	Rock type	granite - outcropping, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Bucket	16 Mar 2024	23 Mar 2024
1	Pipe	16 Mar 2024	23 Mar 2024
1	Elliot trap (small)	16 Mar 2024	23 Mar 2024
1	Funnel	16 Mar 2024	23 Mar 2024
1	Site description	16 Mar 2024	16 Mar 2024
1	Ultrasonic recording	16 Mar 2024	20 Mar 2024
1	Birding	17 Mar 2024	17 Mar 2024
1	Birding	22 Mar 2024	22 Mar 2024
1	Foraging - vertebrates	22 Mar 2024	22 Mar 2024
1	Foraging - SRE	22 Mar 2024	22 Mar 2024
1	Litter sieve	22 Mar 2024	22 Mar 2024
1	Opportunistic sighting	23 Mar 2024	23 Mar 2024
1	Foraging - nocturnal	23 Mar 2024	23 Mar 2024

Site description - visit 1 (16 Mar 2024)			
Granite outcropping with minor drainage and ephemeral pools. Isolated Eucalyptus over open Acacia shrubs over spinifex hummocks on red brown sandy clay loam soil with ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	livestock tracks		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	42.0	Litter distribution	sparse
Tree cover (%)	1.0	Litter depth (cm)	1.0
Shrub cover (%)	15.0	Litter cover (%)	2.0
Grass cover (%)	25.0	Herb cover (%)	1.0



Site details			
Site	WLP005	Position (WGS84)	118.7763 -21.1228
Slope	negligible	Topography	undulating plain
Soil colour	red-brown	Soil texture	sand, gravel
Rock cover (%)	0	Rock type	quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Opportunistic sighting	17 Mar 2024	17 Mar 2024
1	Site description	17 Mar 2024	17 Mar 2024
1	Bucket	17 Mar 2024	24 Mar 2024
1	Pipe	17 Mar 2024	24 Mar 2024
1	Funnel	17 Mar 2024	24 Mar 2024
1	Elliot trap (small)	17 Mar 2024	24 Mar 2024
1	Ultrasonic recording	17 Mar 2024	21 Mar 2024
1	Birding	19 Mar 2024	19 Mar 2024
1	Foraging - vertebrates	21 Mar 2024	21 Mar 2024
1	Birding	21 Mar 2024	21 Mar 2024
1	Birding	21 Mar 2024	21 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Foraging - SRE	21 Mar 2024	21 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Foraging - nocturnal	24 Mar 2024	24 Mar 2024

Site description - visit 1 (17 Mar 2024)			
Hard spinifex sand plain adjacent to major drainage line (Turner River). Isolated Eucalyptus over sparse shrubs of Acacia trachycarpa and mixed low Acacia shrub over stage 3 - 4 hard spinifex on red brown sand with scattered gravel.			
Habitat	spinifex grassland		
Disturbance	vehicle tracks, livestock tracks		
Vegetation condition	Excellent	Fire age	moderate (>5 years)
Total veg. cover (%)	62.0	Litter distribution	under vegetation
Tree cover (%)	1.0	Litter depth (cm)	0.0
Shrub cover (%)	10.0	Litter cover (%)	1.0
Grass cover (%)	50.0	Herb cover (%)	1.0



Site details			
Site	WLP006	Position (WGS84)	118.6965 -21.1343
Slope	gentle	Topography	undulating plain
Soil colour	red-brown	Soil texture	clay, clay loam
Rock cover (%)	0	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	17 Mar 2024	17 Mar 2024
1	Bucket	17 Mar 2024	24 Mar 2024
1	Pipe	17 Mar 2024	24 Mar 2024
1	Funnel	17 Mar 2024	24 Mar 2024
1	Elliot trap (small)	17 Mar 2024	24 Mar 2024
1	Ultrasonic recording	17 Mar 2024	21 Mar 2024
1	Dry pitfall trap	17 Mar 2024	24 Mar 2024
1	Birding	19 Mar 2024	19 Mar 2024
1	Birding	22 Mar 2024	22 Mar 2024
1	Birding	23 Mar 2024	23 Mar 2024
1	Foraging - nocturnal	22 Mar 2024	22 Mar 2024
1	Opportunistic sighting	22 Mar 2024	22 Mar 2024
1	Foraging - vertebrates	23 Mar 2024	23 Mar 2024
1	Foraging - SRE	23 Mar 2024	23 Mar 2024
1	Litter sieve	23 Mar 2024	23 Mar 2024

Site description - visit 1 (17 Mar 2024)			
Scattered Eucalyptus over open Acacia trachycarpa and Acacia inaequilatera shrubs over spinifex hummocks and pasture grasses on red brown clay loam adjacent to drainage line.			
Habitat	spinifex grassland		
Disturbance	livestock tracks, grazing-medium, weed infestation		
Vegetation condition	Good	Fire age	moderate (>5 years)
Total veg. cover (%)	62.0	Litter distribution	under vegetation
Tree cover (%)	5.0	Litter depth (cm)	1.0
Shrub cover (%)	15.0	Litter cover (%)	2.0
Grass cover (%)	40.0	Herb cover (%)	2.0



Site details			
Site	WLP007	Position (WGS84)	118.9040 -21.1036
Slope	gentle	Topography	drainage line
Soil colour	light-brown, brown-grey	Soil texture	sand, gravel, rocks
Rock cover (%)	25	Rock type	ferrous ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	18 Mar 2024	18 Mar 2024
1	Ultrasonic recording	18 Mar 2024	22 Mar 2024
1	Bucket	18 Mar 2024	25 Mar 2024
1	Pipe	18 Mar 2024	25 Mar 2024
1	Elliot trap (small)	18 Mar 2024	25 Mar 2024
1	Funnel	18 Mar 2024	25 Mar 2024
1	Opportunistic sighting	18 Mar 2024	18 Mar 2024
1	Dry pitfall trap	18 Mar 2024	25 Mar 2024
1	Birding	20 Mar 2024	20 Mar 2024
1	Foraging - vertebrates	21 Mar 2024	21 Mar 2024
1	Foraging - SRE	21 Mar 2024	21 Mar 2024
1	Birding	21 Mar 2024	21 Mar 2024
1	Litter sieve	21 Mar 2024	21 Mar 2024
1	Birding	22 Mar 2024	22 Mar 2024
1	Foraging - nocturnal	25 Mar 2024	25 Mar 2024

Site description - visit 1 (18 Mar 2024)			
Rocky ironstone hills with stage 2 - 3 hard spinifex hummock grassland with pasture grasses dissected by moderate drainage lined with mature and sapling Eucalyptus on light brown sandy clay with lots of ironstone rocks and gravel.			
Habitat	spinifex grassland		
Disturbance	weed infestation		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	56.0	Litter distribution	under vegetation
Tree cover (%)	10.0	Litter depth (cm)	1.0
Shrub cover (%)	5.0	Litter cover (%)	5.0
Grass cover (%)	40.0	Herb cover (%)	1.0



Site details			
Site	WLP008	Position (WGS84)	118.8879 -21.1019
Slope	moderate	Topography	drainage line
Soil colour	brown	Soil texture	sand, loam, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	19 Mar 2024	19 Mar 2024
1	Ultrasonic recording	19 Mar 2024	23 Mar 2024
1	Bucket	19 Mar 2024	26 Mar 2024
1	Pipe	19 Mar 2024	26 Mar 2024
1	Funnel	19 Mar 2024	26 Mar 2024
1	Elliot trap (small)	19 Mar 2024	26 Mar 2024
1	Dry pitfall trap	19 Mar 2024	26 Mar 2024
1	Birding	20 Mar 2024	20 Mar 2024
1	Opportunistic sighting	21 Mar 2024	21 Mar 2024
1	Foraging - SRE	21 Mar 2024	21 Mar 2024
1	Foraging - vertebrates	21 Mar 2024	21 Mar 2024
1	Birding	21 Mar 2024	21 Mar 2024
1	Camera trap	21 Mar 2024	26 Mar 2024
1	Camera trap	21 Mar 2024	26 Mar 2024
1	Litter sieve	21 Mar 2024	21 Mar 2024
1	Birding	22 Mar 2024	22 Mar 2024
1	Foraging - nocturnal	25 Mar 2024	25 Mar 2024
1	Opportunistic sighting	25 Mar 2024	25 Mar 2024

Site description - visit 1 (19 Mar 2024)			
Major drainage line through hard spinifex grassland. Mature Eucalyptus lining sandy, pebbled major drainage channel over Melaleuca and Acacia trachycarpa over spinifex and pasture grass. Several ephemeral pools in drainage line.			
Habitat	open woodland		
Disturbance	livestock tracks,weed infestation,exploration (drill pads and access tracks)		
Vegetation condition	Very Good	Fire age	moderate (>5 years)
Total veg. cover (%)	40.0	Litter distribution	transported
Tree cover (%)	10.0	Litter depth (cm)	40.0
Shrub cover (%)	12.0	Litter cover (%)	2.0
Grass cover (%)	20.0	Herb cover (%)	1.0



Site details			
Site	WLP009	Position (WGS84)	118.6684 -21.2117
Slope	moderate	Topography	drainage line
Soil colour	brown	Soil texture	sandy clay, sandy loam, gravel
Rock cover (%)	10	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	20 Mar 2024	20 Mar 2024
1	Bucket	20 Mar 2024	27 Mar 2024
1	Pipe	20 Mar 2024	27 Mar 2024
1	Funnel	20 Mar 2024	27 Mar 2024
1	Opportunistic sighting	20 Mar 2024	20 Mar 2024
1	Ultrasonic recording	22 Mar 2024	26 Mar 2024
1	Birding	23 Mar 2024	23 Mar 2024
1	Opportunistic sighting	24 Mar 2024	24 Mar 2024
1	Foraging - nocturnal	24 Mar 2024	24 Mar 2024
1	Birding	27 Mar 2024	27 Mar 2024
1	Opportunistic sighting	27 Mar 2024	27 Mar 2024
1	Foraging - vertebrates	25 Mar 2024	25 Mar 2024
1	Birding	25 Mar 2024	25 Mar 2024
1	Foraging - SRE	25 Mar 2024	25 Mar 2024

Site description - visit 1 (20 Mar 2024)			
Minor drainage channel in stony hills. Tall Eucalyptus over Acacia inaequilatera and Melaleuca shrubs over spinifex hummocks and pasture grasses on brown sandy clay loam with ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	livestock tracks		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	46.0	Litter distribution	transported
Tree cover (%)	5.0	Litter depth (cm)	5.0
Shrub cover (%)	15.0	Litter cover (%)	2.0
Grass cover (%)	25.0	Herb cover (%)	1.0



Site details			
Site	WLP010	Position (WGS84)	118.9280 -21.1611
Slope	negligible	Topography	undulating plain
Soil colour	light-brown	Soil texture	loamy sand, rocks
Rock cover (%)	0	Rock type	basalt, calcrete, chert, ferrous - ironstone, siltstone / mudstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	18 May 2024	18 May 2024
1	Elliot trap (small)	18 May 2024	25 May 2024
1	Funnel	18 May 2024	25 May 2024
1	Bucket	18 May 2024	25 May 2024
1	Pipe	18 May 2024	25 May 2024
1	Litter sieve	19 May 2024	19 May 2024
1	Camera trap	19 May 2024	25 May 2024
1	Foraging - vertebrates	19 May 2024	19 May 2024
1	Ultrasonic recording	19 May 2024	23 May 2024
1	Audio recording	19 May 2024	25 May 2024
1	Foraging - SRE	21 May 2024	21 May 2024
1	Foraging - nocturnal	21 May 2024	21 May 2024
1	Opportunistic sighting	21 May 2024	21 May 2024
1	Birding	21 May 2024	21 May 2024
1	Birding	21 May 2024	21 May 2024
1	Camera trap	21 May 2024	25 May 2024
1	Birding	19 May 2024	19 May 2024
1	Birding	19 May 2024	19 May 2024
1	Birding	19 May 2024	19 May 2024
1	Birding	21 May 2024	21 May 2024
1	Birding	21 May 2024	21 May 2024
1	Birding	23 May 2024	23 May 2024
1	Foraging - vertebrates	24 May 2024	24 May 2024
1	Foraging - SRE	25 May 2024	25 May 2024
1	Birding	24 May 2024	24 May 2024
1	Camera trap	20 May 2024	25 May 2024

Site description - visit 1 (18 May 2024)			
<p>Raised levy between 2 major drainage channels. Widely scattered Eucalyptus trees over mixed mid to tall shrubs with patches of Melaleuca, evenly scattered Acacia rhodophloia and Acacia inequalatera over long unburnt predominantly stage 4 - 5 spinifex hummock grassland on light-brown silty clay-loamy-sand with alluvial gravel with some floating larger smooth cobbles.</p>			
Habitat	spinifex grassland		
Disturbance	evidence of feral animals, livestock tracks		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	103.0	Litter distribution	under vegetation
Tree cover (%)	2.0	Litter depth (cm)	1.0

Shrub cover (%)	20.0	Litter cover (%)	5.0
Grass cover (%)	80.0	Herb cover (%)	0.1



Site details			
Site	WLP011	Position (WGS84)	118.9298 -21.1796
Slope	negligible	Topography	undulating plain
Soil colour	red-brown	Soil texture	rocks, sandy clay
Rock cover (%)	0	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Funnel	18 May 2024	25 May 2024
1	Bucket	18 May 2024	25 May 2024
1	Pipe	18 May 2024	25 May 2024
1	Elliot trap (small)	18 May 2024	25 May 2024
1	Site description	18 May 2024	18 May 2024
1	Audio recording	19 May 2024	25 May 2024
1	Ultrasonic recording	19 May 2024	23 May 2024
1	Birding	20 May 2024	20 May 2024
1	Birding	20 May 2024	20 May 2024
1	Litter sieve	21 May 2024	21 May 2024
1	Foraging - SRE	21 May 2024	21 May 2024
1	Foraging - nocturnal	20 May 2024	20 May 2024
1	Opportunistic sighting	20 May 2024	20 May 2024
1	Foraging - vertebrates	21 May 2024	21 May 2024
1	Foraging - SRE	21 May 2024	21 May 2024
1	Birding	21 May 2024	21 May 2024
1	Opportunistic sighting	22 May 2024	22 May 2024
1	Birding	23 May 2024	23 May 2024
1	Birding	23 May 2024	23 May 2024
1	Foraging - vertebrates	22 May 2024	22 May 2024
1	Foraging - vertebrates	24 May 2024	24 May 2024
1	Opportunistic sighting	24 May 2024	24 May 2024
1	Foraging - SRE	25 May 2024	25 May 2024
1	Birding	24 May 2024	24 May 2024
1	Birding	24 May 2024	24 May 2024

Site description - visit 1 (18 May 2024)			
Spinifex stony plain. Scattered mixed low to mid Eucalyptus and Corymbia over low Acacia stellaticeps dominant shrubs over stage 3 spinifex hummock grassland on ferrous ironstone pebbles and cobbles on red-brown clay loam.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	126.0	Litter distribution	under vegetation
Tree cover (%)	10.0	Litter depth (cm)	0.1
Shrub cover (%)	40.0	Litter cover (%)	2.0
Grass cover (%)	75.0	Herb cover (%)	1.0

Site details			
Site	WLP012	Position (WGS84)	118.7502 -21.1237
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	clay-loam, sand
Rock cover (%)	0	Rock type	none

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Audio recording	17 Mar 2024	23 Mar 2024
1	Site description	17 Mar 2024	17 Mar 2024

Site description - visit 1 (17 Mar 2024)			
Stage 1 to 4 hard spinifex grassland (average height ~50cm). Open areas of sandy plain in good condition.			
Habitat	spinifex grassland		
Disturbance	firebreak		
Vegetation condition	Very Good	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	55.0	Litter distribution	none
Tree cover (%)	0.0	Litter depth (cm)	0.0
Shrub cover (%)	0.0	Litter cover (%)	0.0
Grass cover (%)	55.0	Herb cover (%)	0.0



Site details			
Site	WLP013	Position (WGS84)	118.6573 -21.1559
Slope	steep	Topography	gully
Soil colour	red-brown	Soil texture	rocks, sandy clay
Rock cover (%)	70	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	20 Mar 2024	20 Mar 2024
1	Camera trap	20 Mar 2024	24 Mar 2024
1	Opportunistic sighting	20 Mar 2024	20 Mar 2024
1	Camera trap	20 Mar 2024	24 Mar 2024
1	Ultrasonic recording	20 Mar 2024	24 Mar 2024
1	Camera trap	20 Mar 2024	24 Mar 2024
1	Camera trap	20 Mar 2024	24 Mar 2024

Site description - visit 1 (20 Mar 2024)			
Rocky gully in hills. Scattered shrubs of Acacia and Grevillea over stage 1 - 2 spinifex hummocks on red brown sandy clay with ironstone rocks. Isolated Ficus on large boulders. South face of hills has small shallow overhangs and crevices.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks)		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	32.0	Litter distribution	sparse
Tree cover (%)	1.0	Litter depth (cm)	0.0
Shrub cover (%)	5.0	Litter cover (%)	1.0
Grass cover (%)	25.0	Herb cover (%)	1.0



Site details			
Site	WLP014	Position (WGS84)	118.7793 -21.1202
Slope	moderate	Topography	drainage line
Soil colour	brown	Soil texture	sand, sandy clay
Rock cover (%)	0	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Ultrasonic recording	20 Mar 2024	23 Mar 2024
1	Site description	20 Mar 2024	20 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Opportunistic sighting	23 Mar 2024	23 Mar 2024
1	Litter sieve	23 Mar 2024	23 Mar 2024

Site description - visit 1 (20 Mar 2024)			
Wide shallow river (Turner River east) with vegetated hummocks and sandy drainage channels. Mature Eucalyptus and tall Melaleuca paperbarks over Melaleuca shrubs and Acacia over spinifex and pasture grasses on sandy clay.			
Habitat	spinifex grassland		
Disturbance	livestock tracks, weed infestation, exploration (drill pads and access tracks)		
Vegetation condition	Very Good	Fire age	moderate (>5 years)
Total veg. cover (%)	51.0	Litter distribution	transported
Tree cover (%)	5.0	Litter depth (cm)	30.0
Shrub cover (%)	15.0	Litter cover (%)	2.0
Grass cover (%)	30.0	Herb cover (%)	1.0



Site details			
Site	WLP015	Position (WGS84)	118.6625 -21.1392
Slope	steep	Topography	mesa
Soil colour	red-brown	Soil texture	rocks, clay loam
Rock cover (%)	40	Rock type	granite - outcropping, ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Camera trap	20 Mar 2024	24 Mar 2024
1	Camera trap	20 Mar 2024	24 Mar 2024
1	Camera trap	20 Mar 2024	24 Mar 2024
1	Ultrasonic recording	20 Mar 2024	24 Mar 2024
1	Camera trap	20 Mar 2024	24 Mar 2024
1	Site description	20 Mar 2024	20 Mar 2024

Site description - visit 1 (20 Mar 2024)			
Steep east facing slope of mesa with large outcropping containing small crevices and overhangs. Scattered low shrubs over stage 2 - 3 hard spinifex on clay loam with rocks and gravel. Recently burnt with normal vegetation structure starting to return.			
Habitat	spinifex grassland		
Disturbance	vehicle tracks		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	26.0	Litter distribution	sparse
Tree cover (%)	0.0	Litter depth (cm)	0.5
Shrub cover (%)	5.0	Litter cover (%)	1.0
Grass cover (%)	20.0	Herb cover (%)	1.0



Site details			
Site	WLP017	Position (WGS84)	118.6805 -21.2237
Slope	steep	Topography	ridgeline
Soil colour	red-brown	Soil texture	gravel, clay
Rock cover (%)	20	Rock type	granite - outcropping, gravel, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Ultrasonic recording	21 Mar 2024	25 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Site description	21 Mar 2024	21 Mar 2024

Site description - visit 1 (21 Mar 2024)			
Ridgelines with outcropping into minor drainage channel. Stage 1 - 3 spinifex hummocks. Some immature shrubs growing over gravel.			
Habitat	spinifex grassland		
Disturbance	erosion channels, vehicle tracks		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	22.0	Litter distribution	sparse
Tree cover (%)	0.0	Litter depth (cm)	0.5
Shrub cover (%)	1.0	Litter cover (%)	0.5
Grass cover (%)	20.0	Herb cover (%)	1.0



Site details			
Site	WLP018	Position (WGS84)	118.6975 -21.1239
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	clay loam, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	21 Mar 2024	21 Mar 2024
1	Audio recording	20 Mar 2024	26 Mar 2024

Site description - visit 1 (21 Mar 2024)			
Isolated mixed shrubs over continuous low stage 2 - 3 hard spinifex grassland on clay loam with ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks), livestock tracks, litter		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	76.0	Litter distribution	sparse
Tree cover (%)	1.0	Litter depth (cm)	0.0
Shrub cover (%)	5.0	Litter cover (%)	0.0
Grass cover (%)	70.0	Herb cover (%)	0.0



Site details			
Site	WLP019	Position (WGS84)	118.6597 -21.1157
Slope	steep	Topography	ridgeline
Soil colour	red-brown	Soil texture	rocks, gravel
Rock cover (%)	70	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	21 Mar 2024	21 Mar 2024
1	Opportunistic sighting	21 Mar 2024	21 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024

Site description - visit 1 (21 Mar 2024)			
Stage 1 - 2 hard spinifex grassland on exposed rocky ironstone ranges with large boulders and gravel, numerous fissures and small caves.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	21.0	Litter distribution	sparse
Tree cover (%)	0.0	Litter depth (cm)	0.0
Shrub cover (%)	1.0	Litter cover (%)	1.0
Grass cover (%)	20.0	Herb cover (%)	0.0



Site details			
Site	WLP020	Position (WGS84)	118.6947 -21.1050
Slope	negligible	Topography	drainage line
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	21 Mar 2024	21 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Birding	21 Mar 2024	21 Mar 2024
1	Opportunistic sighting	25 Mar 2024	25 Mar 2024

Site description - visit 1 (21 Mar 2024)			
Scattered open Eucalyptus woodland over saplings and mixed weeds over tussock grasses and smaller weeds on red brown clay loam soil in a drainage line.			
Habitat	open woodland		
Disturbance	weed infestation, grazing-low, evidence of feral animals		
Vegetation condition	Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	95.0	Litter distribution	concentrated in drifts
Tree cover (%)	30.0	Litter depth (cm)	1.0
Shrub cover (%)	50.0	Litter cover (%)	70.0
Grass cover (%)	10.0	Herb cover (%)	5.0



Site details			
Site	WLP021	Position (WGS84)	118.6864 -21.1699
Slope	gentle	Topography	drainage line
Soil colour	red-brown	Soil texture	clay loam
Rock cover (%)	10	Rock type	granite - rocks, ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	21 Mar 2024	21 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Opportunistic sighting	21 Mar 2024	21 Mar 2024

Site description - visit 1 (21 Mar 2024)			
Eucalyptus woodland dissected by minor drainage channel adjacent to mining village. Mallee Eucalyptus woodland over pasture grasses, low mixed shrubs and herbs on red brown clay.			
Habitat	woodland		
Disturbance	evidence of feral animals, grazing-high, current operations, erosion channels, weed infestation, vehicle tracks, livestock tracks		
Vegetation condition	Poor	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	70.0	Litter distribution	under vegetation
Tree cover (%)	30.0	Litter depth (cm)	3.0
Shrub cover (%)	5.0	Litter cover (%)	15.0
Grass cover (%)	15.0	Herb cover (%)	20.0



Site details			
Site	WLP022	Position (WGS84)	118.6944 -21.1983
Slope	gentle	Topography	foot slope
Soil colour	red-brown	Soil texture	clay loam, gravel
Rock cover (%)	5	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	20 Mar 2024	20 Mar 2024
1	Opportunistic sighting	20 Mar 2024	20 Mar 2024
1	Audio recording	20 Mar 2024	26 Mar 2024

Site description - visit 1 (20 Mar 2024)			
Sparse mixed low shrubs and saplings over fragmented stage 3 - 5 hard spinifex grassland on the foot slope of low rocky hills with minor outcropping and a continuous layer of ironstone gravel. Adjacent to minor drainage channel.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	moderate (>5 years)
Total veg. cover (%)	77.0	Litter distribution	sparse
Tree cover (%)	1.0	Litter depth (cm)	0.0
Shrub cover (%)	5.0	Litter cover (%)	1.0
Grass cover (%)	70.0	Herb cover (%)	1.0



Site details			
Site	WLP023	Position (WGS84)	118.7155 -21.1177
Slope	gentle	Topography	drainage line
Soil colour	yellow	Soil texture	sand
Rock cover (%)	0	Rock type	none

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	21 Mar 2024	21 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Ultrasonic recording	21 Mar 2024	25 Mar 2024
1	Camera trap	21 Mar 2024	25 Mar 2024
1	Birding	21 Mar 2024	21 Mar 2024
1	Foraging - vertebrates	26 Mar 2024	26 Mar 2024
1	Birding	26 Mar 2024	26 Mar 2024

Site description - visit 1 (21 Mar 2024)			
Isolated Eucalyptus interspersed in an open Melaleuca woodland over sparse low shrubs and grasses along major inundated drainage channel (Turner River) on water-logged yellow sandy substrate.			
Habitat	open woodland		
Disturbance	exploration (drill pads and access tracks)		
Vegetation condition	Excellent	Fire age	moderate (>5 years)
Total veg. cover (%)	29.0	Litter distribution	under vegetation
Tree cover (%)	25.0	Litter depth (cm)	1.0
Shrub cover (%)	2.0	Litter cover (%)	2.0
Grass cover (%)	2.0	Herb cover (%)	0.0



Site details			
Site	WLP024	Position (WGS84)	118.9015 -21.1096
Slope	gentle	Topography	foot slope
Soil colour	brown	Soil texture	clay loam
Rock cover (%)	5	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	21 Mar 2024	21 Mar 2024
1	Birding	21 Mar 2024	21 Mar 2024
1	Foraging - vertebrates	21 Mar 2024	21 Mar 2024
1	Camera trap	21 Mar 2024	26 Mar 2024
1	Camera trap	21 Mar 2024	26 Mar 2024
1	Foraging - SRE	21 Mar 2024	21 Mar 2024

Site description - visit 1 (21 Mar 2024)			
Bank of flooded mining pit. Eucalyptus woodland over Melaleuca over pasture grasses on brown clay loam.			
Habitat	woodland		
Disturbance	excavation, historic clearing, grazing-low, livestock tracks, weed infestation, exploration (drill pads and access tracks)		
Vegetation condition	Good	Fire age	moderate (>5 years)
Total veg. cover (%)	104.0	Litter distribution	under vegetation
Tree cover (%)	50.0	Litter depth (cm)	2.0
Shrub cover (%)	2.0	Litter cover (%)	20.0
Grass cover (%)	50.0	Herb cover (%)	2.0



Site details			
Site	WLP025	Position (WGS84)	118.8991 -21.1105
Slope	moderate	Topography	foot slope
Soil colour	brown	Soil texture	clay loam
Rock cover (%)	3	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	21 Mar 2024	21 Mar 2024
1	Birding	21 Mar 2024	21 Mar 2024
1	Foraging - vertebrates	21 Mar 2024	21 Mar 2024
1	Ultrasonic recording	21 Mar 2024	26 Mar 2024
1	Camera trap	21 Mar 2024	26 Mar 2024
1	Camera trap	21 Mar 2024	26 Mar 2024
1	Foraging - SRE	21 Mar 2024	21 Mar 2024

Site description - visit 1 (21 Mar 2024)			
Bank of flooded mine pit. Eucalyptus over Melaleuca paperbark over pasture grasses on brown clay loam with spoil heaps of ironstone rocks.			
Habitat	woodland		
Disturbance	excavation, exploration (drill pads and access tracks), grazing-low, weed infestation, historic clearing, livestock tracks		
Vegetation condition	Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	76.0	Litter distribution	under vegetation
Tree cover (%)	25.0	Litter depth (cm)	10.0
Shrub cover (%)	10.0	Litter cover (%)	5.0
Grass cover (%)	40.0	Herb cover (%)	1.0



Site details			
Site	WLP026	Position (WGS84)	118.6376 -21.2125
Slope	moderate	Topography	drainage line
Soil colour	brown	Soil texture	clay loam
Rock cover (%)	15	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Camera trap	21 Mar 2024	26 Mar 2024
1	Opportunistic sighting	21 Mar 2024	21 Mar 2024
1	Site description	21 Mar 2024	21 Mar 2024
1	Camera trap	21 Mar 2024	26 Mar 2024
1	Camera trap	21 Mar 2024	26 Mar 2024
1	Audio recording	23 Mar 2024	26 Mar 2024
1	Ultrasonic recording	23 Mar 2024	26 Mar 2024
1	Foraging - vertebrates	19 Mar 2024	19 Mar 2024
1	Foraging - vertebrates	19 Mar 2024	19 Mar 2024
1	Litter sieve	19 Mar 2024	19 Mar 2024
1	Birding	19 Mar 2024	19 Mar 2024
1	Foraging - SRE	19 Mar 2024	19 Mar 2024
1	Foraging - SRE	19 Mar 2024	19 Mar 2024

Site description - visit 1 (21 Mar 2024)			
Drainage line surrounded by ridges. Eucalypus trees over mixed Acacia over widespread spinifex and pasture grasses on clay loam substrate with gravel.			
Habitat	shrubland		
Disturbance	weed infestation, vehicle tracks, evidence of feral animals		
Vegetation condition	Good	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	46.0	Litter distribution	under vegetation
Tree cover (%)	15.0	Litter depth (cm)	1.0
Shrub cover (%)	20.0	Litter cover (%)	10.0
Grass cover (%)	10.0	Herb cover (%)	1.0



Site details			
Site	WLP027	Position (WGS84)	118.6470 -21.1825
Slope	gentle	Topography	gully
Soil colour	red-brown	Soil texture	rocks, gravel / alluvial, clay loam
Rock cover (%)	30	Rock type	granite - boulders, ferrous - BIF

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	26 Mar 2024	26 Mar 2024
1	Birding	26 Mar 2024	26 Mar 2024
1	Foraging - vertebrates	26 Mar 2024	26 Mar 2024
1	Foraging - SRE	26 Mar 2024	26 Mar 2024

Site description - visit 1 (26 Mar 2024)			
Gully with minor drainage. Flanked by ranges with large boulders, rock piles, crevices and overhangs. Small eucalypts over Acacia over spinifex on boulders and alluvial rocks/sand on red brown clay loam.			
Habitat	woodland		
Disturbance	current operations, weed infestation, grazing-low		
Vegetation condition	Very Good	Fire age	moderate (>5 years)
Total veg. cover (%)	61.0	Litter distribution	under vegetation
Tree cover (%)	20.0	Litter depth (cm)	1.0
Shrub cover (%)	20.0	Litter cover (%)	5.0
Grass cover (%)	20.0	Herb cover (%)	1.0



Site details			
Site	WLP028	Position (WGS84)	118.9272 -21.1939
Slope	steep	Topography	ridgeline
Soil colour	red-brown	Soil texture	clay loam, rocks
Rock cover (%)	5	Rock type	basalt, chert

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	22 May 2024	22 May 2024
1	Foraging - vertebrates	22 May 2024	22 May 2024
1	Foraging - SRE	22 May 2024	22 May 2024

Site description - visit 1 (22 May 2024)			
Spinifex ridgeline. Widely scattered low shrubs over stage 3 spinifex hummock grassland on a moderately steep with benched upper slope on gravel, pebbles and cobbles of ferrous ironstone on shallow red-brown clay-loam soil.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	92.0	Litter distribution	under vegetation
Tree cover (%)	1.0	Litter depth (cm)	0.1
Shrub cover (%)	15.0	Litter cover (%)	0.1
Grass cover (%)	75.0	Herb cover (%)	0.1



Site details			
Site	WLP029	Position (WGS84)	118.9431 -21.1578
Slope	steep	Topography	ridgeline
Soil colour	red-brown	Soil texture	clay loam
Rock cover (%)	80	Rock type	chert, ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	19 May 2024	19 May 2024
1	Ultrasonic recording	19 May 2024	23 May 2024
1	Camera trap	19 May 2024	23 May 2024
1	Camera trap	19 May 2024	23 May 2024
1	Opportunistic sighting	23 May 2024	23 May 2024
1	Litter sieve	23 May 2024	23 May 2024
1	Foraging - SRE	23 May 2024	23 May 2024
1	Foraging - vertebrates	23 May 2024	23 May 2024
1	Camera trap	20 May 2024	24 May 2024

Site description - visit 1 (19 May 2024)			
Tall ridgeline with lots of cracks and small caves with scattered low Eucalyptus over Acacia tumida with isolated to widely scattered fruiting Ficus trees and other small shrubs over hard stage 3 spinifex hummocks on red brown clay loam with gravel and pebbles on east-facing steep slope.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	47.0	Litter distribution	sparse
Tree cover (%)	5.0	Litter depth (cm)	2.0
Shrub cover (%)	10.0	Litter cover (%)	2.0
Grass cover (%)	30.0	Herb cover (%)	2.0



Site details			
Site	WLP030	Position (WGS84)	118.9420 -21.1601
Slope	steep	Topography	ridgeline
Soil colour	red-brown	Soil texture	gravel, rocks
Rock cover (%)	25	Rock type	chert, ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	20 May 2024	20 May 2024
1	Camera trap	20 May 2024	24 May 2024
1	Camera trap	20 May 2024	24 May 2024
1	Camera trap	20 May 2024	24 May 2024
1	Camera trap	20 May 2024	24 May 2024
1	Opportunistic sighting	24 May 2024	24 May 2024
1	Camera trap	20 May 2024	24 May 2024
1	Camera trap	20 May 2024	24 May 2024
1	Camera trap	20 May 2024	24 May 2024
1	Camera trap	20 May 2024	24 May 2024

Site description - visit 1 (20 May 2024)			
East facing ridge. Widely scattered mid Eucalyptus trees over low-mid scattered to patchy Acacia dominant shrubs over stage 3 spinifex hummock grassland on angular pebbles, cobbles and boulders on shallow skeletal red-brown clay-loam soil.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	101.0	Litter distribution	under vegetation
Tree cover (%)	5.0	Litter depth (cm)	1.0
Shrub cover (%)	20.0	Litter cover (%)	5.0
Grass cover (%)	75.0	Herb cover (%)	1.0



Site details			
Site	WLP031	Position (WGS84)	118.9415 -21.1745
Slope	moderate	Topography	gully
Soil colour	light-brown, red-brown	Soil texture	clay loam, loam, rocks
Rock cover (%)	5	Rock type	sandstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	20 May 2024	20 May 2024
1	Camera trap	20 May 2024	24 May 2024

Site description - visit 1 (20 May 2024)			
Open to scattered, mixed low Corymbia and Eucalyptus trees over mid to low Acacia tumida shrubland over stage 3 spinifex hummocks with widely scattered mixed herbs on sandstone ridge with light brown to reddish brown loamy clay soil.			
Habitat	shrubland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	98.0	Litter distribution	under vegetation
Tree cover (%)	7.0	Litter depth (cm)	1.0
Shrub cover (%)	50.0	Litter cover (%)	4.0
Grass cover (%)	40.0	Herb cover (%)	1.0



Site details			
Site	WLP032	Position (WGS84)	118.9357 -21.1862
Slope	steep	Topography	drainage line
Soil colour	light-brown, red-brown	Soil texture	alluvium, gravel / alluvial, rocks
Rock cover (%)	15	Rock type	sandstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	20 May 2024	20 May 2024
1	Camera trap	20 May 2024	24 May 2024
1	Ultrasonic recording	20 May 2024	24 May 2024
1	Birding	22 May 2024	22 May 2024
1	Opportunistic sighting	22 May 2024	22 May 2024

Site description - visit 1 (20 May 2024)			
Long water pool in drainage channel open to catteredarge hollow bearing Eucalyptus trees along up to 8m high pithy sandstone ridge			
Habitat	waterhole		
Disturbance	evidence of feral animals, livestock tracks		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	24.0	Litter distribution	none
Tree cover (%)	10.0	Litter depth (cm)	0.0
Shrub cover (%)	3.0	Litter cover (%)	0.0
Grass cover (%)	10.0	Herb cover (%)	1.0



Site details			
Site	WLP033	Position (WGS84)	118.9271 -21.1655
Slope	moderate	Topography	drainage line
Soil colour	light-brown	Soil texture	gravel / alluvial, rocks
Rock cover (%)	1	Rock type	basalt, calcrete, chert, ferrous - ironstone, quartz, sandstone, siltstone / mudstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	21 May 2024	21 May 2024
1	Camera trap	21 May 2024	25 May 2024

Site description - visit 1 (21 May 2024)			
Seasonal/ephemeral water pool. Scattered Eucalyptus trees over stage 3 spinifex hummock grassland on calcrete and sandstone outcrop situated on the east facing slope of a moderate to major drainage line with alluvial gravel and smooth pebbles and cobbles.			
Habitat	waterhole		
Disturbance	evidence of feral animals, livestock tracks		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	16.0	Litter distribution	none
Tree cover (%)	5.0	Litter depth (cm)	0.0
Shrub cover (%)	5.0	Litter cover (%)	0.0
Grass cover (%)	5.0	Herb cover (%)	1.0



Site details			
Site	WLP034	Position (WGS84)	118.9294 -21.1965
Slope	steep	Topography	ridgeline
Soil colour	red-brown	Soil texture	clay loam, rocks
Rock cover (%)	20	Rock type	ferrous - ironstone, basalt, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	22 May 2024	22 May 2024
1	Foraging - SRE	22 May 2024	22 May 2024

Site description - visit 1 (22 May 2024)			
Steep dolomite/chert ridgeline. Widely scattered low Eucalyptus trees over scattered mixed low shrubs over stage 3 spinifex hummock grassland on angular pebbles cobbles and bouldered on red-brown clay loam with ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	83.0	Litter distribution	under vegetation
Tree cover (%)	2.0	Litter depth (cm)	0.0
Shrub cover (%)	10.0	Litter cover (%)	1.0
Grass cover (%)	70.0	Herb cover (%)	1.0



Site details			
Site	WLP035	Position (WGS84)	118.9329 -21.1776
Slope	negligible	Topography	drainage line
Soil colour	brown, light-brown	Soil texture	loamy sand, sand
Rock cover (%)	0	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	20 May 2024	20 May 2024
1	Ultrasonic recording	20 May 2024	24 May 2024

Site description - visit 1 (20 May 2024)			
Eucalyptus vitrix over Melaleuca, Grevillea, and mixed Acacia shrubs over tussock grasses and spinifex edging drainage line on brown loamy sand with lots of pebbles and cobbles.			
Habitat	shrubland		
Disturbance	livestock tracks		
Vegetation condition	Very Good	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	62.0	Litter distribution	concentrated in drifts
Tree cover (%)	10.0	Litter depth (cm)	3.0
Shrub cover (%)	20.0	Litter cover (%)	5.0
Grass cover (%)	30.0	Herb cover (%)	2.0



Site details			
Site	WLP036	Position (WGS84)	118.9001 -21.1181
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	clay loam, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Scattered Eucalyptus and Corymbia over shrubland of Acacia tumida with Grevillea over stage 2 - 3 hard spinifex grassland on red brown clay loam with ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	livestock tracks, exploration (drill pads and access tracks)		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	91.0	Litter distribution	under vegetation
Tree cover (%)	5.0	Litter depth (cm)	2.0
Shrub cover (%)	35.0	Litter cover (%)	5.0
Grass cover (%)	50.0	Herb cover (%)	1.0



Site details			
Site	WLP037	Position (WGS84)	118.8928 -21.0957
Slope	steep	Topography	hill slope
Soil colour	red-brown	Soil texture	rocks, gravel
Rock cover (%)	30	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Isolated mature and sapling Eucalyptus and Grevillea over stage 1 - 2 hard spinifex grassland on rocky ironstone hillslope.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks)		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	46.0	Litter distribution	NONE
Tree cover (%)	2.0	Litter depth (cm)	0.0
Shrub cover (%)	3.0	Litter cover (%)	0.0
Grass cover (%)	40.0	Herb cover (%)	1.0



Site details			
Site	WLP038	Position (WGS84)	118.9055 -21.0993
Slope	steep	Topography	ridgeline
Soil colour	red-brown	Soil texture	rocks, gravel
Rock cover (%)	40	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Scattered eucalypts over stage 1 - 2 spinifex hummock grassland on a rocky ironstone hill slope surrounded by ranges.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks), vehicle tracks		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	60.0	Litter distribution	NONE
Tree cover (%)	3.0	Litter depth (cm)	0.0
Shrub cover (%)	1.0	Litter cover (%)	0.0
Grass cover (%)	55.0	Herb cover (%)	1.0



Site details			
Site	WLP039	Position (WGS84)	118.9043 -21.0934
Slope	moderate	Topography	undulating plain
Soil colour	red-brown	Soil texture	clay loam, gravel, rocks
Rock cover (%)	15	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Opportunistic sighting	24 Mar 2024	24 Mar 2024
1	Site description	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Scattered Eucalyptus trees over Grevillea, Eucalypt saplings and low shrubs over stage 1 - 2 hard spinifex grassland on red brown clay loam with ironstone gravel.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks), historic clearing, vehicle tracks		
Vegetation condition	Poor	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	72.0	Litter distribution	sparse
Tree cover (%)	1.0	Litter depth (cm)	0.0
Shrub cover (%)	10.0	Litter cover (%)	1.0
Grass cover (%)	60.0	Herb cover (%)	1.0



Site details			
Site	WLP040	Position (WGS84)	118.8995 -21.0908
Slope	steep	Topography	plain
Soil colour	red-brown	Soil texture	clay loam, gravel, rocks
Rock cover (%)	15	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Stage 1 - 2 hard spinifex hummock grassland on a rocky ironstone hillslope with moderate outcropping at peak of range.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	63.0	Litter distribution	NONE
Tree cover (%)	1.0	Litter depth (cm)	0.0
Shrub cover (%)	1.0	Litter cover (%)	0.0
Grass cover (%)	60.0	Herb cover (%)	1.0



Site details			
Site	WLP041	Position (WGS84)	118.6674 -21.2065
Slope	steep	Topography	ridgeline
Soil colour	red-brown	Soil texture	clay loam, gravel, rocks
Rock cover (%)	40	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Opportunistic sighting	25 Mar 2024	25 Mar 2024
1	Site description	25 Mar 2024	25 Mar 2024

Site description - visit 1 (25 Mar 2024)			
Scattered low Eucalyptus trees over weeds and patchy stage 1 - 2 hard spinifex hummock grassland on the north face of a rocky ironstone hillslope on red brown clay loam with ironstone gravel and outcropping at peak of range. Small caves and fissures present.			
Habitat	spinifex grassland		
Disturbance	historic clearing, exploration (drill pads and access tracks), weed infestation		
Vegetation condition	Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	22.0	Litter distribution	scattered
Tree cover (%)	2.0	Litter depth (cm)	0.0
Shrub cover (%)	4.0	Litter cover (%)	1.0
Grass cover (%)	15.0	Herb cover (%)	1.0



Site details			
Site	WLP042	Position (WGS84)	118.6916 -21.1815
Slope	gentle	Topography	gully
Soil colour	red-brown, light-brown	Soil texture	sandy loam
Rock cover (%)	25	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	26 Mar 2024	26 Mar 2024

Site description - visit 1 (26 Mar 2024)			
Scattered Eucalyptus and Corymbia over sparse shrubs over stage 1 - 2 hard spinifex grassland with invasive weeds in the gully between rocky ironstone ranges with lots of outcropping, rocks and gravel.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	53.0	Litter distribution	sparse
Tree cover (%)	2.0	Litter depth (cm)	0.0
Shrub cover (%)	5.0	Litter cover (%)	1.0
Grass cover (%)	45.0	Herb cover (%)	1.0



Site details			
Site	WLP043	Position (WGS84)	118.6763 -21.1370
Slope	negligible	Topography	plain
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	26 Mar 2024	26 Mar 2024

Site description - visit 1 (26 Mar 2024)			
Burnt stony clay loam plain consisting of scattered Eucalyptus trees over mixed Acacia and Eucalyptus saplings over stages 1 - 3 hard spinifex with mixed herbs.			
Habitat	shrubland		
Disturbance	exploration (drill pads and access tracks), evidence of feral animals, erosion channels, grazing-low, litter, vehicle tracks		
Vegetation condition	Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	85.0	Litter distribution	sparse
Tree cover (%)	5.0	Litter depth (cm)	1.0
Shrub cover (%)	30.0	Litter cover (%)	1.0
Grass cover (%)	40.0	Herb cover (%)	10.0



Site details			
Site	WLP044	Position (WGS84)	118.6391 -21.1893
Slope	gentle	Topography	foot slope
Soil colour	red-brown	Soil texture	clay loam, gravel
Rock cover (%)	10	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	26 Mar 2024	26 Mar 2024

Site description - visit 1 (26 Mar 2024)			
Eucalyptus trees over scattered Hakea and mixed Acacia over spinifex hummocks and herbs on red brown clay loam footslope with lots of ironstone and quartz cobbles.			
Habitat	shrubland		
Disturbance	exploration (drill pads and access tracks), vehicle tracks		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	52.0	Litter distribution	sparse
Tree cover (%)	2.0	Litter depth (cm)	1.0
Shrub cover (%)	15.0	Litter cover (%)	1.0
Grass cover (%)	30.0	Herb cover (%)	5.0



Site details			
Site	WLP045	Position (WGS84)	118.6477 -21.1655
Slope	gentle	Topography	foot slope
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	26 Mar 2024	26 Mar 2024

Site description - visit 1 (26 Mar 2024)			
Scattered Hakea over mixed Acacia over stage 1 - 2 hard spinifex on a red brown clay loam footslope with lots of ferrous ironstone cobbles and quartz.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks), grazing-low, vehicle tracks		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	100.0	Litter distribution	transported
Tree cover (%)	0.0	Litter depth (cm)	1.0
Shrub cover (%)	30.0	Litter cover (%)	5.0
Grass cover (%)	65.0	Herb cover (%)	5.0



Site details			
Site	WLP046	Position (WGS84)	118.6478 -21.1549
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	gravel, clay loam
Rock cover (%)	15	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	26 Mar 2024	26 Mar 2024

Site description - visit 1 (26 Mar 2024)			
Stony plain below ranges. Isolated Corymbia over Hakea over stage 1 - 3 spinifex. Recently burnt.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks), vehicle tracks		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	22.0	Litter distribution	sparse
Tree cover (%)	1.0	Litter depth (cm)	0.5
Shrub cover (%)	5.0	Litter cover (%)	2.0
Grass cover (%)	15.0	Herb cover (%)	1.0



Site details			
Site	WLP047	Position (WGS84)	118.8274 -21.1138
Slope	negligible	Topography	plain
Soil colour	red-brown	Soil texture	gravel, clay loam
Rock cover (%)	0	Rock type	ferrous - ironstone, granite - rocks, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	25 Mar 2024	25 Mar 2024

Site description - visit 1 (25 Mar 2024)			
Isolated Corymbia over mixed mid level Acacia over low stage 1 - 3 hard spinifex on stony clay loam plain.			
Habitat	shrubland		
Disturbance	vehicle tracks, livestock tracks		
Vegetation condition	Very Good	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	56.0	Litter distribution	sparse
Tree cover (%)	1.0	Litter depth (cm)	0.5
Shrub cover (%)	15.0	Litter cover (%)	2.0
Grass cover (%)	40.0	Herb cover (%)	0.0



Site details			
Site	WLP048	Position (WGS84)	118.6609 -21.1195
Slope	steep	Topography	hill top
Soil colour	red-brown	Soil texture	rocks, gravel
Rock cover (%)	70	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Opportunistic sighting	25 Mar 2024	25 Mar 2024
1	Site description	25 Mar 2024	25 Mar 2024

Site description - visit 1 (25 Mar 2024)			
Scattered Ficus over stage 1 - 2 hard spinifex grassland on the upper slopes of a rocky ironstone ridge line with lots of outcropping and caves throughout.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	33.0	Litter distribution	sparse
Tree cover (%)	2.0	Litter depth (cm)	0.0
Shrub cover (%)	10.0	Litter cover (%)	1.0
Grass cover (%)	20.0	Herb cover (%)	1.0



Site details			
Site	WLP049	Position (WGS84)	118.8930 -21.0997
Slope	moderate	Topography	undulating plain
Soil colour	red-brown	Soil texture	clay-loam, gravel
Rock cover (%)	0	Rock type	ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Sparse Eucalyptus over scattered small shrubs over stage 1 - 2 hard spinifex on ironstone rocks and alluvial gravel soil.			
Habitat	spinifex grassland		
Disturbance	erosion channels, excavation, vehicle tracks		
Vegetation condition	Good	Fire age	moderate (>5 years)
Total veg. cover (%)	63.0	Litter distribution	under vegetation
Tree cover (%)	2.0	Litter depth (cm)	1.0
Shrub cover (%)	5.0	Litter cover (%)	1.0
Grass cover (%)	55.0	Herb cover (%)	1.0



Site details			
Site	WLP050	Position (WGS84)	118.9088 -21.1304
Slope	negligible	Topography	drainage line
Soil colour	light-brown	Soil texture	sand, gravel / alluvial
Rock cover (%)	0	Rock type	ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	24 Mar 2024	24 Mar 2024

Site description - visit 1 (24 Mar 2024)			
Eucalyptus woodland over mixed shrubland over stage 2 - 3 hard spinifex hummocks and pasture grasses along major paleodrainage channel with alluvial river sand, gravel and cobbles. Minor inundation due to recent precipitation.			
Habitat	woodland		
Disturbance	erosion channels, weed infestation, vehicle tracks		
Vegetation condition	Very Good	Fire age	moderate (>5 years)
Total veg. cover (%)	86.0	Litter distribution	under vegetation
Tree cover (%)	30.0	Litter depth (cm)	1.0
Shrub cover (%)	30.0	Litter cover (%)	5.0
Grass cover (%)	25.0	Herb cover (%)	1.0



Site details			
Site	WLP051	Position (WGS84)	118.9220 -21.1866
Slope	negligible	Topography	undulating plain
Soil colour	red-brown	Soil texture	clay, clay loam
Rock cover (%)	0	Rock type	ferrous - BIF, ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	22 May 2024	22 May 2024

Site description - visit 1 (22 May 2024)			
Scattered Corymbia trees in small paleodrainage covered by Acacia tumida and Acacia with small stage 1 hard spinifex on red-brown clay loam on an undulating plain of gravel, pebbles and cobbles.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	relatively recent (1-5 years)
Total veg. cover (%)	51.0	Litter distribution	sparse
Tree cover (%)	5.0	Litter depth (cm)	1.0
Shrub cover (%)	15.0	Litter cover (%)	2.0
Grass cover (%)	30.0	Herb cover (%)	1.0



Site details			
Site	WLP052	Position (WGS84)	118.9203 -21.1928
Slope	gentle	Topography	drainage line
Soil colour	brown, light-brown	Soil texture	loamy sand
Rock cover (%)	0	Rock type	ferrous - BIF, ferrous - ironstone, sandstone, siltstone / mudstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	22 May 2024	22 May 2024

Site description - visit 1 (22 May 2024)			
Corymbia hamersleyana and tall Eucalyptus over Grevillea and Acacia tumida over predominantly stage 3 soft spinifex and other tussock grasses lining small drainage channel with brown sandy loam substrate with lots of rocks, cobbles, and pebbles.			
Habitat	shrubland		
Disturbance	evidence of feral animals		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	76.0	Litter distribution	sparse
Tree cover (%)	5.0	Litter depth (cm)	1.0
Shrub cover (%)	30.0	Litter cover (%)	1.0
Grass cover (%)	40.0	Herb cover (%)	1.0



Site details			
Site	WLP053	Position (WGS84)	118.9331 -21.1606
Slope	negligible	Topography	foot slope
Soil colour	red-brown	Soil texture	clay loam, gravel / alluvial, rocks
Rock cover (%)	1	Rock type	chert, ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	23 May 2024	23 May 2024

Site description - visit 1 (23 May 2024)			
Widely scattered low <i>Corymbia hamersleyana</i> and isolated low <i>Eucalyptus</i> trees over mid <i>Acacia tumida</i> over patchy low <i>Acacia stellaticeps</i> over small stage 4 and 5 spinifex hummocks on angular pebbles and cobbles along minor drainage channel.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	84.0	Litter distribution	under vegetation
Tree cover (%)	3.0	Litter depth (cm)	0.5
Shrub cover (%)	15.0	Litter cover (%)	5.0
Grass cover (%)	65.0	Herb cover (%)	1.0



Site details			
Site	WLP054	Position (WGS84)	118.9280 -21.1741
Slope	negligible	Topography	undulating plain
Soil colour	red-brown	Soil texture	clay loam, rocks
Rock cover (%)	1	Rock type	ferrous - ironstone, quartz, sandstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	23 May 2024	23 May 2024

Site description - visit 1 (23 May 2024)			
Spinifex stony plain. Scattered mixed low to mid Eucalyptus and Corymbia hamersleyana trees over low Acacia stellaticeps dominant shrubs over stage 3 spinifex hummock grassland on red-brown clay loam with pebbles and cobbles.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	moderate (>5 years)
Total veg. cover (%)	131.0	Litter distribution	under vegetation
Tree cover (%)	5.0	Litter depth (cm)	0.5
Shrub cover (%)	45.0	Litter cover (%)	1.0
Grass cover (%)	80.0	Herb cover (%)	1.0



Site details			
Site	WLP055	Position (WGS84)	118.9352 -21.1547
Slope	gentle	Topography	foot slope
Soil colour	light-brown	Soil texture	clay loam, gravel, loam
Rock cover (%)	1	Rock type	calcrete, ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Opportunistic sighting	23 May 2024	23 May 2024
1	Site description	23 May 2024	23 May 2024

Site description - visit 1 (23 May 2024)			
Open mixed mid <i>Corymbia hamersleyana</i> and <i>Eucalyptus</i> over widely scattered mixed low shrubs over predominantly stunted senescent stage 5 spinifex hummock grassland with scattered herbs (weeds) on predominantly calcrete with floating ironstone cobbles on light brown loamy clay.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks), weed infestation		
Vegetation condition	Very Good	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	64.0	Litter distribution	under vegetation
Tree cover (%)	5.0	Litter depth (cm)	0.1
Shrub cover (%)	2.0	Litter cover (%)	0.1
Grass cover (%)	55.0	Herb cover (%)	2.0



Site details			
Site	WLP056	Position (WGS84)	118.9370 -21.1726
Slope	moderate	Topography	ridgeline
Soil colour	red-brown	Soil texture	clay loam, gravel, rocks
Rock cover (%)	10	Rock type	basalt, calcrete, chert, sandstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	23 May 2024	23 May 2024

Site description - visit 1 (23 May 2024)			
Low mixed geology ridgeline. Acacia inaequilatera mid shrub over stage 3 Spinifex hummock grassland with mixed herbs including Ptilotus and senna on angular pebbles cobbles and small bolders of sandstone with mixture of calcrete, shale, quarts an chert surface fragments			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	92.0	Litter distribution	under vegetation
Tree cover (%)	1.0	Litter depth (cm)	0.1
Shrub cover (%)	15.0	Litter cover (%)	1.0
Grass cover (%)	75.0	Herb cover (%)	1.0



Site details			
Site	WLP057	Position (WGS84)	118.9329 -21.1720
Slope	gentle	Topography	foot slope
Soil colour	red-brown	Soil texture	clay loam, gravel, rocks
Rock cover (%)	1	Rock type	chert, ferrous - ironstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	24 May 2024	24 May 2024

Site description - visit 1 (24 May 2024)			
Spinifex stony plain. Open to scattered Corymbia hamersleyana over scattered Acacia dominant shrubs over stage 3-5 spinifex grassland on a pavement of angular gravel and pebbles with floating cobbles of ferrous ironstone, quartz, chert shale and calcrete on red-brown clay loam.			
Habitat	spinifex grassland		
Disturbance	none evident		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	81.0	Litter distribution	sparse
Tree cover (%)	5.0	Litter depth (cm)	0.1
Shrub cover (%)	5.0	Litter cover (%)	0.1
Grass cover (%)	70.0	Herb cover (%)	1.0



Site details			
Site	WLP058	Position (WGS84)	118.9125 -21.1458
Slope	gentle	Topography	undulating plain
Soil colour	light-brown, red-brown	Soil texture	clay loam, gravel, loam, rocks
Rock cover (%)	1	Rock type	chert, ferrous - ironstone, quartz

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	25 May 2024	25 May 2024

Site description - visit 1 (25 May 2024)			
Plain adjacent to minor drainage line between two low basalt/granite ridgelines. Mid Eucalyptus and Corymbia hamersleyana in minor drainage channel. Low Acacia stellatoceps and Acacia inaequilatera shrubs over stage 3 - 5 spinifex hummock grassland on shale, ferrous ironstone, chert, quart angular pebbles cobbles on red-brown silty clay loam.			
Habitat	spinifex grassland		
Disturbance	exploration (drill pads and access tracks), vehicle tracks		
Vegetation condition	Very Good	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	72.0	Litter distribution	sparse
Tree cover (%)	1.0	Litter depth (cm)	0.1
Shrub cover (%)	5.0	Litter cover (%)	0.1
Grass cover (%)	65.0	Herb cover (%)	1.0



Site details			
Site	WLP059	Position (WGS84)	118.9391 -21.1915
Slope	steep	Topography	drainage line
Soil colour	brown-grey, light-brown	Soil texture	alluvium, gravel / alluvial, rocks
Rock cover (%)	30	Rock type	sandstone

Sample and effort summary			
Visit	Sample method	Date start	Date stop
1	Site description	22 May 2024	22 May 2024
1	Birding	22 May 2024	22 May 2024
1	Foraging - vertebrates	22 May 2024	22 May 2024

Site description - visit 1 (22 May 2024)			
Ephemeral water pool in drainage at base of 7m sandstone pithy freeface. Scattered, tall, hollow-forming Eucalyptus trees over mixed mid Acacia shrubs over scattered to patchy stage 5 spinifex hummocks above free-face.			
Habitat	waterhole		
Disturbance	livestock tracks		
Vegetation condition	Excellent	Fire age	long-unburnt (>10 years)
Total veg. cover (%)	31.0	Litter distribution	none
Tree cover (%)	20.0	Litter depth (cm)	0.1
Shrub cover (%)	5.0	Litter cover (%)	0.1
Grass cover (%)	5.0	Herb cover (%)	1.0



Appendix 3 Vertebrate fauna desktop and field survey results

Family	Species	Common name	Status	Introduced	Databases			Unpublished reports								This survey	
					EPBC	NM	TFA	360 Environmental (2018)	Biologic (2012, 2014, 2018)	MinRes	MWH (2014-2016)	Outback Ecology (2009-2013)	Stantec (2017, 2018, 2022)	Western Wildlife (2020)	Phoenix (2024)		
Frogs (10)																	
Limnodynastidae	<i>Neobatrachus aquilonius</i>	Northern Burrowing Frog				•								?			
	<i>Neobatrachus sutor</i>	Shoemaker Frog				•								?			
	<i>Notaden nichollsi</i>	Desert Spadefoot				•								•		•	
	<i>Platyplectrum spenceri</i>	Centralian Burrowing Frog				•										•	
Myobatrachidae	<i>Uperoleia glandulosa</i>	Glandular Toadlet				•										•	
	<i>Uperoleia saxatilis</i>	Pilbara Toadlet	(<i>ex. U. russelli</i>)			•						•		•		•	
	<i>Uperoleia talpa</i>	Ratcheting Toadlet				•											
Pelodryadidae	<i>Cyclorana australis</i>	Giant Frog				•									•		
	<i>Cyclorana maini</i>	Sheep Frog				•						•		•		•	
	<i>Litoria rubella</i>	Little Red Tree Frog				•						•		•		•	
Birds (217)																	
Acanthizidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill				•											
	<i>Gerygone fusca</i>	Western Gerygone				•											
	<i>Gerygone tenebrosa</i>	Dusky Gerygone				•											
	<i>Smicrornis brevirostris</i>	Weebill				•						•					
Accipitridae	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk				•											
	<i>Accipiter fasciatus</i>	Brown Goshawk				•						•		•		•	
	<i>Aquila audax</i>	Wedge-tailed Eagle				•								•			
	<i>Circus approximans</i>	Swamp Harrier				•											
	<i>Circus assimilis</i>	Spotted Harrier				•								•	•		
	<i>Elanus axillaris</i>	Black-shouldered kite				•								•			
	<i>Erythrotriorchis radiatus</i>	Red Goshawk	VU (EPBC & BC Acts)		May												
	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle				•											

Family	Species	Common name	Status	Introduced	Databases			Unpublished reports								This survey
					EPBC	NM	TFA	360 Environmental (2018)	Biologic (2012, 2014, 2018)	MinRes	MWH (2014-2016)	Outback Ecology (2009-2013)	Stantec (2017, 2018, 2022)	Western Wildlife (2020)	Phoenix (2024)	
	<i>Haliastur indus</i>	Brahminy Kite				•										
	<i>Haliastur sphenurus</i>	Whistling Kite				•						•		•	•	•
	<i>Hamirostra melanosternon</i>	Black-breasted Buzzard											•			
	<i>Hieraaetus morphnoides</i>	Little Eagle				•										•
	<i>Lophoictinia isura</i>	Square-tailed Kite	(ex <i>Hamirostra</i>)			•										
	<i>Milvus migrans</i>	Black Kite				•						•		•	•	•
Acrocephalidae	<i>Acrocephalus australis</i>	Australian Reed-warbler				•						•				
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar				•						•		•		•
Alaudidae	<i>Mirafra javanica</i>	Horsfield's Bushlark				•										
Alcedinidae	<i>Dacelo leachii</i>	Blue-winged Kookaburra				•						•		•	•	•
	<i>Todiramphus chloris</i>	Collared Kingfisher				•										
	<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher				•								•	•	•
	<i>Todiramphus sanctus</i>	Sacred Kingfisher				•						•				•
Anatidae	<i>Anas gracilis</i>	Grey Teal				•								•		•
	<i>Anas superciliosa</i>	Pacific Black Duck				•								•		•
	<i>Aythya australis</i>	Hardhead				•								•		
	<i>Chenonetta jubata</i>	Australian Wood Duck				•										
	<i>Cygnus atratus</i>	Black Swan				•										
	<i>Dendrocygna arcuata</i>	Wandering Whistling Duck				•										
	<i>Dendrocygna eytoni</i>	Plumed Whistling Duck				•										
	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck				•										
	<i>Spatula rhynchotis</i>	Australasian Shoveler	(ex <i>Anas</i>)			•										
Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian Darter				•										
Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift	Mig. (EPBC & BC Acts)		Likely	•	•	•		•						
Ardeidae	<i>Ardea alba</i>	Great Egret	(ex <i>A. modesta</i>)			•										

Family	Species	Common name	Status	Introduced	Databases			Unpublished reports								This survey
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	<i>Ardea intermedia</i>	Intermediate Egret				•										
	<i>Ardea pacifica</i>	White-necked Heron				•								•		
	<i>Bubulcus coromandus</i>	Cattle Egret	(ex <i>Ardea ibis</i>)			•										
	<i>Butorides striata</i>	Striated Heron				•										
	<i>Egretta garzetta</i>	Little Egret	(ex <i>Ardea</i>)			•										
	<i>Egretta novaehollandiae</i>	White-faced Heron	(ex <i>Ardea</i>)			•								•		•
	<i>Egretta sacra</i>	Eastern Reef Egret	(ex <i>Ardea</i>)			•										
	<i>Nycticorax caledonicus</i>	Rufous Night Heron				•										
Artamidae	<i>Artamus cinereus</i>	Black-faced Woodswallow				•						•		•	•	•
	<i>Artamus cyanopterus</i>	Dusky Woodswallow				•										•
	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow				•									•	
	<i>Artamus minor</i>	Little Woodswallow				•						•		•		•
	<i>Artamus personatus</i>	Masked Woodswallow				•									•	
	<i>Cracticus nigrogularis</i>	Pied Butcherbird				•						•		•	•	•
	<i>Cracticus torquatus</i>	Grey Butcherbird				•								•		
	<i>Gymnorhina tibicen</i>	Australian Magpie	(ex <i>Cracticus</i>)			•						•			•	
	<i>Strepera versicolor</i>	Grey Currawong	Out of range (extralimital)										•			
Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew				•						•		•	•	
	<i>Esacus magnirostris</i>	Beach Stone-curlew				•										
Cacatuidae	<i>Cacatua sanguinea</i>	Little Corella				•						•		•	•	•
	<i>Eolophus roseicapilla</i>	Galah	(ex <i>Cacatua</i>)			•						•		•	•	
	<i>Nymphicus hollandicus</i>	Cockatiel				•						•		•		•
Campephagidae	<i>Coracina maxima</i>	Ground Cuckoo-shrike				•										
	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike				•						•		•	•	•
	<i>Lalage tricolor</i>	White-winged Triller				•						•		•	•	•

Family	Species	Common name	Status	Introduced	Databases			Unpublished reports								This survey
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Caprimulgidae	<i>Eurostopodus argus</i>	Spotted Nightjar				•						•		•	•	•
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu				•										•
Charadriidae	<i>Charadrius leschenaultii</i>	Greater Sand Plover	VU/Mig./VU (EPBC Act; BC Act)		May	•										
	<i>Charadrius ruficapillus</i>	Red-capped Plover				•										
	<i>Charadrius veredus</i>	Oriental Plover	Mig. (EPBC & BC Acts)		May	•	•									
	<i>Elseyornis melanops</i>	Black-fronted Dotterel				•						•		•		•
	<i>Erythrogonys cinctus</i>	Red-kneed Dotterel				•										
	<i>Pluvialis fulva</i>	Pacific Golden Plover	Mig. (EPBC & BC Acts)				•									
	<i>Pluvialis squatarola</i>	Grey Plover	Mig. (EPBC & BC Acts)		•	•										
	<i>Vanellus miles</i>	Masked Lapwing				•										
	<i>Vanellus tricolor</i>	Banded Lapwing				•										
Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork				•						•				
Cinclosomatidae	<i>Cinclosoma marginatum</i>	Western Quail-thrush	(ex <i>C. castaneothorax</i>)			•										
Climacteridae	<i>Climacteris melanurus</i>	Black-tailed Treecreeper				•						•				
	<i>Climacteris rufus</i>	Rufous Treecreeper				•										
Columbidae	<i>Columba livia</i>	Domestic Pigeon		*		•										
	<i>Geopelia cuneata</i>	Diamond Dove				•						•		•	•	•
	<i>Geopelia humeralis</i>	Bar-shouldered Dove				•										
	<i>Geopelia striata</i>	Zebra Dove				•						•		•	•	•
	<i>Geophaps plumifera</i>	Spinifex Pigeon				•						•	•	•	•	•
	<i>Ocyphaps lophotes</i>	Crested Pigeon				•						•		•	•	•
	<i>Phaps chalcoptera</i>	Common Bronzewing				•								•		•
	<i>Phaps histrionica</i>	Flock Bronzewing				•										
Corvidae	<i>Corvus bennetti</i>	Little Crow				•						•		•		
	<i>Corvus coronoides</i>	Australian Raven	Out of range			•							•			

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	<i>Corvus orru</i>	Torresian Crow				•						•		•	•	•
Cuculidae	<i>Centropus phasianinus</i>	Pheasant Coucal				•										
	<i>Chalcites basalis</i>	Horsfield's Bronze Cuckoo	(ex <i>Chrysococcyx</i>)			•						•		•		
	<i>Heteroscenes pallidus</i>	Pallid Cuckoo	(ex <i>Cacomantis</i>)			•						•				
Dicaeidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird				•										
Estrilidae	<i>Emblema pictum</i>	Painted Finch				•						•		•	•	•
	<i>Heteromunia pectoralis</i>	Pictorella Mannikin				•										
	<i>Neochmia ruficauda</i>	Star Finch				•								•		
	<i>Taeniopygia castanotis</i>	Australian Zebra Finch	(ex <i>T. guttata</i>)			•						•		•	•	•
Falconidae	<i>Falco berigora</i>	Brown Falcon				•						•		•	•	•
	<i>Falco cenchroides</i>	Australian Kestrel				•						•		•	•	•
	<i>Falco hypoleucos</i>	Grey Falcon	VU (BC Act)		Known	•	•			•						
	<i>Falco longipennis</i>	Australian Hobby				•						•		•		
	<i>Falco peregrinus</i>	Peregrine Falcon	OS (BC Act)			•	•			•						
	<i>Falco subniger</i>	Black Falcon				•						•				
Fregatidae	<i>Fregata ariel</i>	Lesser Frigatebird	Mig. (EPBC & BC Acts)				•									
Glareolidae	<i>Glareola maldivarum</i>	Oriental Pratincole	Mig. (EPBC & BC Acts)		May	•	•			•						
	<i>Stiltia isabella</i>	Australian Pratincole				•										
Gruidae	<i>Antigone rubicunda</i>	Brolga	(ex <i>Grus</i>)			•										
Haematopodidae	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher				•										
	<i>Haematopus longirostris</i>	Pied Oystercatcher				•										
Hirundinidae	<i>Cheramoeca leucosterna</i>	White-backed Swallow				•										
	<i>Hirundo neoxena</i>	Welcome Swallow				•						•				
	<i>Hirundo rustica</i>	Barn Swallow	Mig. (EPBC & BC Acts)		May	•										
	<i>Petrochelidon ariel</i>	Fairy Martin				•						•		•	•	

Family	Species	Common name	Status	Introduced	Databases			Unpublished reports								This survey
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	<i>Petrochelidon nigricans</i>	Tree Martin				•						•		•	•	•
Laridae	<i>Chlidonias hybrida</i>	Whiskered Tern	(ex <i>Sterna</i>)			•										
	<i>Chlidonias leucopterus</i>	White-winged Black Tern	Mig. (EPBC & BC Acts)			•			•							
	<i>Chroicocephalus novaehollandiae</i>	Silver Gull	(ex <i>Larus</i>)			•										
	<i>Gelochelidon nilotica</i>	Gull-billed Tern	Mig. (BC Act)			•										
	<i>Hydroprogne caspia</i>	Caspian Tern	Mig. (EPBC & BC Acts)			•	•									
	<i>Onychoprion anaethetus</i>	Bridled Tern	Mig. (EPBC & BC Acts)			•										
	<i>Sterna hirundo</i>	Common Tern	Mig. (EPBC & BC Acts)			•										
	<i>Sternula albifrons</i>	Little Tern	Mig. (EPBC & BC Acts)			•										
	<i>Sternula nereis subsp. nereis</i>	Fairy Tern	VU (EPBC & BC Acts)			•										
	<i>Thalasseus bengalensis</i>	Lesser Crested Tern	(ex <i>Sterna</i>)			•										
	<i>Thalasseus bergii</i>	Crested Tern	Mig. (BC Act)			•	•									
Locustellidae	<i>Cincloramphus cruralis</i>	Brown Songlark	(ex <i>Megalurus</i>)			•								•		•
	<i>Cincloramphus mathewsi</i>	Rufous Songlark	(ex <i>Megalurus</i>)			•						•		•		•
	<i>Poodytes carteri</i>	Spinifex-bird	(ex <i>Eremiornis</i>)			•						•		•	•	•
Maluridae	<i>Amytornis whitei</i> subsp. <i>whitei</i>	Rufous Grasswren	P4 (DBCA list) (ex <i>A. striatus</i>)			•						•		•		•
	<i>Malurus assimilis</i>	Purple-backed Fairy wren	(ex <i>M. lamberti</i>)			•						•		•	•	•
	<i>Malurus leucopterus</i>	White-winged Fairy wren				•						•		•	•	•
	<i>Stipiturus ruficeps</i>	Rufous-crowned Emu-wren				•										
Meliphagidae	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater				•								•	•	
	<i>Certhionyx variegatus</i>	Pied Honeyeater				•						•		•		
	<i>Epthianura aurifrons</i>	Orange Chat				•										
	<i>Epthianura tricolor</i>	Crimson Chat				•								•	•	•
	<i>Gavicalis virescens</i>	Singing Honeyeater				•						•		•	•	•
	<i>Lacustroica whitei</i>	Grey Honeyeater				•						•				

Family	Species	Common name	Status	Introduced	Databases			Unpublished reports								This survey
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	<i>Lichmera indistincta</i>	Brown Honeyeater				•						•		•	•	•
	<i>Manorina flavigula</i>	Yellow-throated Miner				•						•		•	•	•
	<i>Melithreptus gularis</i>	Black-chinned Honeyeater				•									•	
	<i>Ptilotula keartlandi</i>	Grey-headed Honeyeater				•						•	•	•	•	•
	<i>Ptilotula penicillata</i>	White-plumed Honeyeater				•						•		•	•	•
	<i>Ptilotula plumula</i>	Grey-fronted Honeyeater				•						•				•
	<i>Sugomel nigrum</i>	Black Honeyeater				•						•				
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater				•						•		•	•	•
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark				•						•		•	•	•
Motacillidae	<i>Anthus australis</i>	Australian Pipit				•						•		•		
	<i>Motacilla cinerea</i>	Grey Wagtail	Mig. (EPBC & BC Acts)		May											
	<i>Motacilla tschutschensis</i>	Eastern Yellow Wagtail	Mig. (EPBC & BC Acts) (ex <i>M. flava</i>)		Likely											
Oreoicidae	<i>Oreoica gutturalis</i>	Crested Bellbird				•								•	•	•
Otididae	<i>Ardeotis australis</i>	Australian Bustard				•						•		•	•	•
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush				•						•	•	•	•	•
	<i>Pachycephala lanioides</i>	White-breasted Whistler				•										
	<i>Pachycephala melanura</i>	Mangrove Golden Whistler				•										
	<i>Pachycephala rufiventris</i>	Rufous Whistler				•						•		•	•	•
Pandionidae	<i>Pandion cristatus</i>	Osprey	Mig. (EPBC & BC Acts) (ex <i>P. haliaetus</i>)		Likely	•	•									
Pardalotidae	<i>Pardalotus rubricatus</i>	Red-browed Pardalote				•								•	•	•
	<i>Pardalotus striatus</i>	Striated Pardalote				•						•				
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican				•										
Petroicidae	<i>Melanodryas cucullata</i>	Hooded Robin				•										
	<i>Peneothello pulverulenta</i>	Mangrove Robin	(ex <i>Eopsaltria</i>)			•										
	<i>Petroica goodenovii</i>	Red-capped Robin				•									•	

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Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	(ex <i>Phalacrocorax</i>)			•										
	<i>Phalacrocorax carbo</i>	Great Cormorant				•										
	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant				•										
	<i>Phalacrocorax varius</i>	Pied Cormorant				•										
Phasianidae	<i>Coturnix ypsilophora</i>	Brown Quail				•										•
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth				•								•		
Podicipedidae	<i>Podiceps cristatus</i>	Great Crested Grebe				•										
	<i>Poliocephalus poliocephalus</i>	Hoary-headed Grebe				•										
	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe				•						•		•		•
Pomatostomidae	<i>Pomatostomus superciliosus</i>	White-browed Babbler				•										
	<i>Pomatostomus temporalis</i>	Grey-crowned Babbler				•						•		•	•	
Psittacidae	<i>Barnardius zonarius</i>	Australian Ringneck	(ex <i>Platycercus</i>)			•						•		•	•	
	<i>Melopsittacus undulatus</i>	Budgerigar				•						•		•	•	•
	<i>Neophema elegans</i>	Elegant Parrot				•										
	<i>Pezoporus occidentalis</i>	Night Parrot	EN/CR (EPBC Act; BC Act)		May											
	<i>Polytelis alexandrae</i>	Princess Parrot	P4 (DBCA list)		May											
Ptilonorhynchidae	<i>Chlamydera guttata</i>	Spotted/Western Bowerbird	(ex <i>Ptilonorhynchus maculatus</i>)			•						•		•	•	•
Rallidae	<i>Fulica atra</i>	Eurasian Coot				•								•		
	<i>Hypotaenidia philippensis</i>	Buff-banded Rail	(ex <i>Gallirallus</i>)			•										
	<i>Porphyrio melanotus</i>	Purple Swamphen	(ex <i>P. porphyrio</i>)											•		
	<i>Tribonyx ventralis</i>	Black-tailed Native-hen				•										
Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged Stilt				•										
	<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet				•										
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail				•										
	<i>Rhipidura leucophrys</i>	Willie Wagtail				•						•		•	•	•

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	<i>Rhipidura phasiana</i>	Mangrove Grey Fantail				•										
Rostratulidae	<i>Rostratula australis</i>	Australian Painted Snipe	EN (EPBC & BC Acts)		May											
Scolopacidae	<i>Actitis hypoleucos</i>	Common Sandpiper	Mig. (EPBC & BC Acts)		Known	•	•							•		
	<i>Arenaria interpres</i>	Ruddy Turnstone	Mig. (EPBC & BC Acts)			•	•									
	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Mig. (EPBC & BC Acts)		May	•	•			•						
	<i>Calidris ferruginea</i>	Curlew Sandpiper	CR/Mig./CR (EPBC Act; BC Act)		May	•										
	<i>Calidris melanotos</i>	Pectoral Sandpiper	Mig. (EPBC & BC Acts)		May											
	<i>Calidris ruficollis</i>	Red-necked Stint	Mig. (EPBC & BC Acts)			•	•			•						
	<i>Calidris subminuta</i>	Long-toed Stint	Mig. (EPBC & BC Acts)			•				•						
	<i>Calidris tenuirostris</i>	Great Knot	CR/Mig./CR (EPBC Act; BC Act)			•										
	<i>Gallinago stenura</i>	Pin-tailed Snipe	Mig. (EPBC & BC Acts)			•										
	<i>Limosa lapponica</i>	Bar-tailed Godwit	Mig. (EPBC & BC Acts)			•										
	<i>Numenius madagascariensis</i>	Eastern Curlew	CR/Mig./CR (EPBC Act; BC Act)		May	•										
	<i>Numenius minutus</i>	Little Curlew	Mig. (EPBC & BC Acts)			•										
	<i>Numenius phaeopus</i>	Whimbrel	Mig. (EPBC & BC Acts)			•										
	<i>Tringa brevipes</i>	Grey-tailed Tattler	Mig. (EPBC and BC Acts); P4 (DBCA list)			•	•									
	<i>Tringa glareola</i>	Wood Sandpiper	Mig. (EPBC & BC Acts)			•	•			•				•		
	<i>Tringa nebularia</i>	Common Greenshank	Mig. (EPBC & BC Acts)			•	•			•						
	<i>Tringa stagnatilis</i>	Marsh Sandpiper	Mig. (EPBC & BC Acts)			•				•						
	<i>Xenus cinereus</i>	Terek Sandpiper	Mig. (EPBC & BC Acts)			•										
Strigidae	<i>Ninox boobook</i>	Australian Boobook				•									•	•
	<i>Ninox connivens</i>	Barking Owl				•										•
Threskiornithidae	<i>Platalea flavipes</i>	Yellow-billed Spoonbill				•										
	<i>Platalea regia</i>	Royal Spoonbill				•										
	<i>Plegadis falcinellus</i>	Glossy Ibis	Mig. (EPBC & BC Acts)			•				•						

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	<i>Threskiornis moluccus</i>	Australian White Ibis				•										
	<i>Threskiornis spinicollis</i>	Straw-necked Ibis				•										•
Turnicidae	<i>Turnix velox</i>	Little Button-quail				•						•		•	•	•
Tytonidae	<i>Tyto javanica</i>	Eastern Barn Owl	(ex <i>T. alba</i>)			•										
Zosteropidae	<i>Zosterops luteus</i>	Yellow White-eye				•										
Mammals (57)																
Bovidae	<i>Bos taurus</i>	European Cattle		*		•						•		•	•	•
	<i>Capra aegagrus</i>	Goat	(ex <i>C. hircus</i>)	*		•										
Camelidae	<i>Camelus dromedarius</i>	Dromedary Camel		*		•										
Canidae	<i>Canis familiaris</i>	Dog		*		•						•		•	•	•
	<i>Vulpes vulpes</i>	Red Fox		*		•							•			
Dasyuridae	<i>Antechinomys laniger</i>	Kultarr				•										
	<i>Antechinomys longicaudata</i>	Long-tailed Dunnart	P4 (DBCA list) (ex <i>Sminthopsis</i>)			•	•					•				
	<i>Dasyercus blythi</i>	Brush-tailed Mulgara	P4 (DBCA list)			•	•	•		•						
	<i>Dasykaluta rosamondae</i>	Little Red Kaluta				•						•		•	•	•
	<i>Dasyurus hallucatus</i>	Northern Quoll	EN (EPBC & BC Acts)		Known	•	•	•	•	•	•	•	•	•	•	•
	<i>Ningau i timealeyi</i>	Pilbara Ningau i				•						•		•	•	•
	<i>Planigale kendricki</i>	Orange-headed Pilbara Planigale	(ex <i>P. maculata</i>)			•						?		?	•	
	<i>Planigale tealei</i>	Cracking Clay Pilbara Planigale	(ex <i>P. ingrami</i>)			•						?		?		
	<i>Pseudantechinus macdonnellensis</i>	Fat-tailed Pseudantechinus				•										
	<i>Pseudantechinus roryi</i>	Rory's Pseudantechinus				•										
	<i>Pseudantechinus woolleyae</i>	Woolley's Pseudantechinus				•						•		•		•
	<i>Sminthopsis macroura</i>	Stripe-faced Dunnart				•						•				•
	<i>Sminthopsis ooldea</i>	Ooldea Dunnart				•										
	<i>Sminthopsis youngsoni</i>	Lesser Hairy-footed Dunnart				•										

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Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tailed Bat				•						•		•		
	<i>Taphozous georgianus</i>	Common Sheath-tailed Bat				•						•		•	•	•
	<i>Taphozous hilli</i>	Hill’s Sheathtail-bat														•
Equidae	<i>Equus asinus</i>	Donkey		*		•						•				
	<i>Equus caballus</i>	Horse		*		•									•	•
Felidae	<i>Felis catus</i>	Cat		*		•						•	•	•	•	•
Hipposideridae	<i>Hipposideros stenotis</i>	Northern Leaf-nosed Bat	P2 (DBCA list) (extralimital)				•									
Macropodidae	<i>Lagorchestes conspicillatus</i> subsp. <i>conspicillatus</i>	Barrow Island Spectacled Hare-wallaby	VU (EPBC & BC Acts) (Out of range)			•										
	<i>Lagorchestes conspicillatus</i> subsp. <i>leichardti</i>	Spectacled Hare-wallaby (mainland)	P4 (DBCA list)			•	•		•	•						
	<i>Notamacropus agilis</i>	Agile Wallaby				•										
	<i>Osphranter robustus</i>	Euro	(<i>ex Macropus</i>)			•						•		•	•	•
	<i>Osphranter robustus</i> subsp. <i>isabellinus</i>	Barrow Island Euro	VU (EPBC & BC Acts) (<i>ex Macropus</i>) (Out of range)			•										
	<i>Osphranter rufus</i>	Red Kangaroo	(<i>ex Macropus</i>)			•						•			•	•
	<i>Petrogale rothschildi</i>	Rothschild’s Rock-wallaby				•						•	•	•		•
Megadermatidae	<i>Macroderma gigas</i>	Ghost Bat	VU (EPBC & BC Acts)		Known	•	•		•	•	•	•	•			•
Molossidae	<i>Austronomus australis</i>	White-striped Free-tailed Bat				•						•	•	•	•	
	<i>Chaerephon jobensis</i>	Greater Northern Freetail-bat				•						•		•	•	•
	<i>Ozimops cobourgianus</i>	North-western Freetail-bat	P1 (DBCA list) (<i>ex Mormopterus</i>)			•										
	<i>Ozimops lumsdenae</i>	Northern Freetail-bat	(<i>ex Mormopterus</i>)			•										
Muridae	<i>Leggadina lakedownensis</i>	Northern Short-tailed Mouse, Lakeland Downs Mouse, Kerakenga	P4 (DBCA list)			•	•									
	<i>Mus musculus</i>	House Mouse		*		•								•	•	•
	<i>Notomys alexis</i>	Spinifex Hopping-mouse				•						•		•		
	<i>Pseudomys chapmani</i>	Western Pebble-mound Mouse	P4 (DBCA list)			•	•	•	•	•		•	•	•	•	•
	<i>Pseudomys delicatulus</i>	Delicate Mouse				•										

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	<i>Pseudomys desertor</i>	Desert Mouse				•								•		•
	<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse				•						•		•	•	•
	<i>Pseudomys nanus</i>	Western Chestnut Mouse				•										
	<i>Rattus rattus</i>	Black Rat		*		•										
	<i>Zyzomys argurus</i>	Common Rock-rat				•						•	•	•	•	•
Phalangeridae	<i>Trichosurus vulpecula</i>	Common Brushtail Possum	(former distribution)			•										
Pteropodidae	<i>Pteropus alecto</i>	Black Flying-fox													•	
Rhinonycteridae	<i>Rhinonictis aurantia</i> (Pilbara)	Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)		Known	•	•	•		•	•	•	•	•	•	•
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna				•								•	•	•
Thylacomyidae	<i>Macrotis lagotis</i>	Greater Bilby	VU (EPBC & BC Acts)		Known	•	•	•		•					•	•
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat				•						•	•	•	•	•
	<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat				?									•	
	<i>Scotorepens greyii</i>	Little Broad-nosed Bat				•						•		•	•	•
	<i>Vespadelus finlaysoni</i>	Finlayson's Cave Bat				•						•		•	•	•
Reptiles (119)																
Agamidae	<i>Ctenophorus caudicinctus</i>	Ring-tailed Dragon				•						•		•	•	•
	<i>Ctenophorus isolepis</i>	Central Military Dragon				•						•		•	•	•
	<i>Ctenophorus nuchalis</i>	Central Netted Dragon				•									•	•
	<i>Ctenophorus reticulatus</i>	Western Netted Dragon				•										
	<i>Diporiphora paraconvergens</i>	Grey-striped Western Desert Dragon				•										
	<i>Diporiphora pindan</i>	Pindan Two-lined Dragon				•										
	<i>Diporiphora valens</i>	Southern Pilbara Tree Dragon				•										
	<i>Diporiphora vescus</i>	Northern Pilbara Tree Dragon	(ex <i>D. winneckei</i>)			•						•				
	<i>Gowidon longirostris</i>	Long-Nosed Dragon				•						•		•	•	•
	<i>Lophognathus horneri</i>	Horner's Dragon	(ex <i>Amphibolurus gilberti</i>)			•										

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	<i>Pogona minor</i>	Dwarf Bearded Dragon				•								•	•	•
	<i>Pogona minor</i> subsp. <i>minima</i>	Abrolhos dwarf bearded dragon	VU (BC Act) (out of range)			•										
	<i>Tympanocryptis cephalus</i>	Blotch-tailed Earless Dragon				•										
Carphodactylidae	<i>Nephrurus levis</i>	Smooth Knob-tailed Gecko				•								•	•	•
	<i>Nephrurus cinctus</i>	Northern Banded Knob-tailed Gecko	(ex <i>N. wheeleri</i> subsp. <i>cinctus</i>)			•										
Diplodactylidae	<i>Crenadactylus pilbarensis</i>	Pilbara clawless gecko	(ex <i>C. ocellatus</i>)			•										
	<i>Diplodactylus bilybara</i>	Western Fat-tailed Gecko	(ex <i>D. conspicillatus</i>)											•		
	<i>Diplodactylus conspicillatus</i>	Fat-tailed Gecko	Out of range (Now <i>D. bilybara</i> or <i>D. laevis</i>)			•						•		•		
	<i>Diplodactylus galaxias</i>	Northern Pilbara Beak-faced Gecko				•								•		
	<i>Diplodactylus laevis</i>	Desert Fat-tailed Gecko	(ex <i>D. conspicillatus</i>)											•	•	•
	<i>Diplodactylus savagei</i>	Southern Pilbara Beak-faced Gecko				•						•				
	<i>Lucasium stenodactylus</i>	Western Sandplain Gecko				•						•		•	•	•
	<i>Lucasium wombeyi</i>	Pilbara Ground Gecko				•						•		•		•
	<i>Lucasium woodwardi</i>	Pilbara Sandplain Gecko	(ex <i>L. stenodactylum</i>)			•										
	<i>Oedura fimbria</i>	Western Marbled Velvet Gecko	(ex <i>O. marmorata</i>)			•						•			•	•
	<i>Rhynchoedura ornata</i>	Western Beaked Gecko				•						•		•	•	
	<i>Strophurus ciliaris</i>	Northern Spiny-tailed Gecko				•										
	<i>Strophurus elderi</i>	Jewelled Gecko				•						•		•		•
	<i>Strophurus jeanae</i>	Southern Phasmid Gecko				•										
Elapidae	<i>Acanthophis wellsi</i>	Pilbara Death Adder				•										
	<i>Brachyurophis approximans</i>	North-western Shovel-nosed Snake				•						•		•	•	•
	<i>Brachyurophis fasciolatus</i>	Narrow-banded Shovel-nosed Snake												•		
	<i>Demansia reticulata</i>	Reticulated Whipsnake	(ex <i>D. psammophis</i>)			•								•		•
	<i>Demansia rufescens</i>	Rufous Whipsnake				•						•		•		•
	<i>Furina ornata</i>	Moon Snake				•						•		•		•

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	<i>Suta gaikhorstorum</i>	Pilbara Monk Snake	(ex <i>Parasuta monachus</i>)			•										
	<i>Pseudechis australis</i>	Mulga Snake				•						•		•		
	<i>Pseudonaja mengdeni</i>	Western Brown Snake				•						•		?		
	<i>Pseudonaja modesta</i>	Ringed Brown Snake				•										•
	<i>Simoselaps anomalus</i>	Desert Banded Snake				•										
	<i>Suta fasciata</i>	Rosen's Snake				•						•				
	<i>Suta punctata</i>	Spotted Snake				•										
	<i>Vermicella snelli</i>	Pilbara Bandy-bandy				•										
Gekkonidae	<i>Gehyra kimberleyi</i>	Robust Termitaria Gecko												•		
	<i>Gehyra media</i>	Medium Pilbara Spotted Rock Gehyra													•	
	<i>Gehyra pilbara</i>	Pilbara Dtella				•						•				
	<i>Gehyra punctata</i>	Spotted Dtella				•						•		•	•	•
	<i>Gehyra purpurascens</i>	Purplish Dtella				•									•	•
	<i>Gehyra variegata</i>	Variegated Dtella				•						•		•	•	•
	<i>Heteronotia binoei</i>	Bynoe's Gecko				•						•		•	•	•
	<i>Heteronotia spelea</i>	Desert Cave Gecko				•						•		•		•
Pygopodidae	<i>Delma butleri</i>	Unbanded Delma				•						•				•
	<i>Delma elegans</i>	Pilbara Delma				•										
	<i>Delma nasuta</i>	Sharp-snouted Delma				•						•		•		•
	<i>Delma pax</i>	Peace Delma				•						•		•	•	•
	<i>Delma tincta</i>	Excitable Delma				•								•		•
	<i>Lialis burtonis</i>	Burton's Legless Lizard				•						•		•	•	•
	<i>Pygopus nigriceps</i>	Western Hooded Scaly-foot				•										
Pythonidae	<i>Antaresia childreni</i>	Children's Python	(ex <i>A. stimsoni</i>)			•						•		•		•
	<i>Antaresia perthensis</i>	Pygmy Python				•								•		•

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	<i>Aspidites melanocephalus</i>	Black-headed Python				•								•		•
	<i>Aspidites ramsayi</i>	Woma				•										
	<i>Liasis olivaceus</i> subsp. <i>barroni</i>	Pilbara Olive Python	VU (EPBC & BC Acts)		Likely	•	•			•						
Scincidae	<i>Carlia munda</i>	Shaded-litter Rainbow Skink				•						•		•	•	•
	<i>Carlia triacantha</i>	Desert Rainbow Skink				•						•		•		
	<i>Cryptoblepharus buchananii</i>	Buchanan's Snake-eyed Skink				•										
	<i>Cryptoblepharus plagiocephalus</i>	Peron's Snake-eyed Skink				•										
	<i>Cryptoblepharus ustulatus</i>	Russet Snake-eyed Skink				•										•
	<i>Ctenotus angusticeps</i>	Airlie Island Ctenotus	P3 (DBCA list)			•										
	<i>Ctenotus duricola</i>	Eastern Pilbara Lined Ctenotus				•						•		•	•	•
	<i>Ctenotus dux</i>	Narrow-lined Ctenotus				•										
	<i>Ctenotus grandis</i>	Grand Ctenotus				•						•		•	•	•
	<i>Ctenotus hanloni</i>	Nimble Ctenotus				•								•	•	•
	<i>Ctenotus inornatus</i>	Bar-shouldered Ctenotus	<i>C. helenae Sensu lato</i>			•								•		•
	<i>Ctenotus leonhardii</i>	Leonhard's Ctenotus				•						•			•	
	<i>Ctenotus nigrilineatus</i>	Pin-striped Fine-snout Ctenotus	P1 (DBCA list)			•	•									
	<i>Ctenotus pallasotus</i>	Western Pilbara Lined Ctenotus	(ex <i>C. duricola</i>)													•
	<i>Ctenotus pantherinus</i>	Leopard Ctenotus				•						•		•	•	•
	<i>Ctenotus piankai</i>	Coarse Sands Ctenotus				•										•
	<i>Ctenotus rubicundus</i>	Ruddy Ctenotus				•						•				
	<i>Ctenotus rufescens</i>	Rufous Fine-snout Ctenotus				•										
	<i>Ctenotus saxatilis</i>	Rock Ctenotus				•						•		•	•	•
	<i>Ctenotus schomburgkii</i>	Barred Wedge-snout Ctenotus				•						•			•	•
	<i>Ctenotus serventyi</i>	Northwest Sandy-loam Ctenotus				•										
	<i>Ctenotus superciliaris</i>	Sharp-browed Ctenotus	(ex <i>C. duricola</i>)			•										

Family	Species	Common name	Status	Introduced	Databases			Unpublished reports							This survey	
					EPBC	NM	TFA	360 Environmental (2018)	Biologic (2012, 2014, 2018)	MinRes	MWH (2014-2016)	Outback Ecology (2009-2013)	Stantec (2017, 2018, 2022)	Western Wildlife (2020)		Phoenix (2024)
	<i>Cyclodomorphus melanops</i>	Spinifex Slender Blue-tongue				•						•		•		•
	<i>Egernia cygnitos</i>	Western Pilbara Spiny-tailed Skink				•								•		
	<i>Egernia epsisolus</i>	Eastern Pilbara Spiny-tailed Skink				•										•
	<i>Egernia formosa</i>	Goldfields Crevice skink				•										•
	<i>Eremiascincus isolepis</i>	Northern Bar-lipped Skink				•										
	<i>Eremiascincus musivus</i>	Mosaic Desert Skink				•										•
	<i>Eremiascincus pallidus</i>	Western Narrow-banded Skink	(ex <i>E. fasciolatus</i>)			•					•					
	<i>Eremiascincus richardsonii</i>	Broad-banded Sand Swimmer				•										
	<i>Lerista bipes</i>	North-western Sandslider				•					•		•	•	•	•
	<i>Lerista clara</i>	Sharp-blazed Three-toed Slider				•					•					
	<i>Lerista jacksoni</i>	Jackson's Three-toed Slider				•					•		•	•	•	•
	<i>Lerista labialis</i>	Southern Sandslider				•										
	<i>Lerista muelleri</i>	Wood Mulch-slider				•					•				•	•
	<i>Lerista verhmens</i>	Powerful Three-toed Slider				•										
	<i>Liopholis kintorei</i>	Great Desert Skink	VU (EPBC & BC Acts)		May											
	<i>Liopholis striata</i>	Night Skink				•					•					
	<i>Menetia greyii</i>	Common Dwarf Skink				•					•		•	•	•	•
	<i>Menetia surda</i>	Western Dwarf Skink				•							•	•	•	•
	<i>Morethia ruficauda</i>	Lined Firetail Skink				•					•		•	•	•	•
	<i>Notoscincus ornatus</i>	Ornate Soil-crevice Skink				•									•	•
	<i>Proablepharus reginae</i>	Western Soil-crevice Skink				•										
	<i>Tiliqua multifasciata</i>	Central Blue-tongue				•					•		•			•
Typhlopidae	<i>Anilios ammodytes</i>	Sand-diving Blind Snake				•					•		•	•	•	•
	<i>Anilios ganei</i>	Gane's Blind Snake (Pilbara)	P1 (DBCA list)			•	•									
	<i>Anilios grypus</i>	Long-beaked Blind Snake				•					•		•	•	•	•

Family	Species	Common name	Status	Introduced	Databases			Unpublished reports								This survey
					EPBC	NM	TFA	360 Environmental (2018)	Biologic (2012, 2014, 2018)	MinRes	MWH (2014-2016)	Outback Ecology (2009-2013)	Stantec (2017, 2018, 2022)	Western Wildlife (2020)	Phoenix (2024)	
	<i>Aniliios pilbarensis</i>	Pilbara Blind Snake				•						•				
Varanidae	<i>Varanus acanthurus</i>	Spiny-tailed Monitor				•						•		•	•	•
	<i>Varanus brevicauda</i>	Short-tailed Pygmy Monitor				•						•		•	•	•
	<i>Varanus eremius</i>	Pygmy Desert Monitor				•						•		•	•	•
	<i>Varanus giganteus</i>	Perentie				•						•	•	•	•	•
	<i>Varanus gouldii</i>	Bungarra or Sand Monitor				•						•		•		•
	<i>Varanus panoptes</i>	Yellow-spotted Monitor				•						•		•	•	•
	<i>Varanus pilbarensis</i>	Pilbara Rock Monitor				•							•	•		•
	<i>Varanus tristis</i>	Racehorse Monitor				•									•	

Appendix 4 Short-range endemic invertebrate desktop results

Higher taxon, family	Species	SRE category	Nearest record (km)	Habitat records	Source		This survey
					WAM (2023)	Phoenix (2024a)	
Class Arachnida, infraorder Araneomorphae (modern spiders) (5)							
Selenopidae	<i>Karaops`aurizon`</i>	Potential	Inside	Footslope	•		
	<i>Karaops`sp. indet.`</i>	Uncertain	Inside	Granite outcrop, ridge, gorge, gully, drainage line. Leaf litter	•		
	<i>Karaops kariyarra</i>	Confirmed	11.1	Low ridge, breakaway	•		
	<i>Karaops nyamal</i>	Confirmed	50.9	Ridge, gully	•		
	<i>Karaops nyiyaparli</i>	Widespread	Inside	Ridge	•		
Class Arachnida, infraorder Mygalomorphae (trapdoor spiders) (41)							
Actinopodidae	<i>Missulena`sp. 8`</i>	Potential	86.6		•		
	<i>Missulena rutraspina</i>	Widespread	45.4		•		
Anamidae	<i>`MYGAAB` `sp. indet.`</i>	Uncertain	68.1		•		
	<i>Aname`armigera complex`</i>	Uncertain	45.4		•		
	<i>Aname`MYG001 group, mellosa?`</i>	Potential	6.1		•		
	<i>Aname`MYG371`</i>	Widespread	48.9	Drainage line	•		
	<i>Aname`MYG372`</i>	Potential	0.1	Drainage line	•		
	<i>Aname`MYG373`</i>	Potential	Inside	Sandplain with marine couch	•		

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Higher taxon, family	Species	SRE category	Nearest record (km)	Habitat records	Source		This survey
					WAM (2023)	Phoenix (2024a)	
	<i>Aname</i> `MYG373`	Potential	Inside			•	
	<i>Aname</i> `MYG660`	Potential	45.4	Saline flat, triodia	•		
	<i>Aname</i> `MYG662`	Potential	45.4	Saline flat, triodia	•		
	<i>Aname</i> `MYG663`	Potential	45.4		•		
	<i>Aname</i> `MYG664`	Potential	52.9	Hakea, Acacia, Grevillea, over Triodia	•		
	<i>Aname</i> `MYG682`	Potential	Inside		•		
	<i>Aname</i> `Phoenix0247`	Potential	Inside	Spinifex sandplain			•
	<i>Aname</i> `MYG770`	Potential	8.5	Ridge, leaf litter	•		
	<i>Aname</i> `sp. 1`	Potential	45.6		•		
	<i>Aname</i> `sp. indet. yellowfoot`	Uncertain	70.9	Sandplain with low Acacia/grasses	•		
	<i>Aname</i> `sp. indet.`	Uncertain	0.3	Granite outcrop, drainage line, spinifex sandplain, saline flat. Hakea, Acacia, Grevillea, Triodia	•		
	<i>Aname baileyorum</i>	Widespread	Inside	Granite outcrop, drainage line, spinifex sandplain, <i>Acacia</i>	•		
	<i>Aname ellenae</i>	Widespread	68.1		•		
	<i>Aname mcalpinei</i>	Confirmed	61.8	Shrubland on sandplain	•		
	<i>Aname mellosa</i>	Widespread	Inside	Granite outcrop, ridge, breakaway, gorge, gully, riverine drainage, plain, steep slope, leaf & wood litter	•	•	•

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					WAM (2023)	Phoenix (2024a)	
	<i>Aname sinuata</i>	Widespread	15.2		•		
	<i>Kwonkan</i> `MYG007`	Potential	53.3	Acacia shrubland on sandplain, sandplain with marine couch	•		
	<i>Kwonkan</i> `MYG089`	Potential	86.6		•		
	<i>Kwonkan</i> `MYG200`	Potential	52.8		•		
	<i>Kwonkan</i> `MYG209`	Potential	53.3	Acacia shrubland on sandplain	•		
	<i>Kwonkan</i> `sp. indet.`	Uncertain	45.4	Calcrete, spinifex/Acacia, Hakea on Acacia spp. over Triodia	•		
Barychelidae	<i>Aureococrypta</i> `chichester`	Potential	18.4	Minor drainage line	•		
	<i>Aureococrypta</i> `MYG318`	Potential	15.0	Ridge	•		
	<i>Aureococrypta</i> `Phoenix0248`	Potential	Inside	Spinifex stony plain			•
	<i>Synothele</i> `MYG127`	Widespread	17.7	Drainage line, gully	•		
	<i>Synothele</i> `MYG237`	Potential	66.4		•		
	<i>Synothele</i> `MYG334`	Potential	19.0		•		
	<i>Synothele</i> `sp. indet.`	Uncertain	Inside	Stony rise, ironstone gorge	•		
	<i>Synothele</i> `xkarara`	Widespread	Inside		•		
Halonoproctidae	<i>Conothele</i> `MYG607`	Potential	57.8		•		
	<i>Conothele</i> `sp. indet.`	Uncertain	15.2	Gorge	•		

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					WAM (2023)	Phoenix (2024a)	
Idiopidae	<i>Idiosoma</i> `MYG084`	Potential	53.2	Acacia, spinifex on sandplain	•		
	<i>Idiosoma</i> `sp. indet.`	Uncertain	45.4	Saline flat, Hakea, Acacia, Grevillea, Triodia	•		
Class Arachnida, order Opiliones (harvestmen) (5)							
Assamiidae	<i>Dampetrus</i> `aurizon`	Potential	16.3	Footslope	•		
	<i>Dampetrus</i> `DNA09`	Potential	Inside	Spinifex stony plain		•	•
	<i>Dampetrus</i> `Phoenix0243`	Potential	Inside	Drainage line			•
	<i>Dampetrus</i> `sp. indet.`	Uncertain	6.1		•		
Opiliones	Opiliones `sp. indet.`	Uncertain	Inside	Spinifex stony plain, Drainage line			•
Class Arachnida, order Pseudoscorpiones (pseudoscorpions) (55)							
Atemnidae	<i>Anatemnus</i> `Phoenix0094`	Potential	Inside	Drainage line			•
	Atemnidae `Phoenix0245`	Potential	Inside	Drainage line			•
	<i>Anatemnus</i> `sp. indet.`	Uncertain	28.8	Under rock	•		
	Atemnidae `Phoenix0094`	Potential	Inside			•	
	<i>Oratemnus</i> `PSE018`	Potential	22.0	Drainage line	•		
	<i>Oratemnus</i> `PSE060`	Potential	7.7	Drainage line with granite	•		
	<i>Oratemnus</i> `sp. indet.`	Uncertain	Inside	Granite uplands, granite outcrop, ficus on ridge, breakaway, ironstone gorge, drainage line, spinifex stony plain, plain	•		

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					WAM (2023)	Phoenix (2024a)	
Cheiridiidae	`PSEAAB` `sp. indet.`	Uncertain	Inside	Ficus on ridge	•		
	`PSEAAF?` `sp. indet.`	Uncertain	45.9	Under Eucalyptus bark	•		
	`PSEAAF` `PSE-A`	Potential	65.6	Under Eucalyptus bark	•		
	`PSEAAF` `sp. indet.`	Uncertain	45.9	Under Eucalyptus bark	•		
	<i>Austrochernes</i> `sp. nov. 001`	Potential	20.5	Ridge	•		
	<i>Sundochernes</i> `PSE021`	Potential	10.4	Granite outcrop	•		
Chthoniidae	<i>Austrochthonius</i> `PSE135, pilbara`	Potential	1.1	Leaf litter, under ficus	•		
	<i>Austrochthonius</i> `sp. indet.`	Uncertain	15.0	sandstone gorge, ironstone gorge, gully	•		
	<i>Tyrannochthonius</i> `sp. indet.`	Uncertain	20.5	Ridge	•		
	<i>Tyrannochthonius</i> `sp. nov. near aridus`	Potential	14.4	Ridge, sandstone gorge, ironstone gorge, gully	•		
	<i>Tyrannochthonius aridus</i>	Widespread	Inside	Ridge, under Ficus, ficus on ridge, shrubland sand plain	•		
Feaellidae	<i>Feaella tealei</i>	Confirmed	26.0	Gully, under rocks	•		
Garypidae	<i>Solinus</i> `PSE222`	Potential	62.0	Under Eucalyptus bark	•		
	<i>Synsphyronus</i> `PSE008`	Potential	7.7	Under rocks, granite outcrop	•		
	<i>Synsphyronus</i> `PSE012`	Potential	30.2		•		

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					WAM (2023)	Phoenix (2024a)	
	<i>Synsphyronus</i> `PSE094, long chelal hand`	Potential	24.1	Ridge	•		
	<i>Synsphyronus</i> `PSE128`	Potential	Inside	Ficus on ridge, ficus in gully	•		
	<i>Synsphyronus</i> `sp. indet.`	Uncertain	4.2	Under rocks, under bark	•		
	<i>Synsphyronus heptatrachus</i>	Widespread	Inside	Ficus on ridge, ficus in gully	•		
	<i>Synsphyronus xynus</i>	Widespread	26.3	Under Eucalyptus bark, leaf litter, spinifex stony plain	•		•
Hyidae	<i>Indohya</i> `PSE002`	Widespread	Inside	Sandstone gorge, ironstone gorge, gully, ridge, drainage line	•		
Olpiidae	`Genus 7/4` `sp. 7/4A`	Potential	50.9	Ridge, ridge/scree slope, outcropping, gorge, gully	•		
	`Genus 7/4` `sp. indet.`	Uncertain	7.0	Gully, drainage line, shrubland on sandplain, leaf litter	•		
	`PSEAAA` `sp. indet.`	Uncertain	7.5	Ridge, stony rise, rocky clay plain, under Ficus, leaf litter	•		
	<i>Austrohorus</i> `sp. indet.`	Potential	Inside	Granite outcrop, ridge, stony rise, gorge, gully, drainage, shrubland on sandplain, sandplain with low Acacia/grasses, leaf litter, under Ficus, Ficus on ridge	•		
	<i>Beierolpium</i> `sp. 8/2`	Potential	3.7	Granite outcrop, sandy plain, Acacia spinifex sandplain, leaf litter, Ficus leaf litter on outcrop, under Ficus, Ficus on ridge	•		
	<i>Beierolpium</i> `sp. 8/3`	Potential	4.3	Breakaway, channel iron ridge, sandstone gorge, gully, drainage line, euc./spinifex on clay plain, shrubland on sandplain, sandplain with marine couch	•		

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					WAM (2023)	Phoenix (2024a)	
	<i>Beierolpium</i> `sp. 8/4 lge`	Potential	Inside	Ficus leaf litter on outcrop, under Ficus, Ficus on ridge, Eucalyptus open woodland, drainage line, leaf litter	•		
	<i>Beierolpium</i> `sp. 8/4 small`	Widespread	66.9	Melaleuca sandplain	•		
	<i>Beierolpium</i> `sp. 8/4`	Potential	20.3	Foot slope, ridge, outcropping, gorge, gully	•		
	<i>Beierolpium</i> `sp. indet. 6/2 lge`	Potential	20.5	Under Ficus	•		
	<i>Beierolpium</i> `sp. indet. 6/2 small`	Potential	20.5	Under Ficus	•		
	<i>Beierolpium</i> `sp. indet. 7/3 large`	Potential	20.5	Under Ficus	•		
	<i>Beierolpium</i> `sp. indet. 7/3, 6/2x3 lge`	Potential	13.6	Under Ficus	•		
	<i>Beierolpium</i> `sp. indet.`	Uncertain	Inside	Granite outcrop, ridge, gully, Ficus leaf litter on outcrop, drainage, sandy plain, spinifex over stony plain, leaf litter	•		
	<i>Beierolpium</i> `sp. indet`	Uncertain	Inside			•	
	<i>Euryolpium</i> `sp. indet.`	Uncertain	18.5	Granite outcrop, ridge, gorge, gully, drainage line	•		
	<i>Indolpium</i> `long chelal hand`	Potential	Inside		•		
	<i>Indolpium</i> `sp. indet.`	Uncertain	Inside	Various	•		
	<i>Linnaeolpium</i> `sp. indet.`	Uncertain	30.0	Drainage line, gully	•		
	Olpiidae `Phoenix0196`	Potential	Inside			•	

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					WAM (2023)	Phoenix (2024a)	
	Olpiidae `Phoenix0197`	Potential	Inside	Spinifex sandplain		•	•
	Olpiidae `Phoenix0198`	Potential	Inside			•	
	Olpiidae `Phoenix0199`	Potential	Inside			•	
	Olpiidae `Phoenix0244`	Potential	Inside	Rocky ridge and gorge			•
	Olpiidae `sp. indet`	Uncertain	Inside			•	
	<i>Xenolpium</i> `sp. indet.`	Uncertain	85.6	Granite outcrop	•		
Sternophoridae	<i>Afrosterophorus</i> `sp. indet.`	Uncertain	10.4	Granite outcrop, gully, under tree bark	•		
Class Arachnida, order Scorpiones (scorpions) (49)							
Buthidae	`Hope Downs Genus 2` `Hope Downs sp. 1`	Potential	14.9		•		
	<i>Lychas</i> `adonis`	Widespread	10.7	Drainage line, sandplain	•		
	<i>Lychas</i> `annulatus complex`	Potential	9.5	Triodia sandy plain, drainage line, breakaway	•		
	<i>Lychas</i> `bituberculatus complex`	Potential	Inside	Granite outcrop, stony rise, rocky ridge, gully, drainage line, leaf litter, under Ficus, Ficus on ridge	•		
	<i>Lychas</i> `gracilimanus`	Potential	6.1	Stony rise, plain, Acacia/spinifex	•		
	<i>Lychas</i> `hairy tail complex`	Potential	Inside	Granite outcrop, channel iron ridge, ridge, gorge, gully, drainage line, leaf litter, Ficus on ridge, under Ficus	•		
	<i>Lychas</i> `harveyi`	Widespread	Inside	Rocky foothills, spinifex sandplain, drainage line, euc./Triodia on clay plain	•		

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					WAM (2023)	Phoenix (2024a)	
	<i>Lychas</i> `hillside`	Potential	88.6	Rocky hill	•		
	<i>Lychas</i> `macleod`	Potential	16.0		•		
	<i>Lychas</i> `multipunctatus complex`	Widespread	9.4	Rocky foothills, stony rise, breakaway, drainage line, sandplain with low Acacia/grasses, leaf litter	•		
	<i>Lychas</i> `Phoenix0193`	Potential	Inside			•	
	<i>Lychas</i> `Phoenix0194`	Potential	Inside	Drainage line		•	•
	<i>Lychas</i> `Phoenix0195`	Potential	Inside	Spinifex sandplain, drainage line		•	•
	<i>Lychas</i> `Phoenix0242`	Potential	Inside	Spinifex sandplain			•
	<i>Lychas</i> `pilbara 1`	Widespread	9.2	Ridge/outcropping, gully, slope	•		
	<i>Lychas</i> `racing stripe`	Potential	14.9		•		
	<i>Lychas</i> `SCO024`	Potential	Inside	Spinifex stony plain, drainage line		•	•
	<i>Lychas</i> `SCO039`	Potential	Inside	Spinifex stony plain, drainage line			•
	<i>Lychas</i> `SCO046`	Potential	Inside			•	
	<i>Lychas</i> `SCO052`	Potential	Inside	Drainage line			•
	<i>Lychas</i> `sp. 1`	Widespread	2.7		•		
	<i>Lychas</i> `sp. 2`	Widespread	Inside		•		
	<i>Lychas</i> `sp. 3`	Widespread	41.9		•		

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					WAM (2023)	Phoenix (2024a)	
	<i>Lychas</i> `sp. 4`	Widespread	Inside		•		
	<i>Lychas</i> `sp. 6`	Widespread	3.2		•		
	<i>Lychas</i> `sp. indet.`	Uncertain	Inside	Granite outcrop, channel iron ridge, ridge, breakaway, ironstone gorge, gully, drainage line, <i>Acacia</i> shrubland on sandplain, spinifex over stony plain, euc./Triodia on clay plain, under Ficus on ridge, and in gully, hummock grassland	•		
	<i>Lychas annulatus</i>	Widespread	45.4	Acacia/spinifex, calcrete with Euc./spinifex, Triodia saline flat	•		
	<i>Lychas bituberculatus</i>	Widespread	Inside	Channel iron ridge, ridge, gorge, gully, drainage line, leaf litter, Ficus on ridge, under Ficus	•		
Urodacidae	<i>Urodacus</i> `armatus`	Widespread	4.8	Spinifex sandplain, Acacia/spinifex, Hakea, Grevillea	•		
	<i>Urodacus</i> `pilbara 13`	Potential	70.9	Sandplain with low Acacia/grasses	•		
	<i>Urodacus</i> `pilbara 4`	Potential	5.2	Leaf litter	•		
	<i>Urodacus</i> `Pilbara 5`	Potential	Inside	Thick leaf litter under dense Acacia, drainage line	•		
	<i>Urodacus</i> `pilbara 8`	Widespread	14.4	Gully, leaf litter	•		
	<i>Urodacus</i> `SCO010, pearcei`	Potential	16.0	Drainage line, spinifex sandplain	•		
	<i>Urodacus</i> `SCO028`	Potential	18.9		•		
	<i>Urodacus</i> `SCO033`	Potential	61.3		•		
	<i>Urodacus</i> `sp. 1`	Potential	14.9		•		

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Higher taxon, family	Species	SRE category	Nearest record (km)	Habitat records	Source		This survey
					WAM (2023)	Phoenix (2024a)	
	<i>Urodacus</i> `sp. 2`	Potential	56.4		•		
	<i>Urodacus</i> `sp. 5`	Widespread	15.2		•		
	<i>Urodacus</i> `sp. 7`	Potential	80.4		•		
	<i>Urodacus</i> `sp. 9`	Potential	15.2		•		
	<i>Urodacus</i> `sp. indet.`	Uncertain	7.5	Granite outcrop, drainage line, sandy plain	•		
	<i>Urodacus</i> `sp. Pilbara 8`	Widespread	19.0		•		
	<i>Urodacus hoplurus</i>	Widespread	6.0	Eucalyptus & Melaleuca, spinifex sandplain, Acacia/spinifex	•		
	<i>Urodacus lunatus</i>	Confirmed	60.7	SRE status from species description (Buzatto <i>et al.</i> 2023)	•		
	<i>Urodacus</i> `megamastigus complex`	Potential	Inside	Spinifex stony plain, drainage line			•
	<i>Urodacus uncinus</i>	Confirmed	Inside	Drainage line. SRE status from species description (Buzatto <i>et al.</i> 2023)	•		
	<i>Urodacus varians</i>	Potential	36.2		•		
Scorpiones	Scorpiones `sp. indet`	Uncertain	Inside	Spinifex stony plain, drainage line			•
Class Chilopoda (Centipedes) (6)							
Cryptopidae	<i>Cryptops</i> `sp. indet.`	Uncertain	6.1	Acacia and spinifex	•		
Geophilidae	Geophilidae `sp. indet.`	Uncertain	15.4	Leaf litter	•		
Scutigera	`Parascutigera` `sp. indet.`	Uncertain	89.0		•		

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Higher taxon, family	Species	SRE category	Nearest record (km)	Habitat records	Source		This survey
					WAM (2023)	Phoenix (2024a)	
	<i>Pilbarascutigera</i> `sp. indet.`	Uncertain	26.0		•		
	<i>Pilbarascutigera incola</i>	Potential	10.7		•		
	<i>Thereuopoda lesueurii</i>	Widespread	45.4	Granite with sand near creek, Acacia/spinifex, Triodia saline flat, spinifex sandplain	•		
Class Diplopoda (Millipedes) (10)							
Paradoxosomatidae	<i>Antichiropus</i> `DIP005, abydos`	Potential	15.0	Ridge, creekline, drainage line	•		
	<i>Antichiropus</i> `DIP028, mt marsh`	Potential	15.2		•		
	<i>Antichiropus</i> `DIP033, wodgina`	Confirmed	7.4	Under Ficus	•		
	<i>Antichiropus</i> `DIP037, balfour1`	Confirmed	41.9		•		
	<i>Antichiropus</i> `sp. indet.`	Uncertain	13.0	Gully	•		
	<i>Antichiropus apricus</i>	Confirmed	25.8	Riverine	•		
	<i>Antichiropus forcipatus</i>	Confirmed	3.2	Ridge, sandstone gorge, gully, drainage line, creekline	•		
	<i>Antichiropus patriciae</i>	Widespread	Inside		•		
Trigoniulidae	<i>Austrostrophus</i> `sp. indet.`	Uncertain	10.4	Ridge, sandstone, or ironstone gorge, gully	•		
	<i>Austrostrophus stictopygus</i>	Widespread	11.6	Ridge, sandstone, or ironstone gorge, gully	•		
Class Gastropoda (land snails) (22)							

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Higher taxon, family	Species	SRE category	Nearest record (km)	Habitat records	Source		This survey
					WAM (2023)	Phoenix (2024a)	
Camaenidae	Camaenidae `sp. indet`	Uncertain	Inside	Rocky ridge and gorge			•
	`genus nov.` `sp. nov.`	Uncertain	Inside	Under rocks and leaf litter on ridge, outcrop, gorge, gully. Under Ficus on ridge, in gully.	•		
	`genus nov.` cf. `sp. nov Z`	Uncertain	Inside	Under rocks and leaf litter on outcrop and ridge, Ficus grove in gorge	•		
	`genus nov.` cf. `sp. nov. Mount Robinson`	Potential	1.1	Under rocks and leaf litter on outcrop, in gully, under Ficus	•		
	<i>Quistrachia</i> cf. <i>turneri</i>	Potential	27.1	On rock pile	•		
	<i>Quistrachia turneri</i>	Potential	9.2	Granite outcrop/boulders with figs/shrubs, rocky rise, ridge, under rocks	•		
	<i>Rhagada</i> `sp. indet.`	Uncertain	4.6	Gorge, drainage line	•		
	<i>Rhagada</i> `sp. nov. Sulpher Springs`	Potential	29.5		•		
	<i>Rhagada</i> aff. <i>richardsonii</i>	Potential	20.3	Ridge, creek line, drainage line	•		
	<i>Rhagada</i> cf. <i>convicta</i>	Potential	88.6	Limestone ridge, ancient sand dune	•		
	<i>Rhagada</i> cf. <i>richardsonii</i>	Potential	7.0	Ridge, Ficus on Channel Iron deposit, drainage line, creek line, river bed	•		
	<i>Rhagada convicta</i>	Widespread	65.7	Triodia roots	•		
	<i>Rhagada convicta?</i>	Uncertain	61.8		•		
	<i>Rhagada radleyi</i>	Widespread	19.2		•		

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					WAM (2023)	Phoenix (2024a)	
	<i>Rhagada richardsonii</i>	Potential	5.1	Triodia roots, granite outcrop in drainage, Eucalyptus & Acacia, Ironstone Mesa slope, Triodia and figs on outcrop, breakaway ridge slope, fig shrubs in minor gullies	•		
	<i>Rhagada</i> sp. `med banded`	Potential	29.5		•		
	<i>Rhagada</i> sp. `Sulphur Springs`	Potential	26.0		•		
	<i>Rhagada tescorum</i>	Potential	81.9		•		
Helicodiscidae	<i>Stenopylis</i> cf. <i>coarctata</i>	Potential	18.4	Drainage line	•		
	<i>Stenopylis coarctata</i>	Widespread	4.6	Granite outcrop/rocks, Eucalyptus in drainage line, river bed	•		
Subulinidae	<i>Eremopeas interioris</i>	Potential	28.7	Drainage line	•		
Succineidae	<i>Succinea</i> `sp. indet.`	Uncertain	4.6	Granite dome, rock piles, Eucalyptus near creek, steep slope, foot slope, drainage line, riverbed, Acacia thicket surrounding drainage line, creek/ floodplain in depression, under Triodia	•		
Order Isopoda (isopods) (17)							
Armadillidae	<i>Acanthodillo</i> `sp. indet.`	Potential	Inside	Ficus on ridge, ironstone gorge, gully, drainage line, Acacia shrubland on sandplain, leaf litter	•		
	Armadillidae `Phoenix0204`	Potential	Inside			•	
	Armadillidae `Phoenix0205`	Potential	Inside			•	
	Armadillidae `Phoenix0206`	Potential	Inside			•	
	<i>Buddelundia</i> `Phoenix0200`	Potential	Inside	Spinifex stony plain		•	•

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Higher taxon, family	Species	SRE category	Nearest record (km)	Habitat records	Source		This survey
					WAM (2023)	Phoenix (2024a)	
	<i>Buddelundia</i> `Phoenix0201`	Potential	Inside	Spinifex stony plain, drainage line		•	•
	<i>Buddelundia</i> `Phoenix0202`	Potential	Inside	Drainage line		•	•
	<i>Buddelundia</i> `Phoenix0203`	Potential	Inside	Spinifex stony plain, drainage line		•	•
	<i>Buddelundia</i> `Phoenix0207`	Potential	Inside			•	
	<i>Buddelundia</i> `Phoenix0246`	Potential	Inside	Spinifex stony plain, drainage line			•
	<i>Buddelundia</i> `Phoenix0249`	Potential	Inside	Rocky ridge and gorge, drainage line			•
	<i>Buddelundia</i> `sp. 10`	Widespread	Inside	Stony rise, drainage line, Acacia/spinifex sandplain, sandplain with marine couch, shrubland sandplain, melaleuca sandplain, Eucalyptus open woodland	•		
	<i>Buddelundia</i> `sp. 11`	Potential	9.8	Channel iron ridge, ridge, ironstone gorge, sandstone gorge, BIF gully, gully, drainage - alluvial fan, leaf litter	•		
	<i>Buddelundia</i> `sp. 13`	Widespread	Inside	Ficus on ridge, rocky clay plain, drainage line, leaf litter, under Ficus	•		
	<i>Buddelundia</i> `sp. 14`	Widespread	Inside	Breakaway, channel iron ridge, ridge, Ficus on ridge, granite outcrop, ironstone gorge, sandstone gorge, BIF gully, gully, drainage line, Melaleuca sandplain, Eucalyptus open woodland, Eucalypts/spinifex on clay plain, leaf litter, under Ficus	•		
	<i>Buddelundia</i> `sp. 14mw`	Widespread	50.9	Ridge, gorge, gully	•		
	<i>Buddelundia</i> `sp. 14re`	Potential	10.4	Granite outcrop	•		

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Higher taxon, family	Species	SRE category	Nearest record (km)	Habitat records	Source		This survey
					WAM (2023)	Phoenix (2024a)	
	<i>Buddelundia</i> `sp. 17`	Potential	Inside	Granite outcrop, Ficus on ridge, stony rise, drainage line, Eucalyptus open woodland, spinifex sandplain, shrubland on sandplain, Acacia/spinifex sandplain, under Ficus	•		
	<i>Buddelundia</i> `sp. 18`	Widespread	4.7	Ridge, ridge/scree slope, outcropping, sandstone gorge, ironstone gorge, gorge, gully, leaf litter	•		
	<i>Buddelundia</i> `sp. 19`	Potential	4.3	Drainage line, leaf litter, sandy plain, Acacia/spinifex sandplain, Eucalyptus open woodland, Acacia shrubland on sandplain	•		
	<i>Buddelundia</i> `sp. 21`	Potential	1.1	Ridge, stony rise, gully, under Ficus	•		
	<i>Buddelundia</i> `sp. 31`	Potential	Inside	Granite outcrop, Ficus on ridge, Ficus in gully, under Ficus	•		
	<i>Buddelundia</i> `sp. 36`	Widespread	Inside	Ficus on ridge, Ficus in gully, drainage line, under Ficus	•		
	<i>Buddelundia</i> `sp. indet.`	Uncertain	Inside	Rocky clay plain, gully, drainage line	•		
	Buddelundiinae `sp. indet.`	Uncertain	0.4	Channel iron ridge, stony rise, drainage line, rocky clay plain, Eucalypts/spinifex on clay plain, sandy plain, under Ficus, leaf litter	•		
	Buddelundiinae `sp. mw`	Potential	51.0	Ridge, ridge/outcropping	•		
	Buddelundiinae abydos	Widespread	15.0	Ridge, ridge/scree slope, outcropping, ironstone, and sandstone gorge, gully, drainage line	•		
	<i>Spherillo</i> `sp. indet.`	Uncertain	9.5	Drainage line	•		
	<i>Spherillo wodgina</i>	Potential	0.3	Granite outcrop, drainage line, Melaleuca sandplain, Eucalyptus open woodland	•		

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Higher taxon, family	Species	SRE category	Nearest record (km)	Habitat records	Source		This survey
					WAM (2023)	Phoenix (2024a)	
Philosciidae	<i>Laevophiloscia</i> `sp. indet.`	Uncertain	Inside	Breakaway, Ficus on ridge, gully, Ficus in gully, drainage line	•		

Appendix 5 Fauna species by site matrix

Name	Vernacular	WLP001	WLP002	WLP003	WLP004	WLP005	WLP006	WLP007	WLP008	WLP009	WLP010	WLP011	WLP013	WLP014	WLP015	WLP017	WLP019	WLP020	WLP021	WLP022	WLP023	WLP024	WLP025	WLP026	WLP027	WLP029	WLP030	WLP031	WLP032	WLP033	WLP039	WLP041	WLP048	WLP055	BP 04, 07, 12-14	Opp001 - 21			
Amphibians (6)																																							
<i>Cyclorana maini</i>	Sheep Frog			•	•	•	•	•	•																														
<i>Litoria rubella</i>	Little Red Tree Frog				•		•	•	•	•	•																												
<i>Notaden nichollsi</i>	Desert Spadefoot					•																																	
<i>Platyplectrum spenceri</i>	Centralian Burrowing Frog					•	•		•	•																													
<i>Uperoleia glandulosa</i>	Glandular Toadlet					•			•																														
<i>Uperoleia saxatilis</i>	Pilbara Toadlet					•																																	
Birds (62)																																							
<i>Accipiter fasciatus</i>	Brown Goshawk																									•													
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar					•																				•													
<i>Amytornis whitei</i> subsp. <i>whitei</i>	Rufous Grasswren																																			1			
<i>Anas gracilis</i>	Grey Teal																																			•			
<i>Anas superciliosa</i>	Pacific Black Duck																				•															•			
<i>Ardeotis australis</i>	Australian Bustard						•				•												•												•	•			
<i>Artamus cinereus</i>	Black-faced Woodswallow	•	•				•		•		•	•												•											•	•			
<i>Artamus minor</i>	Little Woodswallow												•																										
<i>Artamus personatus</i>	Masked Woodswallow																																			•			
<i>Cacatua sanguinea</i>	Little Corella						•														•																		
<i>Chlamydera guttata</i>	Western Bowerbird								•														•																
<i>Colluricincla harmonica</i>	Grey Shrike-thrush								•	•	•	•														•	•									•			
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike								•												•								•						•				
<i>Corvus orru</i>	Torresian Crow		•		•	•	•	•		•								•			•																		
<i>Coturnix ypsilophora</i>	Brown Quail																							•												•			
<i>Cracticus nigrogularis</i>	Pied Butcherbird				•		•	•		•		•									•									•						•			
<i>Dacelo leachii</i>	Blue-winged Kookaburra					•	•	•	•		•											•																	
<i>Dromaius novaehollandiae</i>	Emu																																						
<i>Egretta novaehollandiae</i>	White-faced Heron																				•															•			
<i>Elseyornis melanops</i>	Black-fronted Dotterel													•							•															•			
<i>Emblema pictum</i>	Painted Finch					•			•		•	•										•	•	•					•							•			
<i>Epthianura tricolor</i>	Crimson Chat		•																																				
<i>Eremiornis carteri</i>	Spinifex-bird	•			•	•	•					•																											
<i>Eurostopodus argus</i>	Spotted Nightjar				•																														•	•			
<i>Falco berigora</i>	Brown Falcon											•																								•			
<i>Falco cenchroides</i>	Australian Kestrel					•			•		•																								•				
<i>Gavicalis virescens</i>	Singing Honeyeater	•	•		•	•	•				•	•												•	•				•							•			
<i>Geopelia cuneata</i>	Diamond Dove		•			•	•				•	•		•				•			•	•	•	•										•	•				
<i>Geopelia striata</i>	Zebra Dove								•													•		•															

Name	Vernacular	WLP001	WLP002	WLP003	WLP004	WLP005	WLP006	WLP007	WLP008	WLP009	WLP010	WLP011	WLP013	WLP014	WLP015	WLP017	WLP019	WLP020	WLP021	WLP022	WLP023	WLP024	WLP025	WLP026	WLP027	WLP029	WLP030	WLP031	WLP032	WLP033	WLP039	WLP041	WLP048	WLP055	BP 04, 07, 12-14	Opp001 - 21			
<i>Geophaps plumifera</i>	Spinifex Pigeon	●					●			●	●	●							●		●	●	●	●						●									
<i>Grallina cyanoleuca</i>	Magpie-lark						●		●					●					●		●	●	●							●		●					●		
<i>Haliastur sphenurus</i>	Whistling Kite				●													●					●														●		
<i>Hieraaetus morphnoides</i>	Little Eagle																																				●		
<i>Lalage tricolor</i>	White-winged Triller										●	●																									●		
<i>Lichmera indistincta</i>	Brown Honeyeater										●	●							●						●				●										
<i>Malurus assimilis</i>	Purple-backed fairy wren										●																												
<i>Malurus leucopterus</i>	White-winged Fairy wren					●																														●			
<i>Manorina flavigula</i>	Yellow-throated Miner	●		●	●		●	●	●	●	●	●								●	●									●									
<i>Megalurus cruralis</i>	Brown Songlark		●			●	●		●													●																	
<i>Megalurus mathewsi</i>	Rufous Songlark					●			●																											●	●		
<i>Melopsittacus undulatus</i>	Budgerigar	●			●		●	●		●	●	●								●	●																		
<i>Merops ornatus</i>	Rainbow Bee-eater	●					●	●	●		●	●						●	●		●	●	●							●							●		
<i>Milvus migrans</i>	Black Kite																																				●		
<i>Ninox boobook</i>	Boobook Owl					●																										●				●			
<i>Ninox connivens</i>	Barking Owl					●																																	
<i>Nymphicus hollandicus</i>	Cockatiel																																				●		
<i>Ocyphaps lophotes</i>	Crested Pigeon		●				●																	●															
<i>Oreoica gutturalis</i>	Crested Bellbird										●	●																											
<i>Pachycephala rufiventris</i>	Rufous Whistler										●	●														●													
<i>Pardalotus rubricatus</i>	Red-browed Pardalote					●	●			●	●													●						●						●	●		
<i>Petrochelidon nigricans</i>	Tree Martin								●														●													●	●		
<i>Phaps chalcoptera</i>	Common Bronzewing																																				●		
<i>Ptilotula keartlandi</i>	Grey-headed Honeyeater			●				●	●			●																									●		
<i>Ptilotula penicillata</i>	White-plumed Honeyeater					●	●	●	●		●	●						●	●		●	●	●	●	●					●					●	●			
<i>Ptilotula plumula</i>	Grey-fronted Honeyeater				●																																		
<i>Rhipidura leucophrys</i>	Willie Wagtail										●	●	●																	●							●		
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe																			●																	●		
<i>Taeniopygia castanotis</i>	Zebra Finch	●	●			●	●		●		●	●						●						●	●					●									
<i>Threskiornis spinicollis</i>	Straw-necked Ibis																							●	●												●		
<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher						●																														●		
<i>Todiramphus sanctus</i>	Sacred Kingfisher					●			●		●										●	●																	
<i>Turnix velox</i>	Little Button-quail						●											●																		●			
Mammals (29)																																							
<i>Bos taurus</i>	European Cattle*		●			●	●		●		●	●							●		●	●	●	●	●										●	●			
<i>Canis familiaris</i>	Dog*					●				●											●			●						●							●		
<i>Chaerephon jobensis</i>	Greater Northern Freetail-bat	●	●	●	●	●	●	●	●					●		●					●		●	●		●													
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	●	●	●	●	●	●	●	●		●	●		●		●					●		●	●	●		●			●									

Name	Vernacular	WLP001	WLP002	WLP003	WLP004	WLP005	WLP006	WLP007	WLP008	WLP009	WLP010	WLP011	WLP013	WLP014	WLP015	WLP017	WLP019	WLP020	WLP021	WLP022	WLP023	WLP024	WLP025	WLP026	WLP027	WLP029	WLP030	WLP031	WLP032	WLP033	WLP039	WLP041	WLP048	WLP055	BP 04, 07, 12-14	Opp001 - 21			
<i>Dasykaluta rosamondae</i>	Little Red Kaluta	●																																					
<i>Dasyurus hallucatus</i>	Northern Quoll			3											4		2								1		5	1				1							
<i>Equus caballus</i>	Horse*																				●															●			
<i>Felis catus</i>	Cat*		●			●					●																								●	●			
<i>Macroderma gigas</i>	Ghost Bat																																1						
<i>Macrotis lagotis</i>	Greater Bilby					2																																	
<i>Mus musculus</i>	House Mouse*								●																														
<i>Ningau timealeyi</i>	Pilbara Ningau					●		●		●	●																												
<i>Osphranter robustus</i>	Euro							●			●								●					●	●					●		●			●	●			
<i>Osphranter rufus</i>	Red Kangaroo	●						●			●	●										●	●	●	●						●				●				
<i>Petrogale rothschildi</i>	Rothschild's Rock-wallaby			●																																			
<i>Pseudantechinus woolleyae</i>	Woolley's Pseudantechinus																●										●												
<i>Pseudomys chapmani</i>	Western Pebble-mound Mouse						2			2		3																							1		3		
<i>Pseudomys desertor</i>	Desert Mouse						●																																
<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse						●				●																												
<i>Rhinonictes aurantia (Pilbara)</i>	Pilbara Leaf-nosed Bat					1	2		1			1									6		1			1			97										
<i>Scotorepens greyii</i>	Little Broad-nosed Bat	●	●	●	●	●	●	●	●		●	●		●	●	●					●		●	●					●										
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart						●																																
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna												●											●															
<i>Taphozous georgianus</i>	Common Sheath-tailed Bat	●	●	●	●	●	●					●				?					●		?			●													
<i>Taphozous hilli</i>	Hill's Sheathtail-bat										●		●	●	●	?							?	●															
<i>Vespadelus finlaysoni</i>	Finlayson's Cave Bat	●			●		●	●	●		●	●	●	●	●	●					●		●	●		●		●											
<i>Zyzomys argurus</i>	Common Rock-rat			●											●	●	●										●	●											
<i>Anilius ammodytes</i>	Sand-diving Blind Snake			●		●	●	●																															
<i>Anilius grypus</i>	Long-beaked Blind Snake					●		●		●		●																								●			
Reptiles (58)																																							
<i>Antaresia childreni</i>	Children's Python			●	●				●		●																												
<i>Antaresia perthensis</i>	Pygmy Python							●																															
<i>Aspidites melanocephalus</i>	Black-headed Python								●																														
<i>Brachyurophis approximans</i>	North-western Shovel-nosed Snake			●		●		●		●																													
<i>Carlia munda</i>	Shaded-litter Rainbow Skink						●	●	●																														
<i>Cryptoblepharus ustulatus</i>	Russet Snake-eyed Skink										●																												
<i>Ctenophorus caudicinctus</i>	Ring-tailed Dragon				●					●	●	●																											
<i>Ctenophorus isolepis</i>	Central Military Dragon	●	●			●	●																												●				
<i>Ctenophorus nuchalis</i>	Central Netted Dragon																	●																		●			

Name	Vernacular	WLP001	WLP002	WLP003	WLP004	WLP005	WLP006	WLP007	WLP008	WLP009	WLP010	WLP011	WLP013	WLP014	WLP015	WLP017	WLP019	WLP020	WLP021	WLP022	WLP023	WLP024	WLP025	WLP026	WLP027	WLP029	WLP030	WLP031	WLP032	WLP033	WLP039	WLP041	WLP048	WLP055	BP 04, 07, 12-14	Opp001 - 21
<i>Ctenotus duricola</i>	Eastern Pilbara Lined Ctenotus			•								•									•															
<i>Ctenotus grandis</i>	Grand Ctenotus				•	•	•				•																									
<i>Ctenotus hanloni</i>	Nimble Ctenotus	•					•	•																												
<i>Ctenotus inornatus</i>	Bar-shouldered Ctenotus	•					•	•																												
<i>Ctenotus pantherinus</i>	Leopard Ctenotus	•	•				•																													
<i>Ctenotus piankai</i>	Coarse Sands Ctenotus	•	•			•	•																													
<i>Ctenotus saxatilis</i>	Rock Ctenotus	•		•	•	•	•	•			•	•														•										
<i>Ctenotus schomburgkii</i>	Barred Wedge-snout Ctenotus		•																																	
<i>Cyclodomorphus melanops</i>	Slender Blue-tongue			•																																
<i>Delma butleri</i>	Unbanded Delma						•	•				•																								
<i>Delma nasuta</i>	Sharp-snouted Delma								•																											
<i>Delma pax</i>	Peace Delma				•			•	•	•																										
<i>Delma tincta</i>	Excitable Delma	•									•																									
<i>Demansia reticulata</i>	Reticulated Whipsnake						•																													
<i>Demansia rufescens</i>	Rufous Whipsnake							•			•																									
<i>Diplodactylus laevis</i>	Desert Fat-tailed Gecko	•	•				•																													
<i>Egernia epsisolus</i>	Eastern Pilbara Spiny-tailed Skink			•																																
<i>Egernia formosa</i>	Goldfields Crevice skink																												•							
<i>Eremiascincus musivus</i>	Mosaic Desert Skink																									•										
<i>Furina ornata</i>	Moon Snake									•	•																									
<i>Gehyra punctata</i>	Spotted Dtella	•	•	•	•			•		•																										
<i>Gehyra purpurascens</i>	Purple Dtella	•	•																																	
<i>Gehyra variegata</i>	Variegated Dtella	•	•		•	•	•	•	•	•	•	•																								
<i>Gowidon longirostris</i>	Long-Nosed Dragon						•	•	•		•										•			•					•							
<i>Heteronotia binoei</i>	Bynoe's Gecko			•	•	•	•	•	•	•	•	•																								
<i>Heteronotia spelea</i>	Desert Cave Gecko			•				•																												
<i>Lerista bipes</i>	North-western Sandslider	•	•			•																														
<i>Lerista jacksoni</i>	Jackson's three-toed Slider			•	•					•		•																								
<i>Lerista muelleri</i>	Wood Mulch-slider				•					•																										
<i>Lialis burtonis</i>	Burton's Legless Lizard	•			•				•		•																									
<i>Lucasium stenodactylus</i>	Sand-plain Gecko	•	•				•		•	•	•	•																								
<i>Lucasium wombeyi</i>	Pilbara Ground Gecko										•																									
<i>Menetia greyii</i>	Common Dwarf Skink											•																								
<i>Menetia surda</i>	Western Dwarf Skink	•	•			•																														
<i>Morethia ruficauda</i>	Lined Firetail Skink	•			•		•		•	•	•	•													•				•							
<i>Nephurus levis</i>	Smooth Knob-tailed Gecko					•																														
<i>Notoscincus ornatus</i>	Ornate Soil-crevice Skink	•	•			•																														

Name	Vernacular	WLP001	WLP002	WLP003	WLP004	WLP005	WLP006	WLP007	WLP008	WLP009	WLP010	WLP011	WLP013	WLP014	WLP015	WLP017	WLP019	WLP020	WLP021	WLP022	WLP023	WLP024	WLP025	WLP026	WLP027	WLP029	WLP030	WLP031	WLP032	WLP033	WLP039	WLP041	WLP048	WLP055	BP 04, 07, 12-14	Opp001 - 21	
<i>Oedura fimbria</i>	Western Marbled Velvet Gecko																									•											
<i>Pogona minor</i>	Dwarf Bearded Dragon		•			•	•																				•										
<i>Pseudonaja modesta</i>	Ringed Brown Snake	•																																			
<i>Strophurus elderi</i>	Jewelled Gecko					•						•																									
<i>Tiliqua multifasciata</i>	Central Blue-tongue	•	•			•		•																													
<i>Varanus acanthurus</i>	Spiny-tailed Monitor	•	•	•	•			•									•																				
<i>Varanus brevicauda</i>	Short-tailed Pygmy Monitor	•	•				•																														
<i>Varanus eremius</i>	Pygmy Desert Monitor						•																														
<i>Varanus giganteus</i>	Perentie										•																										
<i>Varanus gouldii</i>	Bungarra or Sand Monitor					•												•			•																
<i>Varanus panoptes</i>	Yellow-spotted Monitor	•				•						•						•																			
<i>Varanus pilbarensis</i>	Pilbara Rock Monitor														•		•										•										
Species richness / site		37	30	22	29	50	55	35	40	24	49	41	5	8	6	7	5	10	7	3	27	12	20	20	10	11	5	1	18	4	1	4	1	1	18	41	

The number of records for conservation significant fauna has been provided; all non-significant fauna records are denoted as presence/absence.

Appendix 6 SRE molecular report

Wodgina requested total genomic extraction and mitochondrial sequencing services from Genotyping Australia (GA). From Project 1630, Tissue from 45 specimens were submitted to GA and all of these produced a successful sequence and 2 had a poor sequence read. The sequences were edited and aligned using Geneious Prime 2024.0.0. Sequences were BLASTED against publicly accessible sequences in GenBank and with a dataset derived from Phoenix Environmental Sciences previously collated sequence library (Phoenix 2024b). The top 10 hits for each major taxon were gathered, duplicates were removed, and analysed with 2 analyses: a Maximum Likelihood phylogenetic analysis using a GTR+G model of evolution and 100 bootstraps (RAxML) in Geneious to determine relationships between taxa.

GA seq. code	PES code	PES nearest Taxon ID	PES nearest BLAST hit PI	GB nearest Taxon ID	GB nearest BLAST hit PI	Original ID	Final Taxon ID
418764	39545			<i>Aname vernonorum</i>	85.6		<i>Aname</i> 'Phoenix0247'
418775	39570			<i>Aname mellosa</i>	99.5		<i>Aname mellosa</i>
418784	39592			<i>Aname mellosa</i>	97.6		<i>Aname mellosa</i>
418789	39837	<i>Aname mellosa</i>	92.8	<i>Aname mellosa</i>	99.4		<i>Aname mellosa</i>
418799	39874	Atemnidae 'Phoenix0094'	99.5	<i>Anatemnus Biologic-PSEU081</i>			<i>Anatemnus</i> 'Phoenix0094'
418781	39587			Atemnidae 'Biologic-PSEU096'	94.2		Atemnidae 'Phoenix0245'
418802	39880	<i>Synothele</i> 'karara'	90	<i>Aureococrypta MYG319</i>	89.8	Barychelidae	<i>Aureococrypta</i> 'Phoenix0248'
418804	39882	<i>Buddelundia</i> Phoenix0130 (1555)	90.1	<i>Buddelundia SJ 56 DNA</i>	91.2		<i>Buddelundia</i> 'Phoenix0200'
418792	39840			<i>Buddelundiinae NYI01</i>	89.2	Isopod	<i>Buddelundia</i> 'Phoenix0201'
418791	39839			<i>Buddelundia-Biologic-ISOP049</i>	89.1	Isopod	<i>Buddelundia</i> 'Phoenix0202'
418777	39576	<i>Buddelundia</i> Phoenix0152	91.4	<i>Buddelundia SJ 10MA</i>	90.7		<i>Buddelundia</i> 'Phoenix0203'
418793	39841	<i>Buddelundia</i> 'Phoenix0152' (1543)	90.4	<i>Buddelundia SJ 10MA</i>	89.8	Isopod	<i>Buddelundia</i> 'Phoenix0203'
418794	39842	<i>Buddelundia</i> 'Phoenix0152' (1543)	90.4	<i>Buddelundia SJ 10MA</i>	90.1	Isopod	<i>Buddelundia</i> 'Phoenix0203'
418786	39594						<i>Buddelundia</i> 'Phoenix0246'

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
Prepared for Mineral Resources Ltd

GA seq. code	PES code	PES nearest Taxon ID	PES nearest BLAST hit PI	GB nearest Taxon ID	GB nearest BLAST hit PI	Original ID	Final Taxon ID
418796	39844					Isopod	<i>Buddelundia</i> 'Phoenix0246'
418797	39845					Isopod	<i>Buddelundia</i> 'Phoenix0249'
418798	39846					Isopod	<i>Buddelundia</i> 'Phoenix0249'
418783	39590	<i>Dampetrus</i> 'DNA09'	100				<i>Dampetrus</i> 'DNA09'
418806	39886	<i>Dampetrus</i> 'DNA09' (1020)	98.0				<i>Dampetrus</i> 'DNA09'
418770	39560			<i>Dampetrus</i> 'OPI001'	89.5	Dampetrus	<i>Dampetrus</i> 'Phoenix0243'
418766	39553			<i>Lychas Biologic-SCOR024</i>	89.3		did not align
418773	39564	<i>Isometroides</i> 'Pilbara1'	90.2	<i>Isometroides</i> SCO010	90.0		<i>Lychas</i> 'Phoenix0194'
418788	39604	<i>Isometroides</i> 'Pilbara1'	90.2	<i>Isometroides</i> SCO010	90.0		<i>Lychas</i> 'Phoenix0194'
418774	39568	<i>Urodacus</i> 'multipunctatus complex' 1488	90.7	<i>Lychas</i> SCO046	90.7		<i>Lychas</i> 'Phoenix0195'
418780	39586	L bituberculatus complex - 1488	90.7	<i>Lychas</i> SCO046	90.6		<i>Lychas</i> 'Phoenix0195'
418765	39552			<i>Lychas Biologic-SCOR012</i>	90.6		<i>Lychas</i> 'Phoenix0242'
418779	39584	L 'SCO039' complex - 1488	90.4	<i>Lychas Biologic-SCOR012</i>	90.6		<i>Lychas</i> 'Phoenix0242'
418767	39556			<i>Lychas</i> SCO024	97.6		<i>Lychas</i> 'SCO024'
418771	39561			<i>Lychas</i> SCO024	97.4		<i>Lychas</i> 'SCO024'
418772	39563			<i>Lychas</i> SCO024	95.7		<i>Lychas</i> 'SCO024'
418778	39580	L bituberculatus complex - 1488	96.2	<i>Lychas</i> SCO024	96.3		<i>Lychas</i> 'SCO024'
418782	39588	L bituberculatus complex - 1488	96.2	<i>Lychas</i> SCO024	96.3		<i>Lychas</i> 'SCO024'
418790	39838	<i>Lychas</i> 'SCO039' (1488)	95.6	<i>Lychas</i> SCO039	90.1		<i>Lychas</i> 'SCO039' (1488)
418803	39881	<i>Lychas</i> 'SCO039' (1488)	96.3	<i>Lychas</i> WAM-SCO039	91.0		<i>Lychas</i> 'SCO039' (1488)
418768	39557			<i>Lychas</i> SCO052	93.6		<i>Lychas</i> 'SCO052'
418769	39559			<i>Lychas</i> SCO052	93.8		<i>Lychas</i> 'SCO052'

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
Prepared for Mineral Resources Ltd

GA seq. code	PES code	PES nearest Taxon ID	PES nearest BLAST hit PI	GB nearest Taxon ID	GB nearest BLAST hit PI	Original ID	Final Taxon ID
418787	39600			<i>Indolpium – Biologic PSEU079</i>	88.3		Olpiidae 'Phoenix0197'
418801	39878			<i>Olpiidae WAMT114849</i>	90.5	Olpiidae	Olpiidae 'Phoenix0244'
418785	39593						Opiliones – no idea?, contaminated?
418795	39843					Isopod	poor read
418800	39875			<i>Synsphyronus xynus</i>	99.1		<i>Synsphyronus xynus</i>
418762	39538			<i>Urodacus Biologic-SCOR016</i>	93.8		<i>Urodacus</i> 'megamastigus complex' 1488
418763	39543			<i>Urodacus Biologic-SCOR016</i>	92.4		<i>Urodacus</i> 'megamastigus complex' 1488
418776	39572	<i>Urodacus</i> 'megamastigus complex' 1488	95.7	<i>Urodacus Biologic-SCOR016</i>	93.0		<i>Urodacus</i> 'megamastigus complex' 1488
418805	39885	<i>Urodacus</i> 'megamastigus'	92.7	<i>Urodacus</i> 'megamastigus'	92.2		<i>Urodacus</i> 'megamastigus' complex

Appendix 7 Daily maximum and minimum temperatures for Marble Bar (no. 004106) (BoM 2024) and recorded rainfall for Wodgina Lithium Mine during the surveys

Trip no.	Date (2024)	Daily max. temp (°C)	Daily min. temp (°C)	Rainfall (mm)
1	12 March	39.0	26.9	0.0
	13 March	37.7	26.7	0.0
	14 March	37.9	27.3	0.0
	15 March	39.4	26.3	0.0
	16 March	39.0	26.7	0.0
	17 March	37.9	27.9	0.0
	18 March	36.5	23.1	36.2
	19 March	38.6	26.4	0.4
	20 March	35.9	25.3	1.8
	21 March	37.5	25.1	0.0
	22 March	38.4	26.8	0.0
	23 March	36.3	26.4	0.0
	24 March	32.6	23.1	0.0
	25 March	32.7	22.9	0.0
	26 March	33.8	21.7	0.0
	27 March	35.2	22.2	0.0
2	17 May	33.7	Not available	0.0
	18 May	32.5		0.0
	19 May	30.4		0.0
	20 May	29.5		0.0
	21 May	29.1	13.6	0.0
	22 May	28.3	11.6	0.0
	23 May	29.4	11.3	0.0
	24 May	31.8	13.4	0.0
	25 May	33.0	14.9	0.0
	26 May	32.4	18.9	0.0

Results of acoustic surveys Wodgina Mar – May 2024

Report to:
Phoenix Environmental

Prepared by:
Nick Leseberg
Adaptive NRM
21st August 2024



1. Summary

Between March and May 2024, autonomous recording units (ARUs) were deployed at five sites within the Wodgina Project area, in the Chichester bioregion, to survey for Night Parrots (*Pezoporus occidentalis*). No Night Parrot calls were detected during the analysis.

2. Survey effort

Analysis of historical Night Parrot records suggest it was formerly found throughout arid central Australia, before undergoing a significant decline and range contraction during the late-19th and early-20th centuries (Leseberg *et al.* 2021). The species is now known from a small area in western Queensland, and the central and northern inland of Western Australia. There are several historical reports of Night Parrot from the Chichester bioregion, although none have been verified (Leseberg *et al.* 2021). There are several verified contemporary records from the nearby Fortescue bioregion, including records from 120 km to the south of the survey area. Given the number of historical reports and verified records from the Pilbara region more broadly, it is feasible that if suitable habitat exists, Night Parrots could be resident in the survey area.

Research in western Queensland has demonstrated Night Parrots occupy long-term stable roost sites for periods of up to several years. These long-term stable roost sites support both roosting and breeding. The birds also have predictable year-round calling periods at dusk and dawn (Murphy *et al.* 2017a, Leseberg *et al.* 2019). This ensures that if Night Parrots are roosting at a particular site, the likelihood of detecting them using ARUs is very high, provided the ARU is placed for a minimum of four nights in calm weather, and the recorder is set to record during the peak calling periods. During breeding, and following large rain events, calling is more frequent, extends throughout the night, and the likelihood of detection is increased (Murphy *et al.* 2017a). Preliminary results from research in central Western Australia suggest patterns of behaviour in that region are similar (Jackett *et al.* 2017).

Night Parrots are also known to call during the night at feeding and drinking sites (S. Murphy, N. Leseberg, N. Jackett unpubl. data). Anecdotal evidence suggests they may call when moving between these sites (N. Leseberg, N. Jackett, S. Murphy unpubl. data). However, the detection of birds away from roosting sites is likely to be a chance event given the large area over which birds range at night (Murphy *et al.* 2017b). Night Parrots are known to drink, and modelling

suggests they may be reliant on free-standing water (or succulent food containing >55% water) during hot weather (Kearney *et al.* 2016). Birds have been detected in the Great Sandy Desert by focusing survey effort at water sources (J. Brown pers. comm.). It is likely this technique will be most effective during periods of water scarcity, when survey effort can focus on just a few possible locations.

The likelihood of detection is also influenced by the type of ARU being used. In calm conditions, a Song Meter 4 (Wildlife Acoustics, MA, USA), which was the ARU type used for these surveys, is known to be capable of reliably detecting 95% of Night Parrot calls out to a range of around 205 m (Leseberg *et al.* 2022).

Phoenix Environmental conducted sampling at five sites in the project area and recorded a total of 17 nights of data (Table 1). The minimum recommended period for Night Parrot surveys, from 25 minutes after sunset, until 25 minutes before sunrise was achieved at four of the five sites. The ARU deployed at site WLP022 recorded from 60 minutes before until 60 minutes after sunset, and again from 60 minutes before until 60 minutes after sunrise. As the entire dusk and dawn peak calling period was recorded, it is likely that if there was a long-term stable roost site in the vicinity of this site it would have been detected. However, it is not possible to determine whether Night Parrots were transiting the area or foraging nearby during the night. ARUs at the other four sites recorded for the minimum recommended period, and also for a minimum of four non-windy nights, allowing robust conclusions about the presence of Night Parrots in the immediate vicinity at the time of the surveys.

Table 1. Bioacoustic recordings analysed from the Mar-May 2024 survey.

Site name	ARU ID	Recording start date (PM)	Recording end date (AM)	Total recording nights
WLP012	S4A08295	17-Mar-24	23-Mar-24	6
WLP018	S4A08304	21-Mar-24	26-Mar-24	5
WLP022	S4A08293	22-Mar-24	26-Mar-24	4*
WLP010	S4A23909	19-May-24	25-May-24	6
WLP011	S4A23957	19-May-24	25-May-24	6
Total				166

* This ARU only recorded the peak dusk and dawn calling periods, rather than throughout the night, preventing the detection of transiting or foraging Night Parrots.

3. Data analysis

ANRM received the raw acoustic data in '.wav' format. All files were scanned using the software Kaleidoscope Pro v5.2.1, targeting the frequency range of 1500 – 3500 Hz, within which all known Night Parrot calls are distributed (Leseberg *et al.* 2019). These parameters have been tested on a random selection of 250 Night Parrot call examples manually detected from both Great Sandy Desert and East Murchison datasets, of which 205 (82.0%) were automatically detected. Calls not detected were typically extremely faint. The probability of non-detection of a true-positive call was 18.0%; two true-positive calls was 3.2%; three true-positive calls was 0.6%; etc. Of the data tested, the median number of consecutive (spaced at < 5 minutes apart) calls in a sequence when Night Parrots were recorded was five (1–34, $n = 29$). The probability of at least one call being detected within a sequence of median length, assuming there was variation in the location of the source of the call, was > 99.9%.

The resulting 'detections' were then compared to a reference library comprising several thousand Night Parrot calls from Western Australia and Queensland. This library consists of calls recorded at sites where Night Parrots have been confirmed using visual means and is therefore considered of high reliability. The library also comprises multiple examples of all known call types from Western Australia and Queensland (Leseberg *et al.* 2019).

4. Survey results

A total of 9,389 Kaleidoscope detections were manually assessed for Night Parrot vocalisations. No calls attributable to Night Parrots were detected during the analysis. No other species of conservation significance were detected.

5. Conclusion

It is unlikely long-term stable Night Parrot roosts exist within approximately 200 m of the five sites sampled during this survey, at the time of sampling. Additionally, it is unlikely that Night Parrots were foraging in proximity to the four points for which ARUs recorded throughout the night. It is important to reinforce that these results pertain specifically to that area immediately surrounding these survey points, and only for the period during which the survey was conducted. The results of these surveys do not enable robust conclusions about the presence or absence of Night Parrots in the wider landscape.

6. References

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- Murphy, S. A., J. Silcock, R. K. Murphy, J. R. W. Reid, and J. J. Austin. 2017b. Movements and habitat use of the night parrot *Pezoporus occidentalis* in south-western Queensland. *Austral Ecology* **42**: 858-868.

Appendix 9 Phoenix spring 2023 and autumn 2024 significant fauna records

Species	Status	Site name	Latitude	Longitude
Spring (2023)				
Northern Quoll	EN (EPBC & BC Acts)	WOD017	-21.205	118.6726
Northern Quoll	EN (EPBC & BC Acts)	WOD021	-21.203	118.655
Greater Bilby	VU (EPBC & BC Acts)	BP006	-21.0439	118.6507
Greater Bilby	VU (EPBC & BC Acts)	WOD040	-21.1229	118.7761
Western Pebble-mound Mouse	P4 (DBCA list)	Opp012	-21.1396	118.6742
Western Pebble-mound Mouse	P4 (DBCA list)	Opp013	-21.1528	118.6841
Western Pebble-mound Mouse	P4 (DBCA list)	Opp014	-21.1411	118.6748
Western Pebble-mound Mouse	P4 (DBCA list)	WOD003	-21.1344	118.6972
Western Pebble-mound Mouse	P4 (DBCA list)	WOD003	-21.1344	118.6972
Western Pebble-mound Mouse	P4 (DBCA list)	WOD027	-21.1676	118.682
Western Pebble-mound Mouse	P4 (DBCA list)	WOD044	-21.0776	118.6126
Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	WOD006	-21.1143	118.8054
Autumn (2024) (current survey)				
Rufous Grasswren	(P4 DBCA list)	Opp21	-21.1694	118.9387
Northern Quoll	EN (EPBC & BC Acts)	WLP003	-21.1492	118.7087
Northern Quoll	EN (EPBC & BC Acts)	WLP003	-21.1483	118.7095
Northern Quoll	EN (EPBC & BC Acts)	WLP003	-21.1481	118.7099
Northern Quoll	EN (EPBC & BC Acts)	WLP015	-21.1388	118.6629
Northern Quoll	EN (EPBC & BC Acts)	WLP015	-21.1389	118.6624
Northern Quoll	EN (EPBC & BC Acts)	WLP015	-21.1391	118.6624
Northern Quoll	EN (EPBC & BC Acts)	WLP015	-21.1391	118.6624
Northern Quoll	EN (EPBC & BC Acts)	WLP019	-21.1169	118.661
Northern Quoll	EN (EPBC & BC Acts)	WLP019	-21.1157	118.6597
Northern Quoll	EN (EPBC & BC Acts)	WLP027	-21.1825	118.647
Northern Quoll	EN (EPBC & BC Acts)	WLP030	-21.1617	118.9425
Northern Quoll	EN (EPBC & BC Acts)	WLP030	-21.1709	118.9423
Northern Quoll	EN (EPBC & BC Acts)	WLP030	-21.173	118.9428
Northern Quoll	EN (EPBC & BC Acts)	WLP030	-21.1609	118.9433
Northern Quoll	EN (EPBC & BC Acts)	WLP030	-21.162	118.9403
Northern Quoll	EN (EPBC & BC Acts)	WLP031	-21.1746	118.9416
Northern Quoll	EN (EPBC & BC Acts)	WLP041	-21.2064	118.6674
Ghost Bat	VU (EPBC & BC Acts)	WLP048	-21.1195	118.6609
Greater Bilby	VU (EPBC & BC Acts)	WLP005	-21.1231	118.7761
Greater Bilby	VU (EPBC & BC Acts)	WLP005	-21.1231	118.7761
Western Pebble-mound Mouse	P4 (DBCA list)	Opp13	-21.184	118.9326
Western Pebble-mound Mouse	P4 (DBCA list)	Opp15	-21.184	118.9236
Western Pebble-mound Mouse	P4 (DBCA list)	Opp17	-21.1858	118.9212
Western Pebble-mound Mouse	P4 (DBCA list)	WLP006	-21.1343	118.6964
Western Pebble-mound Mouse	P4 (DBCA list)	WLP006	-21.1353	118.6965
Western Pebble-mound Mouse	P4 (DBCA list)	WLP009	-21.2116	118.6684
Western Pebble-mound Mouse	P4 (DBCA list)	WLP009	-21.209	118.6678

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
Prepared for Mineral Resources Ltd

Species	Status	Site name	Latitude	Longitude
Western Pebble-mound Mouse	P4 (DBCA list)	WLP011	-21.1786	118.9316
Western Pebble-mound Mouse	P4 (DBCA list)	WLP011	-21.1811	118.9308
Western Pebble-mound Mouse	P4 (DBCA list)	WLP011	-21.1797	118.9289
Western Pebble-mound Mouse	P4 (DBCA list)	WLP055	-21.1547	118.9352
Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	WLP005	-21.123	118.7766
Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	WLP006	-21.1336	118.6975
Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	WLP008	-21.1019	118.8879
Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	WLP011	-21.1792	118.9297
Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	WLP023	-21.1177	118.7156
Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	WLP025	-21.1105	118.8991
Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	WLP029	-21.1578	118.9431
Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	WLP032	-21.1862	118.9357

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
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Appendix 10 Phoenix (2023) spring survey effort

Site/s	Site type	Habitat assessment (#)	Diurnal vertebrate searches (hours)	Nocturnal vertebrate searches (hours)	Birding (hours)	Bucket (trap nights)	Pipe (trap nights)	Funnel (trap nights)	Aluminium box (trap nights)	Camera (trap nights)	Ultrasonic recording (nights)	Audio recording (nights)	Bilby plot (#)	SRE foraging (hours)	Litter sieves (#)	Wet pitfall (trap nights)
WOD001	FS	1	0.7	2	0.7	35	35	140	70				1	0.7	3	
WOD002	FS	1	1.3	2	0.7	35	35	140						1.3		
WOD003	FS	1	0.7	2	0.7	35	35	140	70	3				0.7	3	260
WOD004	FS	1	0.7	3	0.7	35	35	140	70	4	4		1	0.7		260
WOD005	FS	1	0.7	4	1	35	35	140	70	6	3/6	6		0.7	3	260
WOD006	FS	1	1.3	3	2	35	35	140	70	7	7		1	1.3	3	260
WOD007	FS	1	0.7		0.7					4	4			0.7	3	265
WOD008	FS	1	0.7		0.3									0.7	3	265
WOD009	FS	1	1.3		0.7											
WOD010	FS	1	0.7		0.3											
WOD011	FS	1														
WOD012	FS	1	1.3		0.7											
WOD013	FS	1														270
WOD014	FS	1	1.3		0.7					4				1.3		265
WOD015	TFS	1									4					
WOD016	TFS	1								4						
WOD017	TFS	1								4						
WOD018	TFS	1								4						
WOD019	TFS	1								4						
WOD020	TFS	1								4						
WOD021	TFS	1								4						
WOD022	TFS	1								5						
WOD023	TFS	1								5						
WOD024	TFS	1								4						

Detailed terrestrial fauna survey for the Wodgina Lithium Project - mine area, airstrip, Breccia borefield and infrastructure corridor
Prepared for Mineral Resources Ltd

Site/s	Site type	Habitat assessment (#)	Diurnal vertebrate searches (hours)	Nocturnal vertebrate searches (hours)	Birding (hours)	Bucket (trap nights)	Pipe (trap nights)	Funnel (trap nights)	Aluminium box (trap nights)	Camera (trap nights)	Ultrasonic recording (nights)	Audio recording (nights)	Bilby plot (#)	SRE foraging (hours)	Litter sieves (#)	Wet pitfall (trap nights)
WOD025	TFS	1								5						
WOD026	TFS	1								4						
WOD027- WOD055	FS	29														
BP001 – BP012	TFS	12											12			
Opp001	IS															
Opp002	IS															
Opp003	IS															
Opp004	IS															
Opp005	FS															
Opp006	FS															
Opp007	FS															
Opp008	FS			2												
Opp009	FS	1	1													
Opp010	IS															
Opp011	IS															
Opp012	IS															
Opp013	IS															
Opp014	IS															
Total		68	12.4	18	9.2	210	210	840	350	75	28	6	15	8.1	18	2,105

Systematic sites are highlighted in grey.

FS = Fauna site; TFS = Targeted fauna site; IS = Individual specimen.

