

A photograph of a rocky hillside with sparse vegetation and trees under a clear blue sky. The foreground is dominated by reddish-brown rocks and low-lying green shrubs. The middle ground shows a slope covered in similar vegetation, leading up to a line of taller, more developed trees. The sky is a clear, bright blue.

MT WELD RARE EARTH PROJECT LEVEL 2 AND TARGETED TERRESTRIAL FAUNA SURVEY

PREPARED FOR **MT WELD MINING PTY LIMITED**

[March 2023]

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Executive Summary

Mt Weld Mining Pty Limited (Mt Weld) commissioned Stantec Australia Pty Ltd (Stantec) to undertake a two-phase Level 2 and Targeted terrestrial fauna survey (the Survey) of the Mt Weld Rare Earths Project (the Survey Area)

The intent of the Survey is to inform proposed applications to the Environmental Protection Authority (EPA) to modify approval limits on disturbance areas and development envelopes prescribed in Ministerial Statement 476 as relevant to the Mt Weld Rare Earths Project. Stantec understands that Mt Weld will be seeking the modifications in two stages: firstly, via an application under the Section 45C of the *Environmental Protection Act, 1986* for an additional 49 ha followed by a separate referral to the EPA under Section 38 of the EP Act for proposed developments including an additional disturbance of 406.97 ha to accommodate Life of Mine activities.

The objective of the Survey was to understand the vertebrate and short-range endemic (SRE) invertebrate values of the Survey Area to support environmental approvals for planned expansion of the Project. The objective was addressed by undertaking a desktop assessment and Level 2 and Targeted terrestrial fauna survey conducted in autumn and spring of 2020, across the Survey Area (3,255 hectares). This follows four Level 1 surveys which have been conducted within sections of the Survey Area since 2011. The resultant significant species data from each survey has been collated and presented within this report.

The desktop assessment comprised nine database searches and the review of 11 previous surveys that were undertaken within or in the vicinity of the Survey Area. Only one of these surveys was a Level 2 survey, which was comparable in scope and size to this Survey.

Survey methods consisted of four systematic sites with 2,912 trap nights utilising pitfall, small Elliott, funnel and cage trapping, as well as avifauna census, motion-sensor camera, echolocation recorder, systematic searching and spotlighting methods. Non-systematic methods comprised targeted searching, motion-sensor camera deployment, opportunistic recording, acoustic bird call recording and bat echolocation recording.

The inventory of 95 species of vertebrate fauna recorded during this Survey represents 34.8% of the total number of species identified from the database searches and fauna surveys undertaken in the vicinity of the Project (n = 273). Species recorded during the Survey comprised of 18 native mammals, five non-native mammals, 52 birds and 20 reptiles (nil amphibians). Eleven species recorded during the Survey were not identified during the desktop assessment; the Ooldea Dunnart, Western Grey Kangaroo, White-striped Free-tailed Bat, South-western Free-tailed Bat, Inland Free-tailed Bat, Western Whistler, Whiskered Tern, Mulga Dragon, Dark-spined Blind Snake, Banded Knob-tailed Gecko and the Perentie, none of which were fauna of significance.

Seven broad fauna habitat types were identified within the Survey Area and the land systems in which these habitats occur were considered typical of the East Murchison subregion. Within the Survey Area, the stony rise and outcropping habitats were the most important fauna habitats at a local scale. These habitats were of limited extent within the Survey Area and are important to the Long-tailed Dunnart (P4). These habitats also supported microhabitats including rocky crevices and cracks, important for SRE taxa.

The desktop assessment identified 25 significant fauna species with the potential to occur within the Survey Area comprising six mammals, 18 birds and one reptile. Three of these species were confirmed as occurring during the Survey, comprising:

Long-tailed Dunnart (P4);

Wood Sandpiper (Mi; IA); and

Common Sandpiper (Mi; IA).

Based on the desktop assessment and habitats identified within the Survey Area, an additional 11 species were assessed as possible and eight were assessed as unlikely to occur. The Long-tailed Dunnart was recorded on four occasions during the Survey within the stony rise habitat, its preferred habitat. The species has been recorded during previous surveys on 12 occasions in the vicinity of the Survey Area. The Long-tailed Dunnart was recorded at 25 locations (212 records) on stony rises to the north of the Survey Area from regional deployments of motion-sensor cameras, confirming that the species is present on other stony rises in the region.

Of the species recorded or likely to occur, the Wood Sandpiper and Common Sandpiper are listed as migratory under the EPBC Act and are therefore considered a Matter of National Environmental

Significance (MNES). The Survey Area was determined not to contain any important habitat nor support an ecologically significant proportion of the population of the Wood Sandpiper and Common Sandpiper, due to limited aquatic habitat.

The fauna assemblages within the Survey Area were sampled at systematic trapping sites. Species accumulation curves indicated that between 70% to 100% of the fauna assemblages was captured during the Survey, however further survey effort is likely to result in more avifauna species being recorded. Additional mammal, avifauna and herpetofauna species were recorded from the Survey Area via targeted and opportunistic survey methods that were not captured in the species accumulation curves. The species assemblages recorded during the Survey, recorded a higher number of species than previous surveys undertaken in the vicinity of the Survey Area.

Habitats in the Survey Area were assessed for the potential to support SRE species based on the presence of microhabitats, habitat extent and isolation. Based on these criteria, one habitat; outcropping was assessed as having a high potential to support SRE species. In addition, the shrub plain and stony rise habitat were assessed as having a medium potential to support SRE species.

A total of 20 specimens from groups prone to short-range endemism were collected during the Survey. Of these, six were identified to morphospecies and four taxa were only able to be identified to genus. Although none were known SRE species, the following were considered to represent potential SRE species and were classified as data deficient.

- the mygalomorph spider specimens from the genus *Idiosoma* sp.;
- the mygalomorph spider specimens from the genus *Idiopidae* sp.;
- the mygalomorph spider specimen from the genus *Proshermacha* sp.;
- the slater specimen from the morphospecies *Buddelundia* '103';
- the slater specimen from the morphospecies *Buddelundia* '106'; and
- the pseudoscorpion specimen from the morphospecies *Synsphyronus* 'weld'.

Furthermore, six specimens were collected from the Survey Area in 2014, which were unable to be identified to genus. These comprised two mygalomorph taxa (*Aname* sp. indet., *Aganippe* sp. indet) and one scorpion taxa (*Urodacus* sp. indet). The slater specimens were collected from within the shrub plain habitat which was assessed as having a medium potential to support SRE taxa. The remaining potential SRE specimens were collected from within the widespread mulga on clay loam habitat, which held a low potential to support SRE taxa. To understand their lineage and distribution within the Survey Area and in the broader regional context, more specimens would need to be collected and genetic analysis would be required in some instances.

In summary, the species assemblages recorded during the Survey, represented a higher number of species than previous surveys undertaken in the vicinity of the Survey Area. Three significant terrestrial vertebrate fauna species were recorded during the Survey, the Long-tailed Dunnart, Wood Sandpiper, and Common Sandpiper, and no others were considered 'likely' to occur. The Long-tailed Dunnart was recorded on four occasions during the Survey, and from previous surveys in the vicinity of the Survey Area, the species was regularly recorded within the stony rise and adjacent outcropping habitat. Motion-sensor cameras recorded the Long-tailed Dunnart at 25 locations on stony rises to the north of the Survey Area, suggesting the species persists on other stony rises within the region. The outcropping habitat also supported important microhabitat features for potential SRE species. The Wood Sandpiper and Common Sandpiper were recorded within artificial water sources on cleared habitat within the Survey Area. The other habitats had limited importance to significant fauna and fauna assemblages.

Mt Weld Mining Pty Limited

Mt Weld Rare Earth Project Level 2 and Targeted Terrestrial Fauna Survey

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- Appendix A Text codes and terms used to describe significant fauna
- Appendix B Database search results
- Appendix C Vertebrate fauna identified from the desktop assessment
- Appendix D Fauna habitat assessments
- Appendix E Vertebrate fauna recorded per systematic site

1. Introduction

1.1 Project Background and Location

Mt Weld Mining Pty Ltd (Mt Weld) has approval to mine, process, and transport rare earth ore from their deposit at the Mt Weld mine site (the Project). Mt Weld commissioned Stantec Australia Pty Ltd (Stantec) to undertake a two-phase Level 2 and Targeted Terrestrial fauna survey (the Survey) within tenements associated with, and adjacent to the Project (the Survey Area). The Survey Area represents two separate areas of land, collectively covering 3,255 ha located approximately 31 km south-east of Laverton, in the Murchison bioregion of Western Australia (**Figure 1-1**).

The intent of the surveys is to inform proposed applications to the Environmental Protection Authority (EPA) to modify approved limits on disturbance areas and development envelopes prescribed in Ministerial Statement 476 as relevant to the Mt Weld Rare Earths Project. Stantec understands that Mt Weld will be seeking the modifications in two stages: firstly, via an application under Section 45C of the *Environmental Protection Act, 1986* for an additional 49 ha of disturbance (now approved by EPA) followed by a separate referral to the EPA for clearing an additional 406.97 ha will be submitted to accommodate Life of Mine disturbance.

Several fauna surveys have previously been undertaken in the vicinity of the Survey Area comprising Halpern Glick Maunsell (1999), MWH (2014), Ninnox Wildlife Consulting (1992), Outback Ecology (2011), Outback Ecology (2013), Stantec (2018b), and Stantec (2018a). However, additional survey work was required to inform environmental approvals for proposed expansion of the Project. The resultant data from each of these surveys and the Stantec (2020) survey have been collated and used to produce this report.

1.2 Report Scope and Objectives

The objective of the Survey was to understand the vertebrate and short-range endemic (SRE) invertebrate values of the Survey Area, through a desktop assessment and by conducting a dual season field survey, to inform environmental approvals for the Project. This report presents the results of a two-phase field survey and the consolidation of all applicable previous terrestrial fauna and short-range endemic (SRE) fauna surveys for the Project. The scope requirements to meet the objective included the following:

- complete a comprehensive desktop assessment of the Survey Area;
- conduct a dual phase level 2 terrestrial fauna survey to assess the occurrence and likely distribution of fauna assemblages within the Survey Area;
- conduct targeted searches for vertebrate fauna of significance (specifically the Long-tailed Dunnart) and SRE invertebrate fauna in prospective habitats to ascertain their occurrence and distribution;
- identify, describe and map fauna habitats within the Survey Area;
- assess the Survey findings in a local and regional context providing comparison with available data within the bioregion; and
- consolidate previous spatial data and mapping into a single mapping layer that can be used to inform the environmental impact assessment (EIA) for the terrestrial fauna environmental factor.

The objectives and methods adopted for the surveys are aligned with the following relevant regulatory guidelines:

- (EPA 2020b), Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment;
- (EPA 2020a), EPA Statement of Environmental Principles, Factors and Objectives.
- (EPA 2016a), Environmental Factor Guideline: Terrestrial Fauna;
- (EPA 2016b), Technical Guidance Sampling of short range endemic invertebrate fauna;
- (EPA 2016c), Technical Guidance: Sampling methods for Terrestrial vertebrate fauna;
- (EPA 2016d), Technical Guidance: Terrestrial Fauna Surveys;
- Department of the Environment (DoE 2013), Matters of National Environmental Significance – significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act*).
- Survey Guidelines for Australia's Threatened Mammals (DSEWPaC 2011b);
- Survey Guidelines for Australia's Threatened Birds (DEWHA 2010a);
- Survey Guidelines for Australia's Threatened Bats (DEWHA 2010b);
- Survey Guidelines for Australia's Threatened Reptiles (DSEWPaC 2011a); and

- Interim Guideline for Preliminary Surveys of Night Parrot (*Pezoporus occidentalis*) in Western Australia (DPaW 2017).

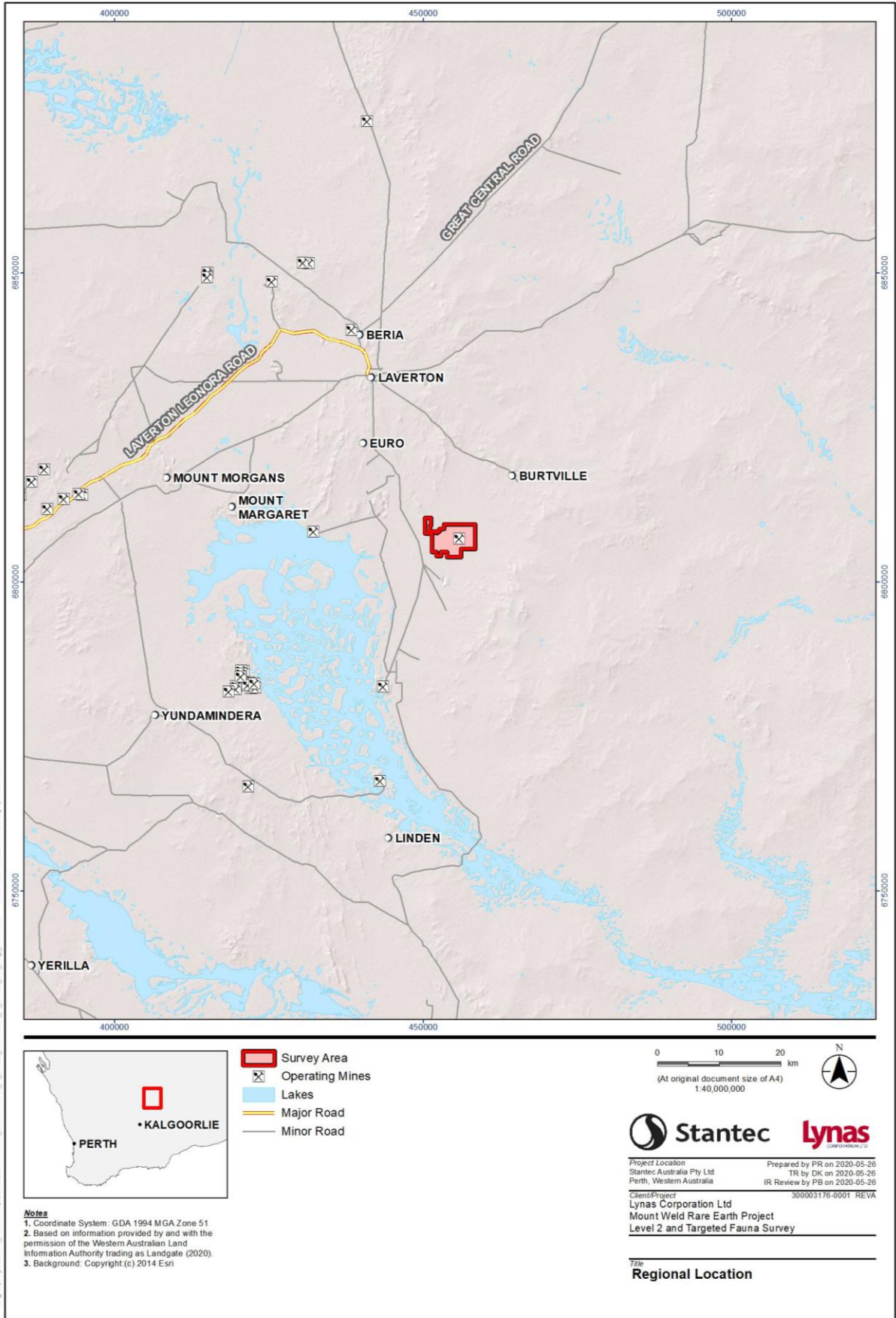


Figure 1-1: Regional location of the Survey Area in the Murchison bioregion of Western Australia

2. Background Information

2.1 Biophysical Environment

2.1.1 Biogeographical location

The Interim Biogeographic Regionalisation for Australia (IBRA) is a bioregional framework that divides Australia into 89 biogeographic regions and 419 subregions on the basis of climate, geology, landforms, vegetation, and fauna (Thackway and Cresswell 1995). It was developed through collaboration between state and territory conservation agencies with coordination by the Commonwealth Department of the Environment, Water, Heritage and the Arts (now the Commonwealth Department of Agriculture, Water and the Environment).

The Survey Area is located in the Murchison bioregion in Western Australia, which covers an area of 281,200 km², with mining and grazing listed as the two main land uses (Australian Natural Resources Atlas 2010, DoE 2008). The Murchison bioregion encompasses the transitional zone between the eucalypt dominated environment of south-west Australia and the mulga/spinifex dominated areas of central Australia (Morton *et al.* 1995).

The vegetation in the bioregion is closely associated with geology, soils and climate. Areas of outcropping rock with skeletal soils support low mulga woodlands. Hummock grassland grows predominantly on calcareous soils and samphire (*Tecticornia* sp.) low shrubland mostly on the saline alluvium areas. In the east of the bioregion, the red sandplains support mallee-mulga parkland over hummock grassland (Thackway and Cresswell 1995).

The Survey Area occurs within the Eastern Murchison subregion (MUR1), which consists of extensive areas of elevated red/red-brown desert sandplains with minimal dune development, breakaway complexes and internal drainage and salt lake systems associated with occluded palaeodrainage systems (Cowan *et al.* 2001). Mulga woodlands rich in ephemeral species dominate the subregion, as well as hummock grasslands, saltbushes and *Tecticornia* shrublands.

2.1.2 Land systems

Land systems are defined as an area or group of areas throughout which there is a recurring pattern of topography, soils and vegetation (Tille 2006). An assessment of land systems provides an indication of the occurrence and distribution of fauna habitats and vegetation within and surrounding the Survey Area.

Land systems across the Murchison bioregion have been mapped by the Natural Resources Assessment Group of the Department of Primary Industries and Regional Development (Pringle *et al.* 1994). This mapping provides a comprehensive description of biophysical resources in the area.

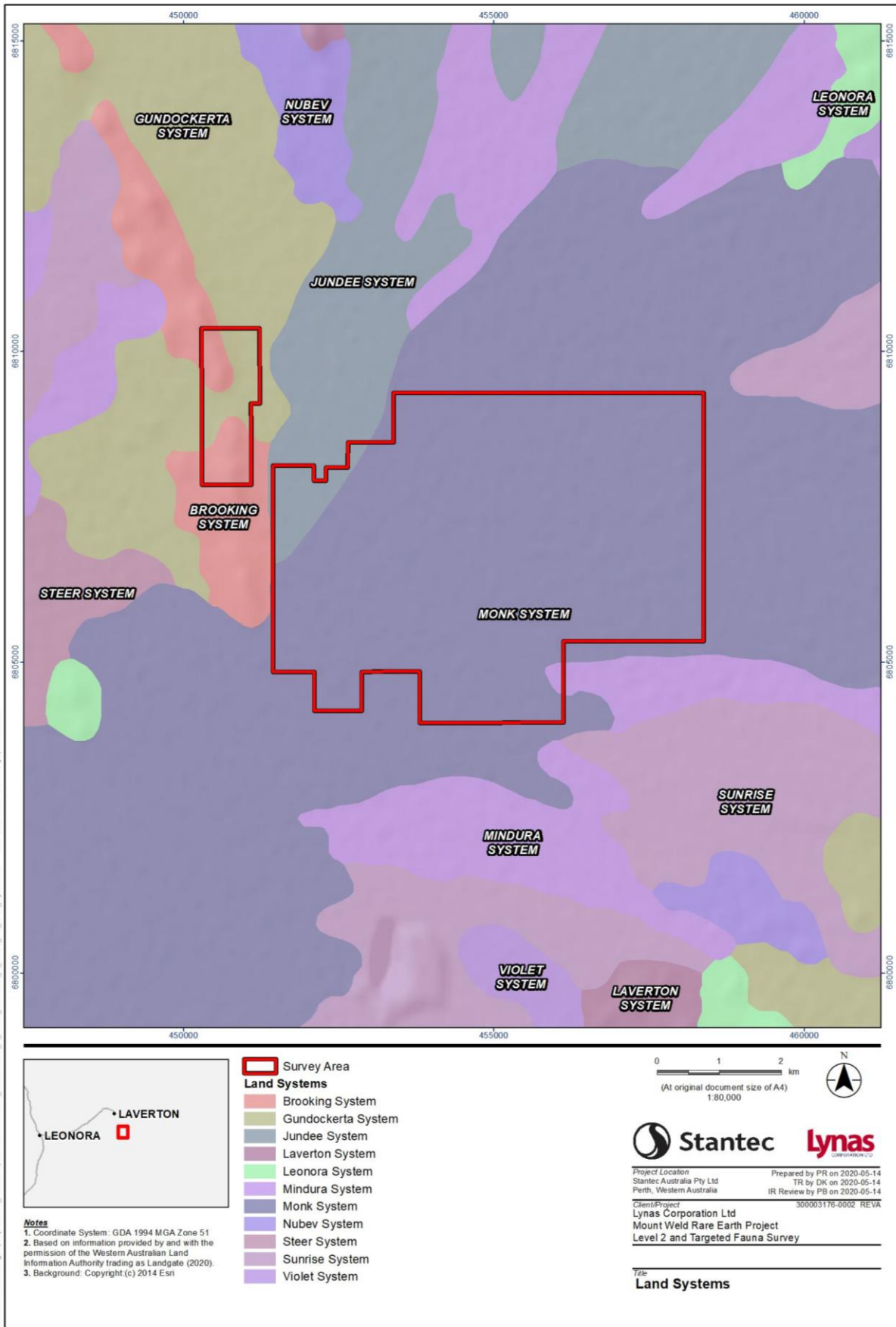
The Survey Area intersects five land systems (**Table 2-1; Figure 2-1**). The Monk and Jundee land systems occupy most of the Survey Area (93%), defined by hardpan plains with gravelly or sandy substrate supporting mulga shrublands. Less than 1% of the Survey Area comprises the Mindura system.

Table 2-1: Description of land systems associated with the Survey Area

Land system	Description	Extent in the bioregion		Extent in the Survey Area	
		ha	%	ha	%
Monk	Hardpan plains with occasional sandy banks supporting mulga tall shrublands and wanderrrie grasses	994,703	3.5	2,904	89.2
Jundee	Hardpan plains with variable gravelly mantles and minor sandy banks supporting weakly groved mulga shrublands	588,270	2.1	123	3.8
Brooking	Prominent ridges of banded iron formations supporting mulga shrublands and occasional minor halophytic communities	96,066	0.3	113	3.5
Gundockerta	Extensive, gently undulating calcareous stony plains supporting bluebush shrublands.	329,501	1.2	104	3.2

Land system	Description	Extent in the bioregion		Extent in the Survey Area	
		ha	%	ha	%
Mindura	Low hills, ridges and outcrops of granite, gneiss and quartz above convex, quartz-strewn interfluves and lower plains supporting sparse acacia shrublands becoming more dense in drainage floors.	380,981	1.4	11	0.3
Total*		2,389,521	8.5	3,255	100

*Note: Some totals may not equal the sum of their parts due to rounding.



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Figure 2-1: Land systems of the Survey Area

2.2 Physical Environment

2.2.1 Climate

The Survey Area is characterised by an arid to semi-arid climate. The closest Bureau of Meteorology (BOM) weather station to the Survey Area, with relevant long-term and recent climatic data is Laverton Weather Station (No. 012045), located approximately 30 km northwest of the Survey Area.

The mean annual rainfall at Laverton is 211 mm, with February usually the wettest month of the year due to rainfall related to ex-tropical cyclone activity off the north-west of Western Australia. Mean monthly temperatures typically peak at approximately 35°C in January (**Figure 2-2**), with mean minimum monthly temperature close to 5°C in July (BoM 2020).

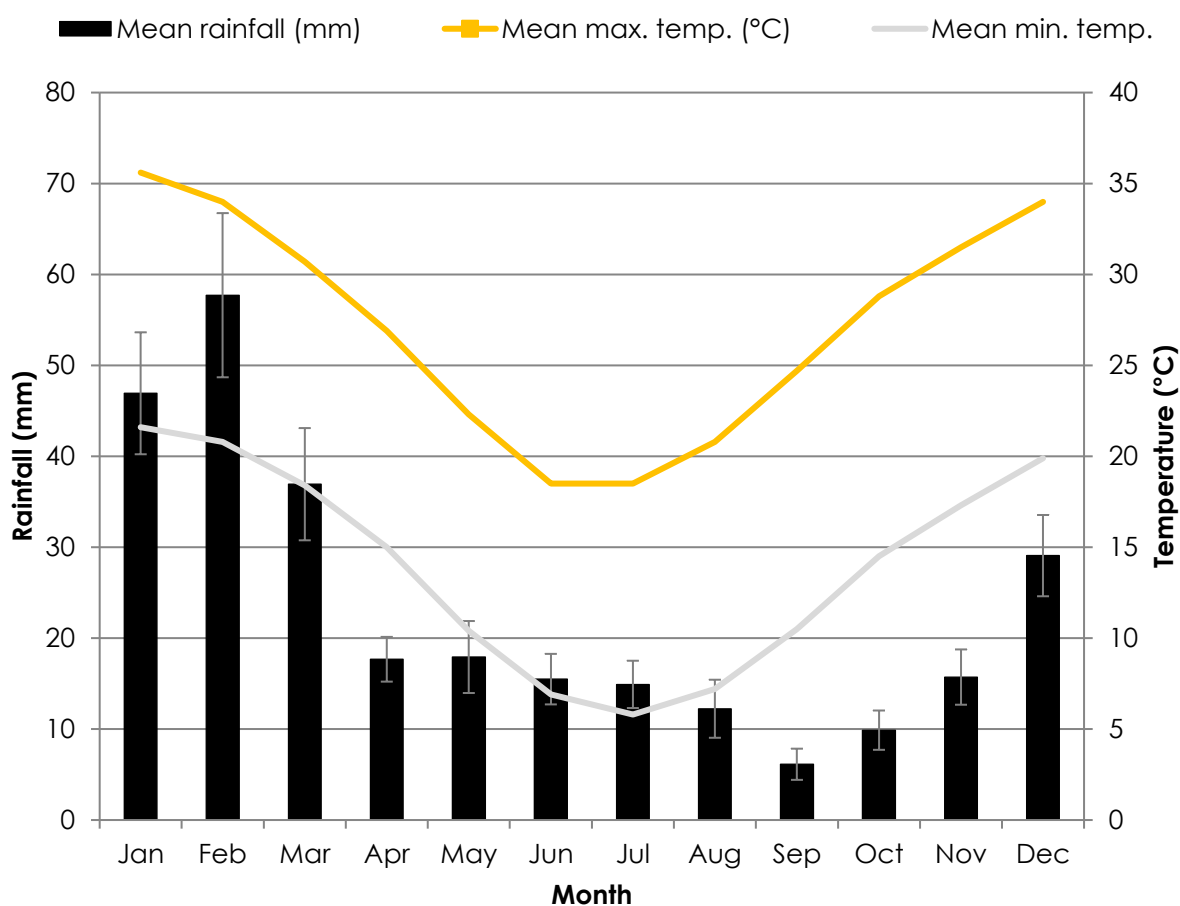


Figure 2-2: Long-term (1899-2020) climate data records from the Laverton weather station (No. 012045) (BoM 2020)

2.2.2 Surface geology and soils

The surface geology of the Survey Area is comprised of two geological units (**Table 2-2; Figure 2-3**). These units were mapped at a scale of 1:1,000,000 by Geoscience Australia (2012). A cemented layer of red-brown hardpan has formed across many wash plains; however, sandy and loamy wash plains are also present (DotE 2008). The soils of the MUR1 subregion consist of red sandy earths to red loams, red-brown hardpan and calcareous loamy earths in low lying areas, with stony soils found near mesas and breakaway complexes (DotE 2008).

Table 2-2: Geological units occurring within the Survey Area

Name	Geological description	Extent within survey area	
		ha	%
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	3102	95.3
Sedimentary rocks 74322 (Ase)	Phyllitic schist, siltstone, sandstone, greywacke, pelite, conglomerate, quartzite, phyllite, shale, slate, claystone, chert, minor felsic volcanic and volcanoclastic rocks; arkose, para- and orthoamphibolites; rare banded iron formation	153	4.7
Total		3,255	100

2.2.3 Surface hydrology and drainage

Broad sheet-flow drainage lines are a feature of the mulga-dominated woodlands of the Survey Area. The landscape exhibits some small low-lying depressions in the northwest, representing the upper reaches of drainage to Lake Carey, approximately 12 km southwest of the Survey Area.

There is no indication of natural permanent surface water within the Survey Area. The Survey Area has altered hydrology in the form of a flood bund in the eastern portion of the Survey Area. This flood bund redirects water flowing from the north, to the south of the mine area.

No Wetlands of International Importance (Ramsar wetlands) or Nationally Important Wetlands occur within the Survey Area. The nearest significant wetland system is Lake Marmion, situated approximately 130 km southeast of the Survey Area (DotE 2019).

2.2.4 Land tenure and use

The dominant land use (85%) within the East Murchison subregion is grazing of sheep and cattle on native pastures (Australian Natural Resources Atlas 2010, Cowan *et al.* 2001). Other land uses include Unallocated Crown Land (UCL), Crown reserves, and mining. Mining in the subregion largely consists of gold and nickel; however most mining lease areas, including the Survey Area, are still required to be stocked, according to the pastoral lands act (Cowan *et al.* 2001).

2.2.5 Conservation Reserves and Environmentally Sensitive Areas

There are three conservation reserves within 250 km of the Survey Area (**Figure 2-4**). The De La Poer Nature Reserve is approximately 170 km to the north; Goongarrie National Park is 145 km southwest and Wanjarri Nature Reserve is approximately 240 km west-northwest. In addition to Lake Marmion (**Section 2.2.3**), Lake Ballard is 140 km southeast of the Survey Area and is listed as a Proposed Ramsar addition. Several other nature reserves, timber reserves and important wetlands occur within 250 km of the Survey Area (**Figure 2-4**).

The De La Poer Range Nature Reserve (74,935 ha) was gazetted in 1974 (Barton and Cowan 2001) and Goongarrie National Park (60,397 ha) in 1995 and this spans both semi-arid and arid climate zones, characterised by a range of woodlands and mulga shrubland. The Wanjarri Nature Reserve (53,000 ha) is mostly of extensive undulating sandplains featuring sand dunes, with breakaways and low granite hills also common, dominated by spinifex grasslands and a range of habitats supporting threatened wildlife.

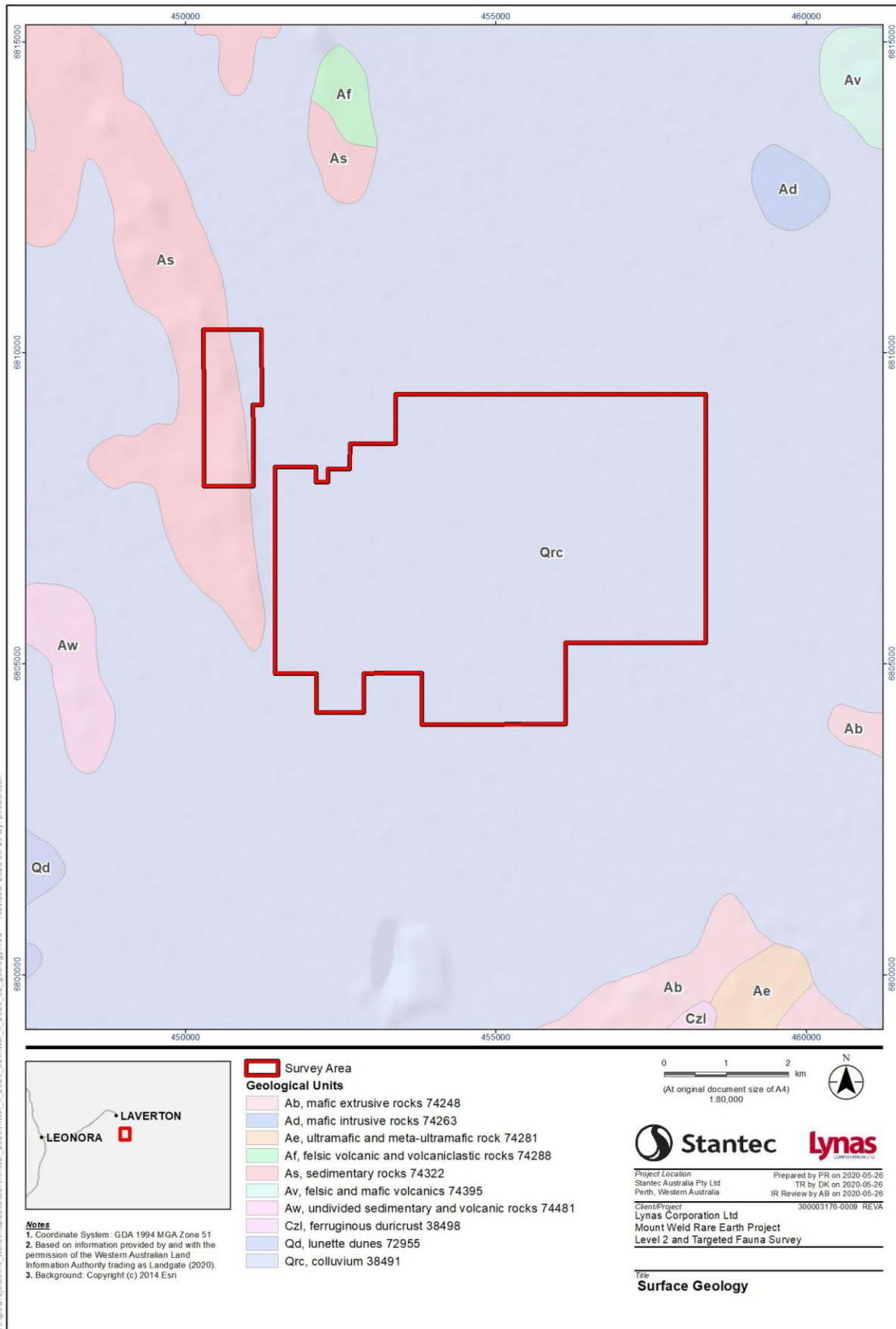


Figure 2-3: Surface geology of the Survey Area

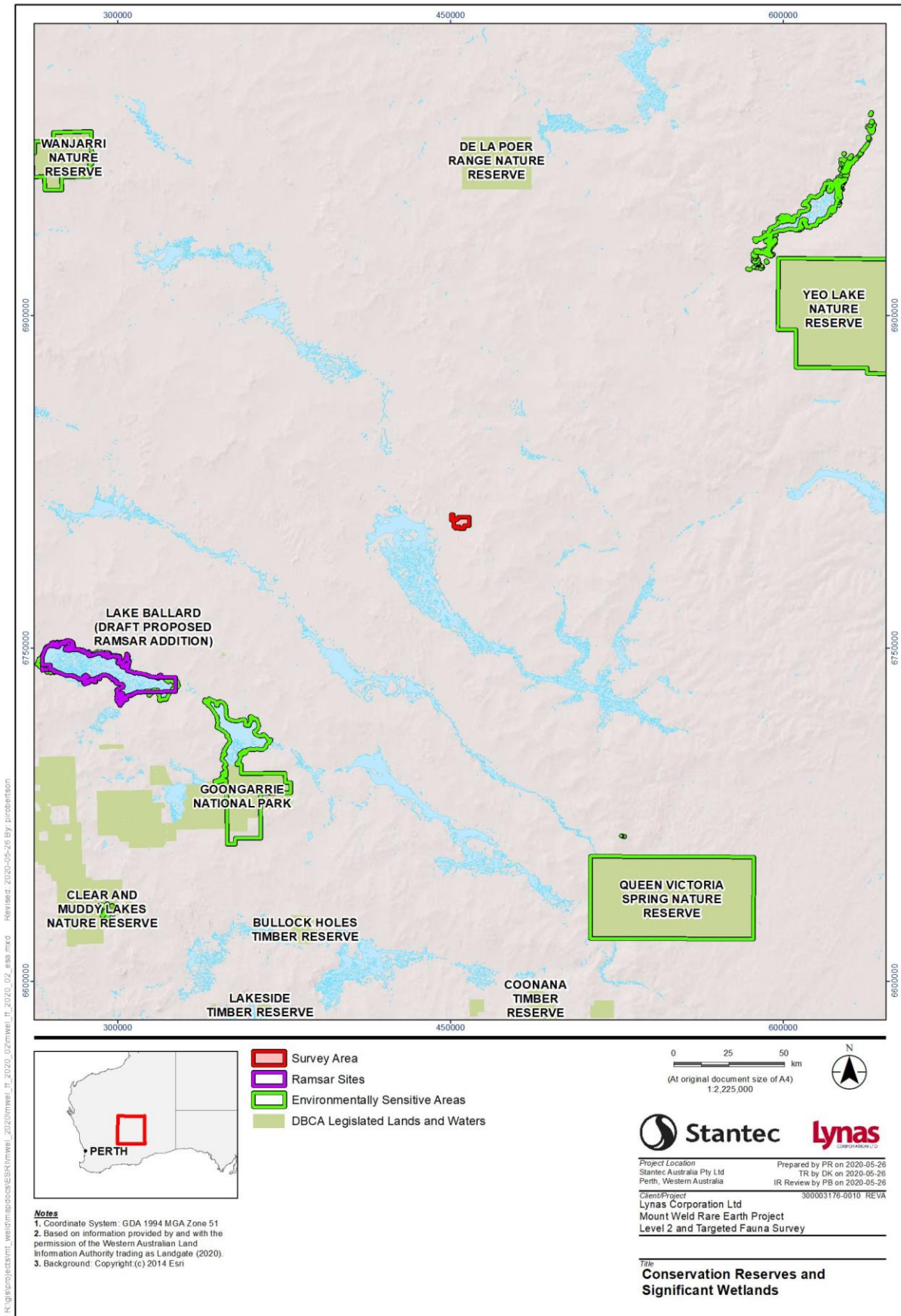


Figure 2-4: Conservation Reserves and Significant Wetlands within 250 km of the Survey Area

3. Desktop Assessment

A desktop assessment, comprising database searches and a literature review, was undertaken to gather contextual information on the Survey Area. The purpose of the desktop assessment was to identify terrestrial fauna potentially occurring within, and in the vicinity of the Survey Area, particularly species of significance.

Conservation significance and rankings used under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), *Biodiversity Conservation Act 2016* (BC Act), as well as the Departments of Biodiversity, Conservation and Attractions (DBCAs) Priority list, are defined in **Appendix A**. The desktop assessment was conducted prior to the release of EPA (2020b) and followed the guidance of EPA (2016d) and EPA (2016c).

3.1 Methods

3.1.1 Database searches

Database searches were completed prior to undertaking Phase 1 of the Survey to generate a list of vertebrate and SRE fauna previously recorded within, and in vicinity of the Survey Area, with an emphasis on species of significance. Nine database searches were conducted according to a central coordinate within the Survey Area (51J 460747 mE, 6815858 mS) (**Table 3-1**). Appropriate search buffers were selected depending on the technical capabilities (maximum buffer, accuracy of data) of the databases and the ecological features of the area. Database search results are presented in **Appendix B**.

Table 3-1: Database searches conducted for the desktop assessment

Custodian	Database name	Method of search	Buffer (km)	Date of receipt
Department of Biodiversity, Conservation and Attractions (DBCAs) (2020c)	NatureMap	Central coordinates (51J) • 460748 mE, 6815857 mS	40	11/03/2020
Department of Agriculture, Water and the Environment (DoAWE) (2020b)	Protected Matters Search Tool (PMST)		50	11/03/2020
DBCAs (2020b)	Threatened and Priority Fauna		50	18/03/2020
DBCAs (2020a)	Threatened Ecological Community (TEC) and Priority Ecological Communities (PEC)		50	26/03/2020
Birdlife Australia (2020)	Birdlife Bird Data		50	18/03/2020
Western Australian Museum (WAM) (2020c)	Arachnid and Myriapod Database	Coordinates (51J) • NW corner: 351705 mE, 6901345 mS	100	14/04/2020
WAM (2020d)	Mollusc Database	• SE corner: 553774 mE, 6706115 mS		15/04/2020
Department of Agriculture, Water and the Environment (DoAWE) (2020b)	Index of Biodiversity Surveys for Assessment (IBSA)	Central coordinates (51J) 460748 mE, 6815857 mS	50	15/04/2020
Atlas of Living Australia (ALA) (ALA 2023)	Atlas of Living Australia (ALA)	Central coordinates (51J) 460748 mE, 6815857 mS	50	21/02/2023

3.1.2 Literature review

Background information relating to the Survey Area and surrounds was compiled prior to conducting the field work for the Survey. Historic vegetation mapping (Beard 1975, Shepherd *et al.* 2002), soil and landform mapping and characteristics (Tille 2006), land system mapping and characteristics (Pringle *et al.* 1994), and IBRA classification and system information (Cowan *et al.* 2001) were reviewed to provide broad contextual information.

The literature review considered eight terrestrial fauna surveys previously conducted since 1992, which overlap the Survey Area, summarised in **Table 3-2** and shown in **Figure 3-1**. To assist in providing regional comparison to the results of the Survey, three terrestrial fauna surveys within approximately 60 km were also reviewed (**Table 3-3**).

Table 3-2: Summary of the relevant fauna surveys completed in the vicinity of the Survey Area

Reference	Survey details	Proximity to Survey Area	Survey timing and staff	Survey effort	Fauna habitats	Fauna assemblages recorded	Species of conservation significance (species names and conservation status current at time of survey)	Limitations
Long-tailed Dunnart Monitoring in L38/224: Accommodation Camp Summary (Lynas 2020)	Targeted deployment of motion cameras within potential Long-tailed Dunnart habitat, informed by desktop assessment (Stantec 2018a)	Within – Tenement L38/224	Motion cameras installed between 13 June to 16 October 2019 Adam Cargill	<ul style="list-style-type: none"> Twenty-seven motion cameras deployed for a minimum of 10 nights each 	N/A	N/A	<ul style="list-style-type: none"> Long-tailed Dunnart (P4) 	None
Mt Weld Long-tailed Dunnart Monitoring (Lynas 2019)	Targeted deployment of motion cameras within potential Long-tailed Dunnart habitat, informed by desktop assessment (Stantec 2018a)	Within - Tenement L38/224	Motion cameras installed between 03 February to 12 June 2019 Adam Cargill	<ul style="list-style-type: none"> Fifteen motion cameras deployed for a minimum of 10 nights each. 	N/A	N/A	<ul style="list-style-type: none"> Long-tailed Dunnart (P4) 	None
Mt Weld Long-tailed Dunnart Desktop Assessment (Stantec 2018a)	Assessed the potential suitability and importance of the stony rise habitat for the Long-tailed Dunnart within the Survey Area in the context of the surrounds	Within - Tenement L38/224	N/A	N/A	N/A	N/A	N/A	None
Mt Weld Flora, Vegetation and Fauna Review (Stantec 2018b)	Level 1 Flora, Vegetation and Fauna survey and ground truthing	Within - Tenements E38/2558 and E38/2359 and a portion of L38/224, and the proposed TSF	26 and 28 September 2018 Alice Bott Crystal Heydenrych	<ul style="list-style-type: none"> 18 habitat assessments 	Five broad fauna habitats recorded: <ul style="list-style-type: none"> Low mulga woodland on clay loam; Mulga on clay loam; Mulga on stony plain; Shrub plain; and Stony rise 	N/A	None	None
Lynas Corporation Ltd Mt Weld Rare Earths Project: Level 1 Vegetation, Flora and Fauna Survey (MWH 2014)	Level 1 Flora, Vegetation and Fauna survey	Within - Tenement E38/2558	Survey 15 to 18 September 2014 Arnold Slabber Neal Henshaw	<ul style="list-style-type: none"> Seven habitat assessments Active searches for SRE fauna, scats, tracks and diggings Opportunistic recording Avifauna census 	<ul style="list-style-type: none"> Low mulga woodland over clay loam Mulga on stony loam (adapted from vegetation unit mapping) 	A total of 31 vertebrate fauna species was recorded during the survey period, including: <ul style="list-style-type: none"> 3 mammals (one native); 24 birds; and 4 reptiles. 	Six potential SRE specimens collected from three genera: <ul style="list-style-type: none"> <i>Aname</i>; <i>Aganippe</i>; and <i>Urodachus</i>. 	<ul style="list-style-type: none"> Optimal timing for SRE sampling is during peak rainfall (Nov – Apr).
Lynas Corporation Ltd Mt Weld Rare Earths Project: Level 1 Vegetation, Flora and Fauna Assessment (Outback Ecology 2013)	Level 1 Flora, Vegetation and Fauna survey	Within - Tenement L38/224	Survey from 27 to 29 August 2012 Jeni Alford Michael Young	<ul style="list-style-type: none"> Habitat assessments (eight in northern half of Study Area) One bat echolocation recorder deployment location for two nights Spotlighting Active hand searching for fauna in each broad habitat type Two motion cameras deployed for a total of four trap nights 	Four broad habitats recorded: <ul style="list-style-type: none"> Low mulga woodland on clay loam; Mulga on stony plain; Stony rise; and Shrub plain. 	A total of 22 vertebrate fauna recorded, including: <ul style="list-style-type: none"> 11 mammals, and; 11 birds. 	None	<ul style="list-style-type: none"> Cool conditions potentially limited reptile species detected

Reference	Survey details	Proximity to Survey Area	Survey timing and staff	Survey effort	Fauna habitats	Fauna assemblages recorded	Species of conservation significance <small>(species names and conservation status current at time of survey)</small>	Limitations
Lynas Corporation Ltd Mt Weld Rare Earths Project: Level 1 Terrestrial Fauna Assessment (Outback Ecology 2011)	Level 1 Terrestrial Fauna Assessment	Within - Tenements E38/2558 and E38/2359	Survey from 5 to 7 September 2011 Tamagen Lee-Steere Arnold Slabber	<ul style="list-style-type: none"> Spotlighting Two motion cameras deployed for four trap nights Two bat unit deployment locations <p>The following was completed at six survey sites representative of habitats in the Study Area:</p> <ul style="list-style-type: none"> 90 minute searches Avifauna census Spotlighting SRE targeted search Habitat assessment 	One broad habitat recorded: <ul style="list-style-type: none"> Low mulga woodland over clay loam 	A total of 47 vertebrate fauna recorded, including: <ul style="list-style-type: none"> 15 mammals; 30 birds, and; 2 reptile. 	None	<ul style="list-style-type: none"> Optimal timing for SRE sampling is during peak rainfall (Nov – Apr).
Mt Weld Rare Earths Project: A review of terrestrial vertebrates (Ninox Wildlife Consulting 1992)	Level 1 fauna survey	Within - Tenements E38/2558, E38/2935	22 – 25 April 1991 16 – 19 Dec 1991 NWC principal Technical assistant	<p>Opportunistic site assessment with foot and vehicle transects.</p> <ul style="list-style-type: none"> 100 box traps set for two nights Spotlighting for two nights One-night bat mist-netting Habitat assessments 	<ul style="list-style-type: none"> <i>Acacia aneura</i> mulga woodland Two stands of <i>Eucalyptus lucasii</i> mallee (note, too small to support distinct community) Small patches of <i>Triodia basedowii</i> (note, too small to support distinct community) 	A total of 51 vertebrate fauna recorded: <ul style="list-style-type: none"> 8 mammals; 35 birds; and 8 reptiles 	None	N/A

Table 3-3: Summary of select, relevant regional fauna surveys conducted near the Survey Area

Reference	Study details	Proximity to Survey Area	Survey timing and staff	Survey effort	Fauna habitats	Fauna assemblages recorded	Species of conservation significance <small>(species names and conservation status current at time of survey)</small>	Limitations
Targeted survey for Long-tailed dunnarts for the Granny Deeps Project Area (Terrestrial Ecosystems 2011)	Targeted fauna survey, combined with results from a Level 2 fauna survey of the same area	10 km east	Survey from 5 to 16 April 2011 Scott Thompson Dene Edmunds	<ul style="list-style-type: none"> 840 box traps for 10 nights each 	Open mulga woodland over mixed scattered shrubs	N/A	<ul style="list-style-type: none"> Long-tailed Dunnart (P4) 	N/A
Moolart Well, Dogbolter and Eristoun Gold Projects. Vertebrate Fauna Reconnaissance Survey and Habitat Assessment (Outback Ecology 2006).	Level 1 fauna survey	60 km northeast			<ul style="list-style-type: none"> Gravelly mulga woodlands Low hills and ridges Mulga groves Stony plains Gravelly sand plains Sandy alluvial plains Saline alluvial plains Creeklines Minor drainage lines Rocky outcrops 	A total of 38 vertebrate fauna recorded, including: <ul style="list-style-type: none"> 7 mammals; 28 birds; and 3 reptiles. 	<ul style="list-style-type: none"> None 	
Rosemont Gold Project Biological Assessment Survey – Phases 1 & 2 (Halpern Glick Maunsell 1999)	Level 2 fauna survey	55 km northeast			<ul style="list-style-type: none"> Stony plains Low hills and ridges Groves Gravelly sand plains Saline alluvial plains Drainage lines Rocky outcrops 	A total of 101 vertebrate fauna recorded, including: <ul style="list-style-type: none"> 12 mammals; 67 birds; and 22 reptiles. 	<ul style="list-style-type: none"> None 	

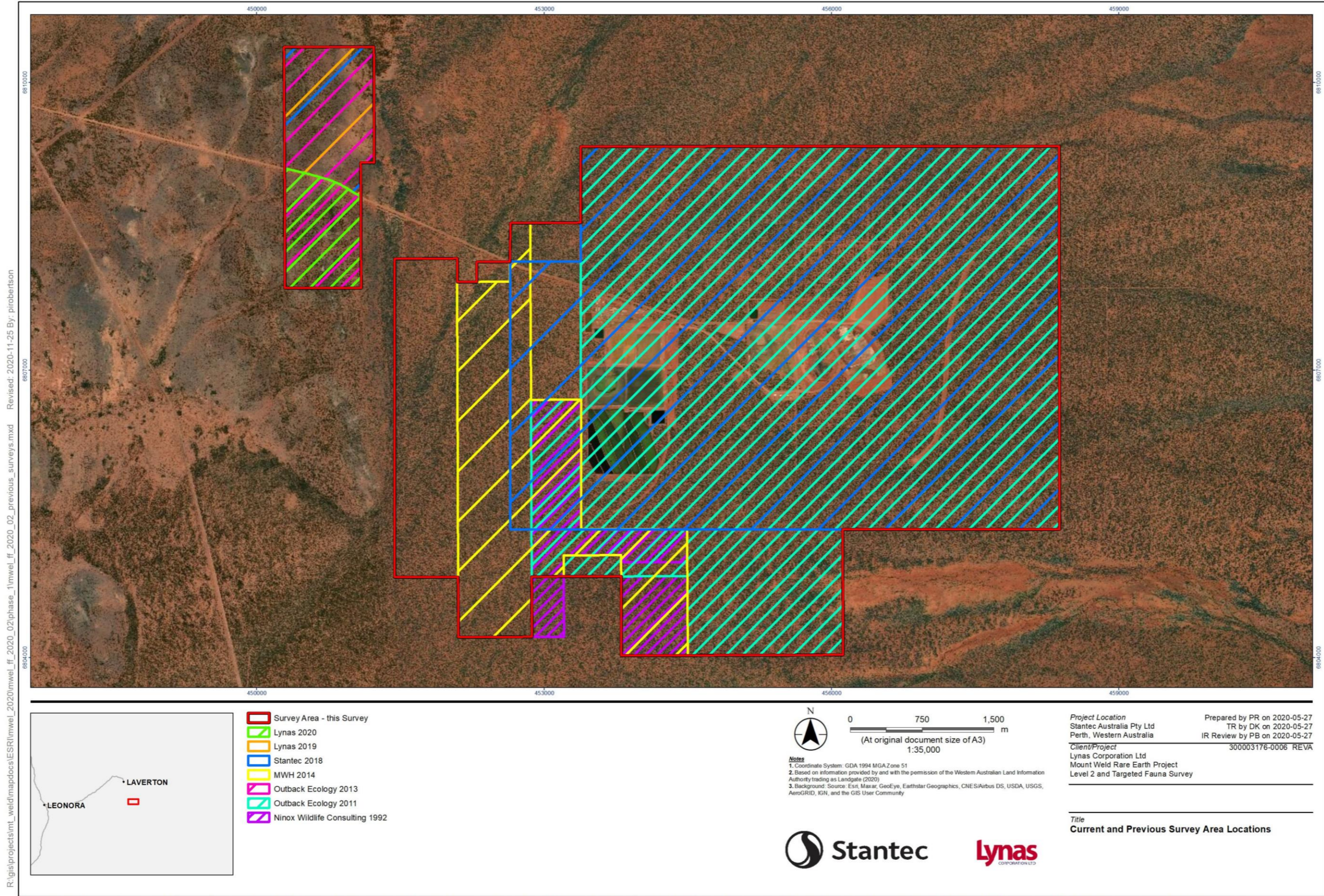


Figure 3-1: Previous fauna surveys identified from the literature review and their proximity to the Survey Area

3.1.3 Likelihood of occurrence of significant fauna

Significant fauna were assessed for their likelihood to occur within the Survey Area (**Section 5.3**), based on proximity, the most recent records and the presence of suitable habitat. The likelihood rankings were assigned using the following criteria:

Confirmed –the species has been recorded unambiguously during the last ten years (i.e. during recent surveys or from reliable records obtained via database searches) in the Survey Area.

Likely – there is a medium to high occurrence that the species uses the Survey Area as it occurs within the known species distribution, contains suitable habitat (either year round or intermittently, such as temporary water sources or features that are only relied upon during certain times of the year e.g. breeding caves) and the species has been recorded recently nearby.

Possible – there is a potential for the species to use the Survey Area as;

- the species has not been recorded recently nearby however;
 - the species may not have been detected during previous surveys e.g. is rare, patchily distributed, highly mobile, or has an extensive foraging range; and
 - the species is known to be cryptic and may not have been detected despite extensive surveys.
- the species has been recorded recently nearby and species presence cannot be ruled out due to factors such as species ecology or distribution however;
 - doubt remains over taxonomic identification;
 - the majority of habitat does not appear suitable; and
 - coordinates are doubtful.

Unlikely – there is an outward potential for the species to use the Survey Area as;

- the Survey Area lacks critical habitat, only supports marginally suitable habitat, or is severely degraded; and/or
- there are few historic record/s and no other current records in the local area.

Not present – the species does not use the Survey Area as;

- the species is not known to occur within the IBRA bioregion based on current literature and distribution;
- the Survey Area lacks important habitat for a species that has highly selective habitat requirements; and
- the species has been historically recorded within Survey Area or locally; however, it is considered locally extinct due to significant habitat changes such as land clearing and/or introduced predators.

3.1.4 SRE classification

Endemism refers to the restriction of a species to a particular area, at a continental, national or local scale (Allen *et al.* 2002). Harvey (2002) defines a restricted range as a species with a maximum range of 10,000 km². Comprehensive systematic reviews of different faunal groups often reveal the presence of SRE invertebrate species (Harvey *et al.* 2011). Some better known SRE species have been listed under State or Commonwealth legislation. However, the majority of SRE species have not been listed under legislation, often due to lack of taxonomic knowledge (EPA 2016b). SRE invertebrates in general are considered relevant to environmental impact assessment as habitat loss and degradation can decrease their prospects for persistence (EPA 2016b)

The SRE invertebrate fauna of Western Australia (WA) is typically associated with sheltered and mesic microhabitats, such as the southeast aspect of slopes, trees, boulders and rock piles, outcrops, mesas, drainage systems, deep gorges, natural springs and fire refuges (EPA 2016b). In WA, many terrestrial SRE invertebrate species have Gondwanan origins and are relics of previously widespread species common to the continents of the southern hemisphere during the mesic climates of the Miocene (Harvey 2002). The subsequent aridification of Australia during the Miocene through to the Pleistocene resulted in the fragmentation and contraction of once common mesic habitats. Consequently, populations dependent on these mesic habitats were also fragmented, resulting in the evolution of SRE invertebrate fauna (Harvey 2002).

A combination of intrinsic and extrinsic factors, such as dispersal capabilities or opportunities, habitat preferences, life history attributes, physiological attributes, habitat availability, biotic and abiotic interactions and historical factors, determine not only the geographic distribution of a taxon, but its propensity for population differentiation and speciation (Ponder and Colgan 2002). Taxa prone to short-range endemism tend to share several ecological and life-history characteristics, such as poor powers of

dispersal, confinement to discontinuous habitats, highly seasonal activity patterns and low fecundity (Harvey 2002).

Invertebrate groups prone to short-range endemism that have potential to occur within the Survey Area and that are regularly targeted during SRE surveys across the state include: mygalomorph spiders, selenopid spiders, scorpions, pseudoscorpions, millipedes, slaters and terrestrial snails. Additional invertebrate groups have potential to include SRE species (Harvey 2002), however, these groups are generally considered beyond the requirements of fauna surveys for environmental impact assessments. Taxonomists at the WAM have developed criteria for explaining the degree of certainty surrounding the SRE status of a specimen where specific knowledge gaps exist, such as:

- unknown geographic distribution of a species due to patchy/limited sampling;
- limited taxonomic resolution due to limited knowledge of a particular group or a lack of specialist skills; and
- specimens are of an inappropriate life stage or sex to allow for accurate identification to species level.

These categories will be used to provide context to specimens collected during this Survey (**Table 3-4**).

Table 3-4: Western Australian Museum short-range endemism classification

SRE category	Criteria	Typical representatives
Confirmed	<ul style="list-style-type: none"> • Confirmed or almost certainly SRE; Taxonomy is well known (but not necessarily published) • Group is well represented in collections (in particular from the region in question) • High levels of endemism exist in documented species of the genus/family. • Inference is often possible from immature specimens based on locality 	<ul style="list-style-type: none"> • <i>Anticiropus</i> millipedes (Paradoxosomatidae) • Aops scorpions (Urodacidae)
Likely	<ul style="list-style-type: none"> • Taxonomically poorly resolved group. Unusual morphology related to poor dispersal for that group e.g. troglomorphism. • Often singletons in surveys. Few, if any, regional records 	<ul style="list-style-type: none"> • Opiliones in the genus Dampetrus • Some pseudoscorpions Schizomids • Some slaters (Philosciidae) • Karaops spiders (Selenopidae)
Potential	<ul style="list-style-type: none"> • Taxonomically poorly resolved group (or specimen cannot be identified to species level) • Often common in certain microhabitats in SRE surveys (i.e. litter dwellers) • Other species within the genus might be widespread 	<ul style="list-style-type: none"> • Many mygalomorph spiders • Some centipedes • Some pseudoscorpions
Unlikely	<ul style="list-style-type: none"> • Cannot be identified to species level and taxonomy uncertain, but experience suggests the distribution is unlikely to be restricted 	<ul style="list-style-type: none"> • Indolpium • pseudoscorpions
Unknown	<ul style="list-style-type: none"> • So little is known that it does not allow for any suggestion of geographic distribution 	<ul style="list-style-type: none"> • Acari
Widespread	<ul style="list-style-type: none"> • Taxonomy well understood • Common and known from areas larger than 10,000 km² 	<ul style="list-style-type: none"> • The spider <i>Gaius villosus</i> (Idiopidae) • The millipede <i>Austrostrophus stictopygus</i>

3.2 Results and Discussion

3.2.1 Vertebrate fauna

The desktop assessment (including database searches and the literature review), identified a total of 273 species of vertebrate fauna, which have previously been recorded and/or have the potential to occur within the Survey Area (**Table 3-5; Appendix C**). These comprised the following:

- 26 native mammals;
- 12 non-native mammals;
- 152 birds;
- 78 reptiles; and
- 5 amphibians.

Many of the species identified are considered unlikely to occur in the Survey Area, due to a lack of suitable or comparable habitat based on available records. In addition, small, common, ground-dwelling reptile and mammal species tend to be patchily distributed even where appropriate habitats exist, and many species of birds can occur as regular migrants, occasional visitors or vagrants.

Three invertebrate species of significance, all fairy shrimp have also been recorded in the vicinity of the Survey Area. These were *Branchinella apophysata*, *Branchinella simplex* and *Branchinella denticulata*. As these species have been recorded from Lake Carey or its peripheral wetlands, and the Survey Area does not contain suitable aquatic habitat, they have been excluded from the likelihood assessment.

Table 3-5: Summary of vertebrate fauna identified during the desktop assessment

Faunal Group	Relevant Regional Reports						Relevant Database Searches				
	(MWH 2014)	(Outback Ecology 2013)	(Outback Ecology 2011)	(Outback Ecology 2006)	(Halpern Glick Maunsell 1999)	(Ninox Wildlife Consulting 1992)	(Birdlife Australia 2020)	(DBCA 2020b)	(DoAWE 2020b)	(DBCA 2020c)	(ALA 2023)
Mammals	1	8	6	3	3	3	0	5	1	19	4
Mammals (non-native)	2	2	8	4	8	5	0	0	9	4	2
Birds	25	11	31	28	68	35	123	9	15	107	71
Reptiles	4	0	2	3	21	18	0	1	0	65	41
Amphibians	0	0	0	0	0	0	0	0	0	5	0
Total	32	21	47	38	100	61	123	15	25	200	118

3.2.2 Significant vertebrate fauna

Of the 273 species of vertebrate fauna identified as being previously recorded and/or having the potential to occur within the Survey Area, 25 were significant fauna, comprising six mammals, 18 birds, and one reptile species (**Table 3-6**). Of these, only the Long-tailed Dunnart (P4) has previously been recorded from within the Survey Area.

Table 3-6: Significant vertebrate fauna species identified during the desktop assessment

Scientific Name	Common Name	EPBC Listing	WA Listing
Mammals			
<i>Myrmecobius fasciatus</i>	Numbat	En	EN
<i>Macrotis lagotis</i>	Bilby	Vu	VU
<i>Lagostrophus fasciatus fasciatus</i>	Banded Hare-wallaby	Vu	VU
<i>Dasyurus geoffroi</i>	Chuditch	Vu	VU
<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart		P4
<i>Dasyercus blythi</i>	Brush-tailed Mulgara		P4
Birds			
<i>Pezoporus occidentalis</i>	Night Parrot	En	CR
<i>Leipoa ocellata</i>	Malleefowl	Vu	VU
<i>Polytelis alexandrae</i>	Princess Parrot	Vu	P4
<i>Apus pacificus</i>	Fork-tailed Swift	Mi	IA
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi	IA
<i>Calidris ruficollis</i>	Red-necked Stint	Mi	IA
<i>Gelochelidon nilotica</i>	Gull-billed Tern	Mi	IA
<i>Plegadis falcinellus</i>	Glossy Ibis	Mi	IA
<i>Ardea modesta</i>	Eastern Great Egret	Mi	IA
<i>Charadrius veredus</i>	Oriental Plover	Mi	IA
<i>Thinornis cucullatus</i>	Hooded Plover	Mi	IA
<i>Tringa glareola</i>	Wood Sandpiper	Mi	IA
<i>Tringa nebularia</i>	Common Greenshank	Mi	IA
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Mi	IA
<i>Calidris melanotos</i>	Pectoral Sandpiper	Mi	IA
<i>Motacilla flava</i>	Yellow Wagtail	Mi	IA
<i>Motacilla cinerea</i>	Grey Wagtail	Mi	IA
<i>Falco peregrinus</i>	Peregrine Falcon		S
Reptiles			
<i>Liopholis kintorei</i>	Great Desert Skink	Vu	VU

3.2.3 Short-range invertebrate fauna

A total of nine SRE invertebrate taxa were returned from the WAM Arachnid and Myriapod database, and the Mollusc (land snail) database (**Table 3-7; Appendix B**). Only specimens identified to species or morphospecies are presented, as it is not possible to determine species distribution based on genus only.

The taxa were filtered by the WAM to include only those species with known distributions of less than 10,000 km² and were limited to terrestrial invertebrates from groups associated with SRE species in the Murchison bioregion (mygalomorph spiders, selenopid spiders, scorpions, pseudoscorpions, millipedes and terrestrial snails). These comprised the following species counts from target groups within 100 km of the Survey Area (excluding slaters where there is no current database):

- 6 mygalomorph spiders;
- 2 scorpions; and
- 1 pseudoscorpion.

Six invertebrate specimens have been previously collected from within the Survey Area, three of which are additional to those returned by the WAM database search (**Table 3-7**). These mygalomorph specimens were not adult males and could therefore not be identified to species level.

Table 3-7: SRE invertebrates returned by the desktop assessment within 100 km of the Survey Area

Group	Family	Genus	Species
Mygalomorph spiders	Anamidae	<i>Aname</i>	`glenorne sp. 2`
		<i>Aname</i>	`MYG629`
		<i>Aname</i>	sp. indet.*
	Nemesiidae	<i>Proshermacha</i>	`MYG504`
		<i>Teyl</i>	`MYG444`
	Barychelidae	<i>Synothele</i>	<i>yundamindra</i>
Idiopidae	<i>Eucyrtops</i>	<i>eremaeus</i>	
	<i>Aganippe</i>	sp. indet.*	
Scorpions	Urodacidae	<i>Urodacus</i>	`gibson 1?`
		<i>Urodacus</i>	`pale complex`
		<i>Urodacus</i>	sp. indet.*
Pseudoscorpions	Chernetidae	<i>Tyrannochthonius</i>	`Helens Bore`

* Denotes specimens that have been collected from within the Survey Area.

4. Survey

4.1 Methods

4.1.1 Survey team and licensing

Field work was conducted by experienced zoologists comprising Melissa Jensen (technical lead) and Stephanie Williams (survey lead) (Table 4-1). All field team members have sound technical knowledge and experience undertaking ecological assessments throughout Western Australia. Bat echolocation recordings were analysed by Robert Bullen, a bat specialist from BatCall WA. Bird acoustic recordings were analysed by Nigel Jackett, an ornithologist specialising in analysing Night Parrot recordings. The field work was conducted under DBCA Regulation 27 Licence BA27000232, issued on 23/03/2020. Phase 1 of the survey was conducted under EPA (2016c) and EPA (2016d) guidance as it predated the release of EPA (2020b). Phase 2 was conducted under the guidance of EPA (2020b).

Table 4-1: Survey teams

Personnel	Qualifications	Role	Years' Experience
Phase 1: 27 March – 6 April 2020			
Melissa Jensen	First Class Honours (Ecology) BAppSc (Wildlife Science)	Technical Lead	11
Stephanie Williams	BSc (Conservation Biology and Zoology), BSc (Biomedical Science)	Survey Lead	2
Phase 2: 14 September – 23 September			
Melissa Jensen	First Class Honours (Ecology) BAppSc (Wildlife Science)	Technical Lead	11
Stephanie Williams	BSc (Conservation Biology and Zoology), BSc (Biomedical Science)	Survey Lead	2

4.1.2 Survey timing

The Level 2 phase 1 survey was conducted from 27 March to 6 April 2020, within the optimal time for a vertebrate fauna survey, which is following maximum rainfall for the region (EPA 2020b). For the Murchison bioregion, this is generally in summer and autumn (September to April). The Survey was conducted outside the breeding season of the Long-tailed Dunnart (October to December) and within peak offspring dispersal for the species (March to April) (van Dyck and Strahan 2008, WAM 2020b, Woolley and Valente 1986). The phase 2 survey was conducted in spring during September 2020, optimal timing for reptiles in the Eremaean province (EPA 2016c).

Rainfall recorded onsite via the mine weather station in the six months prior to phase 1 of the survey (74 mm) was well below the long-term average (109.6 mm), in comparison to the Laverton BoM weather station (No. 012045) (**Table 4-2**). The total rainfall for February was 3.6 mm, approximately 89% lower than the long-term average for that month (31.4 mm).

Monthly rainfall at the Project for the 12 months preceding the Phase 2 survey (124.8 mm) was half the long-term average recorded at the Laverton weather station (246.2 mm) (**Figure 4-1**). Only January and August 2020 received rainfall greater than the long-term average (**Figure 4-1**). The above average rainfall in January can be attributed to 51.6 mm being recorded between 9 and 10 January 2020, associated with an ex-tropical cyclone. Phase 1 was conducted 11 weeks after this rainfall event.

During the field surveys, the weather conditions were typical for the time of year. Rainfall (0.4 mm) was recorded on the fifth day (31/03/2020) only. Maximum daily temperatures ranged from 24.7°C to 35.8°C, while minimum daily temperatures ranged from 11.1°C to 21.2°C (**Table 4-2**). During the phase 2 survey, maximum daily temperatures ranged from 18.6°C to 30.7°C, while minimum daily temperatures ranged from 3.2°C to 21.7°C (**Table 4-2**).

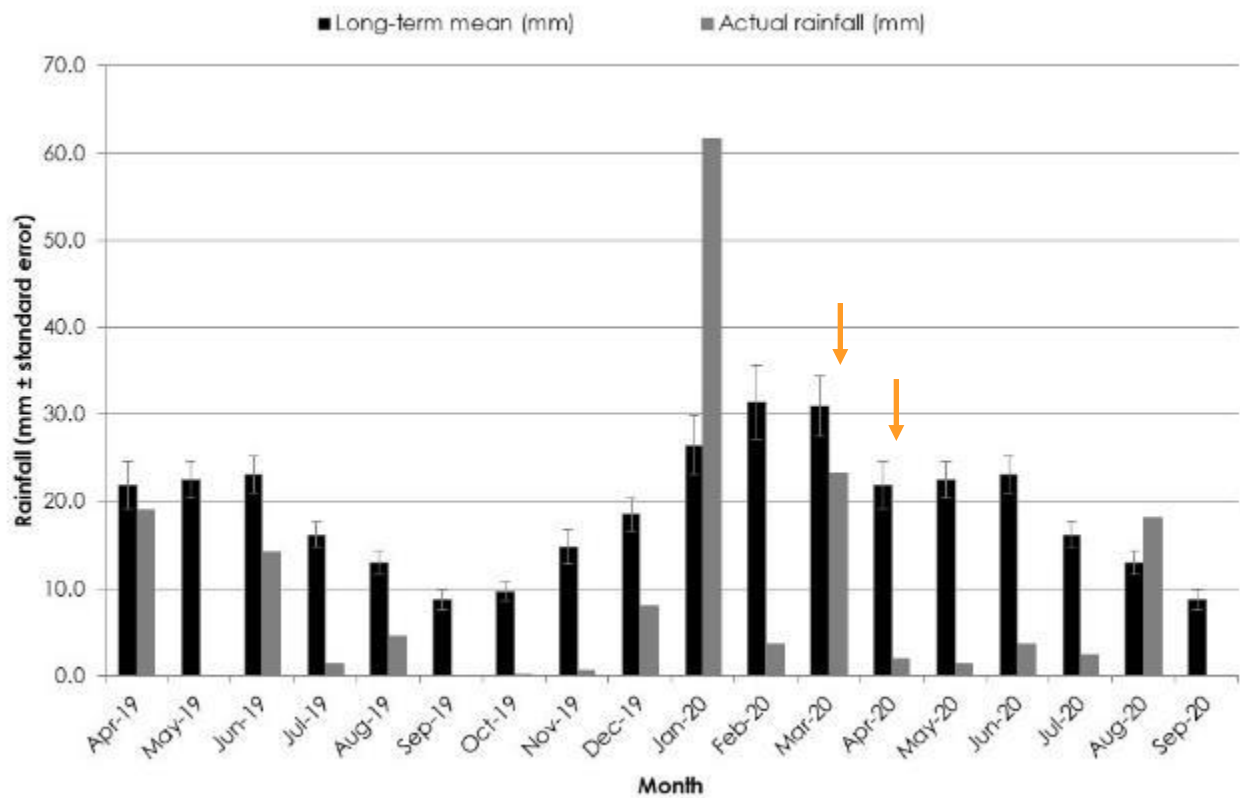


Figure 4-1: Long-term (1994-2020) mean monthly rainfall (mm) at Laverton BoM weather station (No. 012045) and the monthly rainfall (mm) on site preceding Phase 1 and Phase 2 field surveys (orange arrows indicate survey timing)

Table 4-2: Temperatures and rainfall recorded during Phase 1 and Phase 2 field surveys

Date	Temperature (°C)		Rainfall (mm)	Relative Humidity (%)	
	Min	Max		Min	Max
Phase 1					
27-03-2020	15.2	31.5	0.0	22	71.2
28-03-2020	19.6	35.8	0.0	13.3	41.3
29-03-2020	21.2	34.8	0.0	17.2	51.0
30-03-2020	15.4	27.2	0.0	36.8	76.0
31-03-2020	16.5	29.5	0.4	24.3	65.5
01-04-2020	15.1	27.1	0.0	33.2	82.2
02-04-2020	19.3	28.0	0.0	22.7	50.7
03-04-2020	15.5	31.9	0.0	21.0	69.3
04-04-2020	11.1	24.7	0.0	23.2	63.7
05-04-2020	13.7	24.9	0.0	22.2	51.0
06-04-2020	18.3	25.7	0.0	19.8	45.0
Phase 2					
14-09-2020	10.6	23.5	0.0	14.7	59.3
15-09-2020	17.7	28.4	0.0	19.7	36.5
16-09-2020	21.7	29.1	0.0	18	27.8
17-09-2020	10	29.7	0.0	19.3	72
18-09-2020	6.9	18.6	0.0	35	81.7
19-09-2020	7.4	23.1	0.0	20.3	73.5
20-09-2020	9.8	30.7	0.0	5.5	54.3
21-09-2020	8.6	19.6	0.0	22.3	66
22-09-2020	3.2	20.5	0.0	23.8	53.7
23-09-2020	7.6	23.5	0.0	17.5	57.2

4.1.3 Sampling techniques

4.1.3.1 Habitat assessment and mapping

Prior to the field work for the Survey, fauna habitats and mapping identified in Stantec (2019) were reviewed in conjunction with aerial photography, satellite imagery and topographical maps. The extent of these habitat types was ground-truthed and representative areas were selected for detailed habitat assessment. Habitat assessments were undertaken to characterise the quality and complexity of habitat provided for fauna focusing on significant fauna. A total of 10 fauna habitat assessments were undertaken within the Survey Area (**Figure 4-3; Appendix D**). At each assessment location, the following key habitat parameters were recorded:

- landscape and geological (substrata) features;
- vegetation cover, condition and species composition;
- the presence or absence of woody debris, leaf litter, hollows, outcropping or other habitat structures;
- ground cover and composition;
- hydrological features such as the presence or absence of drainage line and surface water;
- types of disturbance and levels of disturbance; and
- any significant microhabitat features, such as caves or water sources, were also recorded and where applicable sampled via opportunistic or targeted survey methods.

4.1.3.2 Site selection


Following the review of habitats by Stantec (2019), sites for systematic sampling (**Section 4.1.3.3**) and targeted survey effort (**Section 4.1.4**) were identified. The indicative location of sampling sites broadly follows a stratified random sampling design, capturing the main broad habitat types in the Survey Area while also:



- maximising coverage and diversity of habitats/landforms;
- considering accessibility and the likelihood of supporting significant fauna; and
- avoiding heavily disturbed areas where possible.

4.1.3.3 Systematic sampling

Four sites were established within the Survey Area, in three broad habitats comprising stony rise, mulga on clay loam, and shrub plain habitat types (**Table 4-3**). Systematic sites were established within the main habitats represented within the Survey Area to gain an understanding of the fauna assemblages present. The sampling program implemented at each of these sites consisted of standardised trapping, fixed-time avifauna census, systematic searching, nocturnal spotlighting, motion-sensor camera deployments and bat echolocation recordings. A detailed breakdown of the survey effort expended at each site is provided in **Section 4.1.7**.

Table 4-3: Systematic trapping sites sampled during the field work for the Survey

Systematic Site	Habitat Type	Representative Photograph
A	Shrub plain	
B	Stony rise	

Systematic Site	Habitat Type	Representative Photograph
C	Mulga on clay loam	
D	Mulga on clay loam	

4.1.3.4 Systematic trapping

A standardised trapping grid was established at each systematic site during the field work for the Survey, to capture terrestrial mammals, reptiles and amphibians (**Figure 4-2**). Each trapping grid comprised two drift fences; 40 cm high and 50 m long, set into the substrate. The following was installed along the drift fences within each standard trapping grid:

- two types of pitfall traps: five standard 20 L PVC buckets and five PVC pipe traps (15 cm in diameter and 50 cm deep). Pitfall traps were set flush with the surface of the ground, with drift fence running through the centre.
- twenty funnel traps measuring 75 cm x 18 cm x 18 cm were placed with one side pressed firmly against the fence in pairs.
- twenty baited small Elliott box traps (9 cm x 10 cm x 33 cm) and two Sheffield cage traps (31 cm x 31 cm x 70 cm) were positioned in the trap line surrounds. To protect animals from heat stress, Elliott and Sheffield traps were placed in shaded locations where possible and covered with vegetation and/or custom-made shade covers. Elliott and Sheffield traps were baited with universal bait (a mixture of oats, peanut butter and sardines).

Traps were left open overnight and checked early the following morning for seven nights each, for a total trapping effort of 364 trap nights per site, equating to 1,456 trapping nights per phase, with a combined total of 2,912 trap nights conducted for the Survey (**Table 4-5**).

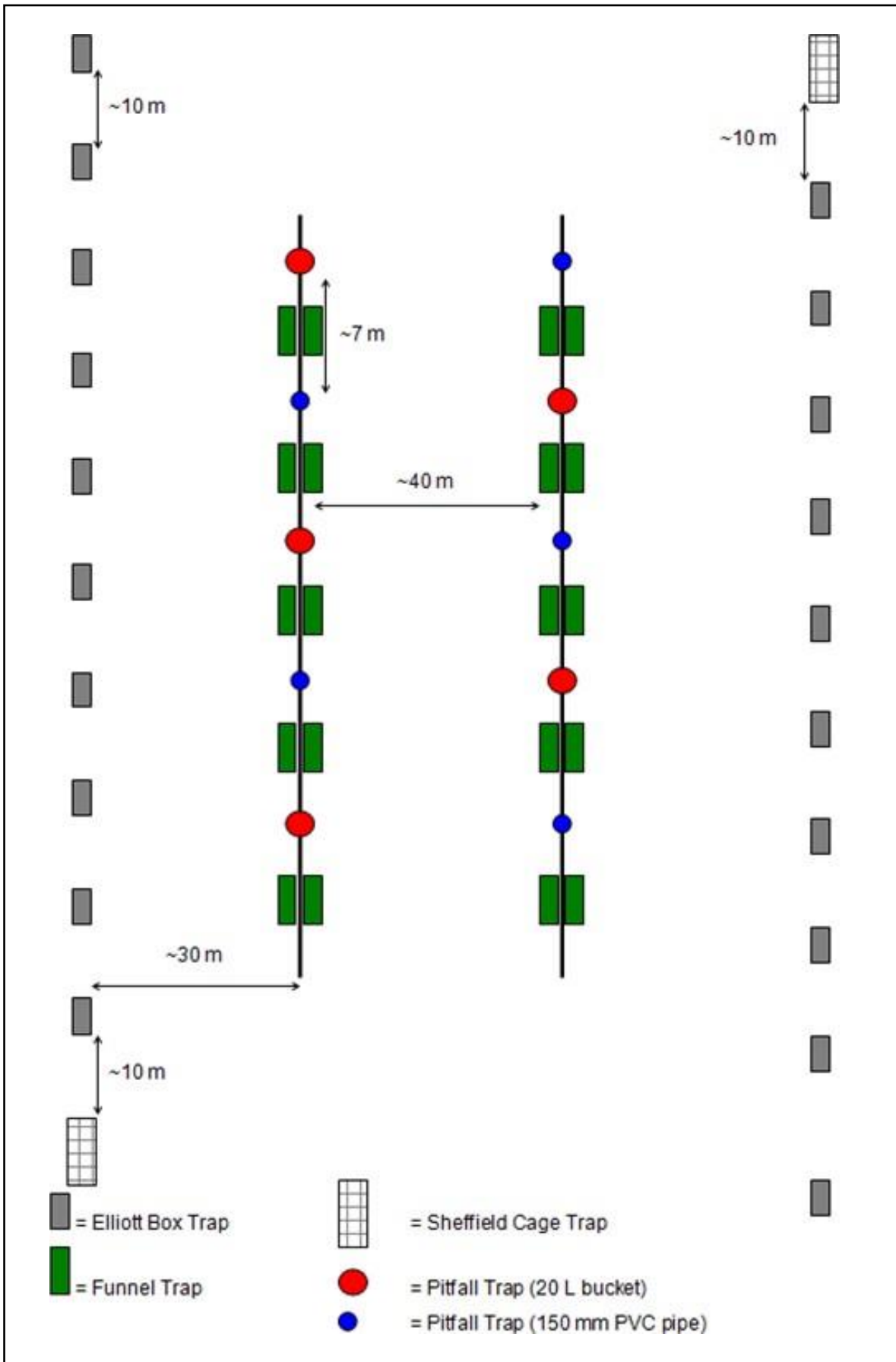


Figure 4-2: Layout of standardised trapping grid deployed at each systematic trapping site

4.1.3.5 Avifauna census

A 20-minute avifauna census was conducted at each systematic site on each day of trapping during the field work for the Survey. Each avifauna census was conducted between 6:30 am and 11:00 am while undertaking trap clearing activities. During each census, sightings, calls or other indirect signs of bird presence i.e. feathers, scats, nests were recorded. A total of 280 minutes of avifauna census was conducted at each site during the field work for the Survey (**Table 4-5**).

4.1.3.6 Systematic searches

Systematic diurnal searching for vertebrate fauna was conducted at each systematic site. This technique allows for the observation of species that are unlikely to be trapped because of their biology or behaviour (e.g. large individuals or diurnal species that are inactive when traps are open at night and/or species that don't forage far from specific habitat features). The specific methods employed included identification of active animals, investigating crevices, overturning logs and stones, searching beneath the bark of dead trees, investigating burrows and recording tracks, diggings, scats and other indirect signs. Systematic searches were performed at each systematic site for a total of 160 person minutes per site during each phase, totalling 640 person minutes for the Survey (**Table 4-5**).

4.1.3.7 Spotlighting and head-torching

Spotlighting was conducted using head torches and vehicle headlights to identify nocturnal species that were unlikely to be trapped, such as nocturnal bird species, frogs and some reptiles. Spotlighting was conducted for a total of 40 person minutes at each systematic site during the field work for the Survey (**Table 4-5**).

4.1.3.8 Motion-sensor cameras

Two motion-sensor cameras (Reconyx HF2X) were deployed at each systematic site for seven consecutive nights and baited with universal bait (**Table 4-5**). Motion-sensor cameras were used to document the presence of vertebrate fauna that are rarely captured via other trapping methods or systematic searches, due to size, general behaviour or trapability, such as macropods and large carnivores.

4.1.3.9 Bat echolocation recorders

Bat recordings were captured using SM4 (Wildlife Acoustics, Inc.) ultrasonic bat recorders fitted with an external omnidirectional SMM-U1 ultrasonic microphone. Each unit was preconfigured to activate at astronomical sunset each day and deactivate at astronomical sunrise the following morning, coinciding with peak bat activity times. One unit was deployed at each systematic site for two nights (**Table 4-5**) and echolocation recordings were analysed by BatCall WA to develop a species inventory per systematic site.

4.1.4 Targeted methods

4.1.4.1 Long-tailed Dunnart motion-sensor cameras

Motion-sensor cameras were established to target the Long-tailed Dunnart at 32 locations across four areas of suitable habitat within the Survey Area during Phase 1 (**Figure 4-3**). These were deployed in suitable habitat, such as outcropping and stony rises. Each camera was baited with universal bait. The motion-sensor cameras were deployed for a period of between three and five nights between the 31st March and 5th April, for a total of 144 motion-sensor camera nights. An additional 32 motion-sensor cameras were deployed from 19 September to 11 October in Phase 2, for a total of 736 motion-sensor camera nights, on stony rises and outcropping to the north of the Survey Area to determine the presence of Long-tailed Dunnart in the wider region (**Figure 4-3**).

4.1.4.2 Bat echolocation recorders

In addition to bat echolocation units deployed at systematic sites, targeted bat echolocation units were deployed at one location for 3 nights during Phase 1 and at three locations for 5-6 nights during Phase 2 to opportunistically supplement survey effort (**Figure 4-3**). The units were deployed adjacent to a permanent water source in most cases.

4.1.4.3 Bird acoustic recording units

Bird acoustic recording units were deployed within the Survey Area to target the Night Parrot (**Figure 4-3**). The desktop assessment determined the Night Parrot to be unlikely to occur based on a lack of previous records and no suitable habitat present within the Survey Area. Recording units were deployed as a precautionary approach given the recent attention the species has received from regulators. Four acoustic SM4 Mini (Wildlife Acoustics Inc.) units were deployed in phase 2 of the Survey. Units were spread throughout habitats considered to be low potential to achieve geographical spread within the Survey

Area. Three units were deployed in the mulga on clay loam habitat, and one unit was deployed in the mulga on stony plain habitat (**Figure 4-3**). Each unit was deployed for six nights in line with the 2017 Interim Guidelines (DPaW 2017). Units were set to begin recording one hour prior to sunset and to finish recording one hour after sunrise. This targeted peak calling time for non-breeding individuals, which tend to call within two hours after sunset and within two hours before sunrise. This also allowed for the capture of potential calls associated with breeding birds, which may occur throughout the night and closer to sunset and sunrise (DPaW 2017).

4.1.4.4 Avifauna census

Targeted avifauna census' were conducted for 20 minutes in prospective habitats. During each census, sightings, calls or other indirect signs of bird presence i.e. feathers, scats, nests were recorded. Three targeted avifauna census' were conducted at three locations at permanent water sources, totalling 60 minutes, within the Survey Area (**Figure 4-3**).

4.1.4.5 Targeted searches

A likelihood of occurrence assessment was conducted for significant fauna identified during the desktop assessment (**Section 3.2.2**). Where significant species were assessed as confirmed, likely or possible to occur within the Survey Area and where suitable habitat was present, targeted searches were undertaken in accordance with the methods presented within **Table 4-4**. Evidence that was recorded included: visual observations, mounds, tracks, scats, feathers and carcasses. Any evidence discovered while conducting the searches was recorded using in-field data collection application, and waypoints taken. Targeted survey effort is presented within **Figure 4-3**.

4.1.5 Opportunistic records

Vertebrate fauna observed outside of the systematic and targeted sampling during the field work for the Survey were documented and the resulting records were classified as 'opportunistic' within the Survey Area. Opportunistic records can be direct, such as from visual or aural observations, or indirect, such as from locating bones, carcasses, tracks, scats, burrows or nests. Opportunistic records were generated from observations made as follows:

- before or after the fixed-time systematic searches or bird censuses;
- during trap line establishment;
- while travelling to and from survey sites; and
- at any time while working in or travelling within the Survey Area.

4.1.6 Short-range endemic invertebrates

4.1.6.1 SRE habitat assessments

Habitat assessments form an important component of terrestrial SRE surveys. This is because a risk-based approach that uses habitat as a surrogate to infer a species distribution may be required in situations where SRE species are only recorded from planned impact areas. A risk-based approach will be considered by the (EPA 2016b) under the following conditions:

- a potential SRE taxon is represented by one or few specimens from only within proposed development areas;
- contextual data on the wider distribution and status of the taxon is unavailable from the WAM or the DBCA; and
- additional targeted surveys appear unlikely to yield results in a reasonable timeframe.

Additional habitat information was collected at each of the SRE sites to better understand the potential for these habitats to support SRE species. The SRE habitat assessment was undertaken in an area of approximately 50 x 50 m, with the following information recorded:

- landform;
- outcropping;
- soil type;
- broad vegetation type;
- litter cover and shade cover;
- existing disturbance; and
- the level of physical connectivity to similar sites in the landscape.

There are no prescriptive guidelines to identify the habitats that must be searched when looking for potential SRE taxa, although the most prospective habitats tend to be those that are sheltered, isolated or both (EPA 2016b).

4.1.6.2 Collection techniques

The SRE survey methods involved targeted searches and collection of invertebrate specimens from dry pitfall traps and funnels used during the systematic sampling methods during the field work for the Survey. The techniques used for collecting SRE taxa are aligned with the recommendations made by the EPA (2016b) and endorsed by invertebrate SRE specialists of the WAM and DBCA. Specimens were collected if they were from the following SRE prospective groups; mygalomorph spiders, selenopid spiders, scorpions, pseudoscorpions, millipedes, slaters and terrestrial snails.

4.1.6.2.1 Dry pitfall trapping

Dry pitfall traps and funnels were established at systematic sampling sites (**Section 4.1.3.4**) within the Survey Area. Invertebrate fauna from groups identified to have potential SRE species were collected from traps and preserved (**Section 4.1.6.3**) during the field work for the Survey. Each of the four systematic trap sites was open for seven nights, for a total trapping effort of 364 trap nights per site, equating to 1,456 trapping nights per phase, with a combined total of 2,912 trap nights conducted for the Survey (**Figure 4-3**).

4.1.6.2.2 Targeted searches

Targeted searches for invertebrates from SRE prospective groups was conducted in conjunction with the vertebrate targeted searches at systematic sampling sites (**Figure 4-3**). Targeted searches involved a combination of leaf litter sieving, burrow excavations and rock turning at each systematic site and within suitable habitat. Ultra-violet torches were used to search for scorpions during spotlighting and head torching surveys conducted at each systematic sampling site (**Section 4.1.3.7**). Microhabitats targeted during the searches included:

- the base of shrubs and trees;
- under bark and amongst leaf litter and debris; and
- under logs, rocks and in crevices.

In addition, burrows of scorpions and mygalomorph spiders found during targeted searches were excavated and any occupants collected and preserved.

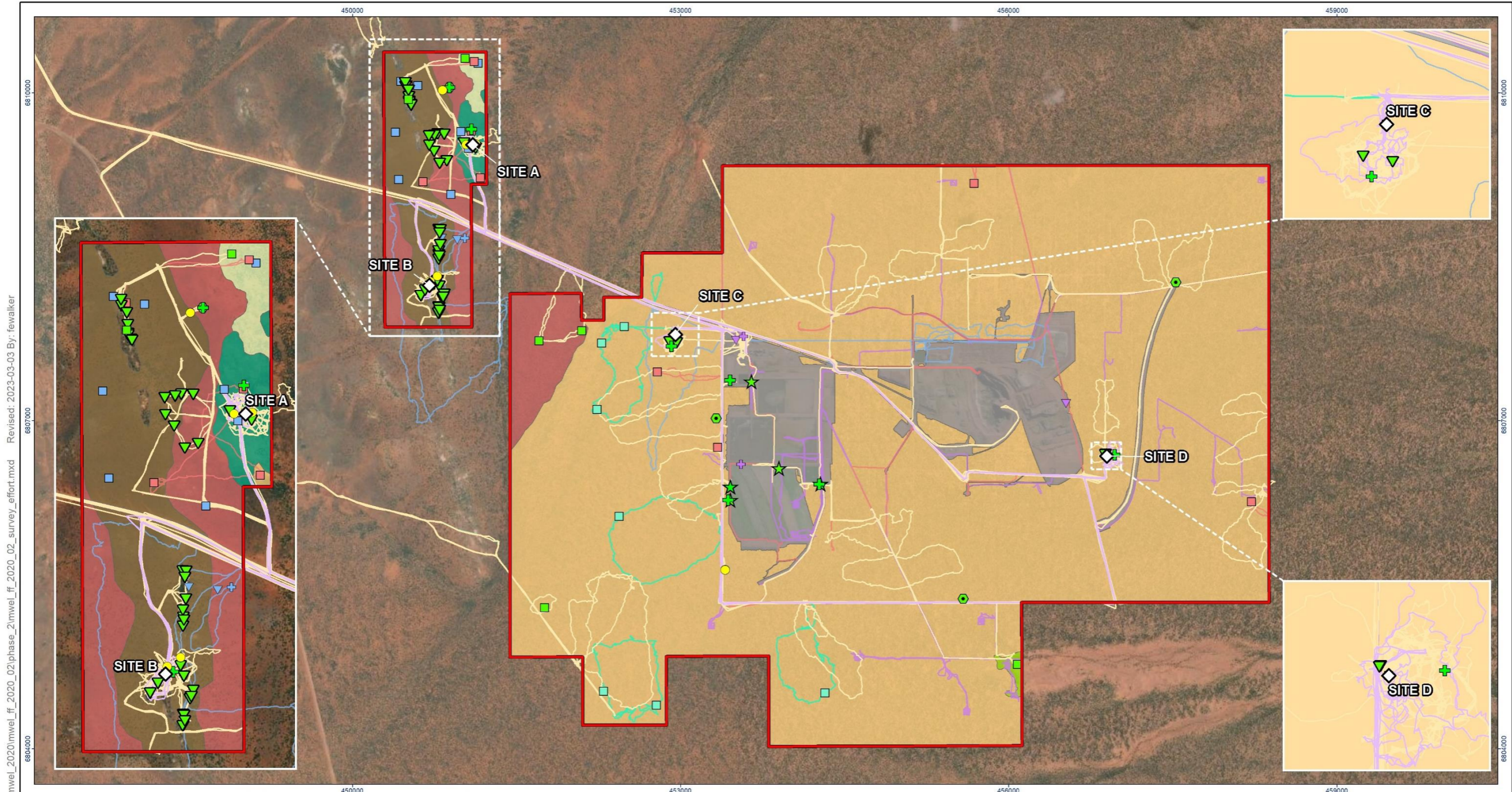
4.1.6.3 SRE specimen processing, preservation, and identification

All invertebrate specimens collected during the Survey were preserved on site in accordance with the WAM Taxonomic Services Submission Guidelines – March 2018 (WAM 2018). These methods allow both morphological identification and DNA barcoding to be completed (where required). SRE specialists Dr Erich Volschenk and Simon Judd of Alacran Environmental Science were engaged to identify invertebrate specimens and assess SRE status.

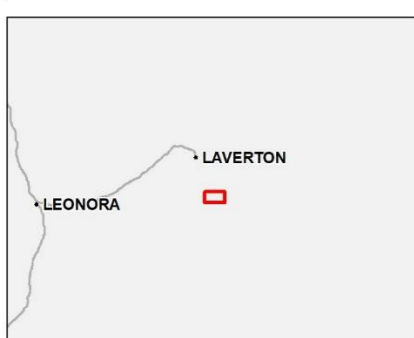
4.1.7 Survey effort

A variety of survey methods were employed during the field work for the Survey to ensure that significant fauna with the likelihood of occurring could be adequately detected (**Table 4-4**). The detection methods of some species were excluded from **Table 4-4**, as they were assessed as no longer occurring in the bioregion (i.e. the Numbat, Bilby, Banded Hare-wallaby, and Chuditch) (**Section 5.3**). A total of 2,912 trap nights for vertebrate fauna were expended at systematic sites during the Survey (**Table 4-5**). This trapping included a total of 560 pitfall trap nights, 1,120 Elliott and 1,120 funnel trap nights also suitable for collecting SRE invertebrate fauna specimens. Systematic sampling also accounted for 1,120 avifauna census minutes, 640 systematic searching minutes, 320 spotlighting minutes, 112 motion-sensor camera sampling nights and 16 bat echolocation recording nights during the Survey (**Table 4-5**).

In addition to systematic sampling, motion-sensor cameras targeting Long-tailed Dunnarts were deployed at 32 locations for 144 trap nights during Phase 1, and at 32 locations for a total of 736 trap nights on stony rises and outcropping to the north of the Survey Area in Phase 2. Targeted bat echolocation units were deployed at one location for 3 nights during Phase 1 and at three locations for 5-6 nights during Phase 2. Targeted SM4 Mini acoustic bird recorders were deployed at four locations throughout the Survey Area in Phase 2 for seven nights, for a total of 28 acoustic recorder nights for the Survey.



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- | | | |
|--|---|---|
| Survey Area | Habitat Assessment (Stantec, 2018) | Cleared |
| Systematic Sites | Habitat Assessment (MWH, 2014) | Low mulga on clay loam |
| ● Acoustic Recorder | + Echolocation Recorder (Outback Ecology, 2013) | Mulga on clay loam |
| + Echolocation Recorder | ■ Habitat Assessment (Outback Ecology, 2013) | Mulga on stony plain |
| ▼ Motion Camera | ▼ Motion Camera (Outback Ecology, 2013) | Outcropping |
| ■ Habitat Assessment | + Echolocation Recorder (Outback Ecology, 2011) | Shrub plain |
| ★ Avifauna Census | ▼ Motion Camera (Outback Ecology, 2011) | Sparse shrubland on heavy clay |
| ● SRE Sites | — Stantec, 2018 | Stony rise |
| — Nocturnal Search Tracks | — MWH, 2014 | |
| — Search Tracks | — Outback Ecology, 2013 | |
| | — Outback Ecology, 2011 | |

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Notes
1. Coordinate System: GDA 1994 MGA Zone 51
2. Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2023)
3. Background: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Project Location
Stantec Australia Pty Ltd
Perth, Western Australia

Client/Project
Lynas Corporation Ltd
Mount Weld Rare Earth Project
Level 2 and Targeted Fauna Survey

Prepared by PR on 2020-11-03
TR by DK on 2020-11-03
IR Review by SW on 2020-11-03
300003176-0000 REVA

Title
Survey Effort



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Figure 4-3: Overview of survey effort during the field work for the Survey

Table 4-4: Detection methods targeting significant fauna species during the field work for the Survey

Common name Species name	Status		Survey method						
	EPBC	BC	Systematic trapping	Systematic searching	Avifauna census	Spotlighting	Targeted searching	Motion-sensor camera	Acoustic recorder
Mammals									
Long-tailed Dunnart (<i>Sminthopsis longicaudata</i>)		P4	X			X		X	
Brush-tailed Mulgara (<i>Dasycercus blythi</i>)		P4	X	X			X	X	
Birds									
Night Parrot (<i>Pezoporus occidentalis</i>)	En	CR				X			X
Malleefowl (<i>Leipoa ocellata</i>)	Vu	VU					X	X	
Princess Parrot (<i>Polytelis alexandrae</i>)	Vu	P4			X		X		
Fork-tailed Swift (<i>Apus pacificus</i>)	Mi	IA			X				
Eleven species of wetland/shorebirds and migratory species from the families: <ul style="list-style-type: none"> • Threskiornithidae; • Ardeidae; • Laridae; • Charadriidae; and • Scolopacidae 	Mi	IA, P4			X				
Yellow Wagtail (<i>Motacilla flava</i>)	Mi	IA			X				
Grey Wagtail (<i>Motacilla cinerea</i>)	Mi	IA			X				
Peregrine Falcon (<i>Falco peregrinus</i>)		S			X				
Reptiles									
Great Desert Skink (<i>Liopholis kintorei</i>)	Vu	VU	X	X			X	X	

Table 4-5: Survey effort conducted at each systematic site during the field work for the Survey

Phase	Sites	Trap nights						Avifauna census (mins.)	Active searches (including 20 min/pp targeted SRE search) (40 mins/pp)	Spotlighting (20 mins/pp)	Bat echolocation recorders (nights)	Motion camera nights (location)
		Buckets	Pipes	Funnels	Small Elliott traps	Cages	Total					
Phase 1	A	35	35	140	140	14	364	140	80	40	2	14 (2)
	B	35	35	140	140	14	364	140	80	40	2	14 (2)
	C	35	35	140	140	14	364	140	80	40	2	14 (2)
	D	35	35	140	140	14	364	140	80	40	2	14 (2)
	Total	140	140	560	560	56	1,456	560	320	160	8	56
Phase 2	A	35	35	140	140	14	364	140	80	40	2	14 (2)
	B	35	35	140	140	14	364	140	80	40	2	14 (2)
	C	35	35	140	140	14	364	140	80	40	2	14 (2)
	D	35	35	140	140	14	364	140	80	40	2	14 (2)
	Total	140	140	560	560	56	1,456	560	320	160	8	56
Survey total		280	280	1,120	1,120	112	2,912	1,120	640	320	16	112

4.1.8 Specimen identification and nomenclature

Fauna taxonomy is dynamic, due to the ongoing description and revision of new species, and the increased understanding of the relationships between taxa through genetic and morphological studies. The nomenclature and taxonomy of all vertebrate fauna in this report follows the Checklist of the Vertebrates of Western Australia (WAM 2020a).

Vertebrate fauna species were identified in the field, as required, using standard field guides or scientific publications for:

- Mammals (Menkhorst and Knight 2011, van Dyck *et al.* 2013, van Dyck and Strahan 2008);
- Birds (Menkhorst *et al.* 2017, Pizzey and Knight 2012);
- Reptiles (Wilson and Swan 2013); and
- Amphibians (Cogger 2014, Tyler and Doughty 2009).

4.2 Analysis

4.2.1 Echolocation data treatment

Echolocation recordings from the field work of the Survey were analysed by BatCall WA to identify species diversity, using COOL EDIT 2000 (now available as AUDITION from Adobe Systems Inc.). Once identified, calls were compared to a database of reference calls.

4.2.2 Species accumulation curves

Species accumulation curves can be used to estimate the sampling adequacy of systematic observation techniques for a survey (EPA 2016c, EPA and DEC 2010). When a curve approaches an asymptote, it suggests that sampling effort has been sufficient to adequately collect the majority of species comprising the faunal assemblage at the locations sampled (Thompson and Withers 2003). The value at which the curve asymptotes can also be used as an approximate measure of the total size of the species complement at that location (Thompson and Withers 2003).

Species accumulation curves for the Survey were calculated using avifauna census data for birds, and systematic trapping data for mammals and herpetofauna (reptiles and amphibians combined). Species accumulation curves derived included Sobs (Mao Tao), to reflect the number of species observed (based on a given total of species recorded), and richness estimators (Chao 1, Chao 2, Jackknife 1 and Bootstrap), to predict the total number of species that could potentially be recorded using these techniques. Bias-corrected formulas are used for Chao 1 and Chao 2 indicators.

While species accumulation curves were created using systematic trapping and avifauna census data, many species were also detected via alternate techniques. In addition, many species may not have been detected during the field work for various reasons such as:

- weather patterns – species such as burrowing frogs may occur within the Survey area year-round but are not detected in the absence of specific climatic events that trigger emergence;
- variation in detectability – some species are readily trapped, seen and/or heard, but other species are more cryptic and require concerted, highly-targeted surveys for detection; and
- species rarity – species with restricted distributions or population sizes may not be detected without major, resource-intensive targeted surveys.

5. Results and Discussion

5.1 Fauna habitats

Seven fauna habitats were identified during the Survey on the basis of location, landform, substrate and vegetation type (**Table 5-1; Figure 5-1; Appendix D**). The habitats classified in the Survey Area were as follows:




- Mulga on clay loam;
- Mulga on stony plain;
- Low mulga on clay loam;
- Stony rise;
- Outcropping;




- Shrub plain; and
- Sparse shrubland on heavy clay.


Survey effort was focussed on habitats that contributed the most to the overall extent of the Survey Area and those that were most likely to be impacted by the proposed developments. The mulga on clay loam habitat made up the majority (81%) of the Survey Area, with the remaining six habitats each accounting for less than 5%. Habitat condition ranged from good to very good, affected by exploration tracks and feral grazing. Broad fauna habitats and their presence in the Survey Area are presented in greater detail in **Sections 5.1.1.1 to 5.1.1.7**. Each of the habitat types identified were defined in terms of distribution and significance according to the following criteria:

- **Distribution:** habitats widespread and common throughout the Survey Area were categorised as Widespread; otherwise they were categorised as being of Limited Extent. Six of the seven habitat categories within the Survey Area were considered to have a Limited Extent (**Table 5-1**). The remaining habitat was considered Widespread within the Survey Area.
- **Significance:** habitats capable of supporting significant fauna or distinct fauna assemblages were categorised as Significant on a local and regional scale; otherwise they were categorised as being of Limited Significance. Two of the seven habitat categories were considered Significant and may support listed fauna, particularly threatened species or distinct assemblages (**Table 5-1**). Habitats and their value to significant fauna are discussed in **Sections 5.1.1.1 to 5.1.1.7**, while **Section 5.3** details the likely occurrence of significant fauna species within the Survey Area.

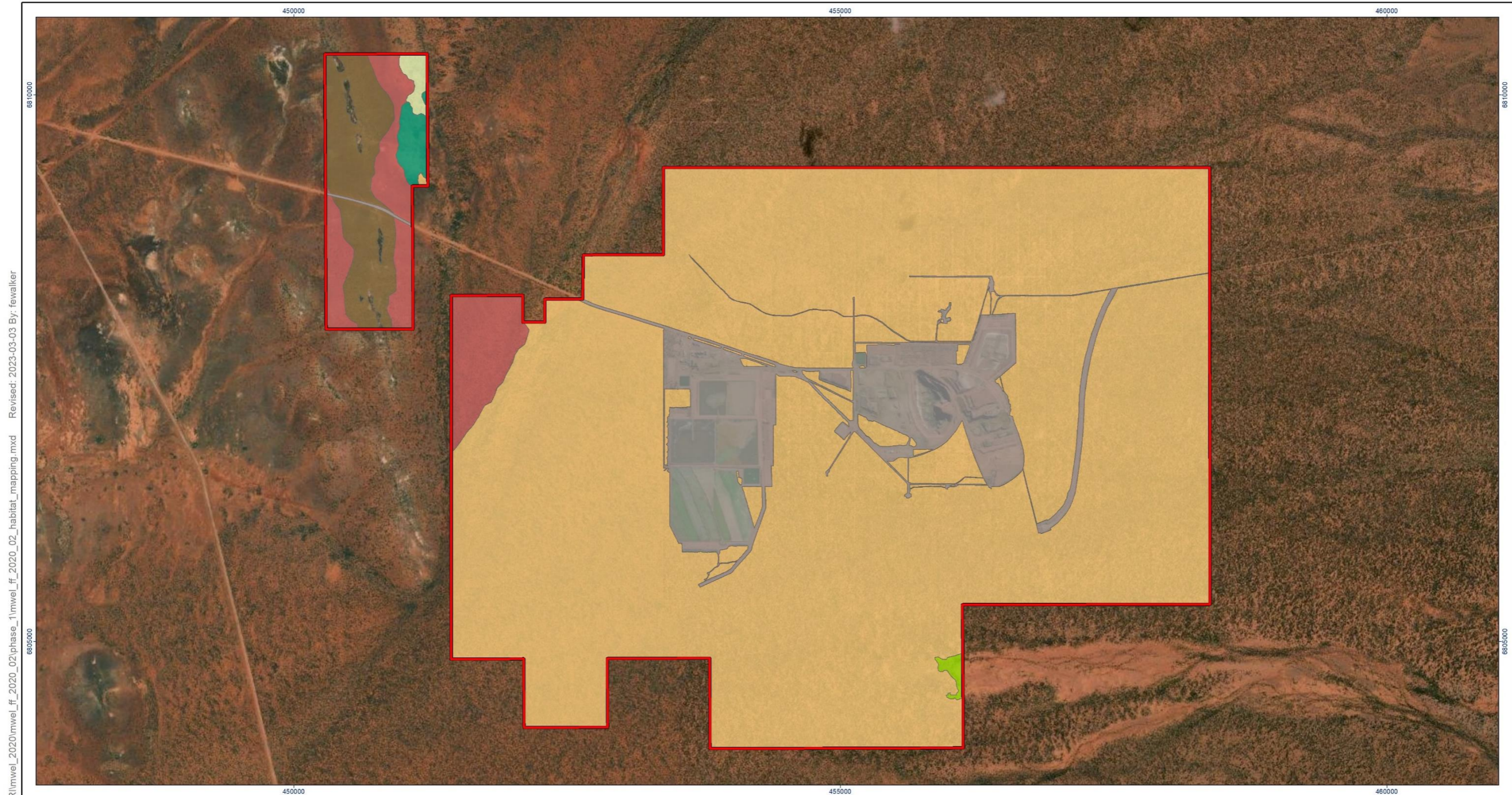
Table 5-1: Attributes of broad fauna habitat types within the Survey Area

Habitat Extent & Significance	Extent (ha)	Proportion of Survey Area (%)	Systematic Site	Vegetation Description	Disturbance Types	Representative Photograph
<p>Mulga on clay loam</p> <ul style="list-style-type: none"> • Widespread • Limited Significance <ul style="list-style-type: none"> ○ Malleefowl 	2,644.11	81.17	C D	<i>Acacia aneura</i> low open forest over <i>Acacia ramulosa</i> var. <i>ramulosa</i> tall shrubland over <i>Eremophila?latrobei</i> subsp. <i>filiformis</i> and <i>Eremophila margarethae</i> low open shrubland	Exploration tracks, feral grazing (cattle and rabbits)	
<p>Mulga on stony plain</p> <ul style="list-style-type: none"> • Limited Extent • Limited Significance 	137.97	4.24	-	<i>Acacia aneura</i> low woodland over <i>Acacia tetragonophylla</i> open shrubland over <i>Acacia caesaneura</i> , <i>Maireana</i> sp. and <i>Ptilotus obovatus</i> low scattered shrubs	Exploration tracks in some areas	
<p>Stony rise</p> <ul style="list-style-type: none"> • Limited Extent • Significant <ul style="list-style-type: none"> ○ Long-tailed Dunnart 	108.10	3.31	B	<i>Hakea preissii</i> and <i>Acacia</i> sp. low open woodland over <i>Senna</i> sp. and <i>Sida</i> sp. shrubland over <i>Maireana</i> sp. and <i>Ptilotus obovatus</i> low open shrubland	Exploration tracks in some areas	

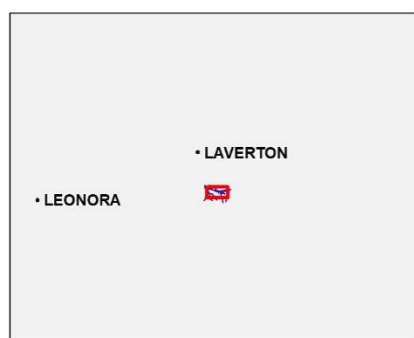
Habitat Extent & Significance	Extent (ha)	Proportion of Survey Area (%)	Systematic Site	Vegetation Description	Disturbance Types	Representative Photograph
Shrub plain <ul style="list-style-type: none"> • Limited Extent • Limited Significance 	16.98	0.54	A	<i>Acacia aneura</i> low open woodland over <i>Acacia tetragonophylla</i> and <i>Santalum spicatum</i> tall open shrubland over <i>Eremophila youngii</i> subsp. <i>youngii</i> scattered shrubs over <i>Ptilotus obovatus</i> scattered low shrubs	Exploration tracks in some areas, feral grazing	
Low mulga on clay loam <ul style="list-style-type: none"> • Limited Extent • Limited Significance 	9.76	0.30	-	<i>Acacia aneura</i> , <i>Acacia caesaneura</i> and <i>Acacia aptaneura</i> low open forest over <i>Acacia tetragonophylla</i> and <i>Santalum spicatum</i> tall open shrubland over <i>Ptilotus obovatus</i> scattered low shrubs	Cattle grazing	
Outcropping <ul style="list-style-type: none"> • Limited Extent • Significant <ul style="list-style-type: none"> ○ Long-tailed Dunnart 	6.61	0.20	-	<i>Acacia aneura</i> , <i>Acacia pteraneura</i> , <i>Acacia ayersiana</i> low woodland over <i>Acacia minyura</i> tall, scattered shrubs over <i>Eremophila</i> sp., <i>Maireana</i> sp. and <i>Ptilotus obovatus</i> low open shrubland	-	

Habitat Extent & Significance	Extent (ha)	Proportion of Survey Area (%)	Systematic Site	Vegetation Description	Disturbance Types	Representative Photograph
Sparse shrubland on heavy clay <ul style="list-style-type: none"> • Limited Extent • Limited Significance 	5.24	0.16	-	<i>Acacia aneura</i> , <i>Acacia pteraneura</i> and <i>Acacia aptaneura</i> low open woodland over <i>Acacia tetragonophylla</i> tall open shrubland over <i>Rhodanthe charsleyae</i> and <i>Sclerolaena</i> spp. open herbland	Feral grazing	
Cleared	326.05	10.07	N/A	N/A	Mining activity	N/A
Total	3,254.81	99.99	N/A	N/A	N/A	N/A

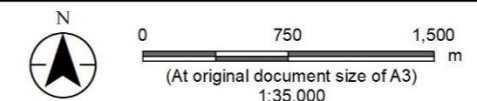
* Some totals may not equal the sum of their parts due to rounding.



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- Survey Area
- Fauna Habitat**
- Cleared
- Low mulga on clay loam
- Mulga on clay loam
- Mulga on stony plain
- Outcropping
- Shrub plain
- Sparse shrubland on heavy clay
- Stony rise



Notes
 1. Coordinate System: GDA 1994 MGA Zone 51
 2. Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2023)
 3. Background: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

<i>Project Location</i> Stantec Australia Pty Ltd Perth, Western Australia	Prepared by PR on 2020-05-26 TR by DK on 2020-05-26 IR Review by PB on 2020-05-26
<i>Client/Project</i> Lynas Corporation Ltd Mount Weld Rare Earth Project Level 2 and Targeted Fauna Survey	300003176-0005 REVA



Title
Habitat Mapping

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Figure 5-1: Broad fauna habitat types within the Survey Area

5.1.1.1 Mulga on clay loam

The mulga on clay loam habitat was the most widespread habitat in the Survey Area (**Table 5-1; Figure 5-1**). This habitat occurred in flat/level areas and was associated with sheet flow of water in a south west direction across the Survey Area. The habitat generally lacked stony substrate; however, pockets of sparse quartz were present in some areas. Vegetation typically comprised open to moderate mulga over sparse *Acacia* spp. and *Eremophila* spp. shrubs on clay loam soils. The woody debris and leaf litter cover was higher in dense areas and this may provide shelter for mammals and reptiles. However, where this is absent there was minimal alternative lower cover and low significance for fauna. This habitat had no significant fauna species recorded during the Survey. Generally, this habitat was relatively open, however areas of dense cover of mulga and shrubs may provide more suitable habitat for roosting and foraging avifauna and may provide some suitable marginal habitat for Malleefowl.

5.1.1.2 Mulga on stony plain

The mulga on stony plain habitat was dominated by mulga, *Acacia tetragonophylla* over *Ptilotus obovatus* low scattered shrubs on clay loam soils. The habitat was characterised by a high cover of coarse fragment evenly spread over a level landscape. Many small patches of leaf litter were present, similarly woody debris was common throughout the habitat. These areas are unlikely to serve as significant habitat for fauna owing to the relatively open vegetation and lack of unique habitat features such as crevices and hollows. Taller trees may provide nesting and/or roosting for bird species, and the small networks of dense mulga may provide shelter for fauna. No significant fauna was recorded from within this habitat during the Survey, nor are they expected to occur.

5.1.1.3 Stony rise

Stony rise habitat comprised low (1-20°) to moderately (21-45°) inclined rises, predominantly in the west of the Survey Area. Upper and mid-story typically comprised mulga over *Acacia* spp. shrubs over a stony substrate with little bare soil present. The substrate comprised coarse fragments ranging from 1 to 20 cm, dominated by ironstone and to a lesser extent quartz.

The Long-tailed Dunnart was recorded via trapping and a motion-sensor camera within this habitat during the Survey (**Table 5-4**). This habitat may provide foraging resources for the Long-tailed Dunnart and may facilitate connectivity between individuals utilising the adjoining outcropping habitat.

5.1.1.4 Shrub Plain

The shrub plain habitat was characterised by very open areas largely lacking an upper storey. Vegetation was dominated by *Hakea preissii* and *Acacia* sp. over *Senna* spp. and *Sida* spp. with *Maireana* spp. low open shrubs. The habitat contained sparse or no woody debris, leaf litter or peeling bark.

The sparse lower storey provided minimal cover for small mammals and reptiles, and the habitat did not contain a substantial amount of alternative shelters (woody debris, peeling bark etc.). No fauna of significance was recorded within this habitat during the Survey, nor are they expected to occur.

5.1.1.5 Low mulga on clay loam

This habitat is characterised by low mulga open to moderate woodland over an open *Acacia* shrubland with scattered *Eremophila youngii* subsp. *youngii* and *Ptilotus obovatus* low shrubs. The substrate has quartz stones evenly spread throughout. These areas supported a denser upper storey cover relative to most habitats within the Survey Area. The relatively dense areas of mulga would provide nesting and roosting habitat for species of birds. Along with the debris and peeling bark, these would provide shelter for small reptiles and mammals.

No fauna of significance was recorded within this habitat during the Survey, nor are any expected to occur.

5.1.1.6 Outcropping

Outcropping habitat comprised moderately inclined upper hill slopes and hillcrests above the stony rise habitat. This habitat was characterised by exposed bedrock and large rocky substrate covering most soil. This habitat contained a relatively complex substrate with rocky crevices and alcoves that provide shelter for ground-dwelling fauna such as reptiles and mammals, particularly the long-tailed dunnart. A chain of outcropping habitat surrounded by stony rise habitat, was present in the west of the Survey Area. This habitat was dominated by mulga over *Acacia minyura* tall, scattered shrubs over *Eremophila* sp., *Maireana* sp. and *Ptilotus obovatus* low open shrubland.

The Long-tailed Dunnart has been recorded within the outcropping habitat in previous surveys of the Survey Area (Lynas 2019). The value of this habitat to the Long-tailed Dunnart lies in the abundance of

shelter provided by the outcropping rocks and crevices. It may also provide suitable foraging habitat for the species.

5.1.1.7 Sparse shrubland on heavy clay

The sparse shrubland on heavy clay habitat is characterised by very open vegetation over heavy clay substrate. The habitat was dominated by mulga over *Acacia tetragonophylla* and sparse *Rhodanthe charsleyae* and *Sclerolaena* spp. shrubs. This habitat is influenced by its low elevation and may become inundated after periods of heavy rainfall. There was only one relatively small area of this habitat in the southeast of the Survey Area. The lack of vegetation and leaf litter provides minimal shelter for small mammals and reptiles. No fauna of significance was recorded within this habitat during the Survey, however it has the potential to support waterbirds when inundated.

5.2 Fauna Assemblages

5.2.1.1 Overview

A total of 95 species of vertebrate fauna were recorded during the Survey, of which 90 were native. This represents 34.8% of the total number of species identified from the desktop assessment (n = 273) as potentially occurring in the Survey Area (**Section 3**). The number of species recorded during the Survey was above most numbers recorded during previous surveys of the Survey Area, however, it should be noted that only one of these surveys (Halpern Glick Maunsell 1999) was of equivalent scope and size to this Level 2 survey. The number of species recorded during this Survey is comparable with the number recorded by Halpern Glick Maunsell (1999).

Eleven species recorded during the Survey were not identified during the desktop assessment; Ooldea Dunnart (*Sminthopsis ooldea*), Western Grey Kangaroo (*Macropus fuliginosus*), White-striped Free-tailed Bat (*Austronomus australis*), South-western Free-tailed Bat (*Ozimops kitcheneri*), Inland Free-tailed Bat (*Ozimops petersi*), Mulga Dragon (*Diporiphora amphiboluroides*), Dark-spined Blind Snake (*Anilius bicolor*), Banded Knob-tailed Gecko (*Nephrurus wheeleri*), Perentie (*Varanus giganteus*), Whiskered Tern (*Sterna hybrida*) and the Western Whistler (*Pachycephala occidentalis*) (**Appendix C**). Two of these species are suspected range extensions (see **Section 5.2.1.8**). The Survey Area is situated on the extremities of known ranges for the Western Grey Kangaroo (DBCA 2020b, van Dyck *et al.* 2013).

Species richness at a given location generally depends on the diversity of microhabitats and the size, number and/or extent of these microhabitats. The mulga on clay loam habitat had the highest species richness (n = 26), followed by the shrub plain habitat (n = 18), followed closely by the stony rise habitat which had the lowest species richness (n = 16) (**Table 5-2**). The high richness and abundance at the mulga on clay loam sites is likely related to twice the sample effort (Site C and Site D), as well as the influence of the denser vegetation providing additional microhabitats. The lower species richness and abundance of the stony rise and shrub plain habitats may be attributed to the open, low vegetation and limited habitat diversity (particularly in the shrub plain habitat). However, some of the species captured at these sites were unique to these sites and only captured in these habitat types.

Table 5-2: Fauna species richness and abundance from systematic sampling of habitats during the Survey

Habitat	Sites	Native mammals		Birds		Reptiles		Amphibians		Total	
		R	A	R	A	R	A	R	A	R	A
Mulga on clay loam	C, D	3	13	14	109	9	29	0	0	26	151
Stony rise	B	3	13	6	19	7	14	0	0	16	46
Shrub plain	A	3	9	10	22	5	8	0	0	18	39
Total		5	35	22	150	14	51	0	0	41	236

Note: records comprise captures from systematic sites only and includes only systematic trapping and systematic avifauna census; R = species richness; A = species abundance.

5.2.1.2 Native mammals

The desktop assessment identified 26 species of native mammal that potentially occur in the Survey Area (**Appendix C**). Of these, 18 species (69.2%) were recorded during the Survey. An additional five species of native mammal were recorded during the Survey that had not been identified by the desktop assessment (**Section 5.2.1.1**). In total 18 species of native mammal were recorded during the Survey, most of which were recorded via targeted survey methods (n = 17), with only the Ooldea Dunnart being recorded exclusively by trapping. The number of native mammals recorded during this Survey was the highest of any of the previous studies conducted within the Survey Area (**Table 3-2**).

All three habitat types showed similar diversity for native mammal captures, based on systematic trapping, with all three habitat types recording three species (n = 3) (**Table 5-2**). However, the mulga on clay loam and stony rise habitats had the highest abundance, which may be attributed to twice the sample effort occurring within the mulga on clay loam habitat (Site C and Site D), a higher upper stratum vegetation cover within the mulga on clay loam habitat, and the presence of rocky outcropping within the stony rise habitat (**Section 5.1**). The most commonly recorded species at systematic sites was the Stripe-faced Dunnart (*Sminthopsis macroura*), which was recorded on 28 occasions, mostly within the mulga on clay loam habitat at Sites C and D (**Appendix E**).

The mulga on clay loam habitat was the most diverse habitat for volant mammals (bats), supporting seven species (**Appendix E**). The shrub plain and stony rise habitats supported six and three species of bat, respectively (**Appendix E**). The most commonly recorded volant mammal species were the White-striped Free-tail Bat (*Austronomus australis*), Gould's Wattled Bat (*Chalinolobus gouldii*), and the Lesser Long-eared Bat (*Nyctophilus geoffroyi*), found at all systematic sites across all habitat types (**Appendix E**).

Of the 23 species of native mammals recorded during the Survey, only one was listed as a significant fauna species; the Long-tailed Dunnart (*Sminthopsis longicaudata*) (P4) (**Section 5.3**).



Plate 5-1: A Woolley's Pseudantechinus (*Pseudantechinus woolleyae*), Kultarr (*Antechinomys laniger*), and Stripe-faced Dunnart (*Sminthopsis macroura*) captured during the Survey. Photos: Melissa Jensen.

5.2.1.3 Birds

The desktop assessment identified 152 species of birds that potentially occur within the Survey Area (**Appendix C**). Of these, 52 species (34.2%) were recorded during this Survey, including 22 species from 150 records at systematic sites (**Appendix E**). This number is above the number recorded from most previous surveys of the Survey Area (**Table 3-2**), with the exception of the Halpern Glick Maunsell (1999) survey, where 67 species of birds were recorded.

The mulga on clay loam habitat contained the highest species richness (n = 14) and concurrently the highest relative abundance with 109 individuals recorded (**Table 5-2**). This is likely due to this habitat having denser vegetation that may support roosting, nesting and foraging for more avifauna species than the other habitats within the Survey Area. The most common bird species at systematic sites was the Southern Whiteface (*Aphelocephala leucopsis*), with 56 records, followed by the Crested Bellbird (*Oreoica gutturalis*), with 21 records. These species are relatively common in the landscape and typically occur in a wide range of habitats (Menkhorst *et al.* 2017). Two species of bird, the Western Whistler (*Pachycephala occidentalis*) and the Whiskered Tern (*Sterna hybrida*) was recorded during the Survey, however had not been identified in the desktop assessment. The Western Whistler has only been described as a distinct

species since 2014 (Joseph *et al.* 2014) and this may explain why it was not identified by the desktop assessment.

Four species of reptile were recorded during the Survey that were not identified in the desktop assessment, including the Mulga Dragon (*Diporiphora amphiboluroides*), Dark-spined Blind Snake (*Anilius bicolor*), and the Perentie (*Varanus giganteus*). The Survey Area is within the range of these species, but these records represent new records for the species in the Laverton area

Five targeted avifauna census' were conducted at artificial water sources within the Survey Area. Of the 52 bird species recorded during the Survey, 14 were found exclusively at the artificial water sources. Of these, the Banded Stilt (*Cladorhynchus leucocephalus*) and the Pink-eared Duck (*Malacorhynchus membranaceus*) were the most abundant with approximately 100 and 80 individuals recorded respectively.

Of the 52 bird species recorded during the Survey, two are listed as significant: the Wood Sandpiper (*Tringa glareola*) (Mi; IA) and the Common Sandpiper (*Actitis hypoleucos*) (Mi; IA) (**Section 5.3**).

5.2.1.4 Reptiles

The desktop assessment identified 78 species of reptiles that potentially occur in the Survey Area (**Appendix C**). In total 20 (25.6%) of these species were recorded during the Survey, including 14 species from 51 records at systematic sites (**Appendix E**). The number of reptiles recorded during this Survey (n = 20) was generally higher than the surveys previously conducted within the Survey Area, with the exclusion of the Halpern Glick Maunsell (1999) survey, where 22 reptiles species were recorded (n = 22) (**Table 3-2**).

The highest species richness and abundance during the Survey was recorded within the mulga on clay loam habitat, with nine species from 29 records observed at systematic sites (**Table 5-2; Appendix E**). This habitat may provide a range of microhabitats for reptiles, including leaf litter, woody debris and peeling bark in which to shelter (**Section 5.1**). This habitat also provides more vegetation cover and the clay loam substrate exhibits moderate to high burrowing suitability.

The most common reptile species recorded during the systematic trapping were the Common Desert Ctenotus (*Ctenotus leonhardii*; 11 records) and the Barred Wedge-snouted Ctenotus (*Ctenotus schomburgkii*; 11 records) (**Appendix E**). The Yellow-spotted Monitor (*Varanus panoptes*) was regularly recorded via motion-sensor camera and systematic searches at Sites B, C and D (**Appendix E**). Four species of reptile were recorded during the Survey that were not identified in the desktop assessment, including the Mulga Dragon (*Diporiphora amphiboluroides*), Dark-spined Blind Snake (*Anilius bicolor*), and the Perentie (*Varanus giganteus*). The Survey Area is within the range of these species, but these records represent new records for the species in the Laverton area. They were recorded within the mulga on clay loam, stony rise and mulga on stony plain habitats respectively within the Survey Area (DBCA 2020b, Wilson and Swan 2017). The fourth species that was not identified during the desktop assessment was the Banded Knob-tailed Gecko (*Nephurus wheeleri*), captured within the shrub plain habitat at Site A. This represents a suspected range extension for this species (**Section 5.2.1.8**).

Of the 20 reptile species recorded during the Survey, none were listed as significant fauna (**Section 5.3**). With the exception of the Banded Knob-tailed Gecko (*Nephurus wheeleri*), all species recorded during the Survey are well known in the bioregion and are widespread (DBCA 2020b, Wilson and Swan 2017).



Plate 5-2: A Goldfields Pebble-mimic Dragon (*Tymanocryptis pseudopsephos*), Dark-spined Blind Snake (*Anilius bicolor*), and Southern Pygmy Spiny-tailed Skink (*Egernia depressa*) captured during the Survey. Photos: Melissa Jensen.

5.2.1.5 Amphibians

The desktop assessment identified five species of amphibians that potentially occur in the Survey Area (**Appendix C**). However, no amphibians were recorded during the Survey (**Table 5-2**). Amphibians may breed and persist at the artificial water sources within the Survey Area, however this habitat was not systematically sampled due to previous clearing. However, there was one small pocket of sparse shrubland on heavy clay (**Section 5.1**), which may support amphibian species, particularly after periods of heavy rainfall (Tyler and Knight 2011, WA Museum 2019). No significant amphibian species are known to occur in the Murchison bioregion.

5.2.1.6 Introduced fauna

The desktop assessment identified ten species of introduced mammal that potentially occur in the Survey Area (**Appendix C**). Five (50%) of these species were recorded during the Survey, including European Cattle (*Bos taurus*), the Red Fox (*Vulpes vulpes*), Feral Cat (*Felis catus*), Horse (*Equus caballus*), and the Rabbit (*Oryctolagus cuniculus*). The European Cattle and Horse were observed directly within the shrub plain, stony rise and/or mulga on clay loam habitats, with tracks and scats recorded throughout the Survey Area. The Rabbit was recorded via motion-sensor camera on three occasions at systematic Site B and twice in the adjacent outcropping habitat. Rabbit scats were recorded in the stony rise, outcropping and mulga on clay loam habitats. Fox and Feral Cat scat were observed opportunistically in outcropping habitat and mulga on sandy loam habitat, respectively.

Additionally, two species of introduced birds were identified during the desktop assessment; the Domestic Pigeon (*Columba livia*) and the Red Jungle Fowl (*Gallus gallus*) that have the potential to occur in the Survey Area (**Appendix C**). However, neither of these species were recorded during the Survey.

5.2.1.7 Additional fauna

Three additional species, not recorded within the Survey Area during the Survey, were identified on the regional cameras deployed to the north of the Survey Area to target Long-tailed Dunnarts in the wider region. These species included, the Dingo (*Canis familiaris dingo*), the Dwarf Bearded Dragon (*Pogona minor*), and the Goldfields Crevice-skink (*Egernia formosa*).

5.2.1.8 Range extensions

Two suspected range extensions were recorded during the Survey. A Banded Knob-tailed Gecko (*Nephurus wheeleri*) was recorded on two occasions at Site A (shrub plain habitat). This record represents a range extension of approximately 104 km (minimum distance to nearest record on Atlas of Living Australia (ALA 2020)). However, the Naturemap (DBCA 2020c) database shows the next closest record as ~327 km northwest of Site A.

A Western Whistler (*Pachycephala occidentalis*) was also recorded at Site A. This record represents a range extension of approximately 300 km to the northeast of its next closest record on the Atlas of Living Australia (ALA 2020).



Plate 5-3: Banded Knob-tailed Gecko (*Nephurus wheeleri*) caught at Site A. Photos: Melissa Jensen.

5.2.2 Sampling adequacy

Species accumulation curves can be used to estimate the sampling adequacy of systematic observation techniques for a survey (EPA 2016c). When a curve approaches an asymptote, it suggests that sampling effort has been sufficient to adequately collect the majority of species comprising the faunal assemblage at the locations sampled ((Thompson and Withers 2003). The value at which the curve asymptotes can also be used as an approximate measure of the total size of the species complement at that location (Thompson *et al.* 2003).

The species richness estimators (particularly Chao 1 and Chao 2) and Sobs accumulation curves for the Survey reached asymptote for mammals, indicating that adequate sampling was conducted to record the majority of mammal species in the area (**Figure 5-2**). Richness predictors indicated that between 83 to 100% of mammal species were trapped during the Survey (**Table 5-3**). Seven additional ground-dwelling mammal species (three native, four introduced) were also recorded within the Survey Area during the Survey, detected by alternative surveying techniques such as systematic searching, spotlighting and motion-sensor camera deployment, and therefore were not included in the Sobs curve. These comprised species not typically recorded via techniques used for systematic trapping (i.e. large macropods or ungulates).

The avifauna species richness estimators and Sobs accumulation curves steadily increased but did not reach asymptote, indicating that additional species would be recorded with further sampling (**Figure 5-3**). Richness predictors indicate that between 70 to 96% of avifauna species were recorded during the Survey, and that between four and nine additional species may be recorded with increased survey effort (**Table 5-3**).

The herpetofauna species richness estimators and Sobs accumulation curves reached an asymptote (particularly Chao 1 and Chao 2) (**Figure 5-4**). Richness predictors indicated that between 78 to 92% of herpetofauna species were recorded during the Survey, and that between one and three additional species may be recorded with further survey effort (**Table 5-3**). Another six species were recorded at systematic sites during spotlighting, systematic searching and opportunistic observations, which were not captured in the Sobs curve.

The season was considered appropriate for the capture of all fauna groups within the Survey Area; warm enough for reptile activity but not too hot to deter avifauna activity during Phase 1. It was noted in the field that many species were in exceptionally good body condition during the Phase 2 field survey. Whilst some curves failed to reach asymptote it should be reiterated that the Sobs curves did not include additional species recorded via targeted or opportunistic methods.

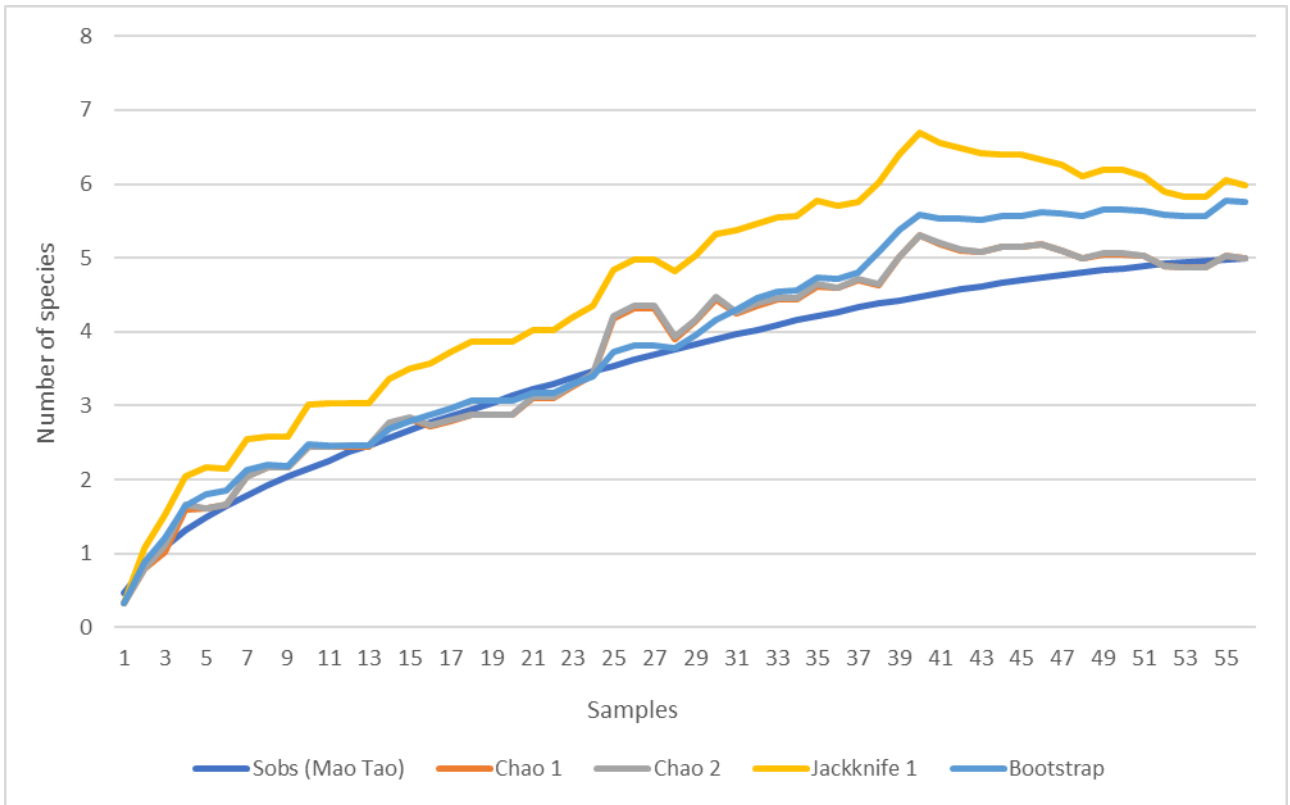


Figure 5-2: Species accumulation curves for captured mammals at systematic sites during the Survey

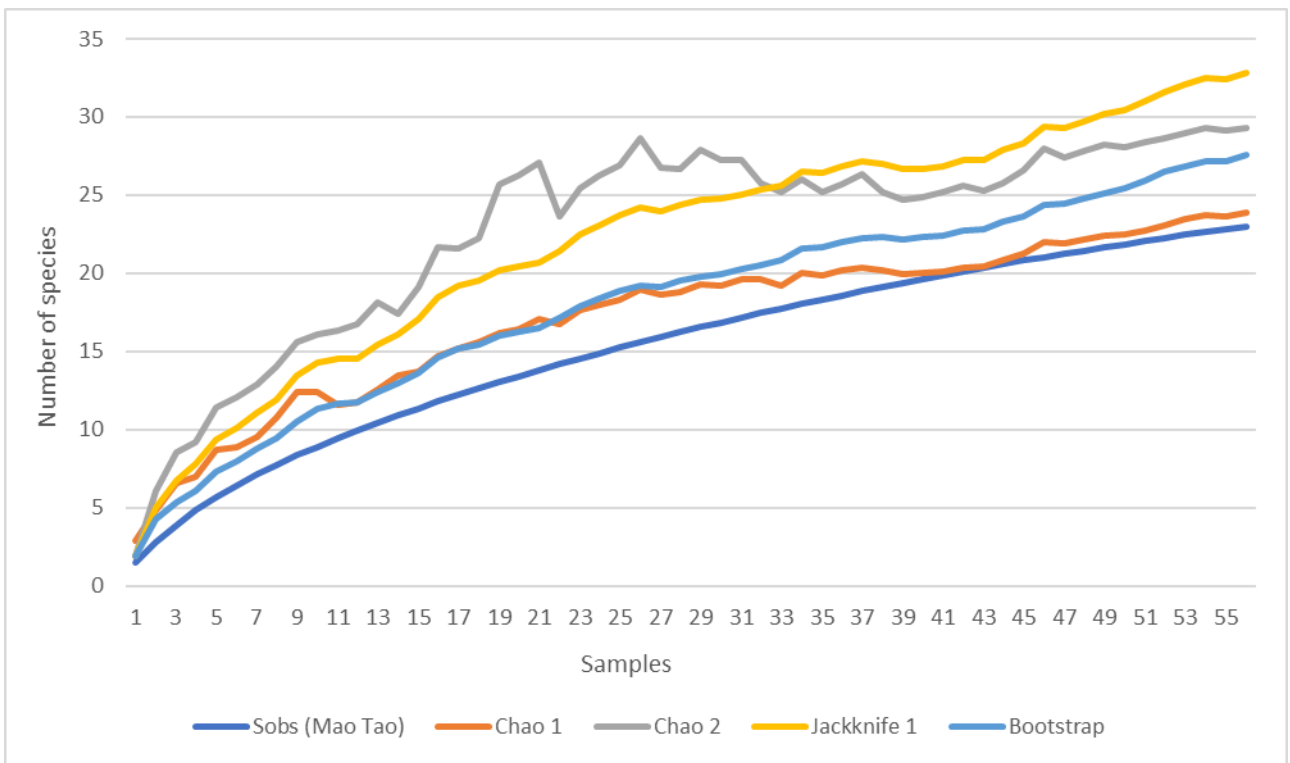


Figure 5-3: Species accumulation curves for avifauna at systematic sites during the Survey

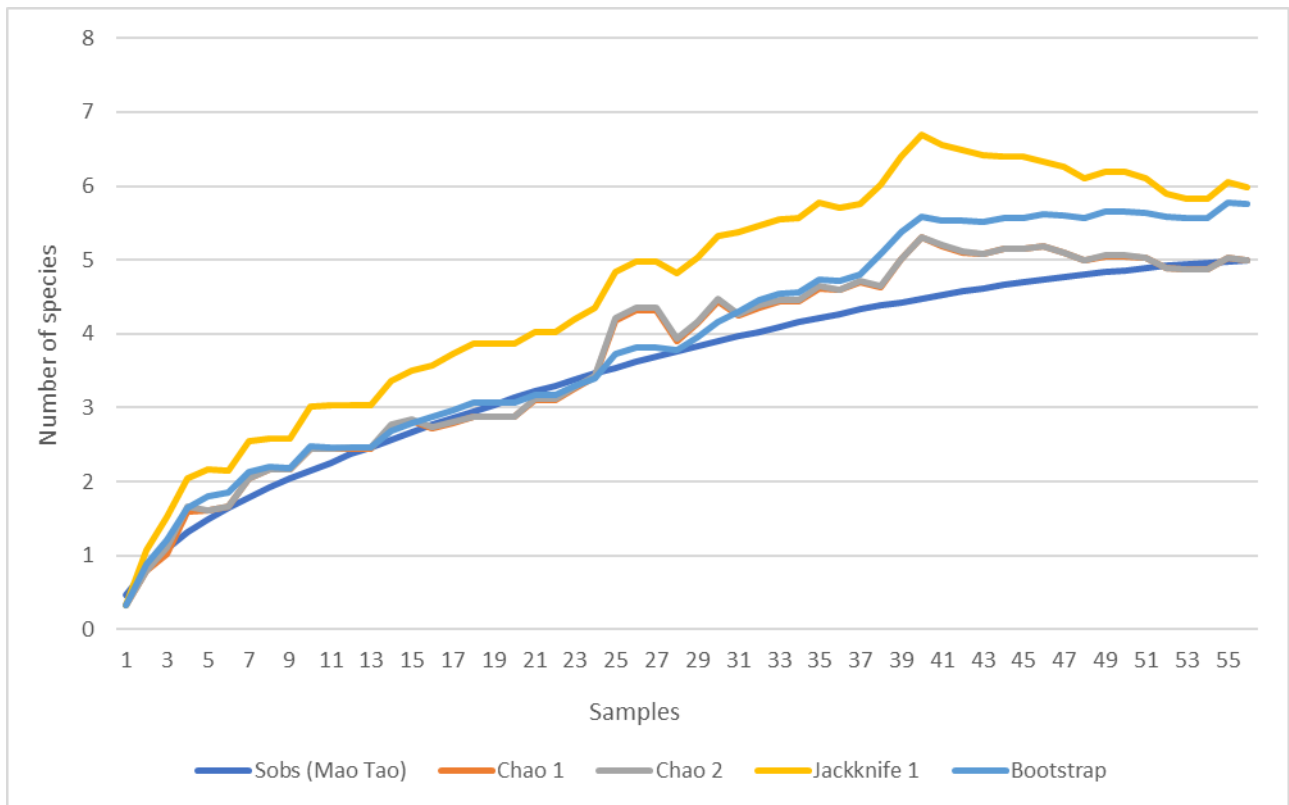


Figure 5-4: Species accumulation curves for captured herpetofauna at systematic sites during the Survey

Table 5-3: Observed and predicted species richness at systematic trapping sites during the Survey

Faunal Group	Observed vs. Estimated		Species Richness (n)	Proportion Recorded (%)
	Obs.	Sobs		
Mammals	Obs.	Sobs	5	-
	Estimated	Chao 1	5	100
		Chao 2	5	100
		Jackknife 1	5.98	83.6
		Bootstrap	5.7	87.7
Birds	Obs.	Sobs	23	-
	Estimated	Chao 1	23.9	96.2
		Chao 2	29.3	78.5
		Jackknife 1	32.8	70.1
		Bootstrap	27.5	83.6
Herpetofauna	Obs.	Sobs	14	-
	Estimated	Chao 1	15.2	92.1
		Chao 2	15.2	92.1
		Jackknife 1	17.9	78.2
		Bootstrap	16.1	87.0

5.3 Fauna of Significance

The desktop assessment identified a total of 25 terrestrial vertebrate fauna species of significance with the potential to occur within the Survey Area, comprising six mammal, 18 bird and one reptile species (**Section 3.2.2**). Three of these species were recorded within the Survey Area during the Survey (**Section 5.3.1 to 5.3.3**) comprising:

- Long-tailed Dunnart (*Sminthopsis longicaudata*) (P4);

- Wood Sandpiper (*Tringa glareola*) (Mi; IA); and
- Common Sandpiper (*Actitis hypoleucos*) (Mi; IA).

The likelihood of significant fauna species occurring within the Survey Area was assessed against the criteria provided in **Section 3.1.3** and is detailed in **Table 5-4**. Of the remaining species, 11 are considered to possibly occur and seven are considered unlikely (**Table 5-4**). Of the 25 significant terrestrial vertebrate species identified in the desktop assessment:

- twenty-three are listed as Threatened under the EPBC Act and/or BC Act;
- three are recognised by DBCA as Priority fauna;
- one species is recognised by the state (BC Act), and requires special protections; and
- thirteen species are listed as Migratory under the EPBC Act and/or International Agreements under the BC Act.

Some of the significant species listed as Threatened, Migratory and/or Priority fauna may be included in multiple groups. In addition, four species comprised records outside their current range and known distribution or are considered extinct (Threatened Species Scientific Committee 2018, van Dyck *et al.* 2013, van Dyck and Strahan 2008). The following are considered not relevant within the context of this Survey, based on the criteria outlined in **Section 3.1.3**:

- Numbat (*Myrmecobius fasciatus*, En;EN): restricted to two natural populations at Dryandra and Perup, and translocated populations outside the Survey Area (Threatened Species Scientific Committee 2018);
- Chuditch (*Dasyurus geoffroii*, Vu;VU): outside current range (DEC 2012, van Dyck *et al.* 2013);
- Bilby (*Macrotis lagotis*, Vu;VU): outside current range and no recent records (DBCA 2020b, van Dyck *et al.* 2013); and
- Banded Hare-wallaby (*Lagostrophus fasciatus fasciatus*, VU under BC Act): extinct on mainland, restricted to Bernier and Dorre Islands, Shark Bay (van Dyck and Strahan 2008).

5.3.1 Long-tailed Dunnart (*Sminthopsis longicaudata*) (P4)

There is limited information on the spatial ecology of the Long-tailed Dunnart, with only three records before 1975, where habitat and locality were not disclosed (van Dyck and Strahan 2008), making the discussion of habitat utilisation, dispersal and the activity of the Long-tailed Dunnart limited. However, limited available literature suggests the species is widely distributed in low abundance across much of the arid and semi-arid areas of Western Australia (van Dyck and Strahan 2008). This species was recorded at two locations in the L38/244 tenement area via trapping and motion-sensor camera within the stony rise habitat during both phases of the Survey (**Figure 5-6**; Plate 5-4). The population within the Survey Area could not be assessed as only two individuals were captured. The occurrence of the Long-tailed Dunnart is consistent with the known habitat preferences, which are rocky landscapes that support low open mulga over a spinifex understorey, occasionally with perennial grasses and cassias (Northern Territory Government 2006, van Dyck and Strahan 2008, WAM 2020b).

The Long-tailed Dunnart has also been recently recorded eight times within the Survey Area (Lynas 2019, 2020), and on 12 occasions in the vicinity of the Survey Area. Of the 12 records, two were located 7.2 km northwest and a further two were located approximately 12 km to the northwest (Terrestrial Ecosystems 2011). Three records from Terrestrial Ecosystems (2011) were within flat, open mulga woodland lacking rocky/stony substrate, with limited understorey. This suggests that either this species is not strictly restricted to rocky or stony habitats, or that the species was possibly misidentified, potentially confused with the similar looking Kultarr (*Antechinomys laniger*) which has also been captured in the area and is known to inhabit flat, open mulga woodlands. The remaining eight records occurred within 700 m of the Survey Area (Lynas 2020).

Thirty-two cameras were deployed on stony rises and outcropping to the north of the Survey Area to determine the presence of Long-tailed Dunnarts in the wider region. Long-tailed Dunnarts were recorded on 25 of these cameras (**Figure 5-6**) on a total of 212 occasions. The majority of Long-tailed Dunnart records were associated with stony rise and outcropping habitat and in conjunction with the records from motion-sensor cameras to the north of the Survey Area, support the argument that the species persists on other stony rise areas in the region.



Plate 5-4: Long-tailed Dunnarts captured at Site B during the Survey; (A) individual captured in pitfall trap during Phase 1, (B) individual prior to release, (C) individual captured during Phase 2 of the survey. Photos: Stephanie Williams and Melissa Jensen.

5.3.2 Wood Sandpiper (*Tringa glareola*) (Mi, IA)

The Wood Sandpiper is a migrant from Siberia travelling to Australia to use freshwater wetlands (Menkhorst *et al.* 2017). The species is more common in the north of Australia, however, can be found in the south along the coast and occasionally at inland freshwater wetlands (DotE 2020c, Menkhorst *et al.* 2017). The Wood Sandpiper utilises freshwater wetlands to forage and roost, before returning to the northern hemisphere for the breeding season (DotE 2020c).

A single individual was recorded during a targeted avifauna census at the Project's evaporation ponds within the cleared areas (**Figure 5-5**; Plate 5-5). The occurrence of the Wood Sandpiper is consistent with known habitat (DotE 2020c), which is at the edges of artificial water sources. This species has been recorded 11.9 km west of the Survey Area in 2008 (DBCA 2020b). That record was in proximity to an artificial water source. The artificial water source within the Survey Area lacks tall fringing vegetation and it is likely that this habitat is a secondary habitat within the region (DotE 2020c).



Plate 5-5: Wood Sandpiper photographed at an evaporation pond. Photo: Melissa Jensen.

5.3.3 Common Sandpiper (*Actitis hypoleucos*) (Mi, IA)

The Common Sandpiper migrates to Australia from Europe and Asia during the non-breeding season, arriving in late July-August and departing in March (DotE 2020f, Menkhorst *et al.* 2017). Found along all coastlines of Australia and in many areas inland, the Common Sandpiper is widespread in small numbers. The population, when in Australia, is concentrated in northern and western Australia (DotE 2020f). The Common Sandpiper uses mangrove-lined creeks, mud with outcropping of rocks, steep-sided sewage ponds and dams, and are usually solitary or in very small groups (Menkhorst *et al.* 2017).

A single individual was recorded during a targeted avifauna census at the Project's return water pond within the cleared areas (**Figure 5-5**). The occurrence of the Common Sandpiper is consistent with known habitat (Menkhorst *et al.* 2017), which includes foraging at steep-sided sewage ponds and dams. This species has previously been recorded on one occasion, 40 km to the north of the Survey Area, in 1979 (DBCA 2020b).

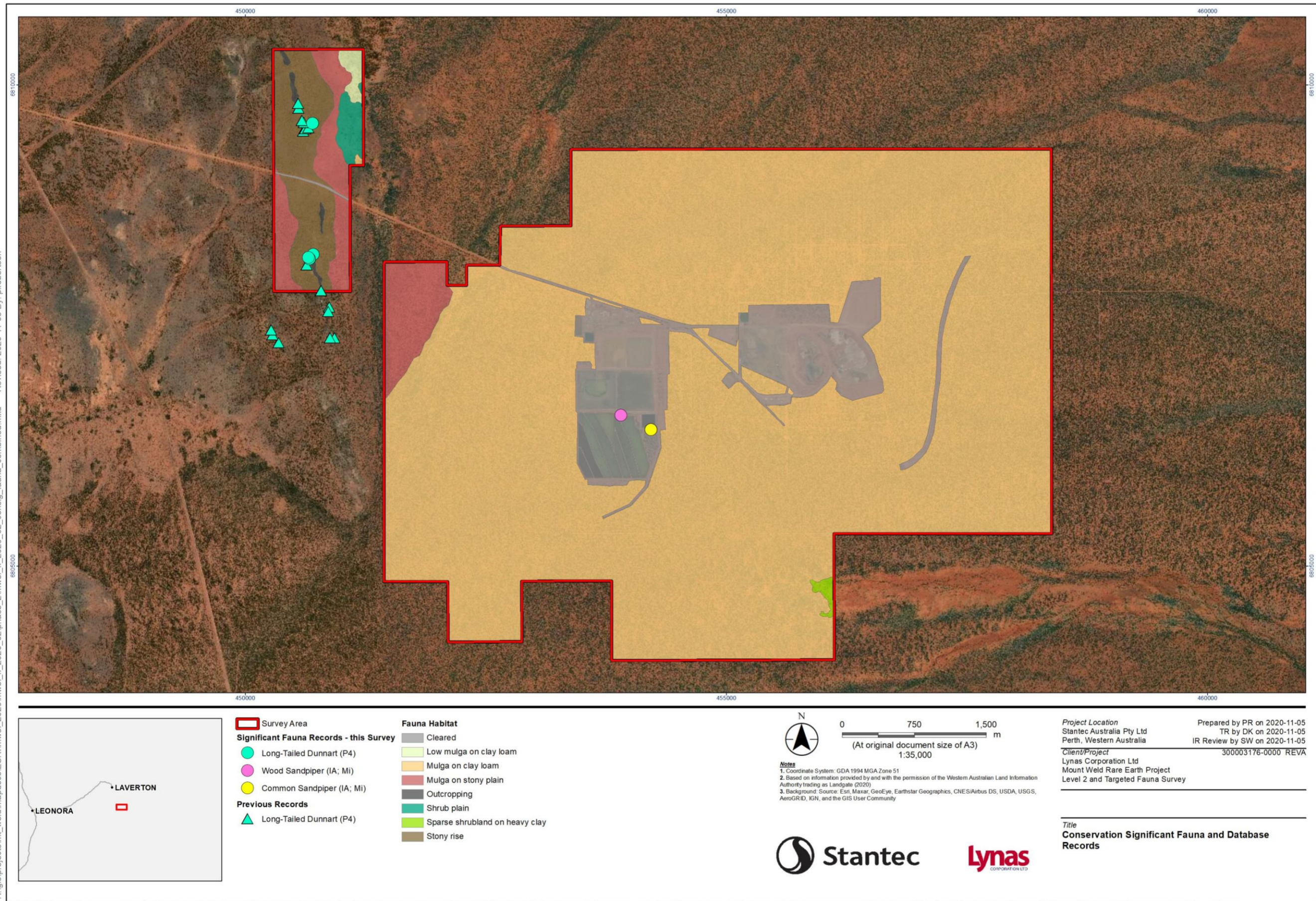
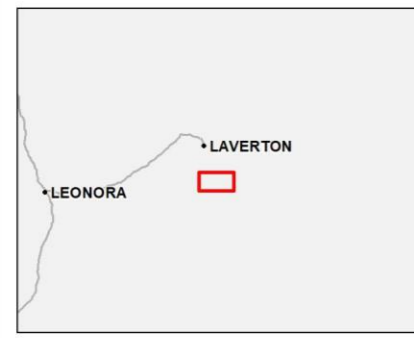
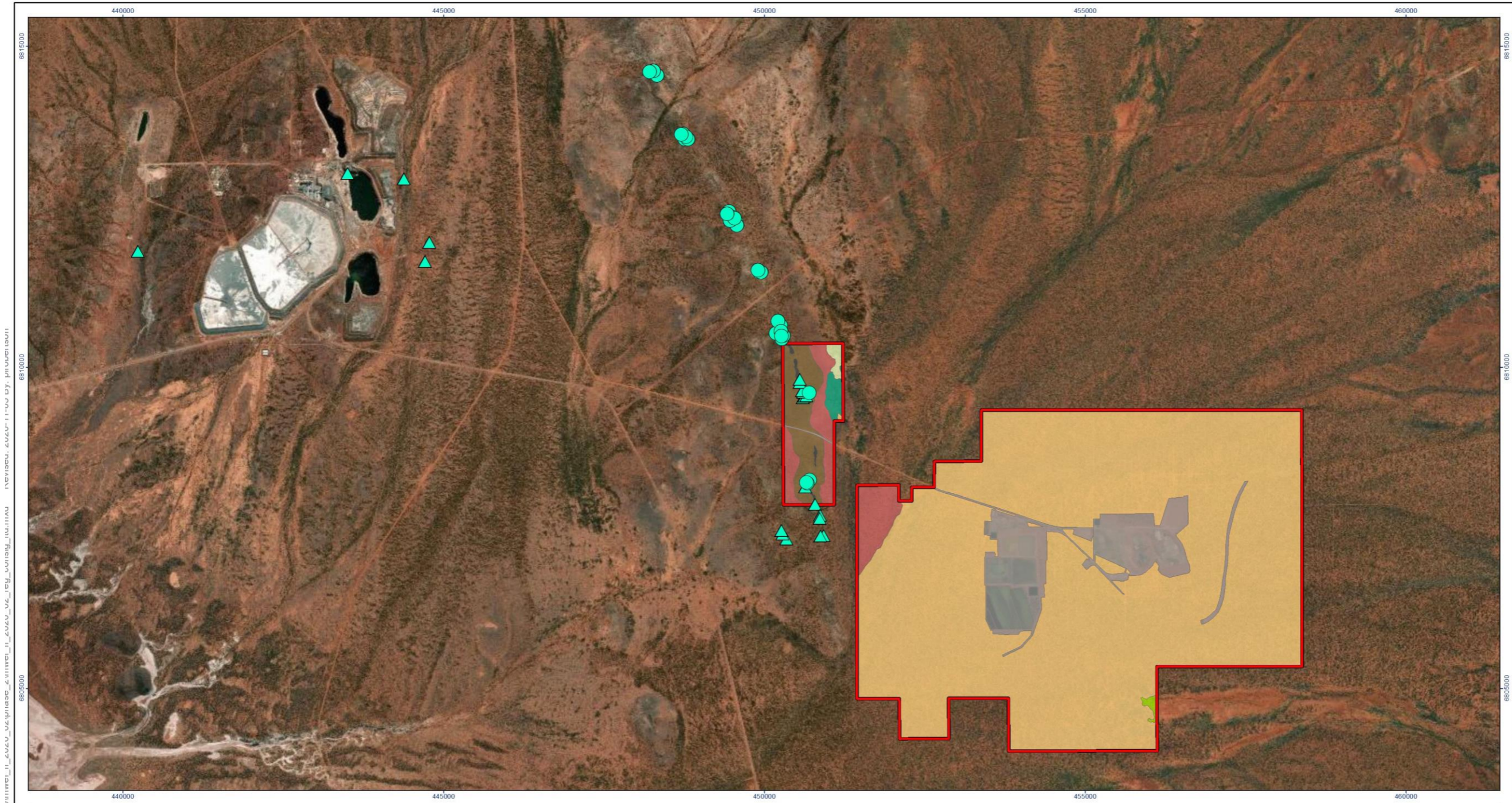
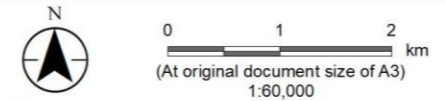


Figure 5-5: Significant fauna records within the Survey Area (from the desktop assessment and during this Survey)



- Survey Area
 - Significant Fauna Records - this Survey**
 - Long-Tailed Dunnart (P4)
 - Previous Records**
 - ▲ Long-Tailed Dunnart (P4)
-
- Fauna Habitat**
 - Cleared
 - Low mulga on clay loam
 - Mulga on clay loam
 - Mulga on stony plain
 - Outcropping
 - Shrub plain
 - Sparse shrubland on heavy clay
 - Stony rise



Notes
 1. Coordinate System: GDA 1994 MGA Zone 51
 2. Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2020)
 3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Project Location
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 Lynas Corporation Ltd
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 Level 2 and Targeted Fauna Survey

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Title
 Regional Long-tailed Dunnart Records



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Figure 5-6: Long-tailed Dunnart occurrence recorded by motion-sensor camera in the wider region

Table 5-4: Post-survey likelihood of occurrence of significant fauna within the Survey Area

Common name (scientific name)	Conservation status		Key threats and reason for listing	Habitat	Likelihood of occurrence and reason for likelihood
	EPBC Act	WA			
Mammals					
Long-tailed Dunnart (<i>Sminthopsis longicaudata</i>)	-	P4	Relatively little is known about the species distribution and biology (van Dyck and Strahan 2008), however potential threats may include inappropriate fire regimes, habitat alteration by non-native herbivores and predations by Red Foxes and Feral Cats.	Rocky, hilly areas, occasionally open areas with a stony, rocky mantle on low open mulga over spinifex and occasionally perennial grasses and cassias (Northern Territory Government 2006, van Dyck and Strahan 2008, WAM 2020b).	Confirmed See Section 4.6.1
Brush-tailed Mulgara (<i>Dasycercus blythi</i>)	-	P4	Major threats may include inappropriate fire regimes, habitat alteration by non-native herbivores and predations by Red Foxes and Feral Cats (Woinarski <i>et al.</i> 2014).	Inhabit spinifex grass plains within the arid zone (van Dyck and Strahan 2008).	Unlikely While the species has been recorded recently nearby, the Survey Area does not contain suitable spinifex sandplain habitat (van Dyck and Strahan 2008). As such, the species is considered unlikely to occur within the Survey Area.
Birds					
Night Parrot (<i>Pezoporus occidentalis</i>)	En	CR	Little is known about potential threats to this species, but suspected threats included reduction of the extent or quality of habitat, increase in numbers of feral predators, increase (or decrease) in grazing pressure, or change in fire regime (DotEE 2016)	Known to inhabit treeless or sparsely wooded long unburnt spinifex hummock plains often interspersed with chenopods (Pyke and Ehrlich 2014).	Unlikely The species has not been recorded recently nearby, and the Survey Area does not contain suitable habitat (Pyke and Ehrlich 2014). The species was only detected as the species or habitat "may occur within the area" (DoAWE 2020b). Four acoustic recording units were deployed within the Survey Area for a total of 28 sampling nights. Three units were deployed in mulga on clay loam habitat and one unit was deployed in the mulga on stony plain habitat. No records of the species were obtained by any of the four units.
Malleefowl (<i>Leipoa ocellata</i>)	Vu	VU	The major threats to the species include, habitat clearing, fragmentation and isolation, habitat alteration by non-native herbivores, predation by Red foxes and to a lesser extent, fire and climate change (Benshemesh 2007).	Knowledge of habitat preferences is limited, however the species tends to inhabit arid or semi- arid shrublands or woodlands dominated by long unburnt mallee, and may also occur in areas dominated by <i>Acacia sp.</i> , wandoo, marri or mallet (Benshemesh 2007). Substrates tend to be sandy loams and loamy sands with an abundance of leaf litter for mound construction and may contain gravel or lateritic fragments (Benshemesh 2007, Parsons 2008). A 2008 study indicates the species may be associated with areas of tall vegetation providing canopy cover, shrubs that provide food such as <i>Acacia</i> and <i>Gastrolobium</i> species and reduced sedge cover (Parsons 2008).	Possible The Survey Area occurs within the species range (Pizzey and Knight 2007) and the species has been recorded recently in the surrounding area, the closest of which are a swathe of secondary sign records from 2019 however, their certainty is not assured (DBCA 2020b). The next closest certain records of which are once during 2015, twice during 2014 and once during 2013 between 25 – 30 km south of the Survey Area (DBCA 2020b). However, the Survey Area only contains marginal habitat. Due to these factors, the species is considered to possibly occur.
Princess Parrot (<i>Polytelis alexandrae</i>)	Vu	P4	The major threats for the species include, habitat degradation, inappropriate fire regimes and habitat alteration by non-native herbivores (DEWHA 2008, DotE 2020g).	Often found far from fresh water, inhabits areas with spinifex under Eucalypts, acacias, desert oaks and poplars, hakeas and mistletoes or vegetation near salt lakes (Pizzey and Knight 2007).	Unlikely The Survey Area lies on the edge of the species irregular range (Pizzey and Knight 2007), and nearby records are restricted to one undated record ~ 23 km northwest of the Survey Area near Laverton (DBCA 2020b).
Wood Sandpiper (<i>Tringa glareola</i>)	Mi	IA	Species migratory between Australia and Siberia, and through much of Asia. Therefore, protected under international agreements Bonn, CAMBA, JAMBA and ROKAMBA. Habitat loss and degradation are the largest threats to the species, particularly the availability of foraging and roosting sites required for successful migration and breeding (Bamford <i>et al.</i> 2008, DEWHA 2009).	Small to large sized shore bird inhabit shallow aquatic areas on coasts, mudflats, saltmarshes, estuaries, lake margins and other inland waters and bore or grassy plains, including artificial water sources (DotE 2020c, Pizzey and Knight 2007).	Confirmed See Section 5.3.2
Two wagtails from the family Motacillidae: • Yellow Wagtail (<i>Motacilla flava</i>) • Grey Wagtail (<i>Motacilla cinerea</i>)	Mi	IA	None listed (DotE 2020d, e).	Yellow and Grey Wagtails are listed as rare vagrants to the Australian continent from the North. Inhabit areas associated with water including running water/ streams, sewage ponds, swamp margins and saltmarshes and lawns, ploughed fields and airfields (Pizzey and Knight 2007).	Unlikely The species have not been recorded recently nearby and mainly visit northern areas of Australia (Menkhorst <i>et al.</i> 2017, Pizzey and Knight 2007).

Common name (scientific name)	Conservation status		Key threats and reason for listing	Habitat	Likelihood of occurrence and reason for likelihood
	EPBC Act	WA			
Gull-billed Tern (<i>Sterna nilotica</i>)	Mi	IA	Species migratory between Australia and Siberia, and through much of Asia. Therefore, protected under international agreements CAMBA (DoE 2020b).	Shallow sheltered seas close to land, estuaries, tidal creeks; and inundated samphire flats, flooded salt lakes, claypans and watercourses in the interior (Johnstone and Storr 1998). Tends to breed on islands in inland lakes (Pizzey and Knight 2007).	Unlikely The Survey Area does not contain suitable habitat (Pizzey and Knight 2007), and the species has only been recorded once recently nearby (~40 km northwest of the Survey Area during 2000) (Birdlife Australia 2020).
Fork-tailed Swift (<i>Apus pacificus</i>)	Mi	IA	Species migratory between Australia and much of Asia. Therefore, protected under international agreements CAMBA, JAMBA and ROKAMBA. There are no significant threats to the Fork-tailed Swift in Australia. Potential threats include habitat destruction and predation by feral animals (DoAWE 2020a).	Aerial species, which forages high above the tree canopy and rarely lower (Johnstone and Storr 1998). Forage in high-flying flocks over a wide range of habitats, however, may be more abundant over inland plains (Menkhorst <i>et al.</i> 2017). The species tends to arrive in Australia between October and November, with numbers peaking in late summer, and migrate north in April (Menkhorst <i>et al.</i> 2017). Species is occasionally observed during winter (Menkhorst <i>et al.</i> 2017).	Possible The species is a non-breeding visitor to Australia, is exclusively an aerial forager and has a large foraging range (Menkhorst <i>et al.</i> 2017, Simpson and Day 2010). The Survey Area occurs within the species range (Menkhorst <i>et al.</i> 2017), and the species may flyover the Survey Area on an irregular basis but is not dependent on habitats within the Survey Area.
Common Sandpiper (<i>Actitis hypoleucos</i>)	Mi	IA	The species migrates to Australia from Europe and Asia during the non-breeding season, arriving in late July-August and departing in March. Despite its name, they are not particularly common in Australia (DoE 2020f, Menkhorst <i>et al.</i> 2017). Threats include habitat changes and/or loss, reduction of water quality and regulation of rivers, pollution, pesticide use, global warming, and human disturbance (including fishing, shellfish harvesting) (DoE 2020f).	Found along all coastlines of Australia and in many areas inland, the Common Sandpiper is widespread in small numbers (DoE 2020f). Characteristic of narrow and often steep shorelines, often in sheltered setting used by few or no other shorebirds. Habitats include mangrove-lined creeks, mud with outcropping of rocks, steep-sided sewage ponds and dams. Usually solitary or in very small groups (Menkhorst <i>et al.</i> 2017).	Confirmed See Section 5.3.3
Seven ibis, plover, sandpiper, greenshank and stint species from the families; Threskiornithidae, Ardeidae Charadriidae, and Scolopacidae. <ul style="list-style-type: none"> Sharp-tailed Sandpiper (<i>Calidris acuminata</i>) Pectoral Sandpiper (<i>Calidris melanotos</i>) Red-necked Stint (<i>Calidris ruficollis</i>) Glossy Ibis (<i>Plegadis falcinellus</i>) Common Greenshank (<i>Tringa nebularia</i>) Eastern Great Egret (<i>Ardea modesta</i>) Oriental Plover (<i>Charadrius veredus</i>) 	Mi	IA	Species migratory between Australia and Siberia, and through much of Asia. Therefore, protected under international agreements CAMBA, JAMBA and ROKAMBA. Habitat loss and degradation are the largest threats to the species, particularly the availability of foraging and roosting sites required for successful migration and breeding (Bamford <i>et al.</i> 2008, DEWHA 2009).	Small to large sized shore birds inhabit shallow aquatic areas on coasts, mudflats, saltmarshes, estuaries, lake margins and other inland waters and bore or grassy plains (Pizzey and Knight 2007).	Possible While these species have been recorded in the surrounds, the Survey Area is devoid of natural habitat such as drainage lines or inland waters (Pizzey and Knight 2007). The Survey Area does contain artificial sources of water which may provide suitable habitat to some species, however information on utilisation and benefit to individual species is limited (Birdlife Australia 2004). As such, while the species may fly over the Survey Area and may use the artificial water source habitats, they are unlikely to depend upon any habitats within the boundaries and more likely to use suitable areas nearby (e.g. Lake Carey).
Hooded Plover (<i>Thinornis cucullatus</i>)		P4			

Common name (scientific name)	Conservation status		Key threats and reason for listing	Habitat	Likelihood of occurrence and reason for likelihood
	EPBC Act	WA			
Peregrine Falcon (<i>Falco peregrinus</i>)		S	The major threat to the species is habitat loss, particularly wooded areas which serve as nesting sites to the species in the absence of cliffs (DotE 2016).	The species occurs along cliffs, gorges, wooded rivers, wetlands, plains and open woodlands, as well as in association with pylons and buildings (Pizzey and Knight 2007). Nests on cliffs, in crevices, large tree hollows or on building ledges (Pizzey and Knight 2007).	Possible The Survey Area occurs within the species current range (Pizzey and Knight 2007), and the species has been recorded recently nearby, including one 2012 and two 2004 records 25 – 30km from the Survey Area (DBCA 2020b). However, the Survey Area does not contain optimal habitat or roosting trees, and all records are associated with Lake Carey which would provide more suitable habitat (DBCA 2020b). As such, while the species possibly occurs within the Survey Area, they are more likely to depend upon surrounding areas.
Reptiles					
Great Desert Skink (<i>Liopholis kintorei</i>)	Vu	VU	The biggest threats to the species include, predations (especially after loss of vegetation cover), inappropriate fire regimes, habitat alteration by non-native herbivores and habitat degradation due to weed invasion (DotE 2020a, Threatened Species Scientific Committee 2016).	Arid areas with spinifex sandflats and clay/ loamy soils (Wilson and Swan 2013).	Unlikely The Survey Area does not contain suitable habitat (Wilson and Swan 2013) and the species has not been recorded recently nearby (one record during 1967 ~40 km northeast of the Survey Area) (DBCA 2020b). As such, the species is considered unlikely to occur.

5.4 Matters of National Environmental Significance

For the purposes of this report, Matters of National Environmental Significance (MNES) are defined as fauna that are listed under the EPBC Act and that have been confirmed to occur within the Survey Area or are considered likely to occur. Fauna that are listed under the EPBC Act but are considered unlikely or possible to occur in the Survey Area were not considered. Two species listed as migratory under the EPBC Act is considered within this section, the Wood Sandpiper (*Tringa glareola*) (Mi; IA) and the Common Sandpiper (*Actitis hypoleucos*) (Mi, IA). No species listed as threatened under the EPBC Act were identified during the Survey.

The terminology, rationale and criteria used within this section is consistent with the Commonwealths Matters of National Environmental Significance: Significant impact guidelines 1.1 (DotE 2013). The following key definitions are directly relevant to the information presented in **Table 5-5**.

5.4.1 What is important habitat for a migratory species?

An 'important habitat' for the migratory species is defined by DotE (2013) as:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- habitat that is of critical importance to the species at particular life-cycle stages; and/or
- habitat utilised by a migratory species which is at the limit of the species range; and/or
- habitat within an area where the species is declining.

The DEWHA (2009) describe Important Habitat for the Wood Sandpiper and Common Sandpiper as:

- a site identified as an internationally important wetland (RAMSAR); and/or
- a site that supports:
 - at least 0.1% of the flyway population of the species; or
 - at least 2,000 migratory shorebirds; or
 - at least 15 shorebird species.

5.4.2 What is an ecologically significant population?

As defined by DotE (2013), an ecologically significant proportion of the population of migratory species varies with each species and when assessing an ecologically significant proportion the following factors should be considered; populations status, genetic distinctiveness and species specific behavioural patterns. The Survey Area does not contain significant habitat for either the Wood Sandpiper or the Common Sandpiper, based on the criteria in **Section 5.4.1 (Table 5-5)**.

Table 5-5: MNES criteria for the Wood Sandpiper and Common Sandpiper, recorded during the Survey

Species	Wood Sandpiper (<i>Tringa glareola</i>)
Occurrence in the Survey Area	One individual observed at the evaporation ponds
Does the Survey Area contain Important Habitat?	<p>No Each of the Important habitat criteria for the species is assessed below:</p> <ul style="list-style-type: none"> Habitat utilised by an ecologically significant proportion of the population: No, only one individual was recorded. Australian population is estimated at 130,000 and the global population is estimated at between 3,055,000 – 4,320,000 (DotE 2020c); Habitat that is critical to the species at particular life-cycle stages: No, breeding does not occur within Australia; Habitat utilised at the limit of the species range: No, whilst scarce in the interior of Australia, the Survey Area is not on the limit of the known range; Habitat within an area where the species is declining: No, in Australia the species has shown no change in the last 20 years, whereas the breeding population has declined in some areas (DotE 2020c); A site identified as an internationally important wetland (RAMSAR): No, the Survey Area does not intersect any internationally important wetlands; A site that supports; 0.1% of the flyway population, ≥2,000 individuals or ≥15 shorebird species: No.
Species	Common Sandpiper (<i>Actitis hypoleucos</i>)
Occurrence in the Survey Area	One individual observed at the return water pond
Does the Survey Area contain Important Habitat?	<p>No Each of the Important habitat criteria for the species is assessed below:</p> <ul style="list-style-type: none"> Habitat utilised by an ecologically significant proportion of the population: the Australian non-breeding population is estimated at 3000, and the global population is estimated at between 2,455,000 and 4,030,000 (Bamford <i>et al.</i> 2008, DotE 2020f); Habitat that is critical to the species at particular life-cycle stages: No, breeding does not occur within Australia; Habitat utilised at the limit of the species range: No, the Survey Area is not on the limit of the known range; Habitat within an area where the species is declining: No record of decline in Australia (DotE 2020f); A site identified as an internationally important wetland (RAMSAR): No, the Survey Area does not intersect any internationally important wetlands; A site that supports; 0.1% of the flyway population, ≥2,000 individuals or ≥15 shorebird species: No.

5.5 Short-range Endemic Invertebrate Fauna

5.5.1 SRE invertebrate fauna habitat

The seven fauna habitats identified during the Survey (**Section 5.1**) were assessed and categorised as having a high, medium or low potential to support terrestrial SRE taxa. This was based on the presence of microhabitats, habitat extent (restricted or widespread in the landscape), and whether the habitat occurred in isolation or was well connected in the landscape (**Table 5-6; Figure 5-7**).

Table 5-6: Assessment of SRE potential within the identified habitats of the Survey Area

Habitat	Assessment criteria			SRE potential
	Presence of microhabitats	Restricted in the landscape	Isolated in the landscape	
Mulga on clay loam	x	x	x	Low
Mulga on stony plain	x	x	x	Low
Stony rise	✓	✓	x	Medium
Shrub plain	x	✓	✓	Medium
Low mulga on clay loam	x	✓	x	Low
Outcropping	✓	✓	✓	High
Sparse shrubland on heavy clay	x	✓	x	Low

One habitat, outcropping, was assessed as having a high potential to support SRE species (**Table 5-6**). The outcropping habitat contained microhabitat features such as cracks and crevices, which can accumulate soil and leaf litter, and create mesic microhabitats likely to support SRE taxa, such as scorpions, land snails, millipedes and pseudoscorpions (Main 2000).

Two habitats; shrub plain and stony rise were assessed as having a medium potential to support SRE species (**Table 5-6**). The shrub plain habitat is relatively restricted and isolated in the landscape, comprising only a small portion of the Survey Area, however, offers little in the way of microhabitats. The stony rise habitat conversely contains some microhabitat features, such as cracks and crevices, as well as being restricted in the landscape, however, is not isolated in the landscape. Consequently, although these habitats may be restricted, they may not support SRE potential species due to lack of microhabitats or isolation.

The remaining five habitats within the Survey Area were assessed as having a low potential to support SRE species (**Table 5-6**). These habitats offered little to no microhabitats and were widespread and connected throughout the landscape.

5.5.2 SRE invertebrate taxa

The desktop assessment identified 12 invertebrate taxa that have potential to occur within the Survey Area and based on current known distributions, fulfill the criteria of being potential SRE species i.e. having a distribution of less than 10,000 km² (**Section 3.1.4**). Of these, four have been recorded within 20 km of the Survey Area, three of which were from within the Survey Area (**Table 5-7**). However three of these could not be identified to species level (see **Section 3.2.3**). During the Survey, a total of 20 specimens represented by nine taxa were collected from known SRE invertebrate groups within the Survey Area, six of which were identified to species (**Table 5-8; Figure 5-7**), equating to 28 specimens from eight taxa including desktop results.

Table 5-7: Invertebrate taxa from the desktop assessment recorded within 20 km from the Survey Area

Group	Family	Genus	Species	Distance to Survey Area (km)
Mygalomorph spider	Anamidae	<i>Aname</i>	`MYG629`	6.3
		<i>Aname</i>	sp. indet.*	within
	Idiopidae	<i>Aganippe</i>	sp. indet.*	within
Scorpions	Urodacidae	<i>Urodacus</i>	sp. indet.*	within

* Denotes specimens that could not be identified to species

Based on the identifications undertaken by Dr Erich Volschenk and Simon Judd of Alacran Environmental Science, there were six taxa identified to morphospecies, two taxa that were only able to be identified to genus, and one taxa was only able to be identified to family from the Survey (**Table 5-8**).

Many taxa are difficult to sample adequately. For example, mygalomorph spiders are time-consuming to locate, and morphological identification requires adult male specimens, which are often in low abundance and only emerge from their burrow during specific conditions, such as following rain or during humid nights.

Two mygalomorph spiders were able to be identified to species, *Mandjelia* 'MYG438', a widespread species in the eastern Goldfield and eastern Murchison regions (**Table 5-8; Figure 5-7**). The other mygalomorph spider was represented by a single male specimen and was matched to previously

undetermined *Proshermacha* specimens in the WA Museum from Irwin Hills. It was given the morphospecies code 'MYG715' and is a potential SRE owing to data deficiency regarding its distribution limits. The remaining six mygalomorph spider specimens comprised female specimens and therefore could not be identified to species level (**Table 5-8**). They were identified as *Idiopidae* sp. and *Idiosoma* sp., with the SRE status of 'Potential SRE: (data deficient)'. Furthermore, five mygalomorphs were collected in 2014, however these were only identified to genus as they comprised females and juveniles, and are classified as potential SREs. These comprised three females and one juvenile from the *Agnippe* genus, and one juvenile from the *Aname* genus (MWH 2014), equating to 11 mygalomorph specimens from four taxa collected from the Survey Area. Genetic analysis would be required to determine the relationship of these specimens and their distribution.

The scorpion specimens from the current survey were identified to *Lychas jonesae*, a well-known and widespread species in the eastern Goldfields and eastern Murchison regions and is found across the more arid southern half of Australia, where it has been recorded from Kalgoorlie to Berry in South Australia (**Table 5-8; Figure 5-7**). A scorpion was identified in 2014, however as it was a sub-adult this could only be identified to genus *Urodachus* (MWH 2014).

The slater specimens were able to be identified to two morphospecies: *Buddelundia* '103' and *Buddelundia* '106' (**Table 5-8; Figure 5-7**). No males of the *Buddelundia* '103' species have previously been collected, and such this species is described solely from female specimens and lacks formal taxonomic description. This morphospecies has a limited distribution and such is considered 'Potential SRE' however, due to taxonomic uncertainty is it also considered data deficient. A single specimen of *Buddelundia* '106' was collected during the Survey and marked the first male of the morphospecies to be collected. Very little is known about distribution and such is considered 'Potential SRE: Data Deficient'. *Buddelundia* '103' was collected from shrubland plain habitat while *Buddelundia* '106' was collected from Mulga on clay loam habitat. A recent search of the Alacran Environmental database (7 March 2023) which uses Simons Judds nomenclature for slaters did not reveal any additional matches for these taxa.

One pseudoscorpion specimen was collected during the Survey, belonging to the *Synsphyronus* genus (**Table 5-8; Figure 5-7**). This specimen was collected from Site D, within the mulga on clay loam habitat. The specimen did not conform to any previously described Western Australia morphospecies and is the only known specimen of *Synsphyronus* 'weld'. Thus, this morphospecies is considered 'Potential SRE: Data Deficient'.

One land snail specimen was collected during the Survey, belonging to the Pupillidae family (**Table 5-8; Figure 5-7**). Western Australian species in the family Pupillidae are generally quite widespread are therefore not SREs.

Table 5-8: Specimens from SRE groups collected during the Survey

Group	Site	Sample number	Identification	# of individuals	Collection method	SRE status	Habitat
Mygalomorph spider	A	LN7479	<i>Idiosoma</i> sp.	1	Burrow excavation	Potential SRE: Data Deficient	Shrub plain
	A	LN6984	<i>Zodariidae</i> sp.	1	Dry pitfall trap	Widespread	Shrub plain
	D	LN9454	<i>Idiopidae</i> sp.	1	Burrow excavation	Potential SRE: Data Deficient	Mulga on clay loam
	D	LN8963	<i>Idiopidae</i> sp.	1	Burrow excavation	Potential SRE: Data Deficient	Mulga on clay loam
	D	LN6987	<i>Mandjelia</i> 'MYG438'	1	Burrow excavation	Widespread	Mulga on clay loam
	D	647	<i>Proshermacha</i> 'MYG715'	1	Dry pitfall trap	Potential SRE: Data Deficient	Mulga on clay loam
	SRE1	LN8970	<i>Idiosoma</i> sp.	1	Burrow excavation	Potential SRE: Data Deficient	Mulga on clay loam
	SRE2	LN7976	<i>Idiosoma</i> sp.	1	Burrow excavation	Potential SRE: Data Deficient	Mulga on clay loam
Scorpion	A	LN6622	<i>Lychas jonesae</i>	1	Targeted search	Widespread	Shrub plain
	A	LN9464	<i>Lychas jonesae</i>	1	Dry pitfall trap	Widespread	Shrub plain
	A	653	<i>Lychas jonesae</i>	1	Dry pitfall trap	Widespread	Shrub plain
	B	723	<i>Lychas jonesae</i>	1	Dry pitfall trap	Widespread	Stony rise
	C	LN8961	<i>Lychas jonesae</i>	1	Targeted search	Widespread	Mulga on clay loam
	C	LN7468	<i>Lychas jonesae</i>	1	Targeted search	Widespread	Mulga on clay loam
	D	LN6624	<i>Lychas jonesae</i>	3	Targeted search	Widespread	Mulga on clay loam
	D	712	<i>Lychas jonesae</i>	1	Dry pitfall trap	Widespread	Mulga on clay loam
Pseudoscorpion	D	LN6256	<i>Synsphyronus</i> 'weld'	1	Opportunistic	Potential SRE: Data Deficient	Mulga on clay loam
Land snail	B	626	<i>Pupillidae</i> sp.	1	Leaf sieving	Widespread	Stony rise
Slater	A	LN7966	<i>Buddelundia</i> '103'	1	Dry pitfall trap	Potential SRE: Data Deficient	Shrub plain
	D	LN7988	<i>Buddelundia</i> '106'	1	Dry pitfall trap	Potential SRE: Data Deficient	Mulga on clay loam

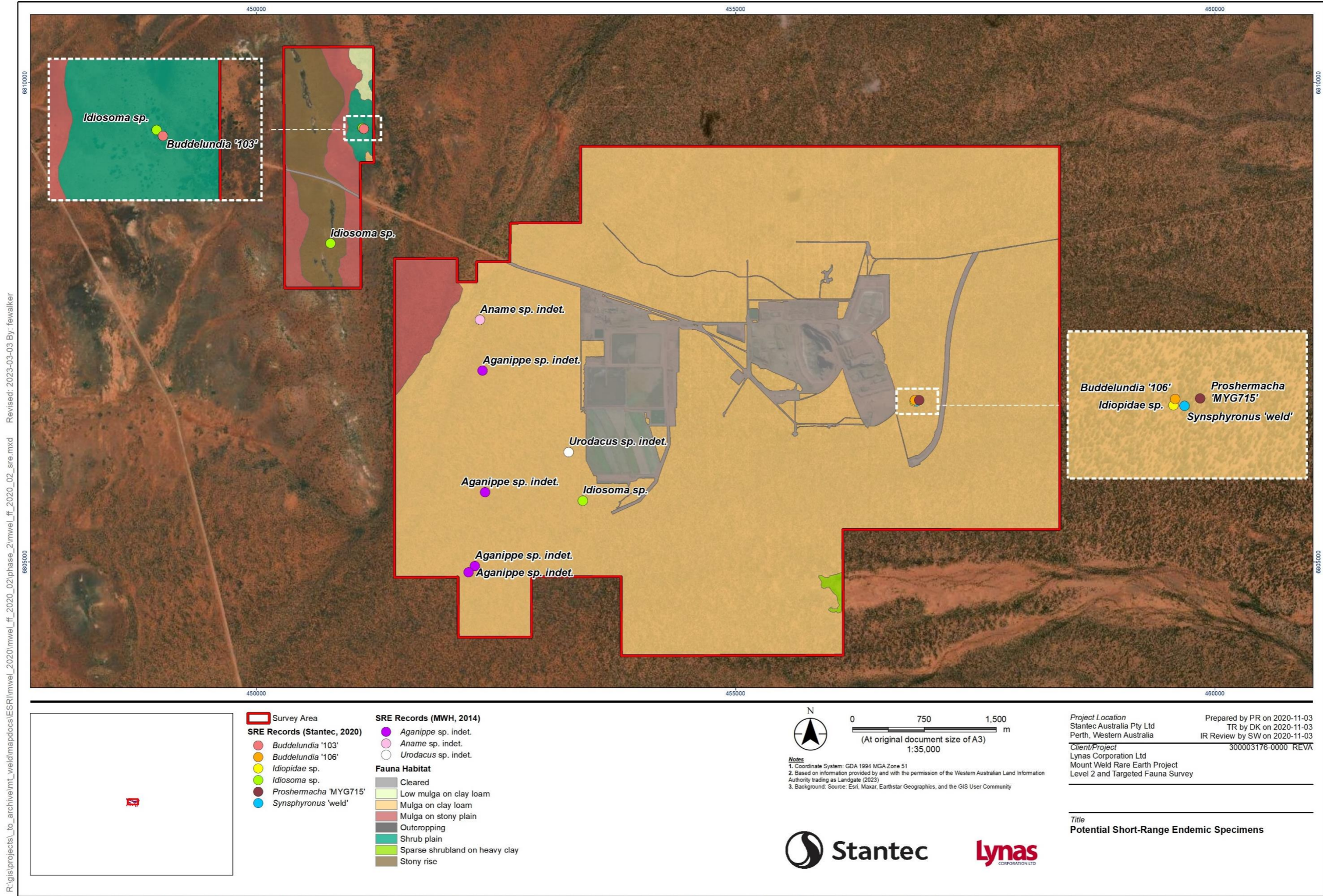


Figure 5-7: SRE invertebrate specimen records within the Survey Area (from the desktop assessment and this Survey)

6. Survey Limitations and Constraints

There are a number of possible limitations and constraints that can impinge on the adequacy of fauna surveys (EPA 2020b) (**Table 6-1**). All fauna surveys are limited to some degree by time and seasonal factors; consequently, it is most ideal if multiple surveys of an area are undertaken over a number of years and across different seasons (**Table 6-1**).

This Survey was potentially limited by seasonal factors within the Survey Area and the proportion of fauna identified (**Table 6-1**).

Table 6-1: Potential constraints of the Survey

Factor	Constraint	Comments
Competency and experience of consultants	No	Melissa Jensen was the technical lead, who is an experienced zoologist with over 10 years' experience supported by Stephanie Williams who was the survey lead with 2 years' experience. All team members are competent zoologists/ecologists and all identifications were confirmed by experienced senior zoologist, Melissa Jensen.
Scope	No	All terrestrial vertebrate fauna groups were surveyed using standardised and well-established techniques, and available previous survey work in the vicinity of the Survey Area was reviewed. Bat echolocation recordings were analysed by Robert Bullen of BatCall WA. Potential SRE specimens were analysed by invertebrate taxonomists Dr Erich Volschenk and Simon Judd of Alacran Environmental Science.
Proportion of fauna identified	Partial	Seasonal conditions for the Survey were dry, with below average rainfall in the 12 months preceding the Survey. The inventory of 95 species of vertebrate fauna recorded during the Survey represents 34.8% of the total number of species identified by database searches and surveys in the vicinity of the project (n = 273). The species accumulation curves suggest that additional survey effort would increase the number of species recorded in the Survey Area, however these do not include the additional records made by targeted and opportunistic methods. Most taxonomic groups expected within the Survey Area were represented and the species richness for each faunal group was considered above that of previous surveys in the area. All species were identified using the latest published literature.
Information sources (e.g. historic or recent)	No	Stantec had access to previous reports conducted for the Project, which comprised level 1 and targeted fauna surveys from 1992 to 2019. Stantec conducted a detailed analysis of survey reports, which included the Survey Area and immediate surrounds, summarised in Section 3.1.2 . Despite reports of similar surveys (level 2) conducted in the vicinity of the Survey Area not being available, there was considerable previous data that was able to be consolidated to provide local and regional context for this survey.
Completeness and intensity	No	The Survey Area has been assessed for its value to fauna by this baseline fauna survey. All planned survey works were conducted according to scope, and data relating to significant fauna can be used to inform environmental approvals for the Project. This report details the results of phase 1 of a dual-phase Level 2 fauna survey of the Survey Area, with phase 2 to be undertaken in spring 2020.
Timing / weather / season / cycle	No	Timing, weather, and seasonality of the survey were appropriate for vertebrate fauna in the Murchison bioregion. Rainfall was below average for the 12 months preceding the Survey however, above average rainfall was recorded in January, courtesy of an ex-tropical cyclone system, and in August. Optimal timing for SRE sampling recommended by the Technical Guidance is following rainfall (November to April) (EPA 2016b).

Factor	Constraint	Comments
Disturbances	No	The Survey Area encompasses the mine footprint and exploration tracks, an area of 328 ha (10.1%) of cleared habitat. However, the majority of the Survey Area was not impacted by disturbances (3,227 ha; 89.9%). No recent fire has disturbed the Survey Area. The locations for establishment of systematic sites were selected to avoid areas disturbed by mine and exploration activities.
Intensity	No	The Survey Area was systematically surveyed across four sites for a total of 2,912 trap nights, 1,120 minutes of avifauna census, 640 minutes of systematic searches, 320 minutes of spotlighting, 112 motion-sensor camera nights (16 locations) and 16 echolocation recorder nights (eight locations). This survey work was supplemented with targeted survey effort comprising four echolocation recorder locations, 880 motion-sensor camera nights (64 locations), 100 minutes of targeted avifauna census (five locations), and Malleefowl transects at eleven locations. As such, survey intensity was sufficient for detecting fauna, particularly those of significance within the Survey Area.
Completeness	No	The Survey was complete. Well represented habitats that were likely to yield the greatest diversity and abundance of captures – mulga on clay loam, shrub plain, and stony rise – were targeted for systematic site establishment, and the Survey Area was adequately covered geographically. Targeted survey effort was undertaken on foot in less accessible areas to better understand the occurrence of significant fauna within the Survey Area.
Resources	No	Resources were adequate to carry out the Survey satisfactorily.
Remoteness / access problems	No	Access to areas within the Survey Area was good and survey coverage was adequate to understand fauna assemblages and occurrence of significant fauna within the Survey Area (Figure 4-3). Some areas of the Survey Area had limited access and tracks, however, the habitats within these areas were not dissimilar to those sampled elsewhere in the Survey Area and were less likely to support significant fauna.

7. Summary

The inventory of 95 species of vertebrate fauna recorded during this Survey represents 34.8% of the total number of species identified from the database searches and fauna surveys undertaken in the vicinity of the Project (n = 273). Species recorded during the Survey comprised of 18 native mammals, five non-native, 52 birds and 20 reptiles (nil amphibians). Eleven species recorded during the Survey were not identified during the desktop assessment; the Ooldea Dunnart, Western Grey Kangaroo, White-striped Free-tailed Bat, South-western Free-tailed Bat, Inland Free-tailed Bat, Western Whistler, Whiskered Tern, Mulga Dragon, Dark-spined Blind Snake, Banded Knob-tailed Gecko and the Perentie, none of which were fauna of significance.

Seven broad fauna habitat types were identified within the Survey Area and the land systems in which these habitats occur were considered typical of the East Murchison subregion. Within the Survey Area, the stony rise, and outcropping habitats were the most important fauna habitats at a local scale. These habitats were of limited extent within the Survey Area and are important to the listed Long-tailed Dunnart (P4). These habitats also supported microhabitats including rocky crevices and cracks.

The desktop assessment identified 25 significant fauna species with the potential to occur within the Survey Area comprising six mammals, 18 birds and one reptile. Three of these species were confirmed as occurring during the Survey comprising:

- Long-tailed Dunnart (P4);
- Wood Sandpiper (Mi; IA); and
- Common Sandpiper (Mi; IA).

Based on the desktop assessment and habitats identified within the Survey Area, an additional 11 species were assessed as possible and eight were assessed as unlikely to occur. The Long-tailed Dunnart was recorded on four occasions during the Survey within the Stony rise habitat, its preferred habitat. The species has been recorded on 12 occasions in the vicinity of the Survey Area. The Long-tailed Dunnart was recorded at 25 locations (212 records) on stony rises to the north of the Survey Area from regional deployments of motion-sensor cameras, confirming that the species is present on other stony rises in the region.

Of the species recorded or likely to occur, the Wood Sandpiper and Common Sandpiper are listed as migratory under the EPBC Act and are therefore considered to represent MNES. The Survey Area was determined not to contain any important habitat nor support an ecologically significant proportion of the population of the Wood Sandpiper and Common Sandpiper, due to limited aquatic habitat.

The fauna assemblages within the Survey Area were sampled at systematic trapping sites. Species accumulation curves indicated that between 70% to 100% of the fauna assemblages was captured during the Survey, however further survey effort is likely to result in more avifauna species being recorded. Additional mammal, avifauna and herpetofauna species were recorded from the Survey Area via targeted and opportunistic survey methods that were not captured in the species accumulation curves. The species assemblages recorded during the Survey, recorded a higher number of species than previous surveys undertaken in the vicinity of the Survey Area.

Habitats in the Survey Area were assessed for the potential to support SRE species based on the presence of microhabitats, habitat extent and isolation. Based on these criteria, one habitat, outcropping, was assessed as having a high potential to support SRE species. In addition, the shrub plain and stony rise habitat were assessed as having a medium potential to support SRE species.

A total of 20 specimens from groups prone to short-range endemism were collected during the Survey. Of these, six were identified to morphospecies and four taxa were only able to be identified to genus. Although none were known SRE species, the following were considered to represent potential SRE species and were classified as data deficient.

- the mygalomorph spider specimens from the genus *Idiosoma* sp.;
- the mygalomorph spider specimens from the genus *Idiopidae* sp.;
- the mygalomorph spider specimen from the genus *Proshermacha* sp.;
- the slater specimen from the morphospecies *Buddelundia* '103';
- the slater specimen from the morphospecies *Buddelundia* '106'; and
- the pseudoscorpion specimen from the morphospecies *Synsphyronus* 'weld'.

Furthermore, six specimens were collected from the Survey Area in 2014, which were unable to be identified to genus. These comprised two mygalomorph taxa (*Aname* sp. indet., *Aganippe* sp. indet) and one scorpion taxa (*Urodacus* sp. indet). The slater specimens were collected from within the shrub plain

habitat which was assessed as having a medium potential to support SRE taxa. The remaining potential SRE specimens were collected from within the widespread mulga on clay loam habitat, which held a low potential to support SRE taxa. To understand their lineage and distribution within the Survey Area and in the broader regional context, more specimens would need to be collected and genetic analysis would be required in some instances.

In summary, the species assemblages recorded during the Survey, represented a higher number of species than previous surveys undertaken in the vicinity of the Survey Area. Three significant terrestrial vertebrate fauna species were recorded during the Survey, and no others were considered 'likely' to occur. The Long-tailed Dunnart was recorded on four occasions during the Survey, and in previous surveys in the vicinity of the Survey Area. The species was recorded within the stony rise and adjacent outcropping habitat. Motion-sensor cameras recorded the Long-tailed Dunnart at 25 locations on stony rises to the north of the Survey Area, suggesting the species persists on other stony rises within the region. The outcropping habitat also supported important microhabitat features for potential SRE species. The other habitats had limited importance to significant fauna and fauna assemblages.

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A close-up, low-angle shot of a hand reaching out towards a bright sun in a field of tall grass. The hand is silhouetted against the bright light of the sun, which is positioned in the lower right quadrant of the frame. The grass is tall and thin, with some blades in the foreground being in sharp focus. The overall color palette is warm, dominated by golden yellows, oranges, and deep reds, creating a soft, ethereal atmosphere. The text 'Appendices' is overlaid in the upper right area in a clean, white, sans-serif font.

Appendices

Appendix A Text codes and terms used to describe significant fauna

The Environmental Factor Guideline for Terrestrial Fauna (EPA 2016a) states that terrestrial fauna may be significant for a range of reasons, including: being identified as a threatened or priority species; species with restricted distribution; degree of historical impact from threatening processes and providing an important function required to maintain the ecological integrity of a significant ecosystem.

Those fauna defined as threatened and priority are legislated protection under the EPBC Act and/or the BC Act, or by being listed on the DBCA Priority Species List. This appendix presents a summary of the different rankings and listings used to describe conservation status. Some categories such as 'extinct', 'extinct in the wild' and 'conservation dependent' (EPBC Act) are not represented here, as the table includes only the information needed to fully understand the codes presented in the preceding report. Refer to the relevant legislation for a full description of all codes in use, as well as their associated criteria.

Categories used under the EPBC Act		
Status	Code	Description
Critically Endangered	Cr	Taxa considered to be facing an extremely high risk of extinction in the wild in the immediate future
Endangered	En	Taxa considered to be facing a very high risk of extinction in the wild in the near future
Vulnerable	Vu	Taxa considered to be facing a high risk of extinction in the wild in the medium-term future
Migratory	Mi	Species that migrate to, over and within Australia and its external territories

Conservation Codes used under the BC Act		
Status	Code	Description
Critically Endangered	CR	Taxa rare or likely to become extinct, as critically endangered taxa
Endangered	EN	Taxa rare or likely to become extinct, as endangered taxa
Vulnerable	VU	Taxa rare or likely to become extinct, as vulnerable taxa
Presumed Extinct	EX	Taxa presumed to be extinct
Migratory	IA	Birds subject to international agreements relating to the protection of migratory birds
Conservation Dependent	CD	Taxa of special conservation need, being species dependent on ongoing conservation intervention
Special Protection	S	Taxa in need of special protection

Priority Fauna Under the BC Act		
Status	Code	Description
Priority 1: Poorly-known Species	P1	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
Priority 2: Poorly-known Species	P2	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
Priority 3: Poorly-known Species	P3	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
Priority 4: Rare, Near Threatened and other species in need of monitoring	P4	<p>(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable but are not listed as Conservation Dependent.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>

Appendix B Database search results

Table B-1: Birdlife Bird Data (Birdlife Australia 2020)

Birdlife Species list			
Common Name	Scientific Name	No of sightings from 126 surveys	Most recent record
Emu	<i>Dromaius novaehollandiae</i>	21	22-01-19
Stubble Quail	<i>Coturnix pectoralis</i>	1	10-05-01
Musk Duck	<i>Biziura lobata</i>	2	06-08-04
Freckled Duck	<i>Stictonetta naevosa</i>	2	17-02-17
Black Swan	<i>Cygnus atratus</i>	11	17-06-15
Australian Shelduck	<i>Tadorna tadornoides</i>	23	16-07-19
Australian Wood Duck	<i>Chenonetta jubata</i>	13	21-01-19
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>	18	16-07-19
Australasian Shoveler	<i>Anas rhynchotis</i>	3	04-08-14
Grey Teal	<i>Anas gracilis</i>	31	16-07-19
Pacific Black Duck	<i>Anas superciliosa</i>	25	16-07-19
Hardhead	<i>Aythya australis</i>	12	01-05-13
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	12	15-07-19
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>	24	16-07-19
Rock Dove	<i>Columba livia</i>	1	01-11-99
Common Bronzewing	<i>Phaps chalcoptera</i>	9	21-08-19
Crested Pigeon	<i>Ocyphaps lophotes</i>	56	11-08-18
Diamond Dove	<i>Geopelia cuneata</i>	4	10-08-18
Tawny Frogmouth	<i>Podargus strigoides</i>	1	07-09-00
Spotted Nightjar	<i>Eurostopodus argus</i>	1	07-09-00
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	2	14-07-01
Australasian Darter	<i>Anhinga novaehollandiae</i>	1	15-11-00
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	1	26-03-75
White-necked Heron	<i>Ardea pacifica</i>	9	22-01-19
Eastern Great Egret	<i>Ardea modesta</i>	2	26-03-75
Cattle Egret	<i>Ardea ibis</i>	1	21-05-17
White-faced Heron	<i>Egretta novaehollandiae</i>	11	04-08-14
Glossy Ibis	<i>Plegadis falcinellus</i>	1	05-11-00
Black-shouldered Kite	<i>Elanus axillaris</i>	8	03-07-16
Whistling Kite	<i>Haliastur sphenurus</i>	5	03-07-16
Brown Goshawk	<i>Accipiter fasciatus</i>	1	23-07-01
Collared Sparrowhawk	<i>Accipiter cirrocephalus</i>	2	22-01-19
Spotted Harrier	<i>Circus assimilis</i>	1	15-07-19
Wedge-tailed Eagle	<i>Aquila audax</i>	27	01-05-13
Little Eagle	<i>Hieraaetus morphnoides</i>	1	11-08-18
Nankeen Kestrel	<i>Falco cenchroides</i>	38	08-08-16
Brown Falcon	<i>Falco berigora</i>	31	22-01-19
Australian Hobby	<i>Falco longipennis</i>	5	12-03-04
Black-tailed Native-hen	<i>Tribonyx ventralis</i>	10	22-01-19
Eurasian Coot	<i>Fulica atra</i>	10	16-07-19

Birdlife Species list

Common Name	Scientific Name	No of sightings from 126 surveys	Most recent record
Australian Bustard	<i>Ardeotis australis</i>	1	23-07-01
Black-winged Stilt	<i>Himantopus himantopus</i>	9	22-01-19
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>	4	01-05-13
Banded Stilt	<i>Cladorhynchus leucocephalus</i>	1	18-05-17
Red-capped Plover	<i>Charadrius ruficapillus</i>	12	04-08-14
Black-fronted Dotterel	<i>Eseyornis melanops</i>	27	15-07-19
Red-kneed Dotterel	<i>Erythronyx cinctus</i>	9	22-01-19
Banded Lapwing	<i>Vanellus tricolor</i>	3	21-05-17
Common Greenshank	<i>Tringa nebularia</i>	4	22-01-19
Wood Sandpiper	<i>Tringa glareola</i>	3	20-01-08
Red-necked Stint	<i>Calidris ruficollis</i>	5	01-05-13
Little Button-quail	<i>Turnix velox</i>	3	07-12-11
Galah	<i>Eolophus roseicapillus</i>	32	01-10-14
Cockatiel	<i>Nymphicus hollandicus</i>	6	21-01-19
Purple-crowned Lorikeet	<i>Glossopsitta porphyrocephala</i>	2	24-04-05
Australian Ringneck	<i>Barnardius zonarius</i>	23	22-01-19
Mulga Parrot	<i>Psephotus varius</i>	17	14-07-19
Budgerigar	<i>Melopsittacus undulatus</i>	10	22-01-19
Bourke's Parrot	<i>Neopsephotus bourkii</i>	7	17-02-17
Horsfield's Bronze-Cuckoo	<i>Chalcites basalis</i>	3	10-05-01
Black-eared Cuckoo	<i>Chalcites osculans</i>	1	13-08-99
Pallid Cuckoo	<i>Cacomantis pallidus</i>	12	03-07-16
Red-backed Kingfisher	<i>Todiramphus pyrrophygius</i>	3	25-08-07
Rainbow Bee-eater	<i>Merops ornatus</i>	4	12-03-04
White-browed Treecreeper	<i>Climacteris affinis</i>	4	22-04-05
Western Bowerbird	<i>Ptilonorhynchus guttatus</i>	27	14-07-19
Splendid Fairy-wren	<i>Malurus splendens</i>	10	20-06-05
White-winged Fairy-wren	<i>Malurus leucopterus</i>	16	16-07-19
Variiegated Fairy-wren	<i>Malurus lamberti</i>	1	28-08-02
Redthroat	<i>Pyrholaemus brunneus</i>	6	15-07-19
Weebill	<i>Smicronis brevirostris</i>	11	12-08-18
Western Gerygone	<i>Gerygone fusca</i>	2	21-04-05
Slaty-backed Thornbill	<i>Acanthiza robustirostris</i>	5	11-08-18
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	20	07-06-15
Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>	29	14-07-19
Inland Thornbill	<i>Acanthiza apicalis</i>	18	12-08-18
Southern Whiteface	<i>Aphelocephala leucopsis</i>	16	11-08-18
Striated Pardalote	<i>Pardalotus striatus</i>	6	05-08-14
Pied Honeyeater	<i>Certhionyx variegatus</i>	4	07-12-11
Singing Honeyeater	<i>Lichenostomus virescens</i>	77	27-09-19

Birdlife Species list			
Common Name	Scientific Name	No of sightings from 126 surveys	Most recent record
Grey-fronted Honeyeater	<i>Lichenostomus plumulus</i>	4	01-10-14
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	2	05-08-14
White-fronted Honeyeater	<i>Purnella albifrons</i>	20	25-05-08
Yellow-throated Miner	<i>Manorina flavigula</i>	60	27-09-19
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	56	22-01-19
Red Wattlebird	<i>Anthochaera carunculata</i>	1	20-06-05
Crimson Chat	<i>Epthianura tricolor</i>	7	06-08-14
Orange Chat	<i>Epthianura aurifrons</i>	2	05-02-13
White-fronted Chat	<i>Epthianura albifrons</i>	3	10-05-01
Black Honeyeater	<i>Sugomel niger</i>	2	04-10-02
Brown Honeyeater	<i>Lichmera indistincta</i>	12	27-09-19
White-browed Babbler	<i>Pomatostomus superciliosus</i>	10	03-07-16
Chestnut-breasted Quail-thrush	<i>Cinclosoma castaneothorax</i>	4	05-10-14
Chiming Wedgebill	<i>Psophodes occidentalis</i>	2	15-07-01
Ground Cuckoo-shrike	<i>Coracina maxima</i>	5	23-05-17
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	37	08-08-16
White-winged Triller	<i>Lalage sueurii</i>	4	01-05-13
Rufous Whistler	<i>Pachycephala rufiventris</i>	20	04-08-14
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	11	15-07-19
Crested Bellbird	<i>Oreica gutturalis</i>	50	12-08-18
Masked Woodswallow	<i>Artamus personatus</i>	6	09-12-11
Black-faced Woodswallow	<i>Artamus cinereus</i>	22	01-05-13
Little Woodswallow	<i>Artamus minor</i>	1	04-10-02
Grey Butcherbird	<i>Cracticus torquatus</i>	21	11-08-18
Pied Butcherbird	<i>Cracticus nigrogularis</i>	63	14-07-19
Australian Magpie	<i>Cracticus tibicen</i>	21	05-12-19
Grey Currawong	<i>Strepera versicolor</i>	5	12-09-02
Grey Fantail	<i>Rhipidura albiscapa</i>	1	16-01-00
Willie Wagtail	<i>Rhipidura leucophrys</i>	51	05-12-19
Little Crow	<i>Corvus bennetti</i>	44	19-09-19
Torresian Crow	<i>Corvus orru</i>	17	05-08-14
Magpie-lark	<i>Grallina cyanoleuca</i>	48	27-09-19
Jacky Winter	<i>Microeca fascians</i>	1	07-09-00
Red-capped Robin	<i>Petroica goodenovii</i>	32	21-01-19
Hooded Robin	<i>Melanodryas cucullata</i>	10	03-04-12
Rufous Songlark	<i>Cincloramphus mathewsi</i>	8	05-08-14
Brown Songlark	<i>Cincloramphus cruralis</i>	5	25-08-07
White-backed Swallow	<i>Cheramoeca leucosterna</i>	15	06-04-12
Welcome Swallow	<i>Hirundo neoxena</i>	34	16-07-19
Fairy Martin	<i>Petrochelidon ariel</i>	4	04-08-14

Birdlife Species list			
Common Name	Scientific Name	No of sightings from 126 surveys	Most recent record
Tree Martin	<i>Petrochelidon nigricans</i>	15	05-08-14
Mistletoebird	<i>Dicaeum hirundinaceum</i>	6	02-05-13
Zebra Finch	<i>Taeniopygia guttata</i>	50	21-01-19
Australasian Pipit	<i>Anthus novaeseelandiae</i>	30	10-08-18
Crow & Raven species		12	27-09-19

Table B-2: Threatened and Priority Fauna (DBCA 2020b)

CLASS	NAME_SCI	NAME_COM	CONS_CODE	DATE	GDA_LONG	GDA_LAT
BIRD	<i>Actitis hypoleucos</i>	Common Sandpiper	IA	27-02-79	122.501400	-28.498700
INVERTEBRATE	<i>Branchinella apophysata</i>	a fairy shrimp (Laverton)	P1	17-01-37	122.166700	-28.800000
INVERTEBRATE	<i>Branchinella denticulata</i>	a fairy shrimp (Carnarvon to Kalgoorlie)	P3	11-04-17	122.381200	-28.869300
INVERTEBRATE	<i>Branchinella simplex</i>	a fairy shrimp (inland WA)	P1	08-03-11	122.328600	-28.867400
INVERTEBRATE	<i>Branchinella simplex</i>	a fairy shrimp (inland WA)	P1	08-03-11	122.240500	-28.814500
INVERTEBRATE	<i>Branchinella simplex</i>	a fairy shrimp (inland WA)	P1	08-03-11	122.275000	-28.835200
INVERTEBRATE	<i>Branchinella simplex</i>	a fairy shrimp (inland WA)	P1	08-03-11	122.381900	-28.936200
BIRD	<i>Calidris ruficollis</i>	Red-necked Stint	IA	01-05-13	122.381100	-28.838600
BIRD	<i>Calidris ruficollis</i>	Red-necked Stint	IA	23-04-05	122.441400	-29.050900
BIRD	<i>Calidris ruficollis</i>	Red-necked Stint	IA	20-01-08	122.381100	-28.838600
BIRD	<i>Calidris ruficollis</i>	Red-necked Stint	IA	01-05-13	122.381100	-28.838600
MAMMAL	<i>Dasyercus blythi</i>	Brush-tailed Mulgara	P4	26-05-14	122.761700	-29.100600
MAMMAL	<i>Dasyercus blythi</i>	Brush-tailed Mulgara	P4	26-05-14	122.761900	-29.100800
MAMMAL	<i>Dasyercus blythi</i>	Brush-tailed Mulgara	P4	26-05-14	122.764200	-29.101400
BIRD	<i>Falco peregrinus</i>	Peregrine Falcon	OS	22-03-04	122.422900	-29.052200
BIRD	<i>Falco peregrinus</i>	Peregrine Falcon	OS	19-03-04	122.444300	-29.117000
BIRD	<i>Falco peregrinus</i>	Peregrine Falcon	OS	14-11-12	122.220700	-28.806600
BIRD	<i>Gelochelidon nilotica</i>	Gull-billed Tern	IA	15-11-00	122.200300	-28.597200
MAMMAL	<i>Lagostrophus fasciatus fasciatus</i>	Banded Hare-wallaby, Mernine	VU	01-01-10	122.400000	-28.633300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	26-05-14	122.655900	-29.091800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	21-02-15	122.655900	-29.091800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	26-05-14	122.655900	-29.091800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	07-10-13	122.615800	-29.129800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	15-05-07	122.419700	-29.063300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	23-02-13	122.482600	-29.196700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.758900	-28.849500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.821100	-28.796400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.864000	-28.802000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.854800	-28.793800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.797100	-28.751000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.830700	-28.794000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.783000	-28.866100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.866200	-28.803800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.627900	-28.694400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.857100	-28.796100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.606200	-28.695300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.766500	-28.735300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.705600	-28.691400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.776500	-28.742500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.844000	-28.926300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.994400	-28.757800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.845100	-28.925300

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.732700	-28.708000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.845500	-28.925500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.836600	-28.919600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.838000	-28.923000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.883500	-28.533800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.828500	-28.900900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.780900	-28.506000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.852300	-28.930900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.881800	-28.533800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.747800	-28.835700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.742900	-28.828000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.855200	-28.785500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.956800	-28.898800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.866500	-28.900800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793000	-28.527800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792600	-28.527500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793000	-28.527900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.956800	-28.898700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.765000	-28.506600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.881500	-28.533700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.789000	-28.497900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.829400	-28.904900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839900	-28.923300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793400	-28.527600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793500	-28.528500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792000	-28.524600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.790000	-28.525500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.686300	-28.585400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.720400	-28.610100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.721000	-28.609100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.721200	-28.610000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.957700	-28.899400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793200	-28.526900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.840600	-28.924200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.796100	-28.528100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.731500	-28.617700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.795800	-28.528100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.928000	-28.536400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.956600	-28.900700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793200	-28.527700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.797200	-28.529400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.774900	-28.502800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.010400	-28.758400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.004800	-28.757100

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.783500	-28.499700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.933100	-28.535700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.796000	-28.877700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.566000	-28.577500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.010200	-28.759000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.936900	-28.539000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.924600	-28.540000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.699000	-28.793100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.929200	-28.536300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.643700	-28.556200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.859000	-28.794500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.643400	-28.548700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.746900	-28.835800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.651500	-28.561200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.005100	-28.757500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743200	-28.832400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744400	-28.833700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.858900	-28.942100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743500	-28.833100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.790200	-28.877100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.849400	-28.927500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.931700	-28.536700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.747200	-28.836100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.858200	-28.941000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.735100	-28.823500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.851600	-28.791900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.855300	-28.786000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.748100	-28.835800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.849700	-28.928000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.989200	-28.763300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.928900	-28.535700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.783600	-28.499600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743300	-28.832600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.772100	-28.507500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.603900	-28.565200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.778100	-28.741300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.746400	-28.836800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.918600	-28.903300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.790500	-28.877500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837400	-28.532200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792200	-28.873700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.003200	-28.758000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.795400	-28.877700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.735100	-28.823900

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744500	-28.834400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.909500	-28.779800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.794300	-28.500300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.783600	-28.499800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.686100	-28.587600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.907400	-28.779400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.957600	-28.900400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.700400	-28.795200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.028800	-28.755600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.752500	-28.839200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.841400	-28.782000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.772200	-28.507700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.999900	-28.759900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.835900	-28.778200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.855200	-28.936000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.838800	-28.531600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.650700	-28.561800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.723600	-28.613100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.981700	-28.761300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.929700	-28.535900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.771800	-28.507000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.709900	-28.529200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.836700	-28.905400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.975300	-28.764800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.790400	-28.876100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.752300	-28.836600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.838700	-28.531400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.795900	-28.877200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.929300	-28.535800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.747700	-28.834600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.011800	-28.757400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.979600	-28.762000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743100	-28.832500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.853900	-28.790500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837500	-28.780400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.956100	-28.897800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745100	-28.834700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.623500	-28.557200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744700	-28.834600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.840700	-28.531900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.013500	-28.755900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.647800	-28.557700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.692700	-28.535100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.003800	-28.761400

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.929400	-28.536000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.835000	-28.902900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744200	-28.834300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.751400	-28.838500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.835000	-28.530700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.835900	-28.531000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.015500	-28.755000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.651900	-28.551200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.752300	-28.837400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.823800	-28.776000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745400	-28.835200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837300	-28.532000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.910100	-28.778000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837500	-28.532000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.881000	-28.780500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.850200	-28.786500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.923300	-28.903000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.772300	-28.504400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.001000	-28.759800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.877500	-28.898900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.737700	-28.827700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.865800	-28.801400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.992500	-28.760300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793800	-28.500700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.688700	-28.695000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.682000	-28.584800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.783100	-28.499500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839400	-28.531300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.776700	-28.861100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.005200	-28.758000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744100	-28.833600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839200	-28.529400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.791600	-28.876000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839100	-28.531300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.934100	-28.774500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.028300	-28.752800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.746500	-28.836800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.011500	-28.757400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.637400	-28.691200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.833700	-28.901600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.728800	-28.613500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744100	-28.833700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793700	-28.875500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.028900	-28.753400

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.924500	-28.539700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.953100	-28.768900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.762000	-28.847500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.857100	-28.786100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.901200	-28.776400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.844100	-28.786300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.906900	-28.775400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.780900	-28.528100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.857600	-28.784600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.773700	-28.503300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.735300	-28.823800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.836500	-28.529400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837100	-28.532400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.646300	-28.691200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.791200	-28.747400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.748100	-28.835000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.733700	-28.824600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744300	-28.836600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744800	-28.835900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.727800	-28.614100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.798000	-28.497400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.695400	-28.683200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.772400	-28.507800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.747000	-28.836700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.930700	-28.537100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.651100	-28.562000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837600	-28.531600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.952200	-28.769500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.733600	-28.824800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.840900	-28.531900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.752300	-28.836300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744700	-28.833300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.736100	-28.821200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.662200	-28.566300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.747700	-28.836000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.699700	-28.694500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.695700	-28.684000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.884200	-28.966700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744300	-28.834400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839300	-28.531400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.648300	-28.551300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.942700	-28.897000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.011700	-28.757500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.657400	-28.564800

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793200	-28.877200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.970900	-28.763500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.949800	-28.768500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.865300	-28.531300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.736000	-28.713500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.661900	-28.693000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.702800	-28.686700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.015700	-28.757200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.845900	-28.786100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.787000	-28.870500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.646200	-28.691200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.849300	-28.794000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.856100	-28.533000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.858100	-28.942100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.993200	-28.763000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744300	-28.834000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837500	-28.530700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.738500	-28.619400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.006400	-28.755500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.654500	-28.565500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.866000	-28.900000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.907300	-28.775100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.911800	-28.775400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.709600	-28.526400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.747000	-28.835900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.834300	-28.531200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.854200	-28.934600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.920000	-28.898500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793700	-28.500700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.708900	-28.693500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.858800	-28.943000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.678400	-28.538000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.776600	-28.502200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.957100	-28.900700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.798000	-28.879700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.747300	-28.833700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.809200	-28.527600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.936100	-28.537700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744300	-28.833100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837300	-28.532300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.664200	-28.547000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.836500	-28.533100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.853400	-28.934000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.840600	-28.531900

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744600	-28.834600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.933400	-28.536000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839500	-28.531500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837700	-28.531600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.846800	-28.789600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743500	-28.832600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837400	-28.530400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792800	-28.500200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.651500	-28.561400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.651300	-28.561900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.936300	-28.539100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792400	-28.876500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.004400	-28.759000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.805100	-28.530300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.951300	-28.770000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.833300	-28.900900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.937500	-28.537200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.835500	-28.903700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.817100	-28.526900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.689000	-28.676300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.740000	-28.831300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.746600	-28.835400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792100	-28.874400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.853400	-28.932800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.664900	-28.694700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.734700	-28.824100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.772300	-28.507400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.857000	-28.939000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.651500	-28.561200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.035400	-28.753300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.739700	-28.831600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743800	-28.835500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792700	-28.500100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.978200	-28.764600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745200	-28.832900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.929300	-28.536300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.623500	-28.557300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.009900	-28.759400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.029200	-28.754300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.834100	-28.530600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.906100	-28.777800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.867800	-28.804000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.909400	-28.777900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.738600	-28.826100

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.723200	-28.614200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.012100	-28.755800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.734900	-28.820400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.931800	-28.536700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.011600	-28.755600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.787300	-28.873600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.655900	-28.567500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.835500	-28.530900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.777100	-28.502000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.848700	-28.786500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.011100	-28.757300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.871000	-28.955000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839400	-28.531100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.854900	-28.786600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.836500	-28.529000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.668400	-28.576500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.822300	-28.526600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.777800	-28.741400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.695200	-28.534100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.768100	-28.504700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.750000	-28.839200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.648700	-28.563200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.012800	-28.756100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.806900	-28.889100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.685600	-28.586800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839300	-28.531400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.796500	-28.498100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793400	-28.875100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.783900	-28.741000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.907700	-28.779100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744900	-28.834300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793700	-28.500500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793500	-28.500500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.833600	-28.919500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.853600	-28.532800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.775100	-28.504700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.785300	-28.527700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743800	-28.832700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.788600	-28.870300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.794600	-28.879100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839800	-28.787100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.746200	-28.833200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.929500	-28.536600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.857000	-28.788600

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.954200	-28.768000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.856700	-28.939600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.718700	-28.702400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839500	-28.531400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.621500	-28.559600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.653200	-28.562900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.977400	-28.764500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.776200	-28.502000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.955500	-28.768100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.999500	-28.760300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743200	-28.833100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793400	-28.875000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793100	-28.874800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.755200	-28.840800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.858700	-28.943100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.728500	-28.613000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.834800	-28.529800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.910500	-28.775700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.671600	-28.573700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.833600	-28.778500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.652700	-28.691100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745200	-28.835400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.861600	-28.946700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.749900	-28.836800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.746900	-28.835500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.809900	-28.530000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.704100	-28.528800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.921900	-28.540100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792700	-28.876300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.751900	-28.840700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.962700	-28.898500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.928800	-28.900100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.751100	-28.841700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.774500	-28.503000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.633800	-28.553100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.935900	-28.538900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.835700	-28.918900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.684100	-28.586200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837000	-28.533000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.695000	-28.681000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.790400	-28.877000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793100	-28.876800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.787500	-28.870400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.858100	-28.787700

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.728900	-28.611700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.727900	-28.615100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.737200	-28.619800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.645800	-28.551100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.977500	-28.764200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.783700	-28.499700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.794200	-28.500300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.993600	-28.761800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792300	-28.753700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839200	-28.531300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.735400	-28.618600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.713700	-28.807800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.955800	-28.899000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839700	-28.531500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.774400	-28.504500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.850400	-28.929000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.904000	-28.901700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.975300	-28.767000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.930200	-28.900900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.918700	-28.903000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.648200	-28.548700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.853200	-28.790600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.737200	-28.619200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745100	-28.834400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.975200	-28.762200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.710400	-28.799400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.836700	-28.780100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.649600	-28.561300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.683500	-28.587300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743500	-28.832700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.797700	-28.530000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.012500	-28.754200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.836900	-28.780500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.953000	-28.768900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.002400	-28.760000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792900	-28.500300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.919000	-28.903100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.835100	-28.530600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.933500	-28.773000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837600	-28.530600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.848600	-28.786400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745400	-28.836400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.855200	-28.785100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745200	-28.836900

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.953600	-28.769000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.906800	-28.777000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.641800	-28.554100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.004800	-28.757000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.957500	-28.900400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.936100	-28.539300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.011200	-28.757700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.868000	-28.804100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.664100	-28.544600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744600	-28.836600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.840800	-28.925100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743000	-28.832600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.652000	-28.564300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.829200	-28.912100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.901000	-28.900300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.795000	-28.498300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.791900	-28.526300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.867600	-28.804100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744800	-28.834300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.651800	-28.562400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.796000	-28.527200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.790400	-28.877300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.587200	-28.569800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.731900	-28.519300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.777700	-28.502300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.786700	-28.524300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.744800	-28.835100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.836000	-28.529500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.952700	-28.769700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.948900	-28.770500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.603700	-28.566200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.787000	-28.498900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.716900	-28.691900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.004900	-28.757600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.882400	-28.963500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.860200	-28.945500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.826500	-28.528800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.918200	-28.903000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.681300	-28.669100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.004800	-28.757400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792800	-28.528100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837100	-28.532400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.574800	-28.577000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.952400	-28.541800

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793500	-28.875000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.960600	-28.765600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837500	-28.530300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.907900	-28.778600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.846500	-28.785500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.847700	-28.789500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.746600	-28.835700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.004700	-28.759400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.755800	-28.840500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.644200	-28.551600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.956300	-28.899300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.739700	-28.831600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.826600	-28.792800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.978700	-28.764700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.724900	-28.702500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745300	-28.833500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745000	-28.834800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.748000	-28.834700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745500	-28.835100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.774200	-28.504300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.604900	-28.691100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.880300	-28.780600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.956300	-28.899100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.747000	-28.836800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.785900	-28.501700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.826900	-28.792300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.746800	-28.834500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.651700	-28.562800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.855300	-28.532600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.776300	-28.502000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.647900	-28.557700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.736400	-28.824700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.775700	-28.737400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.824000	-28.776200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837000	-28.532400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.797600	-28.883400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.859700	-28.799800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.657300	-28.543400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.683400	-28.585900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745100	-28.836600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.903000	-28.779500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.029100	-28.753700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837800	-28.531400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.002700	-28.759400

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.922700	-28.774700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.748000	-28.834400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.842300	-28.786300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.836400	-28.528800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.906900	-28.775200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.860100	-28.945500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.617900	-28.561300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.617500	-28.560900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.934200	-28.541100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.878600	-28.902500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.783900	-28.873600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.730400	-28.618900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.909800	-28.780000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.772300	-28.507500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.794000	-28.500400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.751900	-28.840300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.780300	-28.525600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.781800	-28.524700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.685200	-28.676300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.839400	-28.531400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.794200	-28.529000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.878000	-28.959400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.927100	-28.900600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.736900	-28.619600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.911000	-28.778600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.853600	-28.790500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.775000	-28.504700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.645600	-28.557200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.620300	-28.558100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.929800	-28.538300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.778600	-28.501200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.004200	-28.759300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.862000	-28.899500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.754600	-28.841100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.936200	-28.538700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.719700	-28.697400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.004500	-28.759000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.828400	-28.529600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.029400	-28.754800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793300	-28.527700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.838200	-28.532500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.713700	-28.529200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793400	-28.528600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.952500	-28.766000

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.957200	-28.900900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.835500	-28.903300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.675100	-28.579400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.742100	-28.833900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.788100	-28.527300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.785400	-28.500800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.851000	-28.785800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.748000	-28.835100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.593600	-28.693100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.774900	-28.504900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.575300	-28.576500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.592200	-28.694300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.830400	-28.530400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.763300	-28.511700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.653200	-28.562600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.956500	-28.900000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.689400	-28.677700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.853200	-28.795300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.956100	-28.899600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.722500	-28.613900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837600	-28.532400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.754900	-28.841000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.742800	-28.832900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.796100	-28.751800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.586500	-28.568800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.989000	-28.761100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.801800	-28.496700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.028900	-28.754400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.832300	-28.531500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745800	-28.834800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.837100	-28.532400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.972000	-28.764200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.979200	-28.764100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.590900	-28.571300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.953100	-28.542400
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.858900	-28.798100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.738000	-28.519900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.682600	-28.583600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.896100	-28.780000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792300	-28.500200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.585100	-28.569900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743300	-28.832600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.682500	-28.582800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.900100	-28.777900

BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.003400	-28.757700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.836200	-28.782900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.746300	-28.833200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.792200	-28.526100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.855000	-28.785300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.929000	-28.537700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.793100	-28.528500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.789100	-28.527200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.859400	-28.530500
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.841600	-28.790900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.745800	-28.836900
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.988700	-28.760700
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.728000	-28.615200
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.909200	-28.778300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.794200	-28.500600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.886800	-28.782600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.654600	-28.564100
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.936700	-28.899800
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.647800	-28.562300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.933500	-28.535600
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.015400	-28.755000
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	122.743100	-28.832300
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	19-06-19	123.011600	-28.759100
REPTILE	<i>Liopholis kintorei</i>	Great Desert Skink	VU	01-03-67	122.751400	-28.514700
MAMMAL	<i>Macrotis lagotis</i>	Bilby, Dalgyte, Ninu	VU		122.400000	-28.633300
MAMMAL	<i>Macrotis lagotis</i>	Bilby, Dalgyte, Ninu	VU		122.400000	-28.633300
MAMMAL	<i>Myrmecobius fasciatus</i>	Numbat, Walpurti	EN	01-01-18	122.401400	-28.682000
MAMMAL	<i>Myrmecobius fasciatus</i>	Numbat, Walpurti	EN		122.500000	-28.683300
MAMMAL	<i>Myrmecobius fasciatus</i>	Numbat, Walpurti	EN		122.500000	-28.683300
BIRD	<i>Plegadis falcinellus</i>	Glossy Ibis	IA	05-11-00	122.216900	-28.597200
BIRD	<i>Polytelis alexandrae</i>	Princess Parrot	P4		122.400000	-28.633300
BIRD	<i>Polytelis alexandrae</i>	Princess Parrot	P4		122.400000	-28.633300
MAMMAL	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	01-01-11	122.430000	-28.810000
MAMMAL	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	01-01-11	122.430000	-28.810000
MAMMAL	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	07-01-11	122.434000	-28.818900
MAMMAL	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	07-01-11	122.434000	-28.818900
MAMMAL	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	08-01-11	122.387400	-28.820000
MAMMAL	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	08-01-11	122.387400	-28.820000
MAMMAL	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	12-01-11	122.433300	-28.821600
MAMMAL	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	12-01-11	122.433300	-28.821600
MAMMAL	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	06-04-11	122.421000	-28.809200
MAMMAL	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	18-04-11	122.430000	-28.810000
BIRD	<i>Tringa glareola</i>	Wood Sandpiper	IA	20-01-08	122.381100	-28.838600
BIRD	<i>Tringa nebularia</i>	Common Greenshank, Greenshank	IA	15-11-00	122.200300	-28.597200

Table B-3: Protected Matters Search Tool (DoAWE 2020b)

Matters of National Environmental Importance	
World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities	None
Listed Threatened Species:	4
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act	
Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information	
State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	13
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Matters of National Environmental Significance

Listed Threatened Species			
Name		Status	Type of Presence
Scientific	Common		
Birds			
<i>Leipoa ocellata</i>	Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
<i>Pezoporus occidentalis</i>	Night Parrot [59350]	Endangered	Species or species habitat may occur within area
<i>Polytelis alexandrae</i>	Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat known to occur within area
Mammals			
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species			
Name		Threatened	Type of Presence
Scientific	Common		
Migratory Marine Birds			
<i>Apus pacificus</i>	Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species			
<i>Motacilla cinerea</i>	Grey Wagtail [642]		Species or species habitat may occur within area
<i>Motacilla flava</i>	Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species			
<i>Actitis hypoleucos</i>	Common Sandpiper [59309]		Species or species habitat may occur within area
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<i>Calidris melanotos</i>	Pectoral Sandpiper [858]		Species or species habitat may occur within area
<i>Charadrius veredus</i>	Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
<i>Tringa nebularia</i>	Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species			
Name		Threatened	Type of Presence
Scientific	Common		
Birds			
<i>Actitis hypoleucos</i>	Common Sandpiper [59309]		Species or species habitat may occur within area
<i>Apus pacificus</i>	Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<i>Ardea alba</i>	Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<i>Calidris melanotos</i>	Pectoral Sandpiper [858]		Species or species habitat may occur within area
<i>Charadrius veredus</i>	Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo [705]		Species or species habitat known to occur within area
<i>Merops ornatus</i>	Rainbow Bee-eater [670]		Species or species habitat may occur within area
<i>Motacilla cinerea</i>	Grey Wagtail [642]		Species or species habitat may occur within area
<i>Motacilla flava</i>	Yellow Wagtail [644]		Species or species habitat may occur within area
<i>Thinornis rubricollis</i>	Hooded Plover [59510]		Species or species habitat may occur within area
<i>Tringa nebularia</i>	Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Invasive Species

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

Name		Status	Type of Presence
Scientific	Common		
Birds			
<i>Columba livia</i>	Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Mammals			
<i>Camelus dromedarius</i>	Dromedary, Camel [7]		Species or species habitat likely to occur within area
<i>Canis lupus familiaris</i>	Domestic Dog [82654]		Species or species habitat likely to occur within area
<i>Capra hircus</i>	Goat [2]		Species or species habitat likely to occur within area
<i>Equus asinus</i>	Donkey, Ass [4]		Species or species habitat likely to occur within area
<i>Equus caballus</i>	Horse [5]		Species or species habitat likely to occur within area
<i>Felis catus</i>	Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
<i>Mus musculus</i>	House Mouse [120]		Species or species habitat likely to occur within area
<i>Oryctolagus cuniculus</i>	Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
<i>Vulpes vulpes</i>	Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants			
<i>Carrichtera annua</i>	Ward's Weed [9511]		Species or species habitat may occur within area
<i>Cenchrus ciliaris</i>	Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
<i>Tamarix aphylla</i>	Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Table B-4: NatureMap (DBCA 2020c)

Name ID	Species Name	Common Name	Naturalised	Conservation Code	Endemic To Query Area
Mammals					
24087	<i>Antechinomys laniger</i>	Kultarr			
24251	<i>Bos taurus</i>	European Cattle	Y		
24187	<i>Chalinolobus morio</i>	Chocolate Wattled Bat			
30903	<i>Dasycercus blythi</i>	Brush-tailed Mulgara		P4	
24258	<i>Equus caballus</i>	Horse	Y		
24128	<i>Lagostrophus fasciatus subsp. fasciatus</i>	Banded hare-wallaby		VU	
25489	<i>Macropus robustus</i>	Euro			
24136	<i>Macropus rufus</i>	Red Kangaroo			
24168	<i>Macrotis lagotis</i>	Bilby		VU	
24223	<i>Mus musculus</i>	House Mouse	Y		
24146	<i>Myrmecobius fasciatus</i>	Numbat		EN	
24094	<i>Ningau ridei</i>	Wongai Ningau			
24096	<i>Ningau yvonneae</i>	Southern Ningau			
24224	<i>Notomys alexis</i>	Spinifex Hopping-mouse			
24194	<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat			
24085	<i>Oryctolagus cuniculus</i>	Rabbit	Y		
24237	<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse			
24108	<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart			
24109	<i>Sminthopsis dolichura</i>	Little long-tailed Dunnart			
24114	<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart			
24115	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart		P4	
24116	<i>Sminthopsis macroura</i>	Stripe-faced Dunnart			
24205	<i>Vespadelus finlaysoni</i>	Finlayson's Cave Bat			

Birds					
24559	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater			
24260	<i>Acanthiza apicalis</i>	Broad-tailed Thornbill (Inland Thornbill)			
24261	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill			
24264	<i>Acanthiza robustirostris</i>	Slaty-backed Thornbill			
24265	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill			
25535	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk			
25536	<i>Accipiter fasciatus</i>	Brown Goshawk			
25544	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar			
24312	<i>Anas gracilis</i>	Grey Teal			
24316	<i>Anas superciliosa</i>	Pacific Black Duck			
25528	<i>Aphelocephala leucopsis</i>	Southern Whiteface			
24267	<i>Aphelocephala leucopsis subsp. leucopsis</i>	Southern Whiteface			
24285	<i>Aquila audax</i>	Wedge-tailed Eagle			
25558	<i>Ardea ibis</i>	Cattle Egret			
24341	<i>Ardea pacifica</i>	White-necked Heron			
24610	<i>Ardeotis australis</i>	Australian Bustard			
25566	<i>Artamus cinereus</i>				
24355	<i>Artamus minor</i>	Little Woodswallow			
24356	<i>Artamus personatus</i>	Masked Woodswallow			
24318	<i>Aythya australis</i>	Hardhead			
	<i>Barnardius zonarius</i>				
33934	<i>Branchinella denticulata</i>	Fairy shrimp (Carnarvon to Kalgoorlie)	P3		
33935	<i>Branchinella simplex</i>	Fairy shrimp (inland WA)		P1	
25715	<i>Cacatua roseicapilla</i>	Galah			
24725	<i>Cacatua roseicapilla subsp. assimilis</i>	Galah			

42307	<i>Cacomantis pallidus</i>	Pallid Cuckoo			
24788	<i>Calidris ruficollis</i>	Red-necked Stint		IA	
24564	<i>Certhionyx variegatus</i>	Pied Honeyeater			
24377	<i>Charadrius ruficapillus</i>	Red-capped Plover			
24321	<i>Chenonetta jubata</i>	Australian Wood Duck			
47909	<i>Cheramoeca leucosterna</i>	White-backed Swallow			
25580	<i>Cinclosoma castaneothorax</i>	Chestnut-breasted Quail-thrush			
42311	<i>Cinclosoma marginatum</i>	Western Quail-thrush			
24774	<i>Cladorhynchus leucocephalus</i>	Banded Stilt			
25581	<i>Climacteris affinis</i>	White-browed Treecreeper			
25675	<i>Colluricincla harmonica</i>	Grey Shrike-thrush			
24399	<i>Columba livia</i>	Domestic Pigeon	Y		
24361	<i>Coracina maxima</i>	Ground Cuckoo-shrike			
25568	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike			
24416	<i>Corvus bennetti</i>	Little Crow			
25593	<i>Corvus orru</i>	Torresian Crow			
24671	<i>Coturnix pectoralis</i>	Stubble Quail			
24420	<i>Cracticus nigrogularis</i>	Pied Butcherbird			
25595	<i>Cracticus tibicen</i>	Australian Magpie			
25596	<i>Cracticus torquatus</i>	Grey Butcherbird			
24322	<i>Cygnus atratus</i>	Black Swan			
25607	<i>Dicaeum hirundinaceum</i>	Mistletoebird			
24470	<i>Dromaius novaehollandiae</i>	Emu			
	<i>Elanus axillaris</i>	Black-shouldered Kite			
47937	<i>Euseyornis melanops</i>	Black-fronted Dotterel			
	<i>Eolophus roseicapillus</i>	Galah			
24567	<i>Epthianura albifrons</i>	White-fronted Chat			

24568	<i>Epthianura aurifrons</i>	Orange Chat			
24570	<i>Epthianura tricolor</i>	Crimson Chat			
24379	<i>Erythronys cinctus</i>	Red-kneed Dotterel			
24368	<i>Eurostopodus argus</i>	Spotted Nightjar			
25621	<i>Falco berigora</i>	Brown Falcon			
25622	<i>Falco cenchroides</i>	Australian Kestrel			
25623	<i>Falco longipennis</i>	Australian Hobby			
25624	<i>Falco peregrinus</i>	Peregrine Falcon		S	
25727	<i>Fulica atra</i>	Eurasian Coot			
	<i>Gallus gallus</i>				
42314	<i>Gavicalis virescens</i>	Singing Honeyeater			
24401	<i>Geopelia cuneata</i>	Diamond Dove			
25530	<i>Gerygone fusca</i>	Western Gerygone			
24443	<i>Grallina cyanoleuca</i>	Magpie-lark			
24295	<i>Haliastur sphenurus</i>	Whistling Kite			
25734	<i>Himantopus himantopus</i>	Black-winged Stilt			
24491	<i>Hirundo neoxena</i>	Welcome Swallow			
24557	<i>Leipoa ocellata</i>	Malleefowl		VU	
25661	<i>Lichmera indistincta</i>	Brown Honeyeater			
24326	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck			
25652	<i>Malurus leucopterus</i>	White-winged Fairy-wren			
25654	<i>Malurus splendens</i>	Splendid Fairy-wren			
24583	<i>Manorina flavigula</i>	Yellow-throated Miner			
47997	<i>Melanodryas cucullata</i>	Hooded Robin			
24736	<i>Melopsittacus undulatus</i>	Budgerigar			
24598	<i>Merops ornatus</i>	Rainbow Bee-eater			
25693	<i>Microeca fascinans</i>	Jacky Winter			

24737	<i>Neophema bourkii</i>	Bourke's Parrot			
24740	<i>Neophema splendida</i>	Scarlet-chested Parrot			
	<i>Neopsephotus bourkii</i>				
24742	<i>Nymphicus hollandicus</i>	Cockatiel			
24407	<i>Ocyphaps lophotes</i>	Crested Pigeon			
24618	<i>Oreoica gutturalis</i>	Crested Bellbird			
25680	<i>Pachycephala rufiventris</i>	Rufous Whistler			
25682	<i>Pardalotus striatus</i>	Striated Pardalote			
24630	<i>Pardalotus striatus subsp. westraliensis</i>	Striated Pardalote			
48060	<i>Petrochelidon ariel</i>	Fairy Martin			
48061	<i>Petrochelidon nigricans</i>	Tree Martin			
24659	<i>Petroica goodenovii</i>	Red-capped Robin			
24409	<i>Phaps chalcoptera</i>	Common Bronzewing			
24748	<i>Platycercus varius</i>	Mulga Parrot			
25703	<i>Podargus strigoides</i>	Tawny Frogmouth			
24681	<i>Poliocephalus poliocephalus</i>	Hoary-headed Grebe			
24752	<i>Polytelis alexandrae</i>	Princess Parrot		P4	
24683	<i>Pomatostomus superciliosus</i>	White-browed Babbler			
24390	<i>Psophodes occidentalis</i>	Western Wedgebill			
	<i>Ptilonorhynchus guttatus</i>				
42344	<i>Purnella albifrons</i>	White-fronted Honeyeater			
24278	<i>Pyrrholaemus brunneus</i>	Redthroat			
24776	<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet			
48096	<i>Rhipidura albiscapa</i>	Grey Fantail			
25614	<i>Rhipidura leucophrys</i>	Willie Wagtail			
30948	<i>Smicromnis brevirostris</i>	Weebill			
24329	<i>Stictonetta naevosa</i>	Freckled Duck			

25597	<i>Strepera versicolor</i>	Grey Currawong			
25705	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe			
24331	<i>Tadorna tadornoides</i>	Australian Shelduck			
30870	<i>Taeniopygia guttata</i>	Zebra Finch			
24845	<i>Threskiornis spinicollis</i>	Straw-necked Ibis			
48141	<i>Tribonyx ventralis</i>	Black-tailed Native-hen			
24806	<i>Tringa glareola</i>	Wood Sandpiper		IA	
24851	<i>Turnix velox</i>	Little Button-quail			
24386	<i>Vanellus tricolor</i>	Banded Lapwing			
Reptiles					
42380	<i>Brachyuophis fasciolatus subsp. fasciolatus</i>	Narrow-banded Shovel-nosed Snake)			
25020	<i>Cryptoblepharus plagioccephalus</i>				
24867	<i>Ctenophorus caudicinctus subsp. infans</i>	Ring-tailed Dragon			
24875	<i>Ctenophorus isolepis subsp. gularis</i>	Central Military Dragon			
25460	<i>Ctenophorus maculatus</i>	Spotted Military Dragon			
24882	<i>Ctenophorus nuchalis</i>	Central Netted Dragon			
24886	<i>Ctenophorus reticulatus</i>	Western Netted Dragon			
24888	<i>Ctenophorus salinarum</i>	Salt Pan Dragon			
24889	<i>Ctenophorus scutulatus</i>	Lozenge-marked Dragon			
25025	<i>Ctenotus ariadnae</i>				
25032	<i>Ctenotus calurus</i>				
25041	<i>Ctenotus grandis subsp. grandis</i>				
25044	<i>Ctenotus hanloni</i>				
25045	<i>Ctenotus helenae</i>				
25052	<i>Ctenotus leonhardii</i>				
25062	<i>Ctenotus piankai</i>				

25075	<i>Ctenotus severus</i>				
25465	<i>Ctenotus uber</i>	Spotted Ctenotus			
25001	<i>Delma nasuta</i>				
25469	<i>Diplodactylus granariensis</i>				
24940	<i>Diplodactylus pulcher</i>				
25092	<i>Egernia depressa</i>	Southern Pygmy Spiny-tailed Skink			
25109	<i>Eremiascincus richardsonii</i>	Broad-banded Sand Swimmer			
25301	<i>Furina ornata</i>	Moon Snake			
24957	<i>Gehyra purpurascens</i>				
24959	<i>Gehyra variegata</i>				
24961	<i>Heteronotia binoei</i>	Bynoe's Gecko			
25125	<i>Lerista bipes</i>				
25130	<i>Lerista desertorum</i>				
25131	<i>Lerista distinguenda</i>				
42411	<i>Lerista timida</i>				
25005	<i>Lialis burtonis</i>				
41412	<i>Liopholis kintorei</i>	Great Desert Skink		VU	
41417	<i>Liopholis striata</i>	Night Skink			
42415	<i>Lucasium squarrosus</i>				
25184	<i>Menetia greyii</i>				
24904	<i>Moloch horridus</i>	Thorny Devil			
25190	<i>Morethia butleri</i>				
24971	<i>Nephrurus vertebralis</i>				
25254	<i>Parasuta monachus</i>				
24907	<i>Pogona minor subsp. minor</i>	Dwarf Bearded Dragon			
25262	<i>Pseudechis butleri</i>	Spotted Mulga Snake			

42416	<i>Pseudonaja mengdeni</i>	Western Brown Snake			
25263	<i>Pseudonaja modesta</i>	Ringed Brown Snake			
25009	<i>Pygopus nigriceps</i>				
24982	<i>Rhynchoedura ornata</i>	Western Beaked Gecko			
25266	<i>Simoselaps bertholdi</i>	Jan's Banded Snake			
24923	<i>Strophurus assimilis</i>	Goldfields Spiny-tailed Gecko			
24927	<i>Strophurus elderi</i>				
24949	<i>Strophurus wellingtonae</i>				
25269	<i>Suta fasciata</i>	Rosen's Snake			
25202	<i>Tiliqua multifasciata</i>	Central Blue-tongue			
25203	<i>Tiliqua occipitalis</i>	Western Bluetongue			
30814	<i>Tympanocryptis cephalus</i>	Pebble Dragon			
24983	<i>Underwoodisaurus milii</i>	Barking Gecko			
25211	<i>Varanus caudolineatus</i>				
25212	<i>Varanus eremius</i>	Pygmy Desert Monitor			
25218	<i>Varanus gouldii</i>	Bungarra or Sand Monitor			
25524	<i>Varanus panoptes</i>	Yellow-spotted Monitor			
25222	<i>Varanus panoptes subsp. panoptes</i>				
25526	<i>Varanus tristis</i>	Racehorse Monitor			
Amphibians					
25375	<i>Cyclorana maini</i>	Sheep Frog			
25376	<i>Cyclorana platycephala</i>	Water-holding Frog			
25425	<i>Neobatrachus kunapalari</i>	Kunapalari Frog			
25427	<i>Neobatrachus sutor</i>	Shoemaker Frog			
42306	<i>Platyplectrum spenceri</i>	Centralian Burrowing Frog			

Table B-5: Arachnid and Myriapod Database (Western Australian Museum) (WAM 2020c)

ORDER	INFRAORDER	FAMILY	GENUS	SPECIES	SITE	DTFR	LATDEC	LONGDEC
Araneae	Mygalomorphae	Anamidae	Aname	`glenorne sp. 2`	14 km NE. of Glenorn Station Homestead, site 1B-P2	09-03-08	-29.05060	121.80900
Araneae	Mygalomorphae	Anamidae	Aname	`glenorne sp. 2`	14 km NE. of Glenorn Station Homestead, site 1B-P6	11-03-08	-29.05060	121.80900
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	13.3 km NE. of Glenorn Station Homestead, site 3B-B3	17-03-08	-29.07860	121.81100
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	13 km E. of Glenorn Station Homestead, site 5A-B3	15-03-08	-29.08790	121.80800
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 9	08-01-11	-28.83190	122.42600
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 1	08-01-11	-28.79280	122.43100
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 7	08-01-11	-28.82360	122.44200
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 1	06-01-11	-28.79280	122.43100
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 1	06-01-11	-28.79280	122.43100
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 2	06-01-11	-28.79860	122.43400
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 7	06-01-11	-28.82360	122.44200
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 1	06-01-11	-28.79280	122.43100
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 2	08-01-11	-28.79860	122.43400
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 5	06-01-11	-28.81860	122.43400
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 1	06-01-11	-28.79280	122.43100
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 11	08-01-11	-28.82640	122.38900
Araneae	Mygalomorphae	Anamidae	Aname	`MYG629`	ca. 21 km S. of Laverton, site 13	06-01-11	-28.81970	122.38700
Araneae	Mygalomorphae	Anamidae	Proshermacha	`MYG504`	Lake Carey, 33 km SW. of Wiluna	12-08-10	-28.81310	122.14500
Araneae	Mygalomorphae	Anamidae	Proshermacha	`sp. indet. (female?)`	Irwin Hills, ca. 45 km SE. of Laverton	11-09-19	-29.12610	123.00700
Araneae	Mygalomorphae	Anamidae	Teyl	`MYG444`	Lake Carey, 33 km SW. of Wiluna	11-08-10	-28.81110	122.14600
Araneae	Mygalomorphae	Anamidae	Teyl	`MYG444`	Lake Carey, 33 km SW. of Wiluna	11-08-10	-28.81110	122.14600
Araneae	Mygalomorphae	Barychelidae	Synothele	yundamindra	Yundamindra, site YMR3	23-07-81	-29.40000	122.46700
Araneae	Mygalomorphae	Barychelidae	Synothele	yundamindra	Yundamindra	23-07-81	-29.40000	122.46700
Araneae	Mygalomorphae	Barychelidae	Synothele	yundamindra	Yundamindra	23-07-81	-29.40000	122.46700
Araneae	Mygalomorphae	Barychelidae	Synothele	yundamindra	Yundamindra	12-10-80	-29.25000	122.40000
Araneae	Mygalomorphae	Barychelidae	`genus indet. (juvenile)`	`sp. indet. (female)`	Irwin Hills, ca. 45 km SE. of Laverton	10-09-19	-29.15200	123.01000
Araneae	Araneomorphae	Corinnidae	Ticopa	longbottomi	Fitz. Loc. 41 [`Sieda`], 5 km E. of Grasspatch	20-03-86	-33.23330	121.71700
Araneae	Araneomorphae	Corinnidae	Ticopa	longbottomi	Fitz. Loc. 41 [`Sieda`], 5 km E. of Grasspatch	06-02-88	-33.23330	121.71700
Araneae	Araneomorphae	Corinnidae	Ticopa	longbottomi	Fitz. Loc. 41 [`Sieda`], 5 km E. of Grasspatch	15-02-89	-33.23330	121.71700
Araneae	Araneomorphae	Corinnidae	Ticopa	longbottomi	`Sieda`, Fitz. Loc. 41, E. of Grasspatch, Tom Starcevich VC Road	27-02-97	-33.16670	121.76700
Araneae	Araneomorphae	Corinnidae	Ticopa	longbottomi	Laverton	00/07/1969	-28.61670	122.40000
Araneae	Araneomorphae	Gnaphosidae	Encoptarthria	`Leonora sp. 1`	46 km E. of Leonora, site 2a	08-10-07	-28.86130	121.79600
Araneae	Araneomorphae	Gnaphosidae	Encoptarthria	`Leonora sp. 1`	46 km E. of Leonora, site 4a	06-10-07	-28.85990	121.80000
Araneae	Araneomorphae	Gnaphosidae	`Eilica?`	`sp.`	46 km E. of Leonora, site 5a	05-10-07	-28.85930	121.78700
Araneae	Araneomorphae	Hersiliidae	Tamopsis	piankai	39 km E. of Laverton	05-10-90	-28.46660	122.83300
Araneae	Mygalomorphae	Idiopidae	Eucyrtops	eremaeus	Cardinia Creek	21-05-56	-28.81660	121.58300
Araneae	Mygalomorphae	Idiopidae	Eucyrtops	eremaeus	Cardinia Creek	20-05-56	-28.95000	121.56700
Araneae	Mygalomorphae	Idiopidae	Eucyrtops	eremaeus	Cardinia Creek, E. of Malcolm	21-05-56	-28.81660	121.58300
Araneae	Mygalomorphae	Idiopidae	Eucyrtops	eremaeus	Mt Ida, 100 km WSW. of Leonora, site MI-10-10E	29-07-08	-29.21620	120.42400
Araneae	Mygalomorphae	Idiopidae	Eucyrtops	eremaeus	Mt Ida, 100 km WSW. of Leonora, site MI-10-10D	29-07-08	-29.21650	120.42400
Araneae	Mygalomorphae	Idiopidae	Euoplos	`sp. indet. (juvenile)`	Lake Carey, 33 km SW. of Wiluna	12-08-10	-28.81170	122.14400
Araneae	Mygalomorphae	Idiopidae	Euoplos	`sp. indet. (juvenile)`	Lake Carey, 33 km SW. of Wiluna	13-08-10	-28.81690	122.14400
Araneae	Mygalomorphae	Idiopidae	Euoplos	`sp. indet. (juvenile)`	Irwin Hills, ca. 45 km SE. of Laverton	10-09-19	-29.15180	123.02000

Araneae	Mygalomorphae	Idiopidae	Euoplos	`sp. indet. (juvenile)`	Lake Carey, 33 km SW. of Wiluna	11-08-10	-28.81110	122.14600
Araneae	Mygalomorphae	Idiopidae	Euoplos	`sp. indet. (juvenile)`	Lake Carey, 33 km SW. of Wiluna	11-08-10	-28.81110	122.14600
Araneae	Mygalomorphae	Idiopidae	Euoplos	`sp. indet. (juvenile)`	Lake Carey, 33 km SW. of Wiluna	11-08-10	-28.81110	122.14600
Araneae	Araneomorphae	Lycosidae	Venator	`sp. (VWF1252)`	SE. of Mt. Kilkenny, site 3B	00/10/2007	-29.07860	121.81100
Araneae	Araneomorphae	Lycosidae	`cf. Hoggicosa`	`sp. (VWF288)`	Yundamindra, site YMR 2	12-10-80	-29.26520	122.40000
Araneae	Araneomorphae	Miturgidae	Miturga	`Leonora sp. 1`	48 km E. of Leonora, site 5b	05-10-07	-28.86020	121.80300
Araneae	Araneomorphae	Miturgidae	Miturga	`Leonora sp. 1`	46 km E. of Leonora, site 1a	09-10-07	-28.86070	121.79000
Araneae	Araneomorphae	Miturgidae	Miturga	`Leonora sp. 1`	46 km E. of Leonora, site 5a	05-10-07	-28.85930	121.78700
Araneae	Araneomorphae	Miturgidae	Miturga	`Leonora sp. 1`	46 km E. of Leonora, site 2a	08-10-07	-28.86130	121.79600
Araneae	Araneomorphae	Miturgidae	Miturga	`Leonora sp. 1`	46 km E. of Leonora, site 2b	08-10-07	-28.86220	121.79600
Araneae	Araneomorphae	Miturgidae	Miturga	`Leonora sp. 1`	46 km E. of Leonora, site 3b	07-10-07	-28.86500	121.79500
Araneae	Araneomorphae	Miturgidae	Miturga	`Leonora sp. 1`	46 km E. of Leonora, site 4a	06-10-07	-28.85990	121.80000
Araneae	Araneomorphae	Miturgidae	Miturga	`Leonora sp. 1`	46 km E. of Leonora, site 3a	07-10-07	-28.86410	121.79500
Araneae	Araneomorphae	Miturgidae	Miturga	`Leonora sp. 1`?	46 km E. of Leonora, site 2b	08-10-07	-28.86220	121.79600
Araneae	Araneomorphae	Oonopidae	Prethopalpus	framenau	Nambi Station, Shady Well calcrete, bore litter trap 11	00/07/2010	-28.39830	122.19900
Araneae	Araneomorphae	Oonopidae	Prethopalpus	framenau	Nambi Station, Shady Well calcrete, bore litter trap 20	00/07/2010	-28.38940	122.19900
Araneae	Araneomorphae	Oonopidae	Prethopalpus	framenau	Nambi Station, Shady Well calcrete, bore litter trap 11	00/07/2010	-28.39830	122.19900
Araneae	Araneomorphae	Oxyopidae	Oxyopes	gratus	Yundamindra, site YMR3	01-01-80	-29.40000	122.46700
Araneae	Araneomorphae	Sparassidae	Neosparassus	`Leonora sp. 1`	46 km E. of Leonora, site 2a	08-10-07	-28.86130	121.79600
Araneae	Araneomorphae	Sparassidae	Neosparassus	`Leonora sp. 1`	46 km E. of Leonora, site 4b	05-10-07	-28.86080	121.80000
Araneae	Araneomorphae	Zodariidae	Habronestes	`Leonora sp. 1`	46 km E. of Leonora, site 2a	08-10-07	-28.86130	121.79600
Araneae	Araneomorphae	Zodariidae	Habronestes	`Leonora sp. 1`	46 km E. of Leonora, site 4	13-10-07	-28.86040	121.79900
Araneae	Araneomorphae	Zodariidae	Habronestes	`Leonora sp. 2`	46 km E. of Leonora, site 4	12-10-07	-28.86080	121.79900
Araneae	Araneomorphae	Zodariidae	Hastbronestes	`sp.`	SE. of Mt. Kilkenny, site 4A	00/10/2007	-29.07890	121.80800
Araneae	Araneomorphae	Zodariidae	Neostorena	`Leonora sp. 1`	46 km E. of Leonora, site 1a	09-10-07	-28.86070	121.79000
Araneae	Araneomorphae	Zodariidae	Neostorena	`Leonora sp. 1`	46 km E. of Leonora, site 1b	09-10-07	-28.86070	121.79100
Araneae	Araneomorphae	Zodariidae	Neostorena	`Leonora sp. 2`	46 km E. of Leonora, site 3b	07-10-07	-28.86500	121.79500
Araneae	Araneomorphae	Zodariidae	Storena	`sp.`	46 km E. of Leonora, site 1b	09-10-07	-28.86070	121.79100
Araneae	Araneomorphae	Zodariidae	`Leonora gen. 1`	`Leonora sp. 1`	46 km E. of Leonora, site 1a	09-10-07	-28.86070	121.79000
Araneae	Araneomorphae	Zodariidae	`Leonora gen. 1`	`Leonora sp. 1`	46 km E. of Leonora, site 2a	08-10-07	-28.86130	121.79600
Araneae	Araneomorphae	Zodariidae	`Leonora gen. 1`	`Leonora sp. 1`	46 km E. of Leonora, site 1b	09-10-07	-28.86070	121.79100
Araneae	Araneomorphae	Zodariidae	`Leonora gen. 1`	`Leonora sp. 1`	46 km E. of Leonora, site 2b	08-10-07	-28.86220	121.79600
Araneae	Araneomorphae	Zodariidae	`Leonora gen. 1`	`Leonora sp. 1`	46 km E. of Leonora, site 3b	07-10-07	-28.86500	121.79500
Pseudoscorpiones		Chthoniidae	Tyrannochthonius	`Helens Bore`	Cardinia, 35 km NE. of Leonora	16-03-09	-28.78170	121.62200
Scolopendrida		Scolopendridae	Cormocephalus	`sp. (fragment)`	Mertondale, 30 km ENE. of Leonora, site 01	04-09-08	-28.64940	121.55100
Scorpiones		Urodacidae	Urodacus	`gibson 1?`	SE. of Mt. Kilkenny, site 5A	00/10/2007	-29.08780	121.80800
Scorpiones		Urodacidae	Urodacus	`pale complex`	NW. of Lake Rebecca, Jump-Up Dam project, site 3	07-03-08	-29.74190	122.06200
Tetramerocerata		Paupodidae	Paupopus	`sp. B02`	Cerebus Mine, ca. 80 km NE. of Leonora	18-10-11	-28.56620	122.28300

Appendix C Vertebrate fauna identified from the desktop assessment

Legend:

Current survey

- A Stantec 2020 (Phase 1)
- B Stantec 2020 (Phase 2)

Literature review

- C Mt Weld Rare Earths Project: Level 1 Flora, Vegetation and Fauna Survey (MWH 2014)
- D Lynas Corporation Ltd. Mt Weld Rare Earths Project: Level 1 Vegetation, Flora and Fauna Assessment (Outback Ecology 2013)
- E Mt Weld Rare Earths Project: Terrestrial Fauna Assessment (Outback Ecology 2011)
- F Moolart Well, Dogbolter and Eristoun Gold Projects. Vertebrate Fauna Reconnaissance Survey and Habitat Assessment (Outback Ecology 2006)
- G Rosemont Gold Project Biological Assessment Survey – Phases 1 & 2 (Halpern Glick Maunsell 1999)
- H Mt Weld Rare Earths Project: A review of terrestrial vertebrates (Ninox Wildlife Consulting 1992)

Database Searches

- I Birds Australia Atlas Database Search (Birdlife Australia 2020)
- J DBCA Threatened and Priority Fauna Database Search (DBCA 2020b)
- K Protected Matters Search Tool (DoAWE 2020b)
- L Naturemap (DBCA 2020c)
- M Atlas of Living Australia {ALA, 2023 #3980}

Family	Species Name	Common Name	EPBC	WA	A	B	C	D	E	F	A	H	I	J	K	L	M
Amphibians																	
Hylidae	<i>Cyclorana maini</i>	Sheep Frog														x	
Hylidae	<i>Cyclorana platycephala</i>	Western Water-holding Frog														x	
Limnodynastidae	<i>Neobatrachus kunapalari</i>	Kunapalari Frog														x	
Limnodynastidae	<i>Neobatrachus sutor</i>	Shoemaker Frog														x	
Limnodynastidae	<i>Platyplectrum spenceri</i>	Centralian Burrowing Frog														x	
Cheluidae	<i>Chelodina steindachneri</i>	Flat-shelled Turtle									x						
Birds																	
Acanthizidae	<i>Acanthiza apicalis</i>	Inland Thornbill			x	x		x		x	x		x			x	x
Acanthizidae	<i>Acanthiza chrysorhoa</i>	Yellow-rumped Thornbill				x	x			x	x	x	x			x	x
Acanthizidae	<i>Acanthiza robustirostris</i>	Slaty-backed Thornbill				x					x	x	x			x	x
Acanthizidae	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill					x			x	x	x	x			x	x
Acanthizidae	<i>Aphelocephala leucopsis</i>	Southern Whiteface			x	x		x	x		x	x	x			x	x
Acanthizidae	<i>Gerygone fusca</i>	Western Gerygone					x		x		x		x			x	
Acanthizidae	<i>Pyrrholaemus brunneus</i>	Redthroat			x	x					x		x			x	x
Acanthizidae	<i>Smicronis brevirostris</i>	Weebill							x	x	x	x	x			x	x
Accipitridae	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk				x							x			x	
Accipitridae	<i>Accipiter fasciatus</i>	Brown Goshawk									x		x			x	x
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle			x	x			x	x	x		x			x	x
Accipitridae	<i>Circus assimilis</i>	Spotted Harrier											x				
Accipitridae	<i>Elanus caeruleus axillaris</i>	Australian Black-shouldered Kite											x			x	
Accipitridae	<i>Haliastur sphenurus</i>	Whistling Kite											x			x	
Accipitridae	<i>Hieraaetus morphnoides</i>	Little Eagle									x		x				x
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar									x		x			x	x
Alcedinidae	<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher									x		x				x
Anatidae	<i>Anas gracilis</i>	Grey Teal			x	x							x			x	
Anatidae	<i>Anas rhynchotis</i>	Australasian Shoveler											x				

Family	Species Name	Common Name	EPBC	WA	A	B	C	D	E	F	A	H	I	J	K	L	M
Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck				x						x	x			x	
Anatidae	<i>Aythya australis</i>	Hardhead											x			x	
Anatidae	<i>Biziura lobata</i>	Musk Duck											x				
Anatidae	<i>Chenonetta jubata</i>	Australian Wood Duck											x			x	
Anatidae	<i>Cygnus atratus</i>	Black Swan			x				x				x			x	
Anatidae	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck			x								x			x	
Anatidae	<i>Stictonetta naevosa</i>	Freckled Duck											x			x	
Anatidae	<i>Tadorna tadornoides</i>	Australian Shelduck			x	x			x			x	x			x	
Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian Darter											x				
Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift	Mi	IA											x		
Ardeidae	<i>Ardea ibis</i>	Cattle Egret											x			x	
Ardeidae	<i>Ardea modesta</i>	Eastern Great Egret	Mi	IA									x		x		
Ardeidae	<i>Ardea novaehollandiae</i>	White-faced Heron											x				x
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron											x			x	
Artamidae	<i>Artamus cinereus</i>	Black-faced Woodswallow			x		x	x	x	x	x		x			x	x
Artamidae	<i>Artamus minor</i>	Little Woodswallow											x			x	
Artamidae	<i>Artamus personatus</i>	Masked Woodswallow											x			x	x
Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew								x							
Cacatuidae	<i>Cacatua roseicapilla</i>	Galah			x		x		x	x	x		x			x	x
Cacatuidae	<i>Nymphicus hollandicus</i>	Cockatiel							x	x			x			x	x
Campephagidae	<i>Coracina maxima</i>	Ground Cuckoo-shrike									x	x	x			x	x
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike					x		x		x		x			x	x
Campephagidae	<i>Lalage tricolor</i>	White-winged Triller				x					x		x				
Caprimulgidae	<i>Eurostopodus argus</i>	Spotted Nightjar											x			x	x
Charadriidae	<i>Elseornis melanops</i>	Black-fronted Dotterel							x		x	x	x			x	
Charadriidae	<i>Charadrius ruficapillus</i>	Red-capped Plover			x	x			x				x			x	
Charadriidae	<i>Charadrius veredus</i>	Oriental Plover	Mi	IA								x			x		

Family	Species Name	Common Name	EPBC	WA	A	B	C	D	E	F	A	H	I	J	K	L	M
Charadriidae	<i>Erythrogonys cinctus</i>	Red-kneed Dotterel											x			x	
Charadriidae	<i>Thinornis cucullatus</i>	Hooded Plover		P4											x		
Charadriidae	<i>Vanellus tricolor</i>	Banded Lapwing									x		x			x	
Cinclosomatidae	<i>Cinclosoma castaneothorax</i>	Chestnut-breasted Quail-thrush				x											x
Cinclosomatidae	<i>Cinclosoma cinnamomeum</i>	Cinnamon Quail-thrush			x							x					
Cinclosomatidae	<i>Cinclosoma marginatum</i>	Western Quail-thrush					x				x		x			x	
Climacteridae	<i>Climacteris affinis</i>	White-browed Treecreeper			x	x	x				x		x			x	x
Climacteridae	<i>Climacteris rufus</i>	Rufous Treecreeper															x
Columbidae	<i>Columba livia</i>	*Domestic Pigeon											x		x	x	
Columbidae	<i>Geopelia cuneata</i>	Diamond Dove							x				x			x	
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon			x	x		x			x	x	x			x	x
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing						x			x		x			x	x
Corvidae	<i>Corvus bennetti</i>	Little Crow					x			x	x	x	x			x	x
Corvidae	<i>Corvus coronoides</i>	Australian Raven						x									x
Corvidae	<i>Corvus orru</i>	Torresian Crow			x	x			x		x		x			x	
Cracticidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird			x	x	x		x	x	x		x			x	x
Cracticidae	<i>Cracticus tibicen</i>	Australian Magpie					x	x	x		x		x			x	x
Cracticidae	<i>Cracticus torquatus</i>	Grey Butcherbird									x		x			x	x
Cracticidae	<i>Strepera versicolor</i>	Grey Currawong									x		x			x	x
Cuculidae	<i>Cacomantis pallidus</i>	Pallid Cuckoo									x		x			x	x
Cuculidae	<i>Chrysococcyx basalis</i>	Horsfield's Bronze Cuckoo									x	x	x				
Cuculidae	<i>Chrysococcyx osculans</i>	Black-eared Cuckoo									x		x		x		x
Dicaeidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird							x				x			x	x
Dromaiidae	<i>Dromaius novaehollandiae</i>	Emu					x		x		x		x			x	x
Estrildidae	<i>Taeniopygia guttata</i>	Zebra Finch					x		x	x	x	x	x			x	x
Falconidae	<i>Falco berigora</i>	Brown Falcon									x		x			x	x
Falconidae	<i>Falco cenchroides</i>	Australian Kestrel			x						x	x	x			x	x

Family	Species Name	Common Name	EPBC	WA	A	B	C	D	E	F	A	H	I	J	K	L	M
Falconidae	<i>Falco longipennis</i>	Australian Hobby				x							x			x	x
Falconidae	<i>Falco peregrinus</i>	Peregrine Falcon		S										x		x	
Hirundinidae	<i>Cheramoeca leucosternus</i>	White-backed Swallow				x							x			x	x
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow				x			x	x		x	x			x	x
Hirundinidae	<i>Petrochelidon ariel</i>	Fairy Martin											x			x	
Hirundinidae	<i>Petrochelidon nigricans</i>	Tree Martin			x								x			x	
Laridae	<i>Sterna nilotica</i>	Gull-billed Tern	Mi	IA										x			
Laridae	<i>Sterna hybrida</i>	Whiskered Tern				x											
Locustellidae	<i>Megalurus cruralis</i>	Brown Songlark			x								x				
Locustellidae	<i>Megalurus mathewsi</i>	Rufous Songlark									x		x				
Maluridae	<i>Malurus lamberti</i>	Variegated Fairy-wren									x		x				x
Maluridae	<i>Malurus leucopterus</i>	White-winged Fairy-wren				x				x	x		x			x	x
Maluridae	<i>Malurus splendens</i>	Splendid Fairy-wren			x	x	x		x	x	x		x			x	x
Megapodiidae	<i>Leipoa ocellata</i>	Malleefowl	Vu	VU								x		x	x		
Meliphagidae	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater								x	x	x	x			x	x
Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird										x	x				x
Meliphagidae	<i>Certhionyx variegatus</i>	Pied Honeyeater									x		x			x	
Meliphagidae	<i>Epthianura albifrons</i>	White-fronted Chat			x							x	x			x	
Meliphagidae	<i>Epthianura aurifrons</i>	Orange Chat											x			x	
Meliphagidae	<i>Epthianura tricolor</i>	Crimson Chat									x		x			x	x
Meliphagidae	<i>Gavicalis virescens</i>	Singing Honeyeater			x	x	x		x		x		x			x	x
Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater									x		x			x	x
Meliphagidae	<i>Manorina flavigula</i>	Yellow-throated Miner			x		x	x		x			x			x	x
Meliphagidae	<i>Ptilotula ornatus</i>	Yellow-plumed Honeyeater									x						
Meliphagidae	<i>Ptilotula penicillata</i>	White-plumed Honeyeater											x				
Meliphagidae	<i>Ptilotula plumula</i>	Grey-fronted Honeyeater											x				x
Meliphagidae	<i>Purnella albifrons</i>	White-fronted Honeyeater									x		x			x	x

Family	Species Name	Common Name	EPBC	WA	A	B	C	D	E	F	A	H	I	J	K	L	M
Meliphagidae	<i>Sugomel niger</i>	Black Honeyeater									x		x				x
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater					x				x		x			x	
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark			x	x	x		x	x	x	x	x			x	x
Motacillidae	<i>Anthus australis</i>	Australian Pipit								x	x		x				x
Motacillidae	<i>Motacilla cinerea</i>	Grey Wagtail	Mi	IA												x	
Motacillidae	<i>Motacilla flava</i>	Yellow Wagtail	Mi	IA											x		
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella								x	x	x					
Oreoicidae	<i>Oreoica gutturalis</i>	Crested Bellbird			x	x	x		x	x	x	x	x			x	x
Otididae	<i>Ardeotis australis</i>	Australian Bustard									x	x	x			x	
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush				x			x	x	x	x	x			x	x
Pachycephalidae	<i>Pachycephala inornata</i>	Gilbert's Whistler			x	x											
Pachycephalidae	<i>Pachycephala occidentalis</i>	Western Whistler				x											
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler			x	x				x	x		x			x	x
Pardalotidae	<i>Pardalotus rubricatus</i>	Red-browed Pardalote						x				x					x
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote										x	x			x	
Pardalotidae	<i>Pardalotus striatus westraliensis</i>															x	
Petroicidae	<i>Melanodryas cucullata</i>	Hooded Robin			x						x	x	x			x	x
Petroicidae	<i>Microeca fascinans</i>	Jacky Winter											x			x	x
Petroicidae	<i>Petroica goodenovii</i>	Red-capped Robin			x	x	x				x		x			x	x
Phalacrocoracidae	<i>Phalacrocorax melanoleucos</i>	Little Pied Cormorant											x				
Phalangeridae	<i>Trichosurus vulpecula</i>	Common Brushtail Possum										x				x	
Phasianidae	<i>Coturnix pectoralis</i>	Stubble Quail										x	x			x	
Phasianidae	<i>Gallus gallus</i>	*Red jungle fowl														x	
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth											x			x	x
Podicipedidae	<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe			x							x	x			x	x
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe										x	x			x	
Pomatostomidae	<i>Pomatostomus superciliosus</i>	White-browed Babbler			x	x	x		x		x	x	x			x	x

Family	Species Name	Common Name	EPBC	WA	A	B	C	D	E	F	A	H	I	J	K	L	M
Psittacidae	<i>Melopsittacus undulatus</i>	Budgerigar							x	x	x		x			x	x
Psittacidae	<i>Neophema bourkii</i>	Bourke's Parrot			x	x	x				x		x			x	x
Psittacidae	<i>Neophema splendida</i>	Scarlet-chested Parrot														x	
Psittacidae	<i>Parvipsitta porphyrocephala</i>	Purple-crowned Lorikeet											x				
Psittacidae	<i>Pezoporus occidentalis</i>	Night Parrot	En	CR											x		
Psittacidae	<i>Platycercus varius</i>	Mulga Parrot				x	x	x	x	x	x		x			x	x
Psittacidae	<i>Platycercus zonarius</i>	Australian Ringneck			x	x		x			x					x	x
Psittacidae	<i>Polytelis alexandrae</i>	Princess Parrot	Vu	P4								x		x	x	x	
Psophodidae	<i>Psophodes occidentalis</i>	Chiming Wedgebill											x				
Ptilonorhynchidae	<i>Ptilonorhynchus maculatus guttatus</i>	Western Bowerbird								x	x		x			x	
Rallidae	<i>Fulica atra</i>	Eurasian Coot											x			x	
Rallidae	<i>Tribonyx ventralis</i>	Black-tailed Native-hen											x			x	
Recurvirostridae	<i>Cladorhynchus leucocephalus</i>	Banded Stilt			x								x			x	
Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged Stilt											x			x	
Recurvirostridae	<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet			x				x				x			x	
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail											x			x	
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail			x	x	x		x	x	x		x			x	x
Scolopacidae	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Mi	IA											x		
Scolopacidae	<i>Calidris melanotos</i>	Pectoral Sandpiper	Mi	IA											x		
Scolopacidae	<i>Calidris ruficollis</i>	Red-necked Stint	Mi	IA									x	x		x	
Scolopacidae	<i>Tringa glareola</i>	Wood Sandpiper	Mi	IA	x								x	x		x	
Scolopacidae	<i>Tringa hypoleucos</i>	Common Sandpiper	Mi	IA		x								x	x		
Scolopacidae	<i>Tringa nebularia</i>	Common Greenshank	Mi	IA									x	x	x		
Strigidae	<i>Ninox boobook</i>	Southern Boobook															x
Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy Ibis	Mi	IA									x	x			
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis														x	

Family	Species Name	Common Name	EPBC	WA	A	B	C	D	E	F	A	H	I	J	K	L	M
Turnicidae	<i>Turnix velox</i>	Little Button-quail							x	x	x		x			x	x
Mammals																	
Bovidae	<i>Bos taurus</i>	*European Cattle			x	x	x		x	x	x	x				x	
Bovidae	<i>Capra hircus</i>	*Goat							x		x				x		
Bovidae	<i>Ovis aries</i>	*Sheep							x			x					
Camelidae	<i>Camelus dromedarius</i>	*Camel						x			x	x			x		x
Canidae	<i>Canis lupus</i>	*Dog/dingo				^			x		x	x			x		
Canidae	<i>Vulpes vulpes</i>	*Red Fox			x					x	x	x			x		
Dasyuridae	<i>Antechinomys laniger</i>	Kultarr			x	x										x	
Dasyuridae	<i>Dasyercus blythi</i>	Brush-tailed Mulgara		P4										x		x	
Dasyuridae	<i>Dasyurus geoffroii</i>	Chuditch	Vu	VU											x		
Dasyuridae	<i>Ningau ridei</i>	Wongai Ningau														x	
Dasyuridae	<i>Ningau yvonneae</i>	Southern Ningau														x	
Dasyuridae	<i>Pseudantechinus woolleyae</i>	Woolley's Pseudantechinus			x	x		x									
Dasyuridae	<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart									x					x	
Dasyuridae	<i>Sminthopsis dolichura</i>	Little long-tailed Dunnart														x	x
Dasyuridae	<i>Sminthopsis fuliginosus</i>	Sooty/Dusky Dunnart															x
Dasyuridae	<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart														x	x
Dasyuridae	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart		P4	x	x								x		x	
Dasyuridae	<i>Sminthopsis macroura</i>	Stripe-faced Dunnart			x	x					x					x	
Dasyuridae	<i>Sminthopsis ooldea</i>	Ooldea Dunnart			x	x											
Emballonuridae	<i>Taphozous hilli</i>	Hill's Sheath-tail Bat			x	x		x									
Equidae	<i>Equus asinus</i>	*Donkey													x		
Equidae	<i>Equus caballus</i>	*Horse			X				x		x				x	x	
Felidae	<i>Felis catus</i>	*Cat			X					x	x	x			x		
Leporidae	<i>Oryctolagus cuniculus</i>	*Rabbit			x	x	x	x	x	x	x				x	x	
Macropodidae	<i>Lagostrophus fasciatus fasciatus</i>	Banded Hare-wallaby		VU										x		x	

Family	Species Name	Common Name	EPBC	WA	A	B	C	D	E	F	A	H	I	J	K	L	M
Macropodidae	<i>Macropus fuliginosus</i>	Western Grey Kangaroo			x	x											
Macropodidae	<i>Osphranter robustus</i>	Euro			x	x	x	x	x	x						x	
Macropodidae	<i>Osphranter rufus</i>	Red Kangaroo				x			x	x	x					x	
Molossidae	<i>Austronomus australis</i>	White-striped Free-tailed Bat			x	x											
Molossidae	<i>Ozimops kitcheneri</i>	South-western Free-tailed Bat			x			x	x								
Molossidae	<i>Ozimops petersi</i>	Inland Free-tailed Bat			x	x											
Muridae	<i>Mus musculus</i>	*House Mouse							x		x				x	x	x
Muridae	<i>Notomys alexis</i>	Spinifex Hopping-mouse														x	
Muridae	<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse				x				x		x				x	x
Muridae	<i>Rattus rattus</i>	*Black Rat							x								
Myrmecobiidae	<i>Myrmecobius fasciatus</i>	Numbat	En	EN								x		x		x	
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			x	x			x								
Thylacomyidae	<i>Macrotis lagotis</i>	Bilby	Vu	VU										x		x	
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat			x	x		x	x								
Vespertilionidae	<i>Chalinolobus morio</i>	Chocolate Wattled Bat														x	
Vespertilionidae	<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat			x	x		x								x	x
Vespertilionidae	<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat			x	x		x	x								
Vespertilionidae	<i>Vespadelus finlaysoni</i>	Finlayson's Cave Bat			x	x		x				x				x	
Reptiles																	
Agamidae	<i>Ctenophorus caudicinctus</i>	Ring-tailed Dragon								x		x				x	x
Agamidae	<i>Ctenophorus fordi</i>	Mallee Sand Dragon				x										x	
Agamidae	<i>Ctenophorus isolepis</i>	Military Dragon										x				x	
Agamidae	<i>Ctenophorus isolepis gularis</i>															x	x
Agamidae	<i>Ctenophorus maculatus</i>	Spotted Military Dragon					x									x	
Agamidae	<i>Ctenophorus nuchalis</i>	Central Netted Dragon								x						x	x
Agamidae	<i>Ctenophorus reticulatus</i>	Western Netted Dragon									x					x	x
Agamidae	<i>Ctenophorus salinarum</i>	Salt Pan Dragon														x	x

Family	Species Name	Common Name	EPBC	WA	A	B	C	D	E	F	A	H	I	J	K	L	M
Agamidae	<i>Ctenophorus scutulatus</i>				x	x	x		x			x				x	
Agamidae	<i>Diporiphora amphiboluroides</i>	Mulga Dragon			x												x
Agamidae	<i>Moloch horridus</i>	Thorny Devil														x	
Agamidae	<i>Pogona minor</i>					^										x	x
Agamidae	<i>Pogona minor minor</i>	Western Bearded Dragon								x	x					x	x
Agamidae	<i>Tympanocryptis pseudopsephos</i>	Goldfields Pebble-mimic Dragon			x	x										x	x
Carphodactylidae	<i>Nephrurus vertebralis</i>				x						x	x				x	
Carphodactylidae	<i>Nephrurus wheeleri</i>	<i>Nephrurus wheeleri</i>				x											
Carphodactylidae	<i>Underwoodisaurus milii</i>	Southern Barking Gecko									x					x	x
Diplodactylidae	<i>Diplodactylus conspicillatus</i>	Variable Fat-tailed Gecko									x	x					x
Diplodactylidae	<i>Diplodactylus granariensis</i>											x				x	
Diplodactylidae	<i>Diplodactylus pulcher</i>				x	x					x	x				x	x
Diplodactylidae	<i>Lucasium squarrosum</i>											x				x	x
Diplodactylidae	<i>Rhynchoedura ornata</i>	Western Beaked Gecko			x	x										x	x
Diplodactylidae	<i>Strophurus assimilis</i>	Goldfields Spiny-tailed Gecko									x					x	
Diplodactylidae	<i>Strophurus elderi</i>															x	
Diplodactylidae	<i>Strophurus strophurus</i>	Western Spiny-tailed Gecko															x
Diplodactylidae	<i>Strophurus wellingtonae</i>					x										x	x
Elapidae	<i>Brachyuropis fasciolatus fasciolatus</i>	Narrow-banded Shovel-nosed Snake														x	
Elapidae	<i>Furina ornata</i>	Moon Snake														x	
Elapidae	<i>Parasuta monachus</i>	Monk Snake														x	x
Elapidae	<i>Pseudechis australis</i>	Mulga Snake														x	
Elapidae	<i>Pseudechis butleri</i>	Spotted Mulga Snake														x	
Elapidae	<i>Pseudonaja mengdeni</i>	Western Brown Snake				x										x	x
Elapidae	<i>Pseudonaja modesta</i>	Ringed Brown Snake														x	x
Elapidae	<i>Simoselaps bertholdi</i>	Jan's Banded Snake														x	


Family	Species Name	Common Name	EPBC	WA	A	B	C	D	E	F	A	H	I	J	K	L	M
Elapidae	<i>Suta fasciata</i>	Rosen's Snake														x	
Gekkonidae	<i>Gehyra crypta</i>																x
Gekkonidae	<i>Gehyra purpurascens</i>															x	x
Gekkonidae	<i>Gehyra variegata</i>				x	x					x	x				x	x
Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's Gecko									x					x	x
Pygopodidae	<i>Delma nasuta</i>															x	
Pygopodidae	<i>Lialis burtonis</i>															x	
Pygopodidae	<i>Pygopus nigriceps</i>															x	x
Pythonidae	<i>Antaresia stimsoni stimsoni</i>										x	x					
Scincidae	<i>Cryptoblepharus plagiocephalus</i>										x					x	x
Scincidae	<i>Ctenotus ariadnae</i>															x	
Scincidae	<i>Ctenotus calurus</i>															x	
Scincidae	<i>Ctenotus grandis</i>											x				x	x
Scincidae	<i>Ctenotus hanloni</i>											x				x	
Scincidae	<i>Ctenotus helenae</i>															x	
Scincidae	<i>Ctenotus inornatus</i>																x
Scincidae	<i>Ctenotus leonhardii</i>	Common Desert Ctenotus			x	x					x					x	x
Scincidae	<i>Ctenotus piankai</i>											x				x	
Scincidae	<i>Ctenotus schomburgkii</i>	Barred Wedge-snouted Ctenotus			x	x											
Scincidae	<i>Ctenotus severus</i>											x				x	
Scincidae	<i>Ctenotus uber</i>										x					x	x
Scincidae	<i>Cyclodomorphus melanops</i>	Slender Blue-tongue														x	
Scincidae	<i>Egernia depressa</i>	Southern Pygmy Spiny-tailed Skink			x	x					x					x	
Scincidae	<i>Egernia formosa</i>					^											
Scincidae	<i>Eremiascincus richardsonii</i>	Broad-banded Sand Swimmer									x					x	x
Scincidae	<i>Lerista bipes</i>											x				x	x


Family	Species Name	Common Name	EPBC	WA	A	B	C	D	E	F	A	H	I	J	K	L	M
Scincidae	<i>Lerista desertorum</i>										x						x
Scincidae	<i>Lerista distinguenda</i>															x	
Scincidae	<i>Lerista muelleri</i>										x	x					
Scincidae	<i>Lerista timida</i>															x	x
Scincidae	<i>Liopholis inornata</i>	Desert Skink															x
Scincidae	<i>Liopholis kintorei</i>	Great Desert Skink	Vu	VU										x		x	
Scincidae	<i>Liopholis striata</i>	Night Skink									x					x	x
Scincidae	<i>Menetia greyii</i>				x	x					x					x	x
Scincidae	<i>Morethia butleri</i>				x											x	x
Scincidae	<i>Tiliqua multifasciata</i>	Central Blue-tongue										x				x	
Scincidae	<i>Tiliqua occipitalis</i>	Western Bluetongue														x	
Typhlopidae	<i>Anilius bicolor</i>	Dark-spined Blind Snake				x											
Typhlopidae	<i>Anilius hamatus</i>	Pale-headed Blind Snake															x
Typhlopidae	<i>Anilius waitii</i>	Beaked Blind Snake															x
Varanidae	<i>Varanus caudolineatus</i>				x	x					x					x	x
Varanidae	<i>Varanus giganteus</i>	Perentie			x												
Varanidae	<i>Varanus eremius</i>	Pygmy Desert Monitor														x	
Varanidae	<i>Varanus gouldii</i>	Sand Monitor					x		x							x	
Varanidae	<i>Varanus panoptes</i>	Yellow-spotted Monitor			x	x										x	
Varanidae	<i>Varanus panoptes panoptes</i>															x	
Varanidae	<i>Varanus panoptes rubidus</i>						x				x	x					x
Varanidae	<i>Varanus tristis</i>	Racehorse Monitor														x	x


*Introduced species


^Species captured on camera during targeted regional survey


Appendix D Fauna habitat assessments


			Site Photograph	
Site	Name	Site A		
	Habitat Type	Shrub plain		
	Landform	Sandy stony plain		
Habitat Features	Slope	Flat		
	Aspect	Flat		
	Water Presence	None		
	Woody Debris	Very common		
	Tree Hollows (>50 cm)	None		
Condition	Condition	Good		
	Disturbance Type	Road access tracks, cattle grazing		
	Fire Age	Very old		
Ground Cover	Rock	Moderate		
	Soil	Evenly spread		
	Leaf Litter	Scarce		
Rocks	Type	Ironstone		Vegetation Description
	Size	Pebbles		
	Abundance	Moderate		
	Exposed Bedrock	None		
Soil	Type	Clay loam	<p><i>Acacia tetragonophylla</i> and <i>Santalum spiculatum</i> tall open shrubland over <i>Eremophila youngii</i> subsp. <i>youngii</i> scattered shrubs over <i>Ptilotus obovatus</i> scattered low shrubs</p>	
	Colour	Red-brown		


Site	Name	Site B	<div style="text-align: center;">Site Photograph</div> 
	Habitat Type	Stony rise	
	Landform	Hillcrest Upper Hillslope	
Habitat Features	Slope	Moderate (21-45°)	
	Aspect	North	
	Water Presence	None	
	Woody Debris	Very common	
	Tree Hollows (>50 cm)	None	
Condition	Condition	Good	
	Disturbance Type	Road access tracks, cattle grazing, mining exploration	
	Fire Age	Very old	
Ground Cover	Rock	Very common	
	Soil	Few small patches	
	Leaf Litter	Few small patches	
Rocks	Type	Ironstone	Vegetation Description
	Size	Small rocks	
	Abundance	Very common	
	Exposed Bedrock	Negligible	
Soil	Type	Sandy loam	<p>Hakea preissii and Acacia sp. low open woodland over Senna sp. and Sida sp. shrubland over Maireana sp. and Ptilotus obovatus low open shrubland</p>
	Colour	Red-brown	
Site	Name	Site C	Site Photograph


	Habitat Type	Mulga on clay loam	
	Landform	Sandy stony plain	
Habitat Features	Slope	Flat	
	Aspect	Flat	
	Water Presence	None	
	Woody Debris	Very common	
	Tree Hollows (>50 cm)	None	
Condition	Condition	Good	
	Disturbance Type	Road access tracks, cattle grazing	
	Fire Age	Very old	
Ground Cover	Rock	Rare	
	Soil	Evenly spread	
	Leaf Litter	Few small patches	
Rocks	Type	Quartz	
	Size	Gravel	
	Abundance	Rare	
	Exposed Bedrock	None	
Soil	Type	Clay loam	
	Colour	Red-brown	
			Vegetation Description
			<i>Acacia aneura</i> low woodland over <i>Acacia tetragonophylla</i> tall open shrubland over <i>Eremophila grantica</i> low open shrubland.


Site	Name	Site D	<div style="text-align: center;">Site Photograph</div> 
	Habitat Type	Mulga on clay loam	
	Landform	Sandy stony plain	
Habitat Features	Slope	Flat	
	Aspect	Flat	
	Water Presence	None	
	Woody Debris	Very common	
	Tree Hollows (>50 cm)	None	
Condition	Condition	Very good	
	Disturbance Type	Cattle grazing, road access tracks	
	Fire Age	Very old	
Ground Cover	Rock	None	
	Soil	Evenly spread	
	Leaf Litter	Many small patches	
Rocks	Type	Quartz	
	Size	Negligible	
	Abundance	None	
	Exposed Bedrock	None	
Soil	Type	Clay loam	<div style="text-align: center;">Vegetation Description</div> <p><i>Acacia aneura</i> low open forest over <i>Acacia ramulosa</i> var. <i>ramulosa</i> tall shrubland over <i>Eremophila?latrobei</i> subsp. <i>filiformis</i> and <i>Eremophila margarethae</i> low open shrubland</p>
	Colour	Red-brown	


Site	Name	H01	<div style="text-align: center;">Site Photograph</div> 
	Habitat Type	Outcropping	
	Landform	Hillcrest upper hillslope	
Habitat Features	Slope	Medium	
	Aspect	North	
	Water Presence	None	
	Woody Debris	Very common	
	Tree Hollows (>50 cm)	None	
Condition	Condition	Good	
	Disturbance Type	Other	
	Fire Age	Very old	
Ground Cover	Rock	Very common	
	Soil	Few small patches	
	Leaf Litter	Few small patches	
Rocks	Type	Ironstone	
	Size	Large rocks	
	Abundance	Very common	
	Exposed Bedrock	Minor outcropping	
Soil	Type	Sandy loam	
	Colour	Orange	

Site	Name	H02	<div style="text-align: center; background-color: black; color: white; padding: 5px;">Site Photograph</div> 
	Habitat Type	Mulga on stony plain	
	Landform	Stony Plain	
Habitat Features	Slope	Flat	
	Aspect	Flat	
	Water Presence	None	
	Woody Debris	Very common	
	Tree Hollows (>50 cm)	None	
Condition	Condition	Good	
	Disturbance Type	Other, road access tracks, cattle grazing	
	Fire Age	Very old	
Ground Cover	Rock	Very common	
	Soil	Many large patches	
	Leaf Litter	Few small patches	
Rocks	Type	Ironstone	
	Size	Gravel	
	Abundance	Very common	
	Exposed Bedrock	None	
Soil	Type	Clay loam	<p><i>Acacia aneura</i> low woodland over <i>Acacia tetragonophylla</i> open shrubland over <i>Acacia caesaneura</i>, <i>Maireana</i> sp. and <i>Ptilotus obovatus</i> low scattered shrubs</p>
	Colour	Red-brown	

Site	Name	H03	<div style="text-align: center;">Site Photograph</div> 	
	Habitat Type	Mulga on clay loam		
	Landform	Sandy stony plain		
Habitat Features	Slope	Flat		
	Aspect	Flat		
	Water Presence	None		
	Woody Debris	Very common		
	Tree Hollows (>50 cm)	None		
Condition	Condition	Very good		
	Disturbance Type	Cattle grazing		
	Fire Age	Very old		
Ground Cover	Rock	Rare		
	Soil	Evenly spread		
	Leaf Litter	Few small patches		
Rocks	Type	Ironstone		<div style="text-align: center;">Vegetation Description</div> <p><i>Acacia aneura</i>, <i>Acacia caesaneura</i> and <i>Acacia aptaneura</i> low open forest over <i>Acacia tetragonophylla</i> and <i>Santalum spicatum</i> tall open shrubland over <i>Ptilotus obovatus</i> scattered low shrubs</p>
	Size	Negligible		
	Abundance	Rare		
	Exposed Bedrock	None		
Soil	Type	Clay loam		
	Colour	Red-brown		

Site	Name	H04	<div style="text-align: center;">Site Photograph</div> 
	Habitat Type	Mulga on clay loam	
	Landform	Plain	
Habitat Features	Slope	Flat	
	Aspect	Flat	
	Water Presence	None	
	Woody Debris	Very common	
	Tree Hollows (>50 cm)	None	
Condition	Condition	Very good	
	Disturbance Type	Road access tracks, cattle grazing	
	Fire Age	Very old	
Ground Cover	Rock	None	
	Soil	Evenly spread	
	Leaf Litter	Many small patches	
Rocks	Type	None discernible	
	Size	None	
	Abundance	None	
	Exposed Bedrock	None	
Soil	Type	Clay loam	<div style="text-align: center;">Vegetation Description</div> <p><i>Acacia aneura</i> low open woodland over <i>Acacia tetragonophylla</i> and <i>Acacia ramulosa</i> subsp. <i>ramulosa</i> tall scattered shrubs over <i>Eremophila granitica</i> low open shrubland over <i>Rhodanthe chersleyae</i> and <i>Calandrinia creethiae</i> open herbland</p>
	Colour	Red-brown	

Site	Name	H05	<div style="text-align: center;">Site Photograph</div> 
	Habitat Type	Sparse shrubland on heavy clay	
	Landform	Drainage area floodplain	
Habitat Features	Slope	Flat	
	Aspect	Flat	
	Water Presence	None	
	Woody Debris	Very common	
	Tree Hollows (>50 cm)	None	
Condition	Condition	Good	
	Disturbance Type	None discernible	
	Fire Age	Very old	
Ground Cover	Rock	None	
	Soil	Evenly spread	
	Leaf Litter	Scarce	
Rocks	Type	None discernible	
	Size	None	
	Abundance	None	
	Exposed Bedrock	None	
Soil	Type	Silty clay loam	
	Colour	Red-brown	

Site	Name	H06	<div style="text-align: center;">Site Photograph</div> 
	Habitat Type	Low mulga on clay loam	
	Landform	Sandy stony plain	
Habitat Features	Slope	Flat	
	Aspect	Flat	
	Water Presence	None	
	Woody Debris	Very common	
	Tree Hollows (>50 cm)	None	
Condition	Condition	Very good	
	Disturbance Type	Cattle grazing	
	Fire Age	Very old	
Ground Cover	Rock	Very common	
	Soil	Evenly spread	
	Leaf Litter	Many small patches	
Rocks	Type	Quartz	
	Size	Pebbles	
	Abundance	Very common	
	Exposed Bedrock	None	
Soil	Type	Clay loam	<div style="text-align: center;">Vegetation Description</div> <p><i>Acacia aneura</i>, <i>Acacia caesaneura</i> and <i>Acacia aptaneura</i> low open forest over <i>Acacia tetragonophylla</i> and <i>Santalum spicatum</i> tall open shrubland over <i>Ptilotus obovatus</i> scattered low shrubs</p>
	Colour	Red-brown	

Appendix E Vertebrate fauna recorded per systematic site

Species	Common Name	Conservation Listing		A	B	C	D
		BC Act	EPBC Act				
Aves							
Acanthizidae							
<i>Acanthiza apicalis</i>	Inland Thornbill			1	1		
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill				4		
<i>Acanthiza robustirostris</i>	Slaty-backed Thornbill					4	
<i>Aphelocephala leucopsis</i>	Southern Whiteface				1	39	16
<i>Pyrrholaemus brunneus</i>	Redthroat					1	
Campephagidae							
<i>Lalage tricolor</i>	White-winged Triller			1			
Climacteridae							
<i>Climacteris affinis</i>	White-browed Treecreeper					4	4
Columbidae							
<i>Ocyphaps lophotes</i>	Crested Pigeon					2	
Corvidae							
<i>Corvu orru</i>	Torresian Crow						6
Cracticidae							
<i>Cracticus nigrogularis</i>	Pied Butcherbird					4	
Locustellidae							
<i>Megalurus cruralis</i>	Brown Songlark			1			1
Maluridae							
<i>Malurus leucopterus</i>	White-winged Fairy-wren			4			
<i>Malurus splendens</i>	Splendid Fairy-wren			4			
Meliphagidae							
<i>Epthianura albifrons</i>	White-fronted Chat				1	1	
<i>Gavicalis virescens</i>	Singing Honeyeater			3		4	1
<i>Manorina flavigula</i>	Yellow-throated Miner					3	
Oreoicidae							
<i>Oreoica gutturalis</i>	Crested Bellbird			8	3	4	6
Pachycephalidae							
<i>Colluricincla harmonica</i>	Grey Shrike-thrush				2		
<i>Pachycephala inornata</i>	Gilbert's Whistler			1			
<i>Pachycephala occidentalis</i>	Western Whistler			1			
<i>Pachycephala rufiventris</i>	Rufous Whistler						1
Petroicidae							
<i>Melanodryas cucullata</i>	Hooded Robin						1
<i>Petroica goodenovii</i>	Red-capped Robin			1	1	10	4
Psittacidae							
<i>Platycercus zonarius</i>	Australian Ringneck			1	8		
Psophodidae							
<i>Cinclosoma castaneothorax</i>	Chestnut-breasted Quail-thrush						4
Rhipiduridae							
<i>Rhipidura leucophrys</i>	Willie Wagtail			1		1	
Mammalia							
Bovidae							
<i>Bos taurus</i>	*European Cattle			4	X	X	X

Species	Common Name	Conservation Listing		A	B	C	D
		BC Act	EPBC Act				
Dasyuridae							
<i>Antechinomys laniger</i>	Kultar			1		1	
<i>Pseudantechinus woolleyae</i>	Woolley's Pseudantechinus				1		
<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4			2		
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart			7	10	6	5
<i>Sminthopsis ooldea</i>	Ooldea Dunnart			1		1	
Emballonuridae							
<i>Taphozous hillei</i>	Hill's Sheathtail Bat					X	X
Equidae							
<i>Equus caballus</i>	*Horse			X	X		X
Felidae							
<i>Felis catus</i>	*Cat					X	
Leporidae							
<i>Oryctolagus cuniculus</i>	*Rabbit			X	X	X	X
Macropodidae							
<i>Macropus fuliginosus</i>	Western Grey Kangaroo						1
Molossidae							
<i>Austronomus australis</i>	White-striped Free-tailed Bat			X	X	X	X
<i>Ozimops petersi</i>	Inland Free-tailed Bat					X	X
Tachyglossidae							
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna				2	1	
Vespertilionidae							
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat			X	X	X	X
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat			X	X	X	X
<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat			X		X	X
<i>Vespadelus finlaysoni</i>	Finlayson's Cave Bat						X
Reptilia							
Agamidae							
<i>Ctenophorus fordi</i>	Mallee Sand Dragon					2	
<i>Diporiphora amphiboluroides</i>							1
<i>Tympanocryptis pseudopsephos</i>				1	6		
Carphodactylidae							
<i>Nephrurus vertebralis</i>							1
<i>Nephrurus wheeleri</i>	<i>Nephrurus wheeleri</i>			2			
Diplodactylidae							
<i>Diplodactylus pulcher</i>				3	1	1	1
<i>Rhynchoedura ornata</i>						3	
<i>Strophurus wellingtonae</i>				1			
Elapidae							
<i>Pseudonaja mengdeni</i>	Western Brown Snake						1
Gekkonidae							
<i>Gehyra variegata</i>					3	2	2
Scincidae							
<i>Ctenotus leonhardii</i>					5	6	
<i>Ctenotus schomburgkii</i>						1	9

Species	Common Name	Conservation Listing		A	B	C	D
		BC Act	EPBC Act				
<i>Egernia depressa</i>				2		2	4
<i>Menetia greyii</i>					1		
<i>Morethia butleri</i>				1	1		1
Typhlopidae							
<i>Anilius bicolor</i>					1	1	
Varanidae							
<i>Varanus caudolineatus</i>						2	
<i>Varanus panoptes</i>					2	1	7

Appendix F Night Parrot analysis results

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10 October 2020

Melissa Jensen
Senior Zoologist
Stantec Australia Pty Ltd

Ref: 30003176

Dear Melissa,

Please find below the results of Stantec's bioacoustic surveys targeting the Night Parrot in September 2020 at Mt Weld.

Survey and analysis background

Stantec Australia conducted targeted sampling for the Night Parrot (*Pezoporus occidentalis*) in September 2020 at Mt Weld. Song Meter 4 (Wildlife Acoustics, MA, USA) acoustic recorders were deployed across 4 sites, and recorded a combined total of 28 nights of data (Table 1). Files were provided in WAV format (2,005 files; 107 GB). Each recorder was programmed to record continuously from sunset to sunrise (approximately 12 hours per night).

The analysis was undertaken using the software Kaleidoscope Pro v5.2.1, targeting the frequency range of 1000 – 4000 Hz for which all known calls of the Night Parrot are distributed within (Jackett et al. 2017; Murphy et al. 2017; Leseberg et al. 2019). Searching for calls over a large frequency range such as this is likely to produce a high number of falsepositive results due to many other bird species calling at similar frequencies but is a necessary procedure in order to capture the potential repertoire of Night Parrot.

Potential Night Parrot calls detected during the analysis were compared to a reference library comprising 897 Night Parrot calls from Western Australia. 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 (Leseberg et al. 2019).

Kaleidoscope Pro search parameters were optimised using 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. Thus, the probability of non-detection of a true-positive call was 18.0%; two true-positive calls was 3.2%; 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 5 (1–34, n=29). The probability of at least one call being detected within a sequence of median length (assuming a Night Parrot was not stationary at the distal edge of a unit's recording radius when calling) was >99.9%.

Table 1. Recordings analysed from September 2020 survey

Recording unit name	Recording start date (PM)	Recording end date (AM)	Total recording nights
MINI01_0915	15/09/2020	22/09/2020	7
MINI02_0915	15/09/2020	22/09/2020	7
MINI03_0915	15/09/2020	22/09/2020	7
MINI04_0915	15/09/2020	22/09/2020	7
Total			28

Results

A total of 8,273 Kaleidoscope detections were manually assessed for Night Parrot vocalisations, and as expected, a high percentage (100% of all calls in this analysis) were false-positives.

No calls attributable to the Night Parrot were detected during the analysis.

Analysis remarks

The recordings were typically of good quality, but wind interfered for the majority of the night on the nights of the 16th and 19th of September across all sites. Low-level generator noise was regularly detected at unit MINI04_0915, but only potentially interfered with (i.e. masked) vocalisations below ~1800 Hz (and therefore at the lower frequency end of Night Parrot vocalisations).

The vocalisations of non-target bird species were detected across all nights at all sites. It is therefore expected that vocalisations of Night Parrots would similarly have been detected had they occurred within a reasonable distance (i.e. several hundred metres) of a unit.

If you have any questions or comments relating to the analysis, don't hesitate to be in touch.

Sincerely,



Nigel Jackett

Selected references

- Jackett, N.A., Greatwich, B.R., Swann, G., and Boyle, A. (2017). A nesting record and vocalisations of the Night Parrot *Pezoporus occidentalis* from the East Murchison, Western Australia. *Australian Field Ornithology*, 34, 144-150.
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- Murphy, S.A., Austin, J.A., Murphy, R.K., Silcock, J., Joseph, L., Garnett, S.T., Leseberg, N.P., Watson, J.E.M. & Burbidge, A.H. (2017a). Observations on breeding Night Parrots (*Pezoporus occidentalis*) in western Queensland. *Emu* 117, 107-113.

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