Basic Vertebrate Fauna Survey

Lake Roe Gold Project

Prepared for: Ramelius Resources Ltd

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EXECUTIVE SUMMARY

Ramelius intends to clear vegetation to construct and operate a gold mine on the western part of Lake Roe and the adjacent area. The project area is ~45km south, southwest of the Rebecca mine site, and ~100km east of Kalgoorlie on the eastern margin of the Norseman-Wiluna Greenstone Belt. A section of the Lake Rebecca mining area was subject to a Detailed vertebrate fauna survey by Western Wildlife (2022) with the fieldwork being undertaken in 2021 and 2022.

To support the environmental approvals, Terrestrial Ecosystems was contracted to complete a Basic vertebrate fauna survey and assessment. This assessment included a site survey and habitat assessment.

There are multiple fauna habitats in the project area (i.e. chenopod shrubland, Eucalypt woodland, Eucalypt over spinifex, Sheoak woodland, mixed shrubs, and salt lake) in addition to disturbed areas that are likely to support only a few vertebrate fauna. All habitats are present in adjacent areas.

Stantec (2019) in its Level 1 survey in 2018, after unusually high rain in the area, recorded the migratory shorebirds Common Sandpiper, Common Greenshank and Sharp-tailed Sandpiper on freshwater claypans in the project area. The proposed mine will impact the western part of Lake Roe and will, therefore, remove potential migratory shorebird foraging areas when Lake Roe is flooded. Given the substantial area of Lake Roe and Lake Rebecca that will not be impacted, removing these foraging areas is not seen as a potentially significant impact, and there will be plenty of other undisturbed lake foraging areas available to migratory shorebirds.

Although not recorded by Stantec (2019) in its survey of the Lake Roe project area and Western Wildlife (2022) in its survey of part of the Lake Rebecca mining project area, the Southern Whiteface is potentially in the project area. This bird will readily move if disturbed into the suitable adjacent habitat, so vegetation clearing would not significantly impact this species. Other avifauna of conservation significance potentially in the project area (e.g. Peregrine Falcon, Princess Parrot) are unlikely to be significantly impacted by the proposed vegetation clearing activities and development. The Malleefowl, its mounds, and tracks were not recorded during the site survey, so it is unlikely to be present.

Clearing native vegetation for the construction and operation of a mine is likely to result in the loss of small vertebrate fauna on-site that cannot move away during the clearing process; however, this loss is not expected to be significant when viewed in a bioregional context. The few larger animals, such as kangaroos, large goannas, and snakes, and most birds will move into adjacent areas once vegetation clearing commences so that potential impacts will be low. There may be an ongoing loss of small native fauna due to vehicle strikes on roads, but overall, this impact will be very low.

The proposed project is unlikely to significantly impact species of conservation significance, so a referral under the *EPBC Act 1999* is not recommended.

1. INTRODUCTION

1.1 BACKGROUND

Ramelius Resources' (Ramelius) Lake Roe gold project area is ~100km east of Kalgoorlie on the eastern margin of the Norseman-Wiluna Greenstone Belt (Figures 1 and 2). Ramelius intends to seek environmental approval to mine this area for gold. Ore from this mine will be trucked via a haul road to Ramelius' Lake Rebecca mine, which is ~45km to the north. Stantec (2019) undertook a Level 1 survey of the project area. This assessment provides a more up-to-date assessment to support approval applications.

This assessment is to provide supporting information when Ramelius seeks environmental approvals.

1.2 PROJECT OBJECTIVES AND SCOPE OF WORKS

Ramelius commissioned Terrestrial Ecosystems to undertake a Basic vertebrate fauna survey and assessment of the proposed mining area (Figure 2). The methodology broadly follows that described in the Environmental Protection Authority (2020) *Technical Guidance Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*.

This Basic vertebrate fauna survey and risk assessment involved a desktop review and an on-site assessment with the objectives to:

- indicate the vertebrate fauna assemblage (reptiles, amphibians, mammals, and birds) on and near the project area so that potential impacts on the fauna and fauna assemblage might be adequately assessed;
- identify the presence and/or potential risk of impacts on species of conservation significance that are present or likely to be present in the project area;
- assess the impact and environmental risks associated with the proposed development on the vertebrate fauna assemblage;
- determine if any additional surveys are required to assess the potential impact on vertebrate fauna assemblage in the project area, including impacts on species of conservation significance; and
- make recommendations that avoid, mitigate or minimise potential impacts on resident fauna.

To achieve these objectives, Terrestrial Ecosystems:

- reviewed Terrestrial Ecosystems' database (includes Atlas of Living Australia) to identify potential vertebrate fauna within the area;
- searched the Commonwealth Government's database of fauna of national environmental significance to identify species potentially occurring within the area that are protected under the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act 1999*) or international migratory bird agreements (JAMBA/CAMBA);
- reviewed previous fauna surveys conducted in and near the project area;
- undertook a site visit to assess fauna habitat types and habitat quality and to search for recently active Malleefowl mounds and tracks;
- assessed the potential risks to the fauna associated with clearing additional areas of native vegetation; and
- discussed the likelihood of *EPBC Act 1999* and *Biodiversity Conservation Act 2016* (*BC Act 2016*) listed species being present in the project area.

2. EXISTING ENVIRONMENT

2.1 LOCATION OF PROJECT AREA

The project area is in the Murchison 1 (MUR1 - East Murchison subregion) IBRA bioregion. An old report by Cowan (2001) described the subregion as mostly dominated by mulga woodlands that are often rich in ephemerals, hummock grasslands, saltbush shrublands, and haloscarcia shrublands. Cowan (2001) recorded no threatened ecological communities in the vicinity of the project areas. Threatening processes for conservation significant fauna were listed as foxes and cats.

The proposed mining area is on the western side of Lake Roe and has an area of ~600ha. Aerial photography indicates that sections of Lake Roe, east of the project area, contain water much more frequently than the section in the proposed mining area.

2.2 LAND USE HISTORY

The dominant land uses for the bioregion are native pastures to support grazing on pastoral leases and crown land reserves, as well as mining, exploration, and mining to a lesser extent. The region surrounding the project area has largely been used for pastoral activities.

2.3 CLIMATE

The project area is characterised as semi-arid. Kalgoorlie, ~100km to the west, has an annual rainfall of ~266mm, although this varies considerably yearly. The highest mean maximum and minimum temperatures in Kalgoorlie are in January, with an average of 34°C and 19°C, respectively (Bureau of Meteorology, 2024). The lowest mean daily maximum and minimum temperatures occur in July (Chart 1). The average monthly rainfall is heaviest in February. Summer rain is unpredictable and often results from thunderstorms coming from the north and the west or decaying cyclonic activity as low-pressure cells move from the Pilbara through the Goldfields.

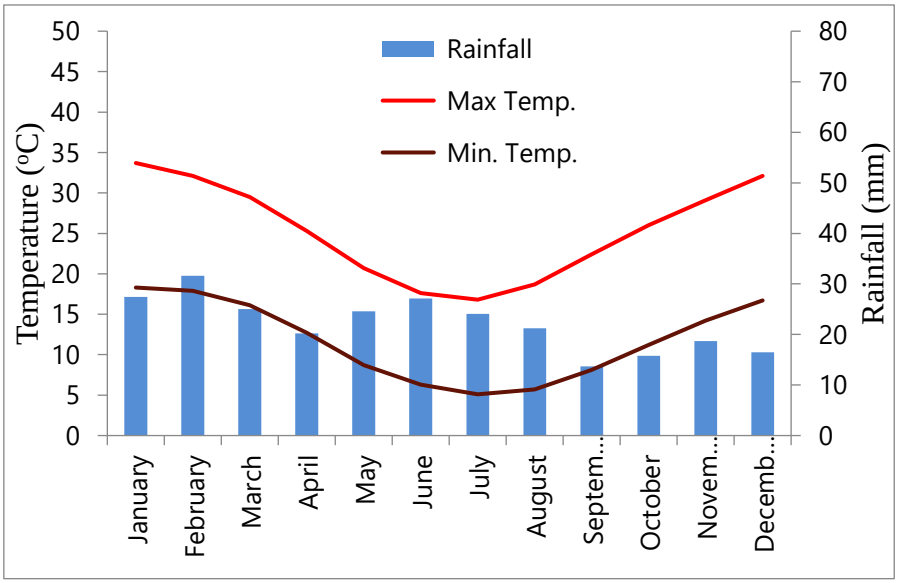

Chart 1. Climatic averages for Kalgoorlie

2.4 REGIONAL BIOLOGICAL FAUNA CONTEXT OF THE PROJECT AREA

Western Wildlife (2022) undertook a Detailed survey of part of the Ramelius Lake Rebecca project area, which is ~45km north of the Lake Roe project area. In addition, other vertebrate fauna survey reports are available for similar habitats in nearby areas. Individual records for fauna are contained in the Atlas of Living Australia, which incorporates data from the Western Australian Museum collection have also been accessed.

Fauna survey data used in this assessment come from:

- Atlas of Living Australia
- Dell, J, How, R.A. and Muir, B.G (1988) Vertebrate fauna. In: The biological survey of the Eastern Goldfields of Western Australia, Part 5, Edjudina - Menzies Study Area. *Records of the Western Australian Museum*, Supplement No 31., pp. 38-77.
- Ecologia Environment (2007) *Jump Up Dam Fauna Assessment*. Unpublished report for Heron Resources, Perth.
- Hart, Simpson and Associates (2000) *Anaconda Nickel Ltd, Cawse Expansion Project, Fauna Survey*. Unpublished report for Anaconda Nickel Ltd, Perth.
- McKenzie, N.L., Rolfe, J.K. and Youngson, W.K. (1992) Vertebrate fauna. In: The biological survey of the Eastern Goldfields of Western Australia; Part 8; Kurnalpi - Kalgoorlie Study Area. *Records of the Western Australian Museum,* Supplement No 41, 37-65.
- Terrestrial Ecosystems (2010) *Fauna Assessment for the Majestic Gold Project*, Unpublished report for Botanica Consulting Pty Ltd and Integra Mining Ltd, Perth.
- Stantec (2019) *Lake Roe Gold Project: Fauna Survey*, Unpublished report for Breaker Resources, Perth.
- Western Wildlife (2022) *Rebecca Gold Project: Detailed Vertebrate Fauna Survey 2021-2022*, Unpublished reported Ramelius Resources, Perth.

2.5 FAUNA SPECIES AT RISK

Cowan (2001) reported the fauna species at risk in the East Murchison subregion as Bilby (*Macrotis lagotis*), Marsupial Mole (*Notoryctes typhlops*), Mulgara (*Dasycercus cristicauda / blythi*), Malleefowl (*Leipoa ocellata*), Princess Parrot (*Polytelis alexandrae*), Slender-billed Thornbill (*Acanthiza iredalei iredalei*), Giant Desert Skink (*Liopholis kintorei*) and Peregrine Falcon (*Falco peregrinus*). This report assesses the potential for these species in the project area, the potential impact that the proposed vegetation clearing and mining activity might have on these species, and other species of conservation significance. Since 2001, the Night Parrot (*Pezoporus occidentalis*) has been rediscovered in Western Australia and is also considered a species at risk in the region, and the Southern Whiteface (*Aphelocephala leucopsis*) has been listed as vulnerable under the *EPBC Act*.

3. METHODOLOGY

3.1 DATABASE SEARCHES

A review of the *EPBC Act 1999* list of protected species was undertaken for the area around the project area to identify species of conservation interest to the Commonwealth Government. In addition, a desktop search of Terrestrial Ecosystems' fauna survey database was used to develop an appreciation of the vertebrate fauna assemblages in relevant sections of the bioregion near the project area.

Other more general texts were also used to provide supplementary information on vertebrates in the bioregion, including Tyler et al. (2000) for frogs; Storr et al. (1983, 1990, 1999b, 2002) and Thompson and Thompson (2006) for reptiles; Johnstone and Storr (1998, 2004) for birds; and Van Dyck and Strahan (2008) for mammals.

Collectively, these sources of information were used to create lists of species expected to utilise the project area and broader bioregion. It should be noted that these lists will include species that have been recorded in the general region but are possibly vagrants. Vagrants can be recorded almost anywhere. Many of the records are historical, and the species is no longer present in the area. Many bird, mammal, reptile, and amphibian species have specific habitat requirements that may be present in the general area but not in the project area. Also, the ecology of many of these species is often poorly understood. Consequently, it can sometimes be difficult to indicate species whose specific habitat requirements are absent in the project area. Therefore, many species will be included in the lists produced from database searches but will not be present in the actual project area.

There are errors in most databases, including the Atlas of Living Australia and the Western Australian Museum (WAM) collection. These errors occur because of a misidentification of individuals, taxonomic name changes, and incorrect coordinates entered into the database. Terrestrial Ecosystems could not verify the primary records, so it has used the information provided. Readers should appreciate that species lists, and fauna surveys reported in the appendices may include these errors.

3.2 PREVIOUS FAUNA ASSESSMENT

Stantec (2019) undertook a Level 1 vertebrate fauna assessment of the project area in 2018. This assessment was carried out from 3-9 November 2018, after unusually high local rain (i.e. 68m in October 2018). The fieldwork included a habitat assessment, a targeted survey for migratory waterbirds, a transect search in suitable habitat for recently active Malleefowl mounds, an acoustic survey (i.e. four SM2 recorders for six consecutive nights and Nigel Jackett analysed the sound recordings) for Night Parrots, an echolocation survey (i.e. three SM2 recorders) for the Central Long-eared Bat, and 26 camera traps (Reconyx 600).

Stantec (2019) reported 12 fauna habitat types, and 84 vertebrate fauna species (i.e. 6 mammals, 55 birds, 16 reptiles) in the project area. The migratory species of conservation significance included: Sharp-tailed Sandpiper, Common Sandpiper, and the Common Greenshank which were found around the freshwater claypan. Cats, rabbits, dogs and European cattle were in the project area. No Malleefowl mounds, nor audio recordings of Night Parrots or echolocation recordings of Central Long-eared Bats in the project area.

3.3 SITE INSPECTION AND FAUNA HABITAT ASSESSMENT

A site survey was undertaken on 17 November 2024 to assess the project area's fauna habitat types and conditions. This information includes a description of the habitat structure, habitat condition, landform, soils, vegetation, and time since the last fire.

The fauna habitat assessment had two foci:

- assessing fauna habitat types and their condition; and
- assessing the possible presence of and recording evidence of species of conservation significance.

Dr James Barr and Tom Raymond, who undertook the site assessment, stopped at multiple locations within the project area and recorded a suite of data about the fauna habitat and its condition. Table 1 indicates the variables recorded at each location.

Table 1. Fauna habitat assessment variables

Observer's Name:	
Coordinates of the location as UTM (GDA94):	
Fire history – options	
☐ > 5 years	
☐ 1-5 years	
☐ < 1 year	
Landform – options	
☐ Beach	☐ Lower slope
☐ Clay plain	☐ Mid slope
☐ Cliff	☐ Ridge
☐ Creek line	☐ River
☐ Dam	☐ Rocky outcrop / breakaway
☐ Drainage line	☐ Salt lake
☐ Dune crest	☐ Sand dune
☐ Dune slope	☐ Sand plain
☐ Dune swale	☐ Stony plain
☐ Escarpment	☐ Swamp
☐ Flat	☐ Undulating
☐ Gorge	☐ Upper slope
☐ Gully	☐ Wetland
☐ Intertidal / mangrove	☐ Water hole
☐ Lake / lake edge	
Habitat quality – options	
☐ *High quality fauna habitat* – These areas closely approximate the vegetation mix and quality that would have been in the area prior to any disturbance. The habitat has connectivity with other habitats and is likely to contain the most natural vertebrate fauna assemblage.	
☐ *Very good fauna habitat* - These areas show minimal signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) and generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be minimally affected by disturbance.	

Observer's Name:	
☐ *Good fauna habitat* – These areas showed signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by disturbance.	
☐ *Disturbed fauna habitat*– These areas showed signs of significant disturbance. Many of the trees, shrubs and undergrowth are cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, containing weeds or have been damaged by vehicle or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.	
☐ *Highly degraded fauna habitat* – These areas often have a significant loss of vegetation, an abundance of weeds, and a large number of vehicle tracks or are completely cleared. Limited or no fauna habitat connectivity. Fauna assemblages in these areas are likely to be significantly different to what might have been in the area pre-disturbance.	
Soil Type – options	
☐ Sand	☐ Silty loam
☐ Loamy sand	☐ Sand clay loam
☐ Clayey sand	☐ Clay
☐ Clay loam	☐ Peat / organic
☐ Silty clay loam	☐ Stony
☐ Sandy loam	
Soil colour - options	
☐ Black	☐ Red
☐ Brown	☐ White
☐ Grey	☐ Yellow
☐ Orange	
Surface stones – options	
☐ None	☐ Boulders (>250mm)
☐ Pebbles (0-50mm)	☐ Rocks
☐ Cobbles (51-250)	

The project area was searched for Malleefowl, their tracks, and mounds. This search was undertaken using a UTV or walking in the more densely vegetated areas. If a Malleefowl mound was found, then its status, location, and dimensions would be recorded in accordance with the National Malleefowl Monitoring Manual (National Malleefowl Recovery Team 2016) and an image of the mound taken. The GPS coordinates of all Malleefowl tracks would also be recorded.

3.4 REPORTING STAFF

Dr Graham Thompson prepared this report, which Dr Scott Thompson reviewed before it was sent to the client. Drs Graham and Scott Thompson, and Dr James Barr completed field habitat mapping and GIS assessment.

Senior scientists have appropriate, relevant post-graduate qualifications, extensive experience in conducting fauna assessments in the Goldfields, have published research articles on biodiversity, fauna assemblages, conservation significant species, trapping techniques, and temporal variations in trapped fauna assemblages

in Goldfields surveys, and are therefore appropriately trained and experienced for the task of preparing this assessment.

Dr Scott Thompson is the only environmental practitioner in Western Australia with independent specialist certification (CEnvP – Ecology Specialist) combined with post-graduate tertiary qualifications and is a licensed pest management technician (LPMT). This unique set of skills and qualifications ensures Scott undertakes fauna surveys, assessments, and control programs to the highest standard and quality assurance. The qualifications and experience of the survey personnel are shown in Table 2.

Table 2. Project personnel and their qualifications

Name	Qualifications	Experience	Role
Dr Scott Thompson	BSc. (Env. Sc.), MSc. (Env. Mngt.), PhD (Env. Sc./Mngt). CEnvP (Ecology Specialist)	> 20 years	Survey coordinator and Principal zoologist
Dr Graham Thompson	Post Grad. Dip. (Zool.), PhD (Zoology)	> 20 years	Principal zoologist
Dr James Barr	BSc (Zoology and Biochemistry), Cert IV (Veterinary nursing), PhD (Behavioural ecology)	> 10 years	Zoologist
Tom Raymond	BSc (Hons, Zoology)	> 3 years	Zoologist

3.5 TAXONOMY AND NOMENCLATURE

The taxonomy and nomenclature for fauna species used in this report are generally based on the WA Museum species list. Terrestrial Ecosystems presumed that the identifications referred to in the appendices or reports used to provide local and regional comparative data were correct, and we have only corrected obvious records where the nomenclature was known to be incorrect.

3.6 LIMITATIONS

This vertebrate fauna survey and risk assessment included a site assessment, information in the Commonwealth Government database, and other published and unpublished fauna survey data for the bioregion and personal experience over the past 20 years undertaking fauna surveys in the goldfields. It is acknowledged that multiple surveys conducted in different seasons, repeated over several years, are necessary to appreciate the fauna assemblage in a project area fully.

The EPA's (2020) technical guidance for terrestrial fauna surveys suggested that many variables may limit fauna surveys. Limitations associated with each of these variables are assessed in Table 3.

Table 3. Fauna survey limitations and constraints

Possible limitations	Constraint	Comment
Availability of data and information	No	There is a Detailed vertebrate fauna survey for the Lake Rebecca mine area, ~45km to the north, and other fauna survey reports for similar habitats in nearby areas.
Competency/experience of the survey team, including experience in the bioregion surveyed	No	The authors of this report have appropriate postgraduate qualifications, have undertaken multiple surveys and assessments in the Goldfields, have published a book and multiple refereed journal articles based on fauna surveys in the region, and are familiar with the vertebrate fauna in this bioregion.

Possible limitations	Constraint	Comment
Scope of the survey, e.g. where faunal groups were excluded from the survey	N/A	
Timing, weather, and season	No	The weather was suitable for a site survey.
Disturbance that may have affected results, e.g. fire, flood	No	Disturbances in the project area have been factored into this assessment.
The proportion of fauna identified, recorded or collected	N/A	
Adequacy of the survey intensity and proportion of survey achieved, e.g. the extent to which the area was surveyed	No	Basic survey requirements were met.
Access problems	No	The site was accessible using a UTV.
Problems with data and analysis, including sampling biases	N/A	

N/A = not applicable, Significant = major impact on outcome of the report, Moderate = impacted parts of the report, Negligible = almost no impact on the report.

4. RESULTS

4.1 FAUNA HABITAT

The following seven fauna habitat types are present in the project area:

- Chenopod shrubland;
- Eucalypt woodland;
- Eucalypt over spinifex;
- Sheoak woodland;
- Mixed shrubs;
- Salt lake; and
- Disturbed areas.

The salt lake and its immediate surrounds is the most dominant fauna habitat in the project area. In addition, the project area has been extensively explored, with evidence of historical drill holes and tracks across the project area. There was evidence of pastoral activity in the project area, and there were likely to be rabbits, cats, and wild dogs.

Seventy-five habitat assessments were undertaken in the project area. The results of the habitat assessment and associated photographs are provided in Appendix D. Plates 1–14 indicate the variation in fauna habitats in the project area.

Plate 1. Fauna habitat

Plate 2. Fauna habitat

Plate 3. Fauna habitat

Plate 4. Fauna habitat

Plate 5. Fauna habitat

Plate 6. Fauna habitat

Plate 7. Fauna habitat

Plate 8. Fauna habitat

Plate 9. Fauna habitat

Plate 10. Fauna habitat

Plate 11. Fauna habitat

Plate 12. Fauna habitat

Plate 13. Disturbed area

Plate 14. Disturbed area

4.2 FAUNA ASSEMBLAGE

Western Wildlife (2022) undertook a Detailed vertebrate fauna survey of the Lake Rebecca mining area, ~45km north of the project area in 2021-22. McKenzie and Hall (1992) surveyed the Kurnalpi – Kalgoorlie region, which was part of the Eastern Goldfields regional government surveys, and Dell and How (1988) reported on a survey for the Edjudina-Menzies area. Terrestrial Ecosystems (2010) undertook a Level 2 survey for the Majestics project area, which is ~90km southwest of the project area. The Terrestrial Ecosystems' (2010) survey included pit trapping, funnel traps, echolocation bat detection surveys, avifauna surveys, and short-range endemic invertebrate surveys. Stantec's (2019) Level 1 fauna assessment included a list of vertebrate species recorded during its site survey. Collectively, the data from these surveys provide a comprehensive list of vertebrate fauna species for the project area.

4.3 BIOREGIONAL VERTEBRATE FAUNA ASSEMBLAGE

Appendix B provides a summary of the fauna survey data available near the project area. There are appreciable differences in the recorded fauna assemblages within and among fauna surveys shown in Appendix B. These differences are partially due to the low survey effort deployed by some of the surveys. They also reflect variations in soils and vegetation and temporal variations in the fauna assemblages.

Tables 4-6 provide a list of vertebrate species potentially found near the project area that have been compiled based on the fauna survey report results shown in Appendix B.

Table 4. Birds potentially found near the project area

Family	Species	Common Name
Casuariidae	*Dromaius novaehollandiae*	Emu
Anatidae	*Chenonetta jubata*	Australian Wood Duck
	Anas superciliosa	Pacific Black Duck
	Anas gracilis	Grey Teal
	Cygnus atratus	Black Swan
	Todorna tadornoides	Australian Shelduck
	Anas superciliosa	Pacific Black Duck
	Anas gracilis	Grey Teal
	Malacorhynchus membranaceus	Pink-eared Duck
	Tachybaptus novaehollandiae	Australasian Grebe
	Ardea pacifica	White-necked Heron
Rallidae	*Tribonyx ventralis*	Black-tailed Nativehen
	Fulica atra	Eurasian Coot
Recurvirostridae	*Cladorhynchus leucocephalus*	Banded Stilt
	Recurvirostra novaehollandiae	Red-necked Avocet
	Elseyornis melanops	Black-fronted Dotterel
	Himantopus himantopus	Black-winged Stilt
Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper
	Actitis hypoleucos	Common Sandpiper
	Tringa nebularis	Common Greenshank
Megapodiidae	*Leipoa ocellata*	Malleefowl
Phasianidae	*Coturnix pectoralis*	Stubble Quail
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe
Columbidae	*Phaps chalcoptera*	Common Bronzewing
	Ocyphaps lophotes	Crested Pigeon
Cuculidae	*Chrysococcyx basalis*	Horsfield's Bronze-Cuckoo
	Chrysococcyx osculans	Black-eared Cuckoo
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar
Podargidae	*Podargus strigoides*	Tawny Frogmouth
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar
Apodidae	*Apus pacificus*	Pacific Swift
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew
Charadriidae	*Vanellus tricolor*	Banded Lapwing
	Charadrius ruficapillus	Red-capped Plover
Scolopacidae	*Tringa glareola*	Wood Sandpiper
Turnicidae	*Turnix velox*	Little Buttonquail
Otididae	*Ardeotis australis*	Australian Bustard
Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant
Accipitridae	*Hieraaetus morphnoides*	Little Eagle

Family	Species	Common Name
	Aquila audax	Wedge-tailed Eagle
	Circus assimilis	Spotted Harrier
	Accipiter fasciatus	Brown Goshawk
	Accipiter cirrocephalus	Collared Sparrowhawk
	Haliastur sphenurus	Whistling Kite
Cuculidae	*Heteroscenes pallidus*	Pallid Cuckoo
Strigidae	*Ninox boobook*	Southern Boobook
Alcedinidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher
Meropidae	*Merops ornatus*	Rainbow Bee-eater
Falconidae	*Falco cenchroides*	Nankeen Kestrel
	Falco longipennis	Australian Hobby
	Falco berigora	Brown Falcon
Cacatuidae	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo
	Eolophus roseicapilla	Galah
	Nymphicus hollandicus	Cockatiel
Psittaculidae	*Polytelis anthopeplus*	Regent Parrot
	Neopsephotus bourkii	Bourke's Parrot
	Barnardius zonarius	Australian Ringneck
	Psephotus varius	Mulga Parrot
	Melopsittacus undulatus	Budgerigar
	Glossopsitta porphyrocephala	Purple-crowned Lorikeet
Ptilonorhynchidae	*Chlamydera guttata*	Western Bowerbird
Climacteridae	*Climacteris affinis*	White-browed Treecreeper
	Climacteris rufus	Rufous Treecreeper
Maluridae	*Malurus lamberti*	Variegated Fairywren
	Malurus splendens	Splendid Fairywren
	Malurus leucopterus	White-winged Fairywren
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater
	Purnella albifrons	White-fronted Honeyeater
	Manorina flavigula	Yellow-throated Miner
	Anthochaera carunculata	Red Wattlebird
	Gavicalis virescens	Singing Honeyeater
	Ptilotula ornata	Yellow-plumed Honeyeater
	Ptilotula plumula	Grey-fronted Honeyeater
	Conopophila whitei	Grey Honeyeater
	Epthianura tricolor	Crimson Chat
	Epthianura aurifrons	Orange Chat
	Epthianura albifrons	White-fronted Chat
	Lichmera indistincta	Brown Honeyeater
	Phylidonyris niger	White-cheeked Honeyeater
	Nesoptilotis leucotis	White-eared Honeyeater
	Melithreptus brevirostris	Brown-headed Honeyeater
Pardalotidae	*Pardalotus striatus*	Striated Pardalote
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat
	Calamanthus campestris	Rufous Fieldwren
	Hylacola cauta	Shy Heathwren
	Acanthiza apicalis	Inland Thornbill
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill
	Acanthiza uropygialis	Chestnut-rumped Thornbill
	Acanthiza robustirostris	Slaty-backed Thornbill
	Smicrornis brevirostris	Weebill
	Aphelocephala leucopsis	Southern Whiteface
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler
Cinclosomatidae	*Cinclosoma castanotum*	Chestnut Quail-thrush
	Cinclosoma castaneothorax	Chestnut-breasted Quail-thrush
Campephagidae	*Coracina maxima*	Ground Cuckooshrike
	Coracina novaehollandiae	Black-faced Cuckooshrike
	Lalage tricolor	White-winged Triller
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella
Oreoicidae	*Oreoica gutturalis*	Crested Bellbird
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush
	Pachycephala inornata	Gilbert's Whistler
	Pachycephala rufiventris	Rufous Whistler
Artamidae	*Artamus personatus*	Masked Woodswallow
	Artamus superciliosus	White-browed Woodswallow
	Artamus cinereus	Black-faced Woodswallow
	Artamus cyanopterus	Dusky Woodswallow
	Cracticus torquatus	Grey Butcherbird
	Cracticus nigrogularis	Pied Butcherbird
	Gymnorhina tibicen	Australian Magpie
	Strepera versicolor	Grey Currawong
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail
	Rhipidura albiscapa	Grey Fantail

Family	Species	Common Name
Monarchidae	*Grallina cyanoleuca*	Magpie-lark
Corvidae	*Corvus orru*	Torresian Crow
	Corvus bennetti	Little Crow
	Corvus coronoides	Australian Raven
Petroicidae	*Microeca fascinans*	Jacky Winter
	Petroica goodenovii	Red-capped Robin
	Melanodryas cucullata	Hooded Robin
Locustellidae	*Cincloramphus cruralis*	Brown Songlark
	Cincloramphus mathewsi	Rufous Songlark
Hirundinidae	*Hirundo neoxena*	Welcome Swallow
	Petrochelidon nigricans	Tree Martin
	Cheramoeca leucosterna	White-backed Swallow
Zosteropidae	*Zosterops lateralis*	Silvereye
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird
Estrildidae	*Taeniopygia guttata*	Zebra Finch (Australian)
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit

Table 5. Amphibians potentially found near the project area

Family	Species	Common Name
Limnodynastidae	*Neobatrachus kunapalari*	Wheatbelt Frog
	Neobatrachus sutor	Shoemaker Frog
	Neobatrachus wilsmorei	Plonking Frog
	Platyplectrum spenceri	Spencer's Burrowing Frog
Myobatrachidae	*Pseudophryne occidentalis*	Western Toadlet
Pelodryadidae	*Cyclorana occidentalis*	Western Water-holding Frog

Table 6. Mammals potentially found near the project area

Family	Species	Common Name
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna
Bovidae	*Bos taurus*	Cow
	Capra hircus	Goat
	Ovis aries	Sheep
Camelidae	*Camelus dromedarius*	Dromedary
Canidae	*Canis lupus*	Dingo
	Vulpes vulpes	Red Fox
Felidae	*Felis catus*	Cat
Molossidae	*Austronomus australis*	White-striped Freetail Bat
	Mormopterus planiceps	Southern Free-tail Bat
	Ozimops kitcheneri	South-western Free-tail Bat
	Ozimops petersi	Inland Free-tailed Bat
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat
	Chalinolobus dwyeri	Large-eared Pied Bat
	Chalinolobus morio	Chocolate Wattled Bat
	Nyctophilus geoffroyi	Lesser Long-eared Bat
	Nyctophilus holtorum	Holt's Long-eared Bat
	Scotorepens balstoni	Inland Broad-nosed Bat
	Vespadelus baverstocki	Inland Forest Bat
	Vespadelus regulus	Southern Forest Bat
Dasyuridae	*Dasycercus blythi*	Brush-tailed Mulgara
	Ningaui ridei	Wongai Ningaui
	Ningaui yvonneae	Mallee Ningaui
	Pseudantechinus woolleyae	Woolley's False Antechinus
	Sminthopsis crassicaudata	Fat-tailed Dunnart
	Sminthopsis dolichura	Little Long-tailed Dunnart
	Sminthopsis gilberti	Gilbert's Dunnart
	Antechinomys longicaudatus	Long-tailed Dunnart
	Sminthopsis murina	Slender-tailed Dunnart
	Sminthopsis ooldea	Ooldea Dunnart
Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo
	Osphranter robustus	Euro
	Osphranter rufus	Red Kangaroo
Leporidae	*Oryctolagus cuniculus*	Rabbit
Equidae	*Equus caballus*	Horse
Muridae	*Mus musculus*	House Mouse
	Notomys alexis	Spinifex Hopping Mouse
	Notomys mitchellii	Mitchell's Hopping Mouse
	Pseudomys bolami	Bolam's Mouse
	Pseudomys hermannsburgensis	Sandy Inland Mouse

Table 7. Reptiles potentially found near the project area

Family	Species	Common Name
Agamidae	*Ctenophorus caudicinctus*	Ring-tailed Dragon
	Ctenophorus cristatus	Crested Dragon
	Ctenophorus fordi	Mallee Dragon
	Ctenophorus inermis	Military Dragon
	Ctenophorus infans	Ring-tailed Dragon
	Ctenophorus isolepis	Central Military Dragon
	Ctenophorus nuchalis	Central Netted Dragon
	Ctenophorus ornatus	Ornate Crevice Dragon
	Ctenophorus reticulatus	Western Netted Dragon
	Ctenophorus salinarum	Saltpan Dragon
	Ctenophorus scutulatus	Lozenge-marked Dragon
	Diporiphora amphiboluroides	Mulga Dragon
	Diporiphora reginae	Plain-backed Two-lined Dragon
	Moloch horridus	Thorny Devil
	Pogona minor	Western Bearded Dragon
	Tympanocryptis cephalus	Pebble Dragon
Carphodactylidae	*Nephrurus laevissimus*	Smooth Knob-tail
	Nephrurus vertebralis	Midline Knob-tail
	Nephrurus wheeleri	Banded Knob-tail
	Underwoodisaurus milii	Barking Gecko
Diplodactylidae	*Amalosia reticulata*	Reticulated Velvet Gecko
	Diplodactylus conspicillatus	Fat-tailed Gecko
	Diplodactylus granariensis	Wheatbelt Stone Gecko
	Diplodactylus pulcher	Beautiful Gecko
	Lucasium damaeum	Beaded Gecko
	Lucasium maini	Main's Ground Gecko
	Lucasium squarrosum	Mottled Ground Gecko
	Rhynchoedura ornata	Beaked Gecko
	Strophurus assimilis	Goldfields Spiny-tailed Gecko
	Strophurus ciliaris	Spiny-tailed Gecko
	Strophurus strophurus	Western Spiny-tailed Gecko
	Strophurus wellingtonae	Western Shield Spiny-tailed Gecko
Elapidae	*Acanthophis pyrrhus*	Desert Death Adder
	Brachyurophis fasciolatus	Narrow-banded Burrowing Snake
	Brachyurophis semifasciata	Half-girdled Snake
	Echiopsis curta	Bardick
	Elapognathus coronatus	Crowned Snake
	Furina ornata	Orange-naped Snake
	Neelaps bimaculatus	Black-naped Burrowing Snake
	Suta gouldii	Gould's Snake
	Suta monachus	Hooded Snake
	Pseudechis australis	Mulga Snake
	Pseudechis butleri	Spotted Mulga Snake
	Pseudonaja mengdeni	Western Brown Snake
	Pseudonaja modesta	Ringed Brown Snake
	Simoselaps bertholdi	Jan's Banded Snake
	Suta fasciata	Rosen's Snake
Gekkonidae	*Christinus marmoratus*	Marbled Gecko
	Gehyra purpurascens	Purplish Dtella
	Gehyra variegata	Variegated Gehyra
	Heteronotia binoei	Bynoe's Gecko
Pygopodidae	*Delma australis*	Marble-faced Delma
	Delma butleri	Unbanded Delma
	Delma nasuta	Sharp-snouted Delma
	Lialis burtonis	Burton's Legless Lizard
	Pygopus lepidopodus	Common Scaly-foot
	Pygopus nigriceps	Western Hooded Scaly-foot
Pythonidae	*Morelia spilota*	Carpet Python
Scincidae	*Cryptoblepharus australis*	Inland Snake-eyed Skink
	Cryptoblepharus buchananii	Buchanan's Snake-eyed Skink
	Ctenotus atlas	Southern Mallee Ctenotus
	Ctenotus calurus	Blue-tailed Finesnout Ctenotus
	Ctenotus greeri	Spotted-necked Ctenotus
	Ctenotus helenae	Clay-soil Ctenotus
	Ctenotus leonhardii	Leonhardi's Ctenotus
	Ctenotus pantherinus	Leopard Ctenotus

Family	Species	Common Name
	Ctenotus quattuordecimlineatus	Fourteen-lined Ctenotus
	Ctenotus schomburgkii	Barred Wedgesnout Ctenotus
	Ctenotus severus	Stern Ctenotus
	Ctenotus uber	Spotted Ctenotus
	Cyclodomorphus melanops	Spinifex Slender Blue-tongue
	Egernia depressa	Southern Pygmy Spiny-tailed Skink
	Egernia formosa	Goldfields Crevice Skink
	Egernia napoleonis	Southwestern Crevice Skink
	Egernia stokesii	Spiny-tailed Skink
	Eremiascincus richardsonii	Broad-banded Sand-swimmer
	Hemiergis initialis	South-western Earless Skink
	Hemiergis peronii	Lowlands Earless Skink
	Lerista bipes	North-western Sandslider
	Lerista desertorum	Central Desert Robust Slider
	Lerista kingi	King's Slider
	Lerista macropisthopus	Unpatterned Robust Slider
	Lerista picturata	Southern Robust Slider
	Lerista puncticauda	Dotty-tailed Robust Slider
	Lerista timida	Timid Slider
	Liopholis inornata	Desert Skink
	Liopholis striata	Nocturnal Desert Skink
	Menetia greyii	Common Dwarf Skink
	Morethia adelaidensis	Saltbush Morethia Skink
	Morethia butleri	Woodland Morethia Skink
	Morethia obscura	Shrubland Pale-flecked Morethia
	Saiphos equalis	Three-toed Skink
	Tiliqua occipitalis	Western Blue-tongued Lizard
	Tiliqua rugosa	Bobtail
Typhlopidae	*Anilios australis*	Austral Blind Snake
	Anilios bicolor	Dark-spined Blind Snake
	Anilios bituberculatus	Prong-snouted Blind Snake
	Anilios hamatus	Pale-headed Blind Snake
	Anilios waitii	Waite's Blind Snake
Varanidae	*Varanus caudolineatus*	Stripe-tailed Monitor
	Varanus giganteus	Perentie
	Varanus gouldii	Gould's Goanna
	Varanus panoptes	Yellow-spotted Monitor
	Varanus tristis	Black-headed Monitor

4.4 FAUNA SPECIES OF CONSERVATION SIGNIFICANCE

Fauna species of conservation significance are protected by the Commonwealth *EPBC Act 1999*, and this list includes species covered by international treaties such as the Japan-Australia Migratory Bird Agreement (JAMBA) and China-Australia Migratory Bird Agreement (CAMBA) and the *BC Act 2016*. The *BC Act 2016* provides for the publishing of the *Wildlife Conservation (Specially Protected Fauna) Notice* that lists species under multiple categories. In addition, the DBCA maintains a list of fauna that require monitoring under four priorities based on the current knowledge of their distribution, abundance, and threatening processes. The *EPBC Act 1999* and *BC Act 2016* imply legislative requirements for managing anthropogenic impacts to minimise the effects of disturbances on species and their habitats. Priority species have no statutory protection other than the DBCA wishes to monitor potential impacts on these species. Environmental consultants and proponents of developments are encouraged to avoid and minimise impacts on these species. Definitions of the significant fauna under the *BC Act 2016* are provided in Appendix C.

Three threatened species of fauna and one migratory/marine species of birds identified under the *EPBC Act 1999* potentially occur in the project area, and one species listed on the DBCA's Priority Fauna List that potentially occur in the project area. The following is an assessment of the likelihood of each of the species listed in Table 8 being found in the project area.

Table 8. Assessment of the potential presence of a conservation significant fauna species in the project area

Species	DBCA Schedule / Priority	Status under Commonwealth EPBC Act	Comment on the potential presence of a species
Curlew Sandpiper *Calidris ferruginea*	Critically Endangered	Critically Endangered	Given the presence of a salt lake in the project area and a much larger adjoining salt lake immediately to the east, this species could be present when the lake contains water. However, there is a better foraging habitat for shorebirds in the eastern sections of the lake, so it is unlikely this migratory bird would be in the project area. If it was, and it was disturbed, it would readily move to another section of the lake away from the disturbance. It is rarely observed in inland lakes.
Night Parrot *Pezoporus occidentalis*	Critically Endangered	Endangered	There is a small amount of mature, ring-forming spinifex in the project area, however, none is above 40cm, which the DBCA's (Department of Biodiversity Conservation and Attractions 2024) guidelines indicate is necessary for roosting and breeding sites. The closest known recent record for Night Parrots is over 550km to the north of the project area, so it is unlikely to be present in the project area.
Sandhill Dunnart *Sminthopsis psammophila*	Endangered	Endangered	Not known in this area and not recorded by Western Wildlife (2022) or Stantec (2019) in its surveys.
Great Desert Skink *Liopholis kintorei*	Vulnerable	Vulnerable	It is highly unlikely to be in the project area due to a lack of suitable habitat and because it is outside its known geographic range.
Malleefowl *Leipoa ocellata*	Vulnerable	Vulnerable	Present in the general area, but there was no evidence of this bird in the project area.
Grey Falcon *Falco hypoleucos*	Vulnerable	Vulnerable	Highly unlikely to be in the project area, as it has rarely been recorded in the eastern Goldfields.
Chuditch *Dasyurus geoffroii*	Vulnerable	Vulnerable	Highly unlikely to occur in the project area.
Princess Parrot *Polytelis alexandrae*	P4	Vulnerable	It may infrequently be seen in the bioregion, however, clearing vegetation is unlikely to impact this species.
Southern Whiteface *Aphelocephala leucopsis*		Vulnerable	Possibly in the project area.
Long-tailed Dunnart *Antechinomys longicaudatus*	P4	Migratory	It is highly unlikely to be in the project area due to a lack of suitable habitat (i.e. rocky breakaways and ridgelines).
Woma *Aspidites ramsayi*	P1		It is unlikely to be in the project area due to predation by cats and wild dogs.
Brush-tailed Mulgara *Dasycercus blythi*	P4	Migratory	It is outside its known geographic range, so it is unlikely that it is in the project area.
Fork-tailed Swift *Apus pacificus*	Migratory	Migratory	It may very infrequently be seen in the region; however, clearing vegetation is unlikely to impact this aerial species.
Oriental Plover *Charadrius veredus*	Migratory	Migratory	It has not been recently recorded in the general area, so it is improbable that it is in the project area.
Grey Wagtail *Motacilla cinerea*	Migratory	Migratory	Highly unlikely to be present in the project area.
Peregrine Falcon *Falco peregrinus*	OS	Migratory	It may very infrequently be seen in the region, however, clearing vegetation is unlikely to impact this species.
Common Sandpiper *Actitis hypoleucos*	Migratory	Migratory	Given the salt lake in the project area and a much larger adjoining salt lake immediately to the east. It was recorded by Stantec (2019) in the project area. If it was present and it was disturbed, it would readily move to another section of the lake away from the disturbance.
Common Greenshank *Tringa nebularia*	Migratory	Migratory	Given the salt lake in the project area and a much larger adjoining salt lake immediately to the east. It was recorded by Stantec (2019) in the

Species	DBCA Schedule / Priority	Status under Commonwealth EPBC Act	Comment on the potential presence of a species
			project area. If it was present and it was disturbed, it would readily move to another section of the lake away from the disturbance.
Sharp-tailed Sandpiper *Calidris acuminata*	Migratory	Migratory	Given the salt lake in the project area and a much larger adjoining salt lake immediately to the east. It was recorded by Stantec (2019) in the project area. If it was present and it was disturbed, it would readily move to another section of the lake away from the disturbance.
Pectoral Sandpiper *Calidris melanotos*	Migratory	Migratory	Given the salt lake in the project area and a much larger adjoining salt lake immediately to the east, this species could be present when the lake contains water. If it was present, and it was disturbed, it would readily move to another section of the lake away from the disturbance.

OS – Other specially protected fauna

Curlew Sandpiper (*Calidris ferruginea*) - Critically Endangered under the *BC Act 2016* and the *EPBC Act 1999*

This sandpiper mostly inhabits the larger west coast islands and is considered a casual or transient species in the inland areas (Johnstone and Storr 1998). It breeds in the arctic coast of Asia and then winters in the southern hemisphere.

Given the salt lake in the project area and a much larger adjoining salt lake immediately to the east, this species could be present when the lake contains water. However, there is a better foraging habitat for shorebirds in the eastern sections of the lake, so it is unlikely this migratory bird would be in the project area. If it was disturbed, it would readily move to another section of the lake away from the disturbance.

Night Parrot (*Pezoporus occidentalis*) - Critically Endangered under the *BC Act 2016* and Endangered under the *EPBC Act 1999*

The Night Parrot is a small, arid-adapted, nocturnal, ground-feeding parrot (Johnstone and Storr 1998, Threatened Species Scientific Committee 2016). Its length is 22-25cm with a body mass of approximately 104g (Threatened Species Scientific Committee 2016), although it was suggested that they were semi-nomadic, the Night Parrots in south-western Queensland appear to be sedentary (Murphy 2015).

The Night Parrot was probably originally distributed over much of semi-arid and arid Australia (Garnett et al. 1993, Threatened Species Scientific Committee 2016). It has been recently recorded in the northwest and western Queensland in the early 1990-2000s where there was a broad cross-section of the habitats available (Garnett et al. 1993, Cupitt and Cupitt 2008, Boles et al. 2016). There have been recent sightings in the Pilbara in 1980, 2005 and 2017, central WA in 1979, north-eastern South Australia in 1979, western Queensland (including Pullen-Pullen-Mt Windsor-Diamantina population) in 1980, 1990, 1993, 2006, and 2013-17 (Davis and Metcalf 2008, Garnett et al. 2011, Charalambous 2016, Pickrell 2016, AG staff 2017, Palaszxzuk and Miles 2017, Rykers 2017, AG staff 2018), Pilbara in 2017 (Jones 2017) and the northern Goldfields (Jackett et al. 2017). Garnett et al. (2011) suggested that 50-250 mature individuals were in less than 5% of its previous range.

Wilson's (1937) summary of observations provided information on the early records of Night Parrots' preferred habitat and breeding sites. Recent information indicates its preferred habitat appears to be in *Triodia* grasslands, chenopod shrublands, shrubby samphire, and floristically diverse habitats dominated by large-seeded species (Threatened Species Scientific Committee 2016, McCarthy 2017, Murphy et al. 2017b). At Pullen Pullen Reserve it nests in large, more or less ring-shaped *Triodia*, and the nest consists of a tunnel (25-30º and 0º to the ground; 20-33cm long) through an apron of dead spinifex leaves that leads to a chamber under a live hummock, with a shallow depression (3-4cm) excavated into the gravelly/sandy soil (Murphy et al. 2017a). In the northern Goldfields the nest was again in a spinifex hummock, it was circular, with an excavated depression (~1.5-2.0cm) in sandy substrate (Hamilton et al. 2017, Jackett et al. 2017). The entrance tunnel was 62cm long, and was downward sloping (27º) with the entrance 28cm above the ground (Hamilton et al. 2017). It has clutches of two to four sub-elliptical, white eggs with a lustrous appearance (Murphy et al. 2017a). Breeding

followed significant rains in March for the observations in Pullen-Pullen Reserve and in April in the northern Goldfields (Hamilton et al. 2017, Murphy et al. 2017a), but it is thought that breeding generally occurs between April and October (Murphy et al. 2017a).

Murphy et al. (2017b) placed a GPS tag on Night Parrots and reported that the two birds called at dusk from their diurnal roosts among spinifex hummocks and then flew to more floristically diverse habitats dominated by large-seeded, prolifically seeding species to feed.

The Department of Biodiversity, Conservation and Attractions' (2024) survey guidelines for Night Parrots indicated that at the local (site) level, roosting and nesting sites are in clumps of dense vegetation, primarily old and large spinifex clumps (often >50 years unburnt), especially hummocks that are ring-forming. These may be in expanses or isolated patches but are sometimes associated with other vegetation types, such as dense chenopod shrubs. Spinifex hummocks that are collapsed (i.e. less than about 40-50 cm in height) are not likely to provide adequate shelter.

There is a small amount of mature, ring-forming spinifex in the project area, and the project area includes a salt lake. However, none of the spinifex is above 40cm, which the DBCA's (2024) guidelines indicate it is necessary for roosting and breeding sites. It was not recorded by Stantec (2019) in it's targeted survey for Night Parrots. In addition, the closest known recent record for Night Parrots is over 550km north of the project area, so it is probably not present in the area.

Sandhill Dunnart (*Sminthopsis psammophila*) - Endangered species under the *EPBC Act 1999* and *BC Act 2016*

The Sandhill Dunnart is a small (30-45g) arid adapted dasyurid found in the eastern part of the Western Australian section of the Great Victoria Desert, eastern Goldfields, and the western and southern parts of South Australia. Recent surveys undertaken for the Great Victoria Desert Trust and eastern Goldfields have increased its geographic range. The records of Sandhill Dunnarts near the project area in Riley's (2020) PhD thesis (Plate 15) indicate that this dunnart has been recorded on multiple occasions to the north-east of the project area. Riley (2020; p.36) summarised the literature to indicate the Sandhill Dunnart prefers 'to live on or near parallel, east-to-west oriented sand dunes with yellow, pale-orange or white sandy soils'. This habitat is not present in the project area, so it is improbable that they are present in the project area.

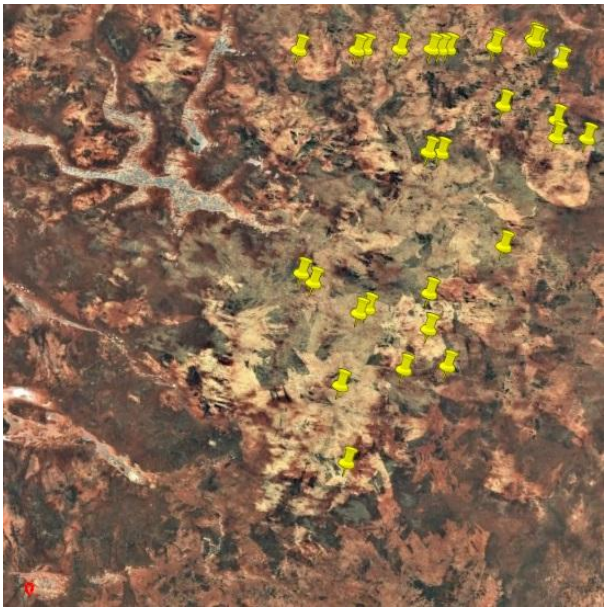

Plate 15. Records (yellow flags) of Sandhill Dunnarts (taken from Riley 2020) project area has a red boundary

Great Desert Skink (*Liopholis kintorei*) - Vulnerable species under the *EPBC Act 1999* and *BC Act 2016*

Liopholis kintorei is a large skink found in the sandy desert regions of Western Australia, Northern Territory, and South Australia. It is found on sandflats and clay-based or loamy soils vegetated with spinifex. It lives in a multi-entranced communal burrow system and uses shared defecation sites. Storr *et al*. (1999a) recorded them in the Wanjarri area of the Great Victoria Desert, and the DBCA threatened species database recorded them in the Laverton area in 1967.

The Giant Desert Skink prefers sandy soils vegetated with spinifex on dune systems. Records of this species in the Atlas of Living Australia indicated that it is unlikely to be found in the project area, and it was also not recorded by Western Wildlife (2022) in its survey. Therefore, Terrestrial Ecosystems assesses that *Liopholis kintorei* is very unlikely to be found in the project area due to a lack of suitable habitat.

Malleefowl (*Leipoa ocellata*) - Vulnerable under the *BC Act 2016* and *EPBC Act 1999*

Malleefowl are large, ground-dwelling birds that rarely fly unless alarmed or are perching for the night. Historically, Malleefowl have been found in mallee regions of southern Australia from approximately the 26th parallel of latitude southwards. Before vegetation clearing for agriculture, Malleefowl were abundant in the WA Wheatbelt. Vegetation clearing for agriculture also opened adjacent bushland to predators, and in the southwest of WA, Malleefowl often only persist in isolated remnant patches of native vegetation. Sheep and other herbivores (e.g. goats, kangaroos) grazing in remnant vegetation remove or thins the undergrowth, and they also compete with Malleefowl for herbaceous foods and can cause changes to the structure and floristic diversity of foraging habitats (Benshemesh 2007).

Malleefowl and their eggs are vulnerable to predation by foxes, and newly hatched chicks are vulnerable to foxes, cats, and raptors (Priddel and Wheeler 1990, Benshemesh and Burton 1999, Benshemesh 2007, Lewis and Hines 2014). Their abundance in the Goldfields is low and sparsely distributed, favouring more densely vegetated areas. Malleefowl build distinctive nests that comprise a large mound of soil/rock covering a central core of leaf litter. These nest mounds range in diameter but can span more than five metres and may be up to one metre high. Malleefowl are generally monogamous; once breeding commences, they pair for life. The presence of nest mounds provides an indication of the presence of Malleefowl in the area.

No Malleefowl tracks or mounds were recorded by Stantec (2019) nor during this survey in the project area, so they are unlikely to be present.

Grey Falcon (*Falco hypoleucos*) - Vulnerable species under the *EPBC Act 1999* and *BC Act 2016*

The Grey Falcon is a moderately large raptor found mostly in the northern half of Western Australia, in lightly wooded, coastal, or riverine areas and nests in tall trees along watercourses.

There are multiple records of the Grey Falcon in the Pilbara but very few in the Goldfields. Based on this species' rarity and lack of records in the eastern Goldfields, it is improbable that it is present in the project area.

Chuditch (*Dasyurus geoffroii*) – Vulnerable under the *BC Act 2016* and *EPBC Act 1999*.

The Chuditch is the largest extant carnivorous marsupial in WA. It is usually active from dusk to dawn. Formally known from over 70% of Australia, the Chuditch now has a patchy distribution throughout the Jarrah forest and mixed Karri/Marri/Jarrah forest of southwest WA and other isolated areas. Chuditch are solitary animals for most of their life and den in hollow logs, burrows, culverts, etc., and have also been recorded in tree hollows and rock cavities. Chuditch are opportunistic feeders and forage primarily on the ground at night. Their diet can include other mammals, birds, lizards, birds, and reptile eggs, but the majority is a mixture of large invertebrates (e.g., spiders, scorpions, and crickets).

How et al. (1988) reported Chuditch being found near the Norseman-Lake King Road and near Mount Holland. DBCA records show that one specimen was recorded in 1974 in Kambalda East. There are multiple records

south of Southern Cross and Marvel Loch and other reported sightings east of Kambalda and near Norseman, but Terrestrial Ecosystems can find none north or east of Kalgoorlie.

As the project area is a significant distance northeast of the species' known distribution, it is highly unlikely that the Chuditch would be found in the project area. Therefore, Terrestrial Ecosystems' assessment is that any vegetation clearing is unlikely to significantly impact this species.

Princess Parrot (*Polytelis alexandrae*) - Vulnerable species under the *EPBC Act 1999* and a Priority 4 species with DBCA

The species is found mostly in the inland arid areas of Australia and in Western Australia in the Gibson, Little Sandy, and Great Victoria Deserts (Johnstone and Storr 1998, Pavey et al. 2014). However, they occasionally occurred in lightly wooded areas adjacent to the sandy deserts (Moriarty 1972).

It is thought to be nomadic within the central desert regions of Australia, occupying arid shrublands, particularly those dominated by Mulga, Desert Oak, and spinifex. Due to the paucity of information on the species, accurate estimates of its conservation significance are difficult to make.

It was not recorded by Stantec (2019) in its survey of the project area. It is possible that the Princess Parrot may be an infrequent visitor to this area when resources are suitable. However, if it was present, then vegetation clearing is unlikely to significantly impact this species as it will move away to other areas if disturbed.

Southern Whiteface (*Aphelocephala leucopsis*) - Vulnerable species under the *EPBC Act 1999*

The Southern Whiteface is a recent addition to the *EPBC Act* listing of vulnerable species. It is a small bird found in the arid and semi-arid interior from the WA coast near Hamelin Bay through the Great Victoria Desert into the arid areas of South Australia, Victoria, NSW, and Queensland. Plate 16 show locations of Southern Whiteface in Western Australia.

It is found in open woodlands and shrublands with an understorey of grasses and low shrubs (Department of Climate Change Energy and the Environment and Water 2023). It forages on the ground, feeding on insects, spiders, and seeds, mostly found in the leaf litter (Johnstone and Storr 2004, Department of Climate Change Energy the Environment and Water 2023).

It was not recorded by Stantec (2019) in its survey of the project area. Western Wildlife did not record it (2022) in its surveys but was recorded by McKenzie et al. (1992) at sites KK53 and 54, and by Ecologia Environment (2007) at Jump-up Dam mine site (~120km north), so it is potentially in the general area. This bird will readily move

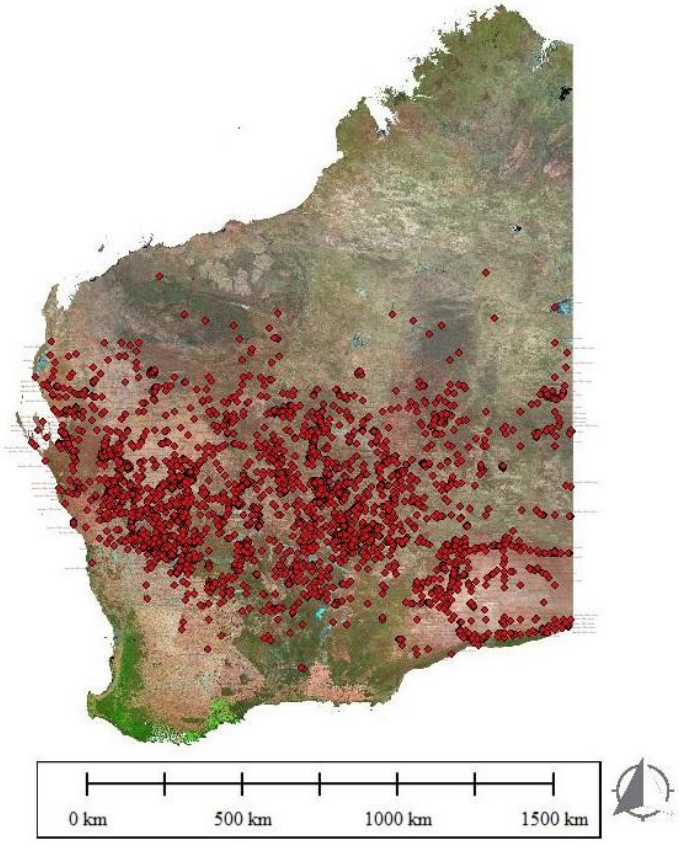

Plate 16. Southern Whiteface records in Terrestrial Ecosystems' fauna survey database. Project area has a blue boundary

to adjacent areas if it is disturbed. There is an abundance of similar fauna habitats present in adjacent areas, so the proposed clearing of vegetation is unlikely to be a significant impact on this bird.

Brush-tailed Mulgara (*Dasycercus blythi*) - Priority 4 with the DBCA

Woolley (2005) recognises two species of 'Mulgara'; *Dasycercus blythi* and *D. cristicauda*. *Dasycercus blythi* has a non-crested tail, two upper premolars, and six nipples; *D. cristicauda* has a crested tail, three upper premolars and eight nipples. Both species potentially have overlapping distributions in arid Australia, but it is thought that *D. cristicauda* does not currently exist in Western Australia, although there are old records indicating its presence. Woolley (2005) suggested the common names for these two species be Brush-tailed Mulgara for *D. blythi* and Crest-tailed Mulgara for *D. cristicauda*. These two species can be sympatric in places but probably utilise different parts of the habitat locally when recorded in the same area. Currently, there are insufficient data to separate the spatial ecology, burrows, and reproductive biology of these two species. Information that follows is based on what is known for 'Mulgara' without distinguishing between the species.

Adult males are typically heavier than females (Gibson and Cole 1992, Dickman *et al*. 2001, Körtner *et al*. 2007), with females growing to 80g and males to 147g (Masters 1998, Dickman *et al*. 2001). Gibson and Cole (1992) reported pouched young in the winter and spring with lactating females as late as December. Litter sizes averaged five but ranged from 2-6 (Gibson and Cole 1992, Masters 1998), with a single litter being produced each year (Dickman *et al*. 2001). Woolley (2008a) reported *D. blythi* females to carry up to six young in central Australia when caught in September, and in captivity, mating has been observed from mid-May to mid-June, and young have been born in June to August after a gestation of five to six weeks. The breeding biology is similar for *D. cristicauda,* but because females have eight nipples they can carry up to eight young (Woolley 2008b). Adult males mostly die after mating.

The Mulgara diet includes insects, arachnids, and rodents as the main prey, but reptiles, centipedes, and small marsupials are also consumed (Chen et al. 1998, Masters 1998, Contos and Letnic 2019).

The reported distribution of Mulgara in Western Australia includes much of the inland spinifex-covered sandy desert and spinifex-vegetated areas in the Pilbara and northern goldfields. Within these areas their distribution is patchy, and it is most frequently confined to habitats dominated by mature spinifex (Gibson and Cole 1992, Masters 2003, Masters *et al*. 2003). Relative abundance seems to be positively associated with rainfall in the previous 12 to 24 months (Gibson and Cole 1992, Masters 1998, Dickman *et al*. 2001, Letnic and Dickman 2005). Significant population fluctuations appear to be a characteristic of the ecology of Mulgara (Manson 1994, Barrick Plutonic Gold Mine 2006). For example, Pearson (2003-04) reported significant fluctuations at Mt Keith with 99 caught in 2001 and only 33 caught in 2002 in a repeated survey. The recent burning of spinifex does not seem to be sufficient to cause Mulgara to move out of an area (Thompson and Thompson 2007).

Mulgara are generally sedentary in contrast with some other small dasyurids and have high site fidelity and a low propensity for dispersal once a home range has been established (Masters 1998, Dickman *et al*. 2001, Masters 2003). Masters (2003) indicated home ranges vary in size from 1.0 to 14.4ha (mean 6.5ha), with some overlap; however, Kortner *et al*. (2007) reported home ranges for males to average 25.5ha and for females to average 10.8ha. Burrows are mostly used by a single individual, but males and females have been found together in a single burrow during the breeding season (Masters 2003, Thompson and Thompson 2007). Kortner *et al*. (2007) reported that 10 of 68 burrows they monitored were used by multiple Mulgara and one individual returned to the same burrow on 32 of 52 days monitored. Masters (2003) reported individual's burrows in her study area were concentrated in a relatively small area, as the average maximum distance across a home range was about 440m. In the Pilbara, Thompson and Thompson (2007, 2008) reported catching nine Mulgara in an area of 22ha and 50 in 210ha, and about 200 trap nights were required to catch each Mulgara in areas with a relatively high density.

Masters (2003) reported that both males and females use 2-9 burrows, but averaged about three, whereas Kortner *et al*. (2007) reported Mulgara used up to 15 burrows, with 47% of burrows used by an individual only once. Woolley (1990) described *D. cristicauda* burrows near Ayers Rock as having one large hole, around which

there was loose soil, and either one or two smaller holes within 1m of the large hole. The tunnels to these pop holes were near vertical. Thompson and Thompson (2007) indicated that burrows in the Pilbara contained between two and nine entrances, tunnels were mostly on a single level and to a depth of about 300mm. Kortner *et al*. (Körtner *et al*. 2007) reported Mulgara burrows in the Uluru National Park varied in complexity, some with only a single entrance, but others had multiple entrances. The lumen for a burrow entrance was typically an arch over a flat bottom with a height of 70-80mm and a width of 80-100mm at the base. Internal tunnels were mostly 50-70mm wide. Masters (2008) suggested that the complexity of burrows varies geographically, with those in central Australia having a single entrance with two or three side tunnels and pop holes and those in Queensland having more than one entrance, deeper branching tunnels, and numerous pop holes. This difference may have been due to differences in species that were not recognised until recently.

According to the Atlas of Living Australia records, the project area is on the southwestern fringe of its geographical distribution, and it was not caught in the Western Wildlife (2022) survey, so it is unlikely to be present in the project area.

Long-tailed Dunnart (*Sminthopsis longicaudata*) - Priority 4 species with DBCA.

Burbidge *et al*. (2008) summarised the Long-tailed Dunnart distribution as widely scattered in arid zone where it inhabits rugged rocky areas. They suggested that its striated foot-pads, long tail, and behaviour in captivity indicated that it was an active and capable climber. Specimens have been recorded in several rocky ranges in the Gibson Desert, West MacDonnell National Park, Murchison, Carnarvon Basin, and the Pilbara. Most capture sites for Long-tailed Dunnarts are within rugged rocky landscapes that support a low open woodland or shrubland of Acacias (especially mulga) with an understorey of spinifex hummocks, and (occasionally) also perennial grasses and cassias.

Terrestrial Ecosystems has caught Long-tailed Dunnarts at Granny Smith (Terrestrial Ecosystems 2011b, a) and Bamford Consulting Ecologists (2017) recorded this dunnart in open Mulga woodlands. Western Wildlife (2022) recorded a Long-tailed Dunnart in the area it assessed, so this dunnart could possibly be found in and around the fragmented rocky habitats in the general area. There were very few rocky habitats in the project area, so Long-tailed Dunnarts are unlikely to be present.

Woma (*Aspidites ramsayi*) - Priority 1 species with DBCA

The southern Woma python was once recorded in a crescent-shaped geographic distribution from Shark Bay to Kitchener in WA. However, it is now mostly only found on the two extremes of this distribution, with a small population east of the Wheatbelt in relatively dense shrubs on a sandy substrate.

In Western Australia, it is found in arid woodland or shrubland areas, typically on sand plains. It has not been recorded recently near the project area; however, this area has not been well surveyed. There is a very low probability that the Woma python is present in the project area and, therefore, could be impacted by the proposed development.

Fork-tailed Swift (*Apus pacificus*) - Migratory species under the *EPBC Act 1999* and *BC Act 2016*

This species breeds in northeast and mid-east Asia and winters in Australia and southern New Guinea. It is a visitor to most parts of Western Australia, beginning to arrive in the Kimberley in late September, in the Pilbara in November, and in the southwest land division in mid-December, and leaving by late April. The Fork-tailed swift is almost exclusively an aerial species, foraging and sleeping on the wing. It rarely comes to ground, usually only for breeding. It is common in the Kimberley, uncommon to moderately common near northwest, west, and southeast coasts, and rare to scarce elsewhere. It is rarely seen in the Goldfields (Plate 17), so it is unlikely to be impacted by the proposed development.

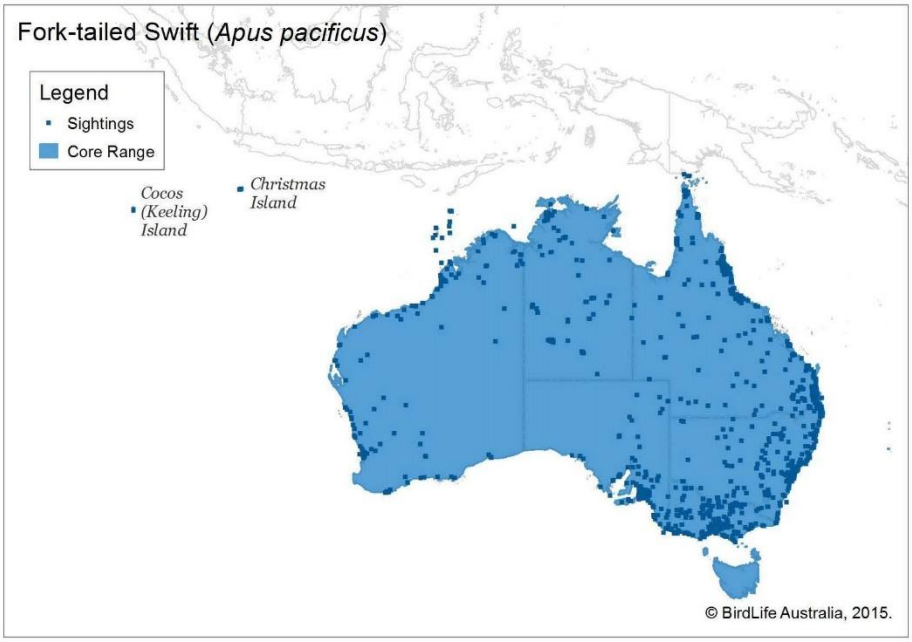

Plate 17. Range and actual reported sightings of the Fork-tailed Swift

(taken from http://www.environment.gov.au/biodiversity/threatened/publications/epbc-act-referral-guidelines-migratory-birds)

Oriental Plover (*Charadrius veredus*) - Migratory species under the *EPBC Act 1999* and *BC Act 2016*

A migrant species with patchy distribution in Australia, the Oriental Plover is sparsely distributed across arid and semi-arid Australia but avoids truly desert regions. Its preferred habitat is dry plains. It was not recorded in other fauna surveys undertaken near the project area. The species is threatened by habitat reduction due to agriculture and changing fire regimes.

This plover has not been recorded in the general area in other regional surveys nor by Stantec (2019) in its survey of the project area. Therefore, Terrestrial Ecosystems assess that the Oriental Plover is unlikely to be seen in the project area and, therefore, unlikely to be impacted.

Grey Wagtail (*Motacilla cinerea*) - Migratory under the *EPBC Act 1999* and *BC Act 2016*

The Grey Wagtail is a small, yellow-breasted bird with a grey back and head. Johnstone and Storr (2004) reported this migratory species as breeding in the Palearctic from western Europe and north-west Africa to eastern Asia and wintering in Africa, south-east Asia, Indonesia, the Philippines, New Guinea, and Australia. Its preferred habitat in Australia is banks and rocks in fast-running fresh water, including rivers, streams, and creeks, where it feeds on insects.

The Atlas of Living Australia records two sightings on the south coast of Western Australia and none around the project area. It is highly unlikely to be seen in the project area due to a lack of records and suitable habitat (Plate 18) so it is unlikely to be impacted by the proposed development.

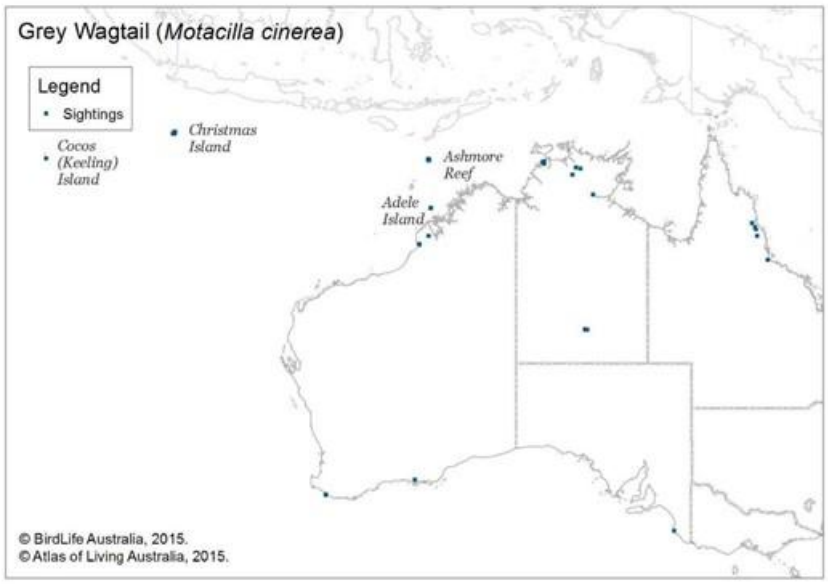

Plate 18. Reported sightings of the Grey Wagtail

(taken from http://www.environment.gov.au/biodiversity/threatened/publications/epbc-act-referral-guidelines-migratory-birds)

Peregrine Falcon (*Falco peregrinus*) - Otherwise specially protected under the *BC Act 2016*

The Peregrine Falcon is uncommon, although widespread throughout much of Australia, excluding the extremely dry areas, and has a wide and patchy distribution. It shows habitat preference for areas near cliffs along coastlines, rivers and ranges and within woodlands along watercourses and around lakes. Nesting sites include ledges along cliffs, granite outcrops and quarries, hollow trees near wetlands, and old nests of other large bird species. There is no evidence to suggest any change in status in the last 50 years.

It was not recorded by Stantec (2019) in its survey of the project area. Peregrine Falcon may infrequently be seen in the project area, however, vegetation clearing is unlikely to significantly impact this species as it will readily move away from disturbance, and there are abundant areas of similar habitat in the region.

Common Sandpiper (*Actitis hypoleucos*), Common Greenshank (*Tringa nebularia*), Sharp-tailed Sandpiper (*Calidris acuminata*) and Pectoral Sandpiper (*Calidris melanotos*) – Migratory under the *EPBC Act* and *BC Act*

These shore birds typically inhabit the shallow areas around fresh and salt-water estuaries, lakes, swamps, and lagoons feeding on various small invertebrates. They breed in the northern hemisphere and fly south in the northern hemisphere's winter to forage. They are mostly found on offshore islands, coastal and near coastal areas, but occasionally move inland after heavy rain to forage on macroinvertebrates found in salt and freshwater lakes that fill with water. Stantec (2019) recorded the Common Sandpiper, Common Greenshank and Sharp-tailed Sandpiper in the project area.

The aerial photography of Lake Roe indicates the eastern section retains water for much longer than the section in the project area and in the adjacent area. The salt lake in the project area is only likely to hold water after a substantial rain event (e.g. 68mm in October 2018). Because the eastern section of Lake Roe is deeper and holds water longer, the population of macroinvertebrates in this section is likely to be denser than when there is water in the salt lake in the project area. Shorebirds will typically forage in the areas of the densest macroinvertebrates.

If these shorebirds are in the project area, they will readily move if disturbed, and there will likely be better foraging habitats in adjacent areas. Therefore, impacts associated with vegetation clearing and mining activity are unlikely to be significant.

5. DISCUSSION

5.1 ADEQUACY OF THE FAUNA SURVEY DATA FOR FAUNA HABITATS REPRESENTED IN THE PROJECT AREA

The EPA's (2020) Technical Guidance on terrestrial fauna surveys indicated that the type of survey should be determined based on:

- level of existing regional knowledge;
- type and comprehensiveness of recent local surveys;
- degree of existing disturbance or fragmentation at the regional scale;
- extent, distribution and significance of habitats;
- significance of species likely to be present;
- sensitivity of the environment to the proposed activities; and
- scale and nature of impact.

The project area is rectangular in shape, and a substantial proportion of the project area is a salt lake. Western Wildlife (2022) undertook a vertebrate fauna survey in the Lake Rebecca mining area, which is ~45km to the north, and there are data available from other surveys undertaken nearby in similar habitats (Dell et al. 1988, McKenzie and Hall 1992, Terrestrial Ecosystems 2010). Stantec (2019) undertook a Level 1 survey in the project area in 2018 after unusually heavy rain in the preceding month and recorded shorebirds on the lake. It is unlikely that further survey efforts in the project area would provide species not previously identified or provide additional information that would alter the assessment of potential impacts.

5.2 POTENTIAL IMPACTS ON VARIOUS TAXA

5.2.1 Amphibians

Frogs are normally only detected immediately after rainfall or around semi-permanent pools. It is likely that *Neobatrachus sutor*, *Neobatrachus kunapalari,* and *Neobatrachus wilsmorei* could also be found in the general area. Vegetation clearing in the project area is likely to result in a loss of individuals within the disturbed area; however, it is unlikely to significantly impact these species when assessed in a bioregional context, as all species are widespread and abundant.

5.2.2 Reptiles

Typically, between 25 and 35 species of reptiles are caught in open mulga woodland, open Eucalypt or Sheoak woodlands or chenopod shrublands (McKenzie and Hall 1992, Terrestrial Ecosystems 2010, 2012b, a). None of the species likely to be in the project area are of conservation significance. There were no characteristics of the reptile assemblage anticipated to be in the project area that indicated that there are reptiles of conservation significance or different to that in the neighbouring areas and given that there were large expanses of similar habitat in adjacent areas, vegetation clearing in the project area is unlikely to have a significant impact on reptiles when assessed in a bioregional context.

5.2.3 Birds

The number of birds and bird species in the eastern Goldfields fluctuates based on seasons and recent rainfall (Craig and Chapman 2003). Semi-arid and arid areas of inland Australia support a diverse range of transient and nomadic species that move through large areas in search of available resources. Heavy rain, followed by flowering and seeding of many plant species, is often sufficient to draw many of these nomadic species to the

general area. These species move on to other areas once the resource is depleted or better resources are available in adjacent areas.

The project area is likely to support a similar assemblage to that present in the adjacent areas (McKenzie and Hall 1992, Terrestrial Ecosystems 2010, Stantec 2019, Western Wildlife 2022). Although not recorded by Western Wildlife (2022), the Southern Whiteface has been recorded in other regional fauna surveys, and there are records of this species occurring nearby in the Atlas of Living Australia. Therefore, it is potentially present in the project area. However, there are vast expanses of similar habitat in adjacent areas, so if it were present and disturbed, it would readily move into adjacent areas and not be significantly impacted.

Migratory shorebirds (e.g. Common Sandpiper, Common Greenshank, and Sharp-tailed Sandpiper) and other wetland avifauna (e.g. Red-necked Avocet, Black-fronted Dotterel, Banded Stilt, Black Swan, Grey Teal, Pink-eared Duck, and Australasian Grebe) are likely to be present in the lake after unusually heavy rains, but will readily move if disturbed.

No Malleefowl; their tracks or mounds were recorded in the project area, so it is improbable that they are present.

5.2.4 Mammals

There is likely to be a diverse range of small mammals in the project area, given the diversity of habitats present, although none of the species likely to be present are of conservation significance. Rabbit scats were recorded, and Stantec (2019) recorded wild dogs and cats in the area. Camel tracks were also recorded.

5.3 FERAL ANIMALS

The project area includes camels, wild dogs, rabbits, and cats (Stantec 2019). Wild dog and cat abundance have the potential to increase once the mine becomes established, as they will feed on putrescible waste and are occasionally fed by on-site staff.

Camels can cause serious damage to vehicles if they collide. Station cattle are essentially wild and have limited road sense, so they are also a potential hazard on the existing tracks. Rabbits are in low abundance but ubiquitous in the Goldfields.

5.4 BIODIVERSITY VALUE

An ecological assessment of a site should consider its biodiversity value at the genetic, species, and ecosystem levels and its ecological functional value at the ecosystem level. Inadequate data exists to assess the ecological value at the genetic level.

Fauna habitats represented in the project area are abundant and in a similar condition to that in the adjacent areas. Therefore, the fauna assemblage in the project area will also be similar in the adjacent areas. The available fauna survey data (Appendix B) provides a good indication of the potential vertebrate fauna in the project area.

5.4.1 Ecological functional value at the ecosystem level

The most significant impact on vertebrate fauna in the project area and surroundings will have been feral cats, wild dogs, and, to a much lesser extent, cattle grazing and rabbits. Fauna habitats in the project area are also abundant in adjacent areas, so the clearing of vegetation to construct a mine is unlikely to impact the ecological functional value of the bioregion.

5.4.2 Maintenance of threatened ecological communities

No threatened ecological fauna communities were identified in the project area.

5.4.3 Condition of fauna habitat

A small quantity of the project area has been disturbed, mostly for tracks, and cattle have grazed the area in low intensity for many years. The uncleared fauna habitat in the project area is similar to that in the many square kilometres of adjacent habitat. Therefore, when considered in a bioregional context, the proposed vegetation clearing is unlikely to impact the vertebrate fauna significantly.

5.4.4 Ecological linkages

The project area does not provide an important ecological linkage or fauna movement corridor.

5.4.5 Size and scale of the proposed disturbance

The project area is small (i.e. 604ha), and the fauna habitats are like those in the adjacent areas and bioregion. Given the available fauna survey data for these habitat types, clearing vegetation to build and operate a mine is unlikely to significantly impact the vertebrate fauna assemblage when considered in a bioregional context.

5.4.6 Abundance and distribution of similar habitat in the adjacent areas

Fauna habitats present in the project area are abundant in adjacent areas. Therefore, the fauna assemblage in the project area is likely similar to neighbouring areas and the bioregion.

5.4.7 Potential impacts on ecosystem function

Clearing native vegetation will likely result in losing small vertebrate fauna on-site that cannot move away during the clearing process. The few larger animals, such as kangaroos and large goannas, and most birds will move into adjacent areas once clearing commences. Shifting animals into adjacent areas will increase the pressure on resources in those areas, and there will likely be some disruption to the ecosystems in these areas for a short period until a balance is restored.

The sparseness of the vegetation and limited ground cover in many areas mean there is a low abundance of terrestrial vertebrate fauna in most of the project area. Impacts associated with clearing vegetation in the project area in a landscape or bioregional context on the vertebrate fauna are likely low as the proposed disturbance area is very small relative to the quantity of similar habitats in the bioregion.

The impact of feral and pest fauna (e.g., cats and wild dogs), which are present in the project area, will be doing more environmental damage than the combined impacts of the proposed vegetation clearing in the project area.

6. POTENTIAL ENVIRONMENTAL IMPACTS

The vegetation clearing to construct and operate a mine will potentially affect vertebrate fauna in numerous ways, including death/injury of fauna during vegetation clearing, impacts with vehicles on the roads and the loss of habitat.

Although there are anticipated short-term impacts on fauna, they are not likely to significantly impact fauna habitat and assemblages in the long term.

6.1.1 Animal deaths during the clearing process and displacement of fauna

Clearing vegetation and activities associated with vegetation clearing will result in the loss of some small fauna that retreat to burrows, such as reptiles and mammals. Nocturnal species are unlikely to be active when most of the land clearing occurs, which may result in these individuals being adversely impacted when they attempt to escape. This loss of vegetation is unlikely to have a significant impact when considered in a bioregional context. Larger terrestrial animals and avian species will most often move to adjacent areas.

6.1.2 Edge effects

In addition to the obvious impact of vegetation clearing, there can be an equally significant or greater impact on the adjacent areas because of 'edge effects'. Small mammals can respond both positively and negatively to edges depending on their ecological traits (Laurance 1991, 1994, Goosem and Marsh 1997, Goosem 2000). Edge and disturbance effects can lead to altered and, most often, higher levels of predation, restricting or increasing fauna movements and altering assemblage structure (Oxley et al. 1974, Paton 1994, Baker et al. 1998, Temple 1998, Luck et al. 1999, Goosem et al. 2001).

Edge effects can disrupt ecological processes such as predation, dispersal, and animal displacement, changing the assemblage structure. Consequently, the impact area will always be much larger than the cleared area. However, for this project area, the sparseness of vegetation and ground cover means there will be few 'edge effects' due to vegetation clearing.

6.1.3 Habitat fragmentation

Clearing vegetation on the western side of Lake Roe is likely to isolate sections of established communities. It may alter long and medium-term movement patterns around established home ranges, particularly for small mammals and reptiles. A reduction in the population because of this development would be difficult to detect, given our current knowledge of the spatial ecology for most of the small mammals in the area. The impacts of habitat fragmentation due to the construction of a roads would, therefore, be very low.

6.1.4 Introduced fauna and weeds

Increased habitat fragmentation and human activity can often increase the abundance of introduced species, such as feral cats (*Felis catus*) and wild dogs (*Canis lupus*). This increase may be due to a decline in habitat health, increased road kills, poor waste disposal, and easier access to areas via tracks.

Cats and wild dogs are known to be established in the area. Increases in dog or cat numbers can harm native fauna because they prey on and compete with native species, severely disrupting the natural balance. The feral cat is a particularly damaging predator of native fauna. Any increase in their numbers could have a detrimental effect on local native fauna (Kinnear 1993, Bamford 1995, Woinarski et al. 2017, Woinarski et al. 2018, Murphy et al. 2019). Hence, it is important to ensure that the populations of feral predators, such as cats, are under control.

6.1.5 Road fauna deaths

An increase in road fauna deaths is likely to occur where new tracks are constructed or upgraded, in particular affecting kangaroos, nocturnal birds, and ground-dwelling carnivorous predators (e.g. goannas). Species such as goannas and raptors are attracted to carrion on road verges, and therefore, there is an increased propensity for these species to be killed by vehicles.

Malleefowl have little road sense and can be easily killed or injured by vehicles on roads and tracks. Appropriate speed limits can reduce this impact.

6.1.6 Dust

High volumes of trucks entering and leaving the mining area could potentially result in dust plumes covering the adjacent vegetation, widening the impact area. Wider areas devoid of vegetation result in more habitat fragmentation, which can have a long-term impact on the vertebrate fauna assemblage. Dust management is, therefore, required to mitigate this potential impact.

6.1.7 Anthropogenic activity

Unnatural noises, vibrations, and frequent truck movements may be sufficient to force individuals or fauna species to move from adjacent areas or alter their activity periods. This form of disturbance is likely to occur during the initial operational period. The overall impact is expected to be confined to a relatively small area and is unlikely to be significant.

7. VERTEBRATE FAUNA RISK ASSESSMENT

7.1 RISK ASSESSMENT

Fauna surveys to support Environmental Impact Assessments (EIA) are part of the environmental risk assessment undertaken to consider what potential impacts a development might have on the biodiversity of a particular area and region. Possible impacts on fauna from the proposed development are identified and briefly described above. Tables 9, 10, and 11 summarise the risk assessment associated with this project.

Any risk assessment is a product of the likelihood of an impact occurring and the consequences of that impact. Likelihood and consequences are categorised and described below. The assessed risk level (likelihood x consequences) is then calculated as the overall risk for the development. This is followed by an assessment of the acceptability of the risk associated with each of the impacts. Disturbances and vegetation clearing impact the fauna at multiple scales – site, local, landscape, and regional. Each of these is considered in the risk assessment. This assessment should be considered in the context of the summary in Table 11.

Table 9. Fauna impact risk assessment descriptors

Likelihood		
Level	Description	Criteria
A	Rare	The environmental event may occur, or one or more species of conservation significance may be present in exceptional circumstances.
B	Unlikely	The environmental event could occur, or one or more species of conservation significance could be present at some time.
C	Moderate	The environmental event should occur, or one or more species of conservation significance should be present at some time.
D	Likely	The environmental event will probably occur, or one or more species of conservation significance will be present in most circumstances.
E	Almost certain	The environmental event is expected to occur, or one or more species of conservation significance is expected to be present in most circumstances.
Consequences		
Level	Description	Criteria
1	Insignificant	Insignificant impact on fauna of conservation significance or regional biodiversity, and the loss of individuals will be insignificant in the context of the availability of similar fauna or fauna assemblages in the area.
2	Minor	Impact on fauna localised and no significant impact on species of conservation significance in the project area. Loss of species at the local scale.
3	Moderate	An appreciable loss of fauna in a regional context or a limited impact on species of conservation significance in the project area.
4	Major	Significant impact on fauna of conservation significance or their habitat in the project area and/or regional biodiversity and/or a significant loss in the biodiversity at the landscape scale.
5	Catastrophic	Loss of species at the regional scale and/or a significant loss of species categorised as 'vulnerable' or 'endangered' under the EPBC Act (1999) at a regional scale.
Acceptability of Risk		
Level of risk	Management Action Required	
Low	No action required.	
Moderate	Avoid if possible, routine management with internal audit and review of monitoring results annually.	
High	Externally approved management plan to reduce risks, monitor major risks annually with external audit and review of management plan outcomes annually. May a referral to the Commonwealth under the EPBC Act 1999.	
Extreme	Unacceptable, project should be redesigned or not proceed.	

Table 10. Levels of acceptable risk

		Likelihood				
		Rare or very low (A)	Unlikely or low (B)	Moderate (C)	Likely (D)	Almost certain (E)
Consequence	Insignificant (1)	Low	Low	Low	Low	Low
	Minor (2)	Low	Low	Low	Moderate	Moderate
	Moderate (3)	Low	Moderate	Moderate	High	High
	Major (4)	Moderate	Moderate	High	High	Extreme
	Catastrophic (5)	Moderate	High	High	Extreme	Extreme

Table 11. A risk assessment of the impact of ground disturbance activity on fauna

			Before management				With management		
	Potential impacts		Inherent risk			Risk controls	Residual risk		
Factor			Likelihood	Consequence	Significance		Likelihood	Consequence	Significance
Fauna survey data	Inadequate survey data to adequately assess the risks	Unknown loss of fauna, fauna of conservation significance, and fauna assemblages, and an incomplete fauna assessment.	B	2	Low				
	Inadequacy of comparative data	Limits on the availability of comparative data reduced the capacity to assess the uniqueness of the fauna assemblages in the project area.	B	2	Low				
Clearing vegetation	Loss of fauna habitat – local scale	Loss of terrestrial fauna in the project area.	E	2	Mod.				
	Loss of fauna habitat – landscape scale	Loss of some fauna during vegetation clearing.	A	1	Low				
	Loss of fauna habitat – regional scale	Small loss of some fauna from the region.	A	1	Low				
	Loss of a threatened ecological fauna community	Loss of an undetected threatened ecological fauna community.	A	3	Low				
	Habitat fragmentation	Fauna movement is restricted, resulting in fauna deaths and biodiversity loss.	A	2	Low				
	Loss of foraging habitat for migratory shorebirds	Vegetation clearing and mining activities will impact on potential foraging habitat for migratory shorebirds, when the lake is full of water. There are plenty of other places these birds can move to on Lake Roe and adjacent lakes, so potential impacts will likely be low.	B	2	Low				
Death or loss of conservation significant fauna	Loss of a unique terrestrial fauna ecosystem	Loss of an ecosystem function containing high species richness, high abundance, and numerous top-of-the-food chain predators.	A	2	Low				
	Night Parrot	Loss of a Night Parrot or small population of Night Parrots	A	3	Low				
	Southern Whiteface	Loss of a Southern Whiteface or small population of Southern Whiteface	A	2					
	Malleefowl	Loss of a Malleefowl or small population of Malleefowl	B	2	Low				
	Chuditch	Loss of a Chuditch or small population of Chuditch	A	2	Low				

			Before management				With management		
	Princess Parrot	Loss of a Princess Parrot or small population of Princess Parrot	A	2	Low				
	Mulgara	Loss of a Mulgara or small population of Mulgara	A	2	Low				
	Fork-tailed Swift	Loss of a Fork-tailed Swift or small population of Fork-tailed Swift	A	2	Low				
	Grey Wagtail	Loss of a Grey Wagtail or small population of Grey Wagtail	A	2	Low				
	Peregrine Falcon	Loss of a Peregrine Falcon or small population of Peregrine Falcon	A	2	Low				
	Migratory shorebird	Loss of a small number of migratory shorebirds	A	2	Low				
Human impacts	Increase or spread of weeds	Changed vegetation and a resulting loss of fauna habitat	E	2	Mod.	Implementation of a weed management plan.	D	2	Low
	Road kills	Animals being killed by vehicles as they cross roads	E	1	Low	Limiting speeds	E	1	Low
	Dust	Dust plumes from vehicle movement can kill vegetation adjacent to roads, increasing habitat fragmentation							
	Increase in feral mammals, specifically the dog and cat	Increased predation on the native fauna	C	2	Low				

7.2 NATIVE VEGETATION CLEARING PRINCIPLES AS THEY PERTAIN TO VERTEBRATE FAUNA

The *Environmental Protection Act (1986)* outlines 10 principles that are to be used in the assessment of native vegetation clearing permit applications, which are also applicable for other assessments and approvals (Table 12). Where possible, native vegetation should not be cleared if the following principles are compromised.

Table 12. Assessment of impact using the native vegetation clearing principles

Principle	Response
It comprises a high level of biological diversity.	Clearing vegetation to construct and operate a mine will not compromise a high level of biodiversity. Species of conservation significance potentially in the project area (i.e. Malleefowl and Southern Whiteface) are unlikely to be significantly impacted.
It comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	Clearing vegetation to construct and operate a mine will not result in significant habitat loss for indigenous fauna. However, the part of Lake Roe in the project area, when it is full of water, provides foraging habitat for migratory shorebirds. The proposed mine will impact the western parts of Lake Roe and, therefore, part of the flooded Lake Roe's foraging opportunities for migratory shorebirds. In addition, habitat potentially cleared will include that which Malleefowl and Southern Whiteface may utilise, but any potential impacts are not considered significant.
It includes, or is necessary for the continued existence or, rare flora.	N/A
It comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	The area does not contain a threatened ecological fauna community.
It is significant as a remnant of native vegetation in an area that has been extensively cleared.	The area is not a remnant.
It is growing in, or in association with, an environment associated with a watercourses or wetland.	The project area includes the western portion of Lake Roe. This part of the lake is only likely to hold water after a significant rainfall event.
The clearing of the vegetation is likely to cause appreciable land degradation.	N/A
The clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	Clearing vegetation is unlikely to impact the environmental values of the bioregion.
The clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	N/A
The clearing of the vegetation is likely to cause, or exacerbate the incidence of flooding.	N/A

7.3 REFERRAL UNDER THE EPBC ACT

Clearing vegetation to construct and operate a mine is unlikely to significantly impact vertebrate fauna species of conservation significance. Therefore, a referral under the *EPBC Act 1999* is not recommended.

8. SUMMARY

Ramelius intends to clear vegetation to construct and operate a gold mine on the western part of Lake Roe and the adjacent area. The project area is ~45km south, southwest of the Rebecca mine site, and ~100km east of Kalgoorlie on the eastern margin of the Norseman-Wiluna Greenstone Belt. A section of the Lake Rebecca mining area was subject to a Detailed vertebrate fauna survey by Western Wildlife (2022) with the fieldwork being undertaken in 2021 and 2022.

To support the environmental approvals, Terrestrial Ecosystems was contracted to complete a Basic vertebrate fauna survey and assessment. This assessment included a site survey and habitat assessment.

There are multiple fauna habitats in the project area (i.e. chenopod shrubland, Eucalypt woodland, Eucalypt over spinifex, Sheoak woodland, mixed shrubs, and salt lake) in addition to disturbed areas that are likely to support only a few vertebrate fauna. All habitats are present in adjacent areas.

Stantec (2019) in its Level 1 survey in 2018, after unusually high rain in the area, recorded the migratory shorebirds Common Sandpiper, Common Greenshank and Sharp-tailed Sandpiper on freshwater claypans in the project area. The proposed mine will impact the western part of Lake Roe and will, therefore, remove potential migratory shorebird foraging areas when Lake Roe is flooded. Given the substantial area of Lake Roe and Lake Rebecca that will not be impacted, removing these foraging areas is not seen as a potentially significant impact, and there will be plenty of other undisturbed lake foraging areas available to migratory shorebirds.

Although not recorded by Stantec (2019) in its survey of the Lake Roe project area and Western Wildlife (2022) in its survey of part of the Lake Rebecca mining project area, the Southern Whiteface is potentially in the project area. This bird will readily move if disturbed into the suitable adjacent habitat, so vegetation clearing would not significantly impact this species. Other avifauna of conservation significance potentially in the project area (e.g. Peregrine Falcon, Princess Parrot) are unlikely to be significantly impacted by the proposed vegetation clearing activities and development. The Malleefowl, its mounds, and tracks were not recorded during the site survey, so it is unlikely to be present.

Clearing native vegetation for the construction and operation of a mine is likely to result in the loss of small vertebrate fauna on-site that cannot move away during the clearing process; however, this loss is not expected to be significant when viewed in a bioregional context. The few larger animals, such as kangaroos, large goannas, and snakes, and most birds will move into adjacent areas once vegetation clearing commences so that potential impacts will be low. There may be an ongoing loss of small native fauna due to vehicle strikes on roads, but overall, this impact will be very low.

The proposed project is unlikely to significantly impact species of conservation significance, so a referral under the *EPBC Act 1999* is not recommended.

9. RECOMMENDATIONS

9.1 INDUCTION AND AWARENESS

All contractors and staff involved in exploration or mining activity should be made aware of the possible presence and issues associated with terrestrial fauna in the area through the induction process.

> **Recommendation 1:** An induction program that includes managing fauna is a mandatory component of working on the project.

9.2 MINIMISING SECONDARY IMPACTS TO THE HABITAT

Pets and feral animals have the potential to impact on native fauna. Pets should not be permitted on site, and feral and pest fauna numbers should be monitored and controlled. All rubbish likely to attract animals should be suitably contained and disposed of so as not to encourage the feeding of fauna around the site.

> **Recommendation 2:** Pets are not permitted on site.

> **Recommendation 3:** All waste and rubbish should be contained in bins and regularly removed from the site or buried so it is not available to pest species.

> **Recommendation 4:** Feeding of native fauna should be actively discouraged.

> **Recommendation 5:** A feral and pest animal management program focussing on feral cats is implemented to reduce the predation on native fauna.

9.3 ROAD FAUNA DEATHS

Increased activity will result in increased traffic and consequential increased fauna deaths on tracks. Limiting vehicle speed on tracks and roads can reduce collisions with fauna, particularly larger animals such as kangaroos and emus. Dead animals on the road also tend to attract raptors, goannas and even cattle, which are likely to be killed.

> **Recommendation 6:** Speed limits are implemented and enforced on-site. These should be determined based on the quality and condition of the roads, but be a maximum of 80km/hr.

> **Recommendation 7:** Signage is erected to indicate the maximum travelling speeds and the possible presence of wildlife crossing roads.

9.4 DUST

Dust generated from mining activity and vehicles can potentially degrade surrounding vegetation, reducing its ability to absorb sunlight and influencing photosynthetic rates. Degradation of these areas will potentially render habitat unsuitable for fauna. Dust suppression and management programs are essential to minimising mining impacts on fauna in areas adjacent to the mine.

> **Recommendation 8:** The impact of dust on adjacent vegetation and fauna habitat is managed and monitored against appropriate KPIs.

9.5 VERTEBRATE FAUNA MANAGEMENT PLAN

Fauna management plans describe the procedures and protocols that must be implemented to avoid, mitigate and minimise impacts on fauna during a project's vegetation clearing, infrastructure development and operational stages. Such plans deal with the method of vegetation clearing, reducing fauna deaths on the roads, the impacts of artificial light spill, vibration, dust, feral species management, monitoring and recording conservation species, monitoring impacts on fauna in adjacent areas, staff inductions, etc.

> **Recommendation 9:** A vertebrate fauna management plan is prepared and implemented for the mining project.

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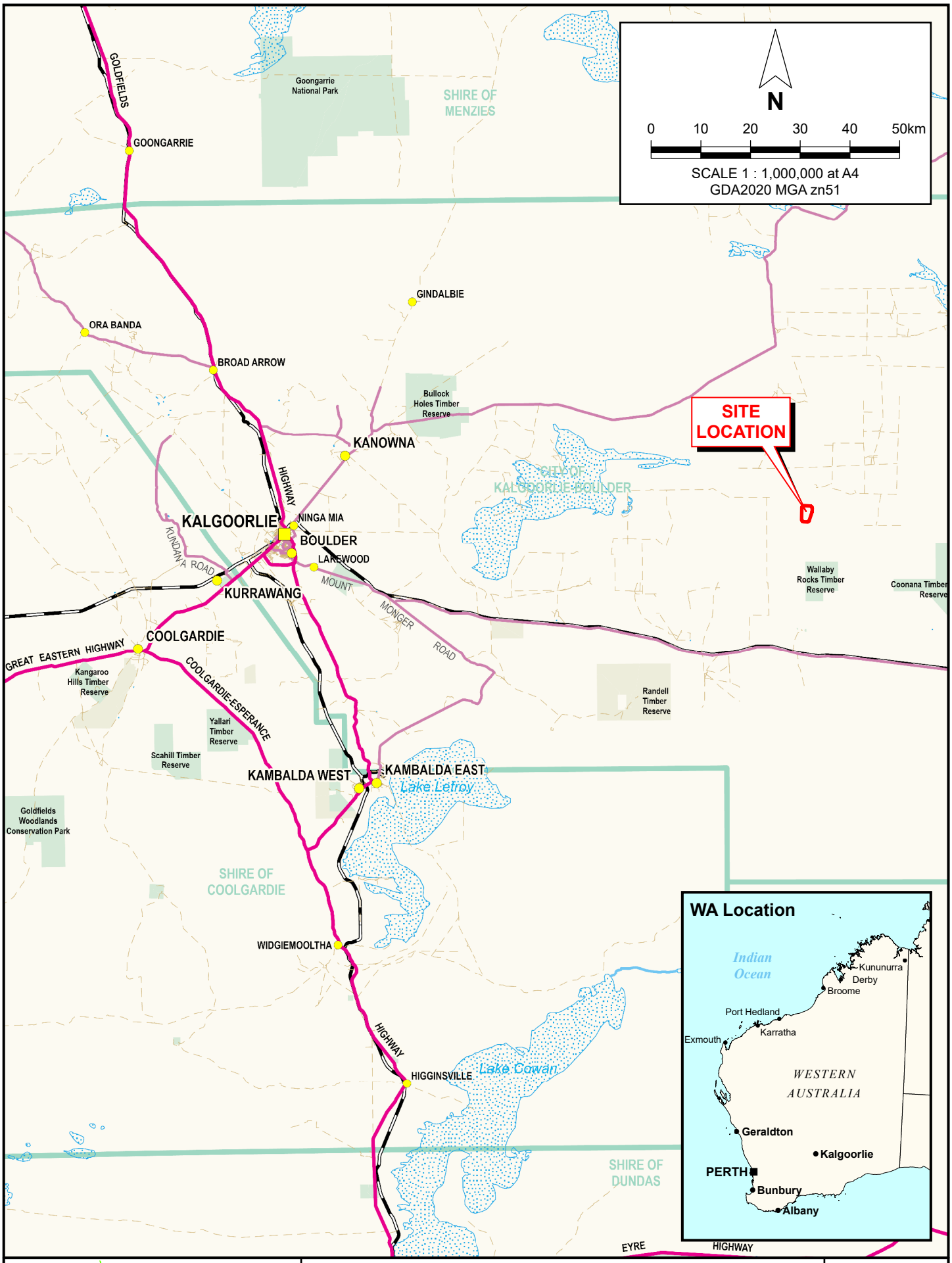
Figures

Basic Vertebrate Fauna Survey
Lake Roe Gold Project



TERRESTRIAL ECOSYSTEMS

Ramelius Resources
BASIC VERTEBRATE FAUNA SURVEY
LAKE ROE GOLD PROJECT

REGIONAL LOCATION

Figure 1

Drawn: S. Thompson | Date: 26 Feb 2025 | Job: 2024-0163

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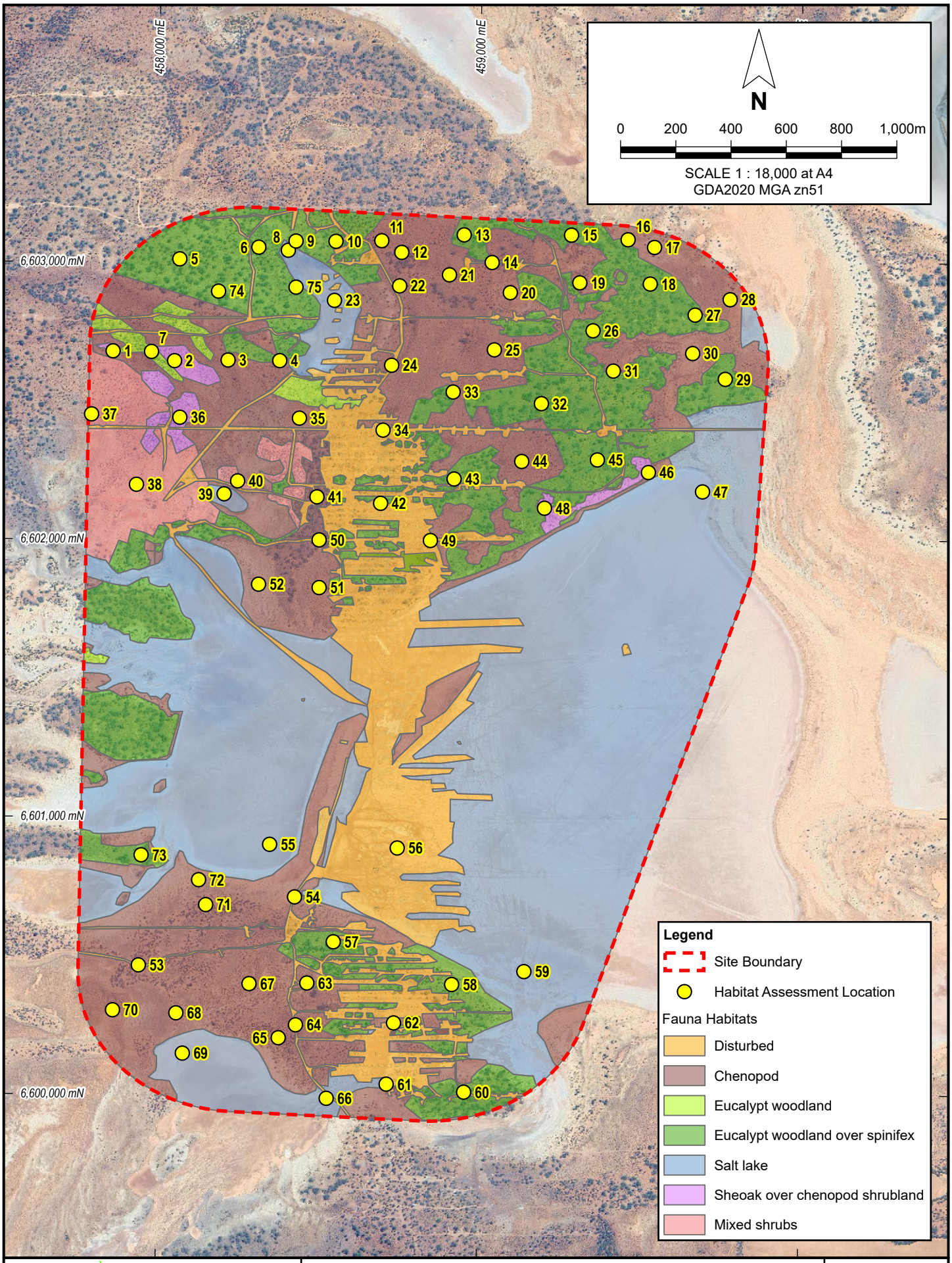

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TERRESTRIAL ECOSYSTEMS

Drawn: S. Thompson | Date: 26 Feb 2025

Ramelius Resources
BASIC VERTEBRATE FAUNA SURVEY
LAKE ROE GOLD PROJECT

FAUNA HABITAT TYPES AND HABITAT ASSESSMENT LOCATIONS

Figure 2

Job: 2024-0163

Appendix A.
Results of the EPBC Act Protected Matters Search

Basic Vertebrate Fauna Survey
Lake Roe Gold Project

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 14-Mar-2025

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	12
Listed Migratory Species:	7

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	11
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	4
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	2
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species			[Resource Information]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.			
Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only
INSECT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ogyris petrina listed as Ogyris subterrestris petrina			
Arid Bronze Azure [94250]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
MAMMAL			
Dasyurus geoffroii			
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sminthopsis psammophila			
Sandhill Dunnart [291]	Endangered	Species or species habitat may occur within area	In buffer area only
PLANT			
Tecticornia flabelliformis			
Bead Glasswort, Bead Samphire [82664]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chalcites osculans as Chrysococcyx osculans			
Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Merops ornatus			
Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Thinornis cucullatus as Thinornis rubricollis			
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat likely to occur within area overfly marine area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Cardunia Rocks	Nature Reserve	WA	In buffer area only
Coonana Timber Reserve	5(1)(g) Reserve	WA	In buffer area only
Ngadju	Indigenous Protected Area	WA	In buffer area only
Wallaby Rocks Timber Reserve	5(1)(g) Reserve	WA	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Nava-1 Cable System	2001/510	Controlled Action	Completed	In buffer area only
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV,	2015/7522	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
sthrn two thirds of Australia				

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix B. Vertebrate Fauna Recorded in Biological Surveys in the Region

Basic Vertebrate Fauna Survey
Lake Roe Gold Project

B.1 VERTEBRATE FAUNA RECORDED IN BIOLOGICAL SURVEYS IN THE REGION

		Surveys	A	B				C										
Family	Species	Common name	Unknown	KK53	KK54	KK51	KK55	Site 14a	Site 5a	Site 1a	Site 17a	Site 14	Site 20a	Site 11	Site 11a	Site 8	Site 19	Site 14b
Amphibians																		
Limnodynastidae	*Neobatrachus kunapalari*	Wheatbelt Frog	X															
	Neobatrachus sutor	Shoemaker Frog	X	1	1													
	Neobatrachus wilsmorei	Plonking Frog	X															
	Platyplectrum spenceri	Spencer's Burrowing Frog	X					8										
Myobatrachidae	*Crinia georgiana*	Quacking Frog	X															
	Pseudophryne occidentalis	Western Toadlet	X						2									
Pelodryadidae	*Cyclorana occidentalis*	Western Water-holding Frog	X															
	Litoria moorei	Motorbike Frog	X															
Reptiles																		
Agamidae	*Ctenophorus caudicinctus*	Ring-tailed Dragon								12								
	Ctenophorus cristatus	Crested Dragon	X			4												
	Ctenophorus fordi	Mallee Dragon	X	1	1	4	4											
	Ctenophorus inermis	Military Dragon									1							
	Ctenophorus infans	Ring-tailed Dragon	X															
	Ctenophorus isolepis	Central Military Dragon	X															
	Ctenophorus nuchalis	Central Netted Dragon	X															
	Ctenophorus ornatus	Ornate Crevice Dragon	X															
	Ctenophorus pictus	Painted Dragon	X															
	Ctenophorus reticulatus	Western Netted Dragon	X	7	4	8		1	13		2	2	4					
	Ctenophorus salinarum	Saltpan Dragon	X						1					5	1	2		
	Ctenophorus scutulatus	Lozenge-marked Dragon	X			9												
	Diporiphora amphiboluroides	Mulga Dragon	X			1	1											
	Diporiphora reginae	Plain-backed Two-lined Dragon	X															
	Moloch horridus	Thorny Devil	X		2	2	3		1									
	Pogona minor	Western Bearded Dragon	X	1	2	2	1					1		2	1	2	2	
	Tympanocryptis cephalus	Pebble Dragon	X												1			
Carphodactylidae	*Nephrurus laevissimus*	Smooth Knob-tail	X															
	Nephrurus vertebralis	Midline Knob-tail	X											1		2		
	Nephrurus wheeleri	Banded Knob-tail	X															
	Underwoodisaurus milii	Barking Gecko	X			5			2		9							
Diplodactylidae	*Amalosia reticulata*	Reticulated Velvet Gecko																
	Diplodactylus conspicillatus	Fat-tailed Gecko	X															
	Diplodactylus granariensis	Wheatbelt Stone Gecko	X															

		Surveys	A	B				C											
Family	Species	Common name	Unknown	KK53	KK54	KK51	KK55	Site 14a	Site 5a	Site 1a	Site 17a	Site 14	Site 20a	Site 11	Site 11a	Site 8	Site 19	Site 14b
	Diplodactylus pulcher	Beautiful Gecko	X			2		4	3		3						1	
	Lucasium damaeum	Beaded Gecko	X															
	Lucasium maini	Main's Ground Gecko	X															
	Lucasium squarrosum	Mottled Ground Gecko	X					1			3		2	1	3			
	Rhynchoedura ornata	Beaked Gecko	X													2		
	Strophurus assimilis	Goldfields Spiny-tailed Gecko																
	Strophurus ciliaris	Spiny-tailed Gecko						2	2		1		1					
	Strophurus strophurus	Western Spiny-tailed Gecko	X													7		
	Strophurus wellingtonae	Western Shield Spiny-tailed Gecko	X															
Elapidae	*Acanthophis pyrrhus*	Desert Death Adder	X															
	Brachyurophis fasciolatus	Narrow-banded Burrowing Snake	X										1					
	Brachyurophis semifasciata	Half-girdled Snake																
	Echiopsis curta	Bardick	X															
	Elapognathus coronatus	Crowned Snake	X															
	Furina ornata	Orange-naped Snake																
	Neelaps bimaculatus	Black-naped Burrowing Snake	X															
	Notechis scutatus	Tiger Snake	X															
	Suta gouldii	Gould's Snake	X															
	Suta monachus	Hooded Snake	X			1		1			3							
	Pseudechis australis	Mulga Snake	X															
	Pseudechis butleri	Spotted Mulga Snake	X															
	Pseudonaja mengdeni	Western Brown Snake	X															
	Pseudonaja modesta	Ringed Brown Snake	X			2	1											
	Simoselaps bertholdi	Jan's Banded Snake	X														1	
	Suta fasciata	Rosen's Snake	X						2									
Gekkonidae	*Christinus marmoratus*	Marbled Gecko	X															
	Gehyra purpurascens	Purplish Dtella	X															
	Gehyra variegata	Variegated Gehyra	X	3		6	1		15	1	15		1			1	1	
	Heteronotia binoei	Bynoe's Gecko	X	3					7		34							
Pygopodidae	*Delma australis*	Marble-faced Delma																
	Delma butleri	Unbanded Delma	X															
	Delma nasuta	Sharp-snouted Delma			1													
	Lialis burtonis	Burton's Legless Lizard	X			1												
	Pygopus lepidopodus	Common Scaly-foot	X															
	Pygopus nigriceps	Western Hooded Scaly-foot	X								1		1					
Pythonidae	*Morelia spilota*	Carpet Python	X															
Scincidae	*Cryptoblepharus australis*	Inland Snake-eyed Skink	X															
	Cryptoblepharus buchananii	Buchanan's Snake-eyed Skink						1										

		Surveys	A	B				C											
Family	Species	Common name	Unknown	KK53	KK54	KK51	KK55	Site 14a	Site 5a	Site 1a	Site 17a	Site 14	Site 20a	Site 11	Site 11a	Site 8	Site 19	Site 14b
	Cryptoblepharus plagiocephalus	Peron's Snake-eyed Skink	X			1												
	Ctenotus atlas	Southern Mallee Ctenotus	X			2	6											
	Ctenotus calurus	Blue-tailed Finesnout Ctenotus	X														1	
	Ctenotus greeri	Spotted-necked Ctenotus	X														12	
	Ctenotus helenae	Clay-soil Ctenotus	X														1	
	Ctenotus leonhardii	Leonhardi's Ctenotus	X	1										5	4	2		
	Ctenotus pantherinus	Leopard Ctenotus	X														4	
	Ctenotus quattuordecimlineatus	Fourteen-lined Ctenotus	X														11	
	Ctenotus schomburgkii	Barred Wedgesnout Ctenotus	X			6	1						2	3		15	11	
	Ctenotus severus	Stern Ctenotus	X							1	6							
	Ctenotus uber	Spotted Ctenotus	X	2				3			2		6					
	Cyclodomorphus melanops	Spinifex Slender Blue-tongue	X		1													
	Egernia depressa	Southern Pygmy Spiny-tailed Skink	X	1		4							4					
	Egernia formosa	Goldfields Crevice Skink	X	1		3			3									
	Egernia napoleonis	Southwestern Crevice Skink	X															
	Egernia stokesii	Spiny-tailed Skink	X															
	Eremiascincus richardsonii	Broad-banded Sand-swimmer	X					1			1							
	Hemiergis initialis	South-western Earless Skink	X															
	Hemiergis peronii	Lowlands Earless Skink	X															
	Lerista bipes	North-western Sandslider	X															
	Lerista desertorum	Central Desert Robust Slider	X								6		2				6	
	Lerista kingi	King's Slider	X															
	Lerista macropisthopus	Unpatterned Robust Slider							2									
	Lerista muelleri	Wood Mulch-slider																
	Lerista picturata	Southern Robust Slider	X						2									
	Lerista puncticauda	Dotty-tailed Robust Slider	X															
	Lerista timida	Timid Slider	X															
	Liopholis inornata	Desert Skink	X			1												
	Liopholis striata	Nocturnal Desert Skink	X										2					
	Menetia greyii	Common Dwarf Skink	X						4									
	Morethia adelaidensis	Saltbush Morethia Skink	X															
	Morethia butleri	Woodland Morethia Skink	X		1	1			4		6	2						
	Morethia obscura	Shrubland Pale-flecked Morethia	X															
	Saiphos equalis	Three-toed Skink	X															
	Tiliqua occipitalis	Western Blue-tongued Lizard	X		3													
	Tiliqua rugosa	Bobtail	X		2	5												
Typhlopidae	*Anilios australis*	Austral Blind Snake	X															
	Anilios bicolor	Dark-spined Blind Snake																

		Surveys	A	B				C											
Family	Species	Common name	Unknown	KK53	KK54	KK51	KK55	Site 14a	Site 5a	Site 1a	Site 17a	Site 14	Site 20a	Site 11	Site 11a	Site 8	Site 19	Site 14b
	Anilios bituberculatus	Prong-snouted Blind Snake																
	Anilios hamatus	Pale-headed Blind Snake						1								1		
	Anilios waitii	Waite's Blind Snake						2								1		
Varanidae	*Varanus caudolineatus*	Stripe-tailed Monitor	X	3		4		1	2				6					
	Varanus giganteus	Perentie							1									
	Varanus gouldii	Gould's Goanna	X		1	1	1		1		1							
	Varanus panoptes	Yellow-spotted Monitor	X					2					1	1				
	Varanus tristis	Black-headed Monitor	X					1										
Bird																		
Casuariidae	*Dromaius novaehollandiae*	Emu			23			1	2						2		2	5
Anatidae	*Chenonetta jubata*	Australian Wood Duck																
	Anas superciliosa	Pacific Black Duck																
	Anas gracilis	Grey Teal																
Megapodiidae	*Leipoa ocellata*	Malleefowl			1		1											
Phasianidae	*Coturnix pectoralis*	Stubble Quail																1
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe																
Columbidae	*Phaps chalcoptera*	Common Bronzewing		1	1	2										1		
	Ocyphaps lophotes	Crested Pigeon						5	6		11	1	7			9		2
Cuculidae	*Chrysococcyx basalis*	Horsfield's Bronze-Cuckoo		3	5	4	1								3	1	3	
	Chrysococcyx osculans	Black-eared Cuckoo				2							2				1	
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar				1		3				3				1		2
Podargidae	*Podargus strigoides*	Tawny Frogmouth		3									1					
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar							2	2								
Apodidae	*Apus pacificus*	Pacific Swift																
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew																
Charadriidae	*Vanellus tricolor*	Banded Lapwing							1		4			9				4
	Charadrius ruficapillus	Red-capped Plover																
Scolopacidae	*Tringa glareola*	Wood Sandpiper																
Turnicidae	*Turnix velox*	Little Buttonquail											2					5
Otididae	*Ardeotis australis*	Australian Bustard						4							1			
Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant																
Accipitridae	*Hieraaetus morphnoides*	Little Eagle											1				3	
	Aquila audax	Wedge-tailed Eagle						2			2	6				3		
	Circus assimilis	Spotted Harrier				1												1
	Accipiter fasciatus	Brown Goshawk															3	
	Accipiter cirrocephalus	Collared Sparrowhawk																
	Haliastur sphenurus	Whistling Kite		2														

		Surveys	A	B				C										
Family	Species	Common name	Unknown	KK53	KK54	KK51	KK55	Site 14a	Site 5a	Site 1a	Site 17a	Site 14	Site 20a	Site 11	Site 11a	Site 8	Site 19	Site 14b
Cuculidae	*Heteroscenes pallidus*	Pallid Cuckoo		1								2	1			1	1	
Strigidae	*Ninox boobook*	Southern Boobook																
Alcedinidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher									6		1					1
Meropidae	*Merops ornatus*	Rainbow Bee-eater			6	6	12						3				3	
Falconidae	*Falco cenchroides*	Nankeen Kestrel		1				5	4		2					2	3	
	Falco longipennis	Australian Hobby														1		
	Falco berigora	Brown Falcon		1		2	1	3			2		3			3	5	1
Cacatuidae	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo																
	Eolophus roseicapilla	Galah		24		1	1	908	7		2	44	7		1	4	5	8
	Nymphicus hollandicus	Cockatiel		1				2							6	35	3	4
Psittaculidae	*Polytelis anthopeplus*	Regent Parrot																
	Neopsephotus bourkii	Bourke's Parrot											4					
	Barnardius zonarius	Australian Ringneck		6	3	7		31	1			25	3			9	16	36
	Psephotus varius	Mulga Parrot		16	4		4						14				2	11
	Melopsittacus undulatus	Budgerigar			4		2	9			2	11	17		20	170	29	15
	Glossopsitta porphyrocephala	Purple-crowned Lorikeet		7		7												
Ptilonorhynchidae	*Chlamydera guttata*	Western Bowerbird	X															
Climacteridae	*Climacteris affinis*	White-browed Treecreeper	X			1							4					
	Climacteris rufus	Rufous Treecreeper	X															
Maluridae	*Malurus lamberti*	Variegated Fairywren		45	20		1											
	Malurus splendens	Splendid Fairywren	X															
	Malurus leucopterus	White-winged Fairywren	X					1						3	76	40		2
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater										2			2			
	Purnella albifrons	White-fronted Honeyeater	X	4		15	15					3			1	2	4	1
	Manorina flavigula	Yellow-throated Miner	X		1	2	1	15			1	10	41			21	13	98
	Anthochaera carunculata	Red Wattlebird	X										3				2	
	Gavicalis virescens	Singing Honeyeater	X	10			1		1		2	11	3		3	8	2	3
	Ptilotula ornata	Yellow-plumed Honeyeater	X		1													
	Ptilotula plumula	Grey-fronted Honeyeater					2					56	2				3	
	Conopophila whitei	Grey Honeyeater																18
	Epthianura tricolor	Crimson Chat	X					24			6	154	29		18	75		
	Epthianura aurifrons	Orange Chat	X												5			
	Epthianura albifrons	White-fronted Chat	X															
	Lichmera indistincta	Brown Honeyeater	X	2	2													
	Phylidonyris niger	White-cheeked Honeyeater				7												
	Nesoptilotis leucotis	White-eared Honeyeater	X		1	7	1											
	Melithreptus brevirostris	Brown-headed Honeyeater	X			17												
Pardalotidae	*Pardalotus striatus*	Striated Pardalote	X	1		5	7										2	1

		Surveys	A	B				C										
Family	Species	Common name	Unknown	KK53	KK54	KK51	KK55	Site 14a	Site 5a	Site 1a	Site 17a	Site 14	Site 20a	Site 11	Site 11a	Site 8	Site 19	Site 14b
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat	X	14	7	6										2		2
	Calamanthus campestris	Rufous Fieldwren																
	Hylacola cauta	Shy Heathwren																
	Acanthiza apicalis	Inland Thornbill	X	22	14	14	4						2				3	
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill	X	47									8			9	4	
	Acanthiza uropygialis	Chestnut-rumped Thornbill	X	67	12	42	3	3	3				126			53	88	5
	Acanthiza robustirostris	Slaty-backed Thornbill	X	2									6				3	
	Smicrornis brevirostris	Weebill	X	15	40	137	55						7				98	
	Aphelocephala leucopsis	Southern Whiteface	X	18	2								52			4	5	8
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler	X	23	18		3		2									3
	Pomatostomus superciliosus	White-browed Babbler	X															
Cinclosomatidae	*Cinclosoma castanotum*	Chestnut Quail-thrush	X															
	Cinclosoma castaneothorax	Chestnut-breasted Quail-thrush											3		2			
Campephagidae	*Coracina maxima*	Ground Cuckooshrike	X					31			3				4			2
	Coracina novaehollandiae	Black-faced Cuckooshrike	X	5		2	1	5			1	4	10			7	9	6
	Lalage tricolor	White-winged Triller	X	1				3					34			39		9
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	X														6	2
Oreoicidae	*Oreoica gutturalis*	Crested Bellbird	X	6	2	5	2	5		2		14	10		3	6	15	1
	Oreoica gutturalis	Crested Bellbird																
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush	X	9	2	7											5	
	Pachycephala inornata	Gilbert's Whistler																
	Pachycephala rufiventris	Rufous Whistler	X	7	8	10	5										8	
Artamidae	*Artamus personatus*	Masked Woodswallow										2	72		2		2	31
	Artamus superciliosus	White-browed Woodswallow											3					
	Artamus cinereus	Black-faced Woodswallow	X					25			11	55	1		7	12		6
	Artamus cyanopterus	Dusky Woodswallow	X	2														
	Cracticus torquatus	Grey Butcherbird	X	2	1	7	1	4				2	8			4	8	7
	Cracticus nigrogularis	Pied Butcherbird	X	2		1		23	4	1		6				13	4	1
	Gymnorhina tibicen	Australian Magpie	X			14		3			9		1					
	Strepera versicolor	Grey Currawong	X	1		2	1	2									2	3
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	X					2			1					12		2
	Rhipidura albiscapa	Grey Fantail	X	1														
Monarchidae	*Grallina cyanoleuca*	Magpie-lark	X	9				12			2					3		7
Corvidae	*Corvus orru*	Torresian Crow													2			2
	Corvus bennetti	Little Crow	X					50	7		12	29	6		11	36	24	21
	Corvus coronoides	Australian Raven	X															
Petroicidae	*Microeca fascinans*	Jacky Winter	X			8		1					1				22	
	Petroica goodenovii	Red-capped Robin	X	187	7	14	5	5	3	3	1	1	47			3	29	3

		Surveys	A	B				C										
Family	Species	Common name	Unknown	KK53	KK54	KK51	KK55	Site 14a	Site 5a	Site 1a	Site 17a	Site 14	Site 20a	Site 11	Site 11a	Site 8	Site 19	Site 14b
	Melanodryas cucullata	Hooded Robin	X					1				2	1		1	2		
Locustellidae	*Cincloramphus cruralis*	Brown Songlark						7			8	3	1	7	7			
	Cincloramphus mathewsi	Rufous Songlark	X															3
Hirundinidae	*Hirundo neoxena*	Welcome Swallow	X															
	Petrochelidon nigricans	Tree Martin	X															
	Cheramoeca leucosterna	White-backed Swallow	X								2							
Zosteropidae	*Zosterops lateralis*	Silvereye	X															
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird	X	2		4										5		4
Estrildidae	*Taeniopygia guttata*	Zebra Finch (Australian)	X	9								12			9	36	5	4
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit	X					16			36			7	18			1
Mammals																		
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna				1												
Bovidae	*Bos taurus*	Cow																
	Capra hircus	Goat						1	1			1					1	
	Ovis aries	Sheep						1					1				1	
Camelidae	*Camelus dromedarius*	Dromedary	X											1				
Canidae	*Canis lupus*	Dingo	X											1				
	Vulpes vulpes	Red Fox				1			1				1				1	
Felidae	*Felis catus*	Cat												1				
Molossidae	*Austronomus australis*	White-striped Freetail Bat	X		3	6	2		1									
	Mormopterus planiceps	Southern Free-tail Bat	X						1									
	Ozimops kitcheneri	South-western Free-tail Bat																
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	X					1	3									
	Chalinolobus morio	Chocolate Wattled Bat	X			3												
	Nyctophilus geoffroyi	Lesser Long-eared Bat	X			1		4	3		9							
	Nyctophilus holtorum	Holt's Long-eared Bat				4												
	Scotorepens balstoni	Inland Broad-nosed Bat	X					6	1									
	Vespadelus baverstocki	Inland Forest Bat	X															
	Vespadelus regulus	Southern Forest Bat	X															
Dasyuridae	*Dasycercus blythi*	Brush-tailed Mulgara																
	Ningaui ridei	Wongai Ningaui	X			1											5	
	Ningaui yvonneae	Mallee Ningaui																
	Pseudantechinus woolleyae	Woolley's False Antechinus	X															
	Sminthopsis crassicaudata	Fat-tailed Dunnart		1	1	2			1				7	5				
	Sminthopsis crassicaudata	Fat-tailed Dunnart	X															
	Sminthopsis dolichura	Little Long-tailed Dunnart	X	4	6	8	1	2	1				1	1		2	1	
	Sminthopsis gilberti	Gilbert's Dunnart	X															

		Surveys	A	B				C											
Family	Species	Common name	Unknown	KK53	KK54	KK51	KK55	Site 14a	Site 5a	Site 1a	Site 17a	Site 14	Site 20a	Site 11	Site 11a	Site 8	Site 19	Site 14b
	Sminthopsis murina	Slender-tailed Dunnart	X															
	Sminthopsis ooldea	Ooldea Dunnart	X															
Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum	X															
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo	X	1		7			1							1		
	Osphranter robustus	Euro	X	4					1		1		1			1	1	
	Osphranter rufus	Red Kangaroo	X			3		1	1		1	1	1	1	1	1		
Vombatidae	*Lasiorhinus latifrons*	Southern Hairy-nosed Wombat	X															
Leporidae	*Oryctolagus cuniculus*	Rabbit	X						2		1			1		1		
Peramelidae	*Perameles bougainville*	Western Barred Bandicoot	X															
Equidae	*Equus caballus*	Horse																
Muridae	*Mus musculus*	House Mouse	X	8		11	4		2		1			2			3	
	Notomys alexis	Spinifex Hopping Mouse	X													1		
	Notomys mitchellii	Mitchell's Hopping Mouse				2	7											
	Pseudomys bolami	Bolam's Mouse	X															
	Pseudomys hermannsburgensis	Sandy Inland Mouse	X	1	2	2	2	1					2	1		1	7	

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C Dell, J and How, R.A. (1988) Vertebrate fauna. In: The biological Survey of the Eastern Goldfields of Western Australia, Part 5, Edjudina - Menzies Study Area. Records of the Western Australian Museum, Supplement No 31., pp. 38-77.

		Surveys	A									B			C												D
Family	Species	Common name	Site 6	Opportunistic	Site 5	Site 7	Site 4	Site 2	Site 8	Site 3	Site 1	Opportunistic:	Site 10	Site 9	Opportunistic	site 10	site 1	site 3	site 5	site 8	site 4	site 9	site 6	site 7	site 2	Jump Up Dam
Reptiles																										
Agamidae	*Ctenophorus cristatus*	Crested Dragon	1										1		2	3	1	1	2	1	1	2	3			
	Ctenophorus reticulatus	Western Netted Dragon		X										1					1					1		1
	Ctenophorus salinarum	Saltpan Dragon			2	2	3	1																		
	Ctenophorus scutulatus	Lozenge-marked Dragon			2		1	1	1	1				4												
	Diporiphora amphiboluroides	Mulga Dragon																								1
	Pogona minor	Western Bearded Dragon												2		4				1						
Carphodactylidae	*Nephrurus vertebralis*	Midline Knob-tail							5																	
	Underwoodisaurus milii	Barking Gecko					1	3							3	1			2	1				1		1
Diplodactylidae	*Amalosia reticulata*	Reticulated Velvet Gecko														1	2			3	1	2		3		
	Diplodactylus granariensis	Wheatbelt Stone Gecko				2		1	1		1		14	3	2	3	2	1	4	9	10	6	15	9	4	
	Diplodactylus pulcher	Beautiful Gecko			4	4	5	2	1	1	3			2	1	1	5		3	1		2		2	8	
	Lucasium maini	Main's Ground Gecko	1		1	1	3		1	1	4				6	1	5	2	6	12	3	12	4	9	8	
	Rhynchoedura ornata	Beaked Gecko					1										1								2	1
	Strophurus assimilis	Goldfields Spiny-tailed Gecko																							2	
Elapidae	*Brachyurophis semifasciata*	Half-girdled Snake						1	1							2						2				1
	Suta monachus	Hooded Snake			1	1																				
	Pseudonaja mengdeni	Western Brown Snake										X													1	
	Simoselaps bertholdi	Jan's Banded Snake			1	1								1		1					2					
	Suta fasciata	Rosen's Snake										X														
Gekkonidae	*Gehyra purpurascens*	Purplish Dtella								1										1	1			1		
	Gehyra variegata	Variegated Gehyra			1	2	1		4	5	1				1	2		5	3	8	5		3			1
	Heteronotia binoei	Bynoe's Gecko	1		1	6	3		3		1		2		1		1	1		1						1
Pygopodidae	*Delma australis*	Marble-faced Delma											1			1								1		
	Lialis burtonis	Burton's Legless Lizard											1													
Pythonidae	*Morelia spilota*	Carpet Python										X														
Scincidae	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink				1							2			1										
	Cryptoblepharus plagiocephalus	Peron's Snake-eyed Skink				1	2	1																		
	Ctenotus leonhardii	Leonhardi's Ctenotus				2																				
	Ctenotus pantherinus	Leopard Ctenotus								1																
	Ctenotus schomburgkii	Barred Wedgesnout Ctenotus	2						1	1				7												
	Ctenotus uber	Spotted Ctenotus				2	2							1												
	Egernia depressa	Southern Pygmy Spiny-tailed Skink				2	1	1		2			1	1												1

		Surveys	A									B			C											D
Family	Species	Common name	Site 6	Opportunistic	Site 5	Site 7	Site 4	Site 2	Site 8	Site 3	Site 1	Opportunistic:	Site 10	Site 9	Opportunistic	site 10	site 1	site 3	site 5	site 8	site 4	site 9	site 6	site 7	site 2	Jump Up Dam
	Egernia formosa	Goldfields Crevice Skink				3	2						1													1
	Eremiascincus richardsonii	Broad-banded Sand-swimmer				2	1		1	1	1															
	Hemiergis initialis	South-western Earless Skink														1					1					
	Lerista muelleri	Wood Mulch-slider														6	1	3	6	8	1	5	2	8	1	
	Lerista picturata	Southern Robust Slider				1			1		3					1					4	2		3		
	Lerista timida	Timid Slider	7		6		3	5	1	5	6															
	Liopholis inornata	Desert Skink	5			1			3	5	1			1				2	1		1		2			
	Menetia greyii	Common Dwarf Skink	2		1	1		1	1	1	3					7	1	1	1	5	1	6	3	6	8	
	Morethia adelaidensis	Saltbush Morethia Skink			1	1																				
	Morethia butleri	Woodland Morethia Skink				1							1				1			1						
	Tiliqua rugosa	Bobtail	2			1								3						3			1		1	
Typhlopidae	*Anilios australis*	Austral Blind Snake													1		1	2	1	1						
	Anilios bicolor	Dark-spined Blind Snake	1		1					1												1		1		
	Anilios bituberculatus	Prong-snouted Blind Snake			2						2					1	1	1	1			1	2			
Varanidae	*Varanus gouldii*	Gould's Goanna				1					2			1	1		1									
	Varanus panoptes	Yellow-spotted Monitor																								1
	Varanus tristis	Black-headed Monitor				1	1																			
Birds																										
Casuariidae	*Dromaius novaehollandiae*	Emu										X														1
Anatidae	*Chenonetta jubata*	Australian Wood Duck													1											
	Anas superciliosa	Pacific Black Duck													1											
	Anas gracilis	Grey Teal										X														
Megapodiidae	*Leipoa ocellata*	Malleefowl										X														1
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe													1											
Columbidae	*Phaps chalcoptera*	Common Bronzewing								2																1
Columbidae	*Ocyphaps lophotes*	Crested Pigeon	2			3	1		1																	1
Cuculidae	*Chrysococcyx basalis*	Horsfield's Bronze-Cuckoo			1		1		1																	1
	Chrysococcyx osculans	Black-eared Cuckoo	1				2								1											1
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar			1																					1
Podargidae	*Podargus strigoides*	Tawny Frogmouth										X														
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar										X														1
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew			1																					
Charadriidae	*Charadrius ruficapillus*	Red-capped Plover													1											
Scolopacidae	*Tringa glareola*	Wood Sandpiper													1											
Turnicidae	*Turnix velox*	Little Buttonquail								1																1
Otididae	*Ardeotis australis*	Australian Bustard													1											1

		Surveys	A									B			C											D
Family	Species	Common name	Site 6	Opportunistic	Site 5	Site 7	Site 4	Site 2	Site 8	Site 3	Site 1	Opportunistic:	Site 10	Site 9	Opportunistic	site 10	site 1	site 3	site 5	site 8	site 4	site 9	site 6	site 7	site 2	Jump Up Dam
Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant													1											
Accipitridae	*Aquila audax*	Wedge-tailed Eagle													1											
	Aquila audax	Wedge-tailed Eagle										X														
	Accipiter cirrocephalus	Collared Sparrowhawk	1																							1
Strigidae	*Ninox boobook*	Southern Boobook										X														
Alcedinidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher										X														
Meropidae	*Merops ornatus*	Rainbow Bee-eater			2			3	1						1											1
Falconidae	*Falco cenchroides*	Nankeen Kestrel													1											
	Falco longipennis	Australian Hobby										X														1
	Falco berigora	Brown Falcon										X			1											1
Cacatuidae	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo										X														
	Eolophus roseicapilla	Galah	1		1		1	1	1	1	1															1
	Nymphicus hollandicus	Cockatiel																								1
Psittaculidae	*Polytelis anthopeplus*	Regent Parrot	2							1																
	Barnardius zonarius	Australian Ringneck													1											1
	Barnardius zonarius	Australian Ringneck	3		4	5	5	4	2	3	3															
	Psephotus varius	Mulga Parrot	4																							1
	Glossopsitta porphyrocephala	Purple-crowned Lorikeet								1																
Ptilonorhynchidae	*Chlamydera guttata*	Western Bowerbird																								1
Climacteridae	*Climacteris affinis*	White-browed Treecreeper																								1
Maluridae	*Malurus lamberti*	Variegated Fairywren			1	1	1																			
	Malurus splendens	Splendid Fairywren			4	1	8	2		5																1
	Malurus leucopterus	White-winged Fairywren																								1
	Malurus leucopterus	White-winged Fairywren			1		1		6	1																
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater										X														
	Purnella albifrons	White-fronted Honeyeater			1	2				2																1
	Manorina flavigula	Yellow-throated Miner																								1
	Manorina flavigula	Yellow-throated Miner	5		1	1		1	2		2															
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater	1		1	8	5	5	4	5	1															1
	Anthochaera carunculata	Red Wattlebird				3									1											1
	Gavicalis virescens	Singing Honeyeater	1		5	8	5	5	11		2															1
	Ptilotula ornata	Yellow-plumed Honeyeater	4					3		2	1				1											
	Epthianura tricolor	Crimson Chat																								1
	Lichmera indistincta	Brown Honeyeater																								1
	Lichmera indistincta	Brown Honeyeater						1																		
	Nesoptilotis leucotis	White-eared Honeyeater	1		1			4		4	9															

		Surveys	A									B			C											D
Family	Species	Common name	Site 6	Opportunistic	Site 5	Site 7	Site 4	Site 2	Site 8	Site 3	Site 1	Opportunistic:	Site 10	Site 9	Opportunistic	site 10	site 1	site 3	site 5	site 8	site 4	site 9	site 6	site 7	site 2	Jump Up Dam
	Melithreptus brevirostris	Brown-headed Honeyeater	1		3		1	2		2	1															
Pardalotidae	*Pardalotus striatus*	Striated Pardalote	5		1						5															1
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat			6	5	6	3	3	5	1															1
	Calamanthus campestris	Rufous Fieldwren							1																	
	Hylacola cauta	Shy Heathwren										X														
	Acanthiza apicalis	Inland Thornbill	5		5	8	8	4	7	5	2															1
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill					1			1																1
	Acanthiza uropygialis	Chestnut-rumped Thornbill	1		5	7	4	1	1	5																1
	Acanthiza robustirostris	Slaty-backed Thornbill					2																			
	Smicrornis brevirostris	Weebill	11		9	3	1	7	1	8	12															
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler													1											1
	Pomatostomus superciliosus	White-browed Babbler	2		1	4	6	3	1	2																
Cinclosomatidae	*Cinclosoma castanotum*	Chestnut Quail-thrush	1																							
	Cinclosoma castaneothorax	Chestnut-breasted Quail-thrush																								1
Campephagidae	*Coracina maxima*	Ground Cuckooshrike										X														
	Coracina novaehollandiae	Black-faced Cuckooshrike	2		1		2				6				1											1
	Lalage tricolor	White-winged Triller								1	1															1
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella										X														
Oreoicidae	*Oreoica gutturalis*	Crested Bellbird													1											1
	Oreoica gutturalis	Crested Bellbird	3		9	9	10	5	6	7	4															
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush	5		2	3	7	5	1	3	2															1
	Pachycephala inornata	Gilbert's Whistler						2		3																
	Pachycephala rufiventris	Rufous Whistler			1	1		3		3	1															1
Artamidae	*Artamus personatus*	Masked Woodswallow										X														1
	Artamus cinereus	Black-faced Woodswallow				3	2																			
	Artamus cyanopterus	Dusky Woodswallow										X														
	Cracticus torquatus	Grey Butcherbird	4			9	1	2			2															
	Cracticus nigrogularis	Pied Butcherbird			1				5						1											1
	Gymnorhina tibicen	Australian Magpie			1										1											1
	Strepera versicolor	Grey Currawong	2		2	2			1		3				1											1
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	1				2		3						1											1
	Rhipidura albiscapa	Grey Fantail								1																
Monarchidae	*Grallina cyanoleuca*	Magpie-lark													1											
Corvidae	*Corvus orru*	Torresian Crow																								
	Corvus bennetti	Little Crow																								1
	Corvus coronoides	Australian Raven	1			6	2		1		1															

		Surveys	A									B			C											D
Family	Species	Common name	Site 6	Opportunistic	Site 5	Site 7	Site 4	Site 2	Site 8	Site 3	Site 1	Opportunistic:	Site 10	Site 9	Opportunistic	site 10	site 1	site 3	site 5	site 8	site 4	site 9	site 6	site 7	site 2	Jump Up Dam
Petroicidae	*Microeca fascinans*	Jacky Winter										X														
	Petroica goodenovii	Red-capped Robin			1		6	2		3																1
	Melanodryas cucullata	Hooded Robin				1																				
Locustellidae	*Cincloramphus cruralis*	Brown Songlark													1											
	Cincloramphus mathewsi	Rufous Songlark																								
Hirundinidae	*Hirundo neoxena*	Welcome Swallow																								
	Petrochelidon nigricans	Tree Martin										X														
	Cheramoeca leucosterna	White-backed Swallow										X														
Zosteropidae	*Zosterops lateralis*	Silvereye																								
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird										X														1
Estrildidae	*Taeniopygia guttata*	Zebra Finch																								1
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit													1											1
Mammals																										
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna										X			1											1
Bovidae	*Bos taurus*	Cow										X														1
	Capra hircus	Goat																								1
	Ovis aries	Sheep													1											
Camelidae	*Camelus dromedarius*	Dromedary										X														
Canidae	*Canis lupus*	Dingo													1											
	Vulpes vulpes	Red Fox																								1
Felidae	*Felis catus*	Cat													1											1
Molossidae	*Austronomus australis*	White-striped Freetail Bat										X														
	Mormopterus planiceps	Southern Free-tail Bat																								
	Ozimops kitcheneri	South-western Free-tail Bat										X														1
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat										X														1
	Chalinolobus morio	Chocolate Wattled Bat										X														1
	Scotorepens balstoni	Inland Broad-nosed Bat										X														1
	Vespadelus baverstocki	Inland Forest Bat										X														
	Vespadelus regulus	Southern Forest Bat																								
Dasyuridae	*Dasycercus blythi*	Brush-tailed Mulgara																								
	Ningaui ridei	Wongai Ningaui																								
	Ningaui yvonneae	Mallee Ningaui				4																				
	Pseudantechinus woolleyae	Woolley's False Antechinus																								
	Sminthopsis crassicaudata	Fat-tailed Dunnart				1																				
	Sminthopsis dolichura	Little Long-tailed Dunnart	6			1	1	2	3							1			2			3	2			
	Antechinomys longicaudatus	Long-tailed Dunnart										X														

		Surveys	A									B			C											D
Family	Species	Common name	Site 6	Opportunistic	Site 5	Site 7	Site 4	Site 2	Site 8	Site 3	Site 1	Opportunistic:	Site 10	Site 9	Opportunistic	site 10	site 1	site 3	site 5	site 8	site 4	site 9	site 6	site 7	site 2	Jump Up Dam
Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum											1	3								1				
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo										X														
	Osphranter robustus	Euro										X			1											1
	Osphranter rufus	Red Kangaroo										X														1
Leporidae	*Oryctolagus cuniculus*	Rabbit										X			1											1
Equidae	*Equus caballus*	Horse										X														
Muridae	*Mus musculus*	House Mouse			8	2			9		5							2	1	3			2			
	Notomys alexis	Spinifex Hopping Mouse			2																					
	Pseudomys bolami	Bolam's Mouse			1	4							1													
	Pseudomys hermannsburgensis	Sandy Inland Mouse	1							3																

A Western Wildlife (2022) Rebecca Gold Project: Detailed Vertebrate Fauna Survey 2021-2022, Unpublished reported Remelius Resources, Perth.
B Hart, Simpson and Associates (2000) Anaconda Nickel Ltd, Cawse Expansion Project, Fauna Survey. Unpublished report for Anaconda Nickel Ltd, Perth.
C Terrestrial Ecosystems (2010) Fauna Assessment for the Majestic Gold Project, Unpublished report for Botanica Consulting Pty Ltd and Integra Mining Ltd, Perth.
D Ecologia Environment (2007) Jump Up Dam Fauna Assessment. Unpublished report for Heron Resources, Perth.

Appendix C. Definitions of Significant Fauna under the Biodiversity Conservation Act 2016 and Priority Species

Basic Vertebrate Fauna Survey
Lake Roe Gold Project

C.1 DEFINITIONS OF SIGNIFICANT FAUNA UNDER THE WA BIODIVERSITY CONSERVATION ACT 2016

Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such. The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*. Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T Threatened Species

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

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

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

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

CR Critically endangered species

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

[1] The definition of flora includes algae, fungi and lichens

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

EN Endangered species

Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU Vulnerable species

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct Species

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

EX Extinct species

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

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

EW Extinct in the wild species

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

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

Specially Protected Species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory birds protected under an international agreement

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

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

CD Species of special conservation interest (conservation dependant fauna)

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

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

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

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

P Priority species

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations

P1 Priority 1: Poorly-known species

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

P2 Priority 2: Poorly-known species

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

P3 Priority 3: Poorly-known species

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

P4 Priority 4: Rare, Near Threatened and other species in need of monitoring

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

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

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

Appendix D.
Rapid habitat assessments

Basic Vertebrate Fauna Survey
Lake Roe Gold Project

Date: 17/11/2024 Habitat Assessment #: 1 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 457857 mE 6602678 mN Fire History: >5 Landform: Gentle slope

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Sheoak woodland over chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 2 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458048 mE 6602643 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Sheoak woodland over chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 3 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458215 mE 6602646 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 4 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458376 mE 6602644 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand and pebbles

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 5 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458063 mE 6603010 mN Fire History: >5 Landform: Flat plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand and pebbles

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 6 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458309 mE 6603053 mN Fire History: >5 Landform: Gentle slope

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 7 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 457976 mE 6602676 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 8 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458401 mE 6603042 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand and pebbles

Habitat Type: Salt lake

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 9 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458425 mE 6603076 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 10 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458549 mE 6603075 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 11 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458692 mE 6603078 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 12 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458755 mE 6603036 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 13 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458949 mE 6603100 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 14 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459036 mE 6603000 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 15 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459283 mE 6603100 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 16 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459459 mE 6603084 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 17 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459542 mE 6603057 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 18 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459529 mE 6602925 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

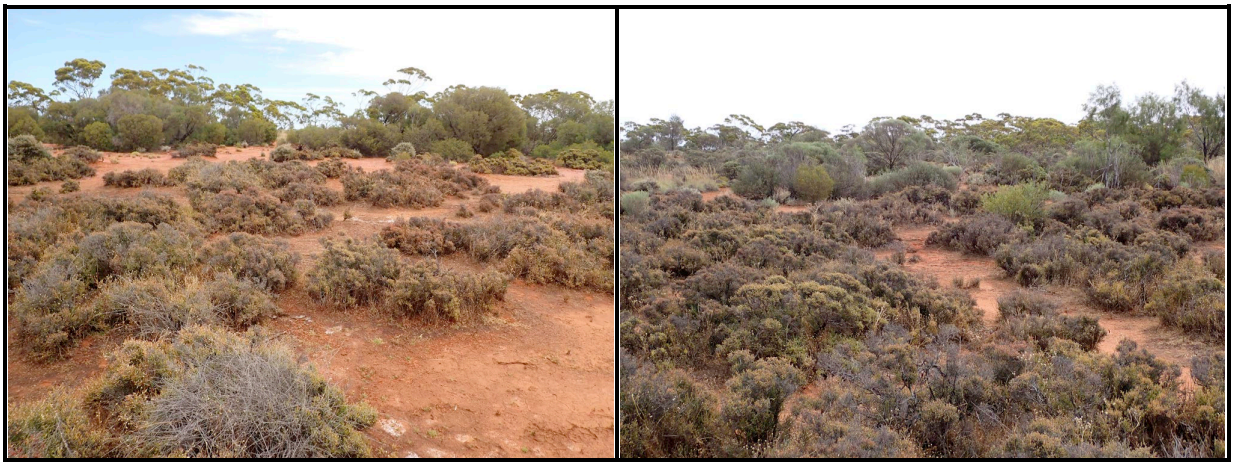
TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 19 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459309 mE 6602928 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland



Date: 17/11/2024 Habitat Assessment #: 20 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459093 mE 6602892 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 21 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458903 mE 6602956 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 22 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458748 mE 6602915 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 23 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458545 mE 6602862 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Sand

Habitat Type: Salt lake

Date: 17/11/2024 Habitat Assessment #: 24 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458725 mE 6602629 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 25 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459044 mE 6602686 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 26 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459351 mE 6602756 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 27 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459669 mE 6602813 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 28 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459778 mE 6602869 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 29 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459764 mE 6602582 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

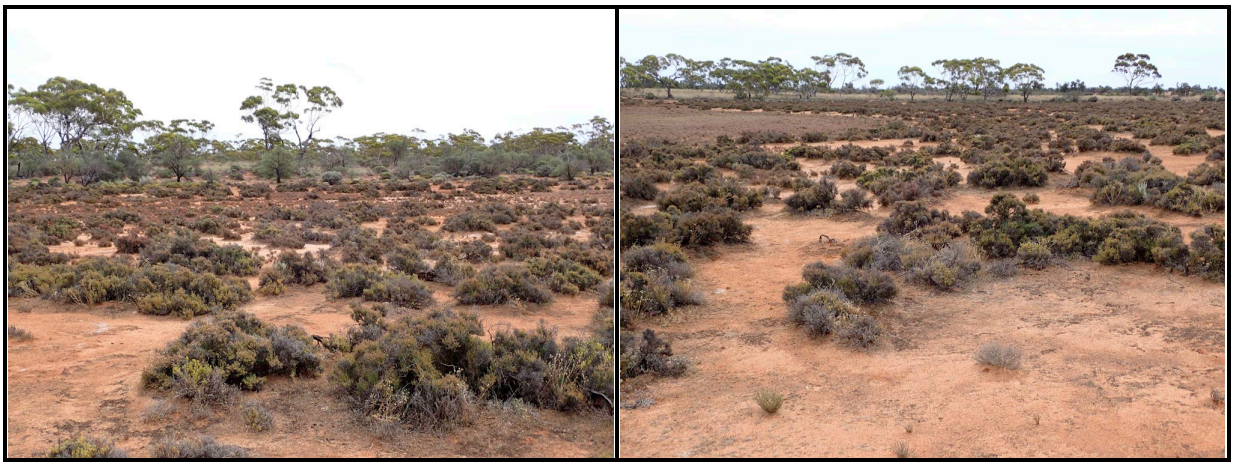
Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 30 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459662 mE 6602675 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland



Date: 17/11/2024 Habitat Assessment #: 31 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459415 mE 6602611 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 32 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459191 mE 6602492 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 33 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458916 mE 6602533 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 34 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458699 mE 6602395 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 35 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458438 mE 6602437 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 36 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458065 mE 6602439 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Sheoak woodland over chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 37 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 457791 mE 6602450 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Mixed shrubs

Date: 17/11/2024 Habitat Assessment #: 38 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 457931 mE 6602197 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Mixed shrubs

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 39 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458204 mE 6602164 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Salt lake

Date: 17/11/2024 Habitat Assessment #: 40 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458246 mE 6602211 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Mixed shrubs

Date: 17/11/2024 Habitat Assessment #: 41 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458494 mE 6602154 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

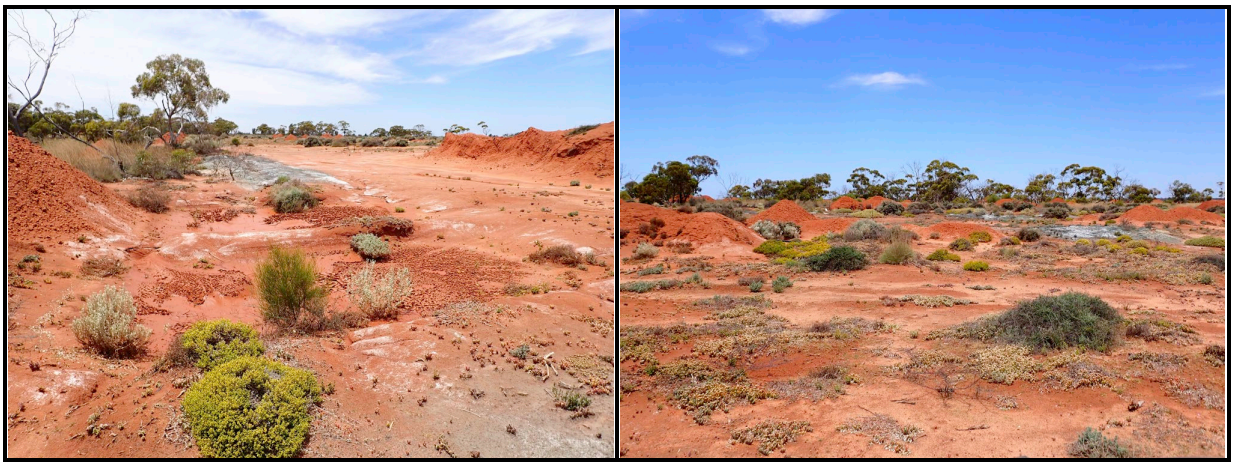
Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 42 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458692 mE 6602131 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Sand

Habitat Type: Eucalypt woodland over spinifex



Date: 17/11/2024 Habitat Assessment #: 43 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458920 mE 6602220 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 44 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459131 mE 6602284 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 45 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459366 mE 6602290 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 46 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459526 mE 6602245 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Sheoak woodland over chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 47 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459694 mE 6602176 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Salt lake

Date: 17/11/2024 Habitat Assessment #: 48 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459202 mE 6602116 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Sheoak woodland over chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 49 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458848 mE 6601998 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 50 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458501 mE 6601999 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 51 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458502 mE 6601827 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 52 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458313 mE 6601838 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 53 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 457944 mE 6600465 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

Habitat Type: Mixed shrubs

Date: 17/11/2024 Habitat Assessment #: 54 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458429 mE 6600712 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 55 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458351 mE 6600901 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Salt lake

Date: 17/11/2024 Habitat Assessment #: 56 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458748 mE 6600889 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Completely degraded Surface: Sand

Habitat Type: Salt lake

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 57 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458551 mE 6600551 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 58 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458920 mE 6600398 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 59 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 459145 mE 6600445 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

Habitat Type: Salt lake

Date: 17/11/2024 Habitat Assessment #: 60 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458959 mE 6600010 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 61 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458717 mE 6600038 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Distrubed Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 62 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458739 mE 6600259 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Distrubed Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 63 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458469 mE 6600402 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 64 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458434 mE 6600251 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 65 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458381 mE 6600204 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Mixed shrubs

Date: 17/11/2024 Habitat Assessment #: 66 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458531 mE 6599986 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand

Habitat Type: Salt lake

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 67 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458289 mE 6600399 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

Date: 17/11/2024 Habitat Assessment #: 68 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458061 mE 6600293 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Mixed shrubs

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 69 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458082 mE 6600148 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Salt lake

Date: 17/11/2024 Habitat Assessment #: 70 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 457864 mE 6600303 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 71 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458153 mE 6600683 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Mixed shrubs

Date: 17/11/2024 Habitat Assessment #: 72 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458130 mE 6600773 mN Fire History: >5 Landform: Disturbed

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Chenopod shrubland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 73 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 457951 mE 6600862 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

Date: 17/11/2024 Habitat Assessment #: 74 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458184 mE 6602894 mN Fire History: >5 Landform: Flat plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland

TERRESTRIAL ECOSYSTEMS

Date: 17/11/2024 Habitat Assessment #: 75 Observer: Dr James Barr and Mitch Plozza

GDA94 51; 458426 mE 6602909 mN Fire History: >5 Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Sand

Habitat Type: Eucalypt woodland over spinifex

TERRESTRIAL ECOSYSTEMS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