Fauna survey and assessment

M30/257

Prepared for: Minstrel Resources Pty Ltd

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EXECUTIVE SUMMARY

Minstrel Resources Pty Ltd (Minstrel) requested a Basic and targeted fauna assessment of a proposed mining area. The assessed area was ~110km northwest of Kalgoorlie and 55km southwest of Menzies and is ~406ha.

Terrestrial Ecosystems completed a basic and targeted fauna survey and assessment of the project area. The area has two broad fauna habitats: mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland and mixed Eucalyptus woodland over open acacia and sclerophyll shrubland.

Malleefowl (listed as Vulnerable) tracks, mounds and one individual were recorded. Two Malleefowl mounds were recorded of which one was active. The Southern Whiteface (listed as Vulnerable) has been recorded in a region so it could be present in the project area. This small bush bird is widespread in the Midwest and Goldfields and readily moves if disturbed. Removing or destroying a Southern Whiteface active nest could be considered a significant impact; therefore, if vegetation clearing is to be undertaken during the breeding season (i.e. July to October, presuming there have not been early rains, which will bring the breeding season forward), then there needs to be a check that no Southern Whiteface active nests will be impacted.

Once there is an understanding of proposed disturbance areas, a mitigation and management plan can be developed to reduce the impact on Malleefowl. An assessment of the residual impacts can then be determined, and an assessment of the significance of any impacts on Malleefowl can be undertaken to decide whether a referral to the Commonwealth Government under the *EPBC Act* is required.

Peregrine Falcons and the Central Long-eared Bat may be in the project area. Both species will readily move if disturbed and are unlikely to be significantly impacted by vegetation clearing. Wild dogs, feral cats, and rabbits are also in the project area.

It is recommended that:

- a fauna management plan is prepared for the exploration and mining operations;
- all Malleefowl observed or adversely impacted are recorded;
- an induction program includes a component on managing fauna in the project area;
- areas to be cleared of vegetation between July and October, and earlier if there have been substantial autumn rains, should be checked for active Southern Whiteface nests;
- an area of 250m around any active Southern Whiteface nest should not be cleared until the chicks have fledged;
- a 200m buffer is set up around the Malleefowl mound in breeding season and 50m in non-breeding season;
- the impact of dust on adjacent vegetation and fauna habitat is managed against appropriate KPIs and in accordance with the site processes and procedures;
- all areas disturbed during exploration are rehabilitated as soon as practical after they are no longer required;
- where possible, access routes are aligned to existing roads, tracks and other barriers or follow the boundaries of broad-scale vegetation associations in the area;
- pets are not permitted on the project;
- all waste and rubbish be contained in bins and regularly removed from the project or placed in landfill and suitably covered to exclude access to predator species;
- feeding of native fauna is prohibited;
- a log of all on-site drill holes be maintained detailing when they were capped, how and by whom;
- information on protecting fauna and reporting deaths and sightings of Malleefowl and other species of conservation significance should be incorporated into the induction program; and
- the impact of dust on adjacent vegetation and fauna habitat is managed against appropriate KPIs and following the site processes and procedures.

1. INTRODUCTION

1.1 BACKGROUND

Minstrel Resources Pty Ltd (Minstrel) requested a Basic and targeted fauna assessment of a proposed mining area. The assessed area was ~110km northwest of Kalgoorlie and 55km southwest of Menzies and is ~406ha (Figure 1). In November 2024, Minstrel's application was approved to convert prospecting leases P30/1100, P30/1102, P30/1103, and P30/1131 into a mining lease (M30/275). This fauna survey encompassed the entirety of the newly granted mining lease.

1.2 PROJECT OBJECTIVES AND SCOPE OF WORKS

Terrestrial Ecosystems undertook a Basic and targeted fauna survey and assessment for recently active Malleefowl mounds and Arid Bronze Azure butterflies. The methodology follows that described in the Environmental Protection Authority (EPA; 2020) *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* and supporting Department of Biodiversity, Conservation and Attractions survey guidelines.

The objectives of this assessment were to:

- indicate the vertebrate fauna assemblage (reptiles, amphibians, mammals and birds) in and near the project area so that potential impacts on the fauna and fauna assemblage might be adequately assessed;
- locate and record recently active Malleefowl mounds in the area;
- assess and survey the area for Arid Bronze Azure (butterfly);
- describe and map the major vertebrate fauna habitats present in the project area;
- list the vertebrate fauna species potentially present in the project area;
- discuss potential impacts on species listed as threatened under State and Commonwealth legislation; and
- recommend management strategies to mitigate potential impacts on the vertebrate 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 (EPBC) Act 1999* or international migratory bird agreements (JAMBA/CAMBA);
- undertook a site reconnaissance survey and a targeted search for active and recently active Malleefowl mounds;
- undertook a tree, ant and butterfly survey to determine the presence of Arid Bronze Azure and Inland Hairstreak butterflies;
- reviewed previous fauna surveys conducted near the project area in similar habitat types; and
- discussed the likelihood of *EPBC Act 1999* and *Biodiversity Conservation (BC) Act 2016* listed species being present in the project area.

2. EXISTING ENVIRONMENT

2.1 LOCATION OF PROJECT AREA

The proposed exploration and mining operations are in the Southern Cross (C003) Interim Biogeographic Regionalisation of Australia (IBRA) subregion within the Coolgardie Biogeographic region (Cowan 2002).

This subregion lies on the Yilgarn Craton and has subdued relief, internally draining, and gently undulating plains with low hills and ridges of Archaean greenstone in the western section (Cowan 2002). The vegetation in the subregion is typically mallee, Acacia thickets and shrubland on the sandplains and eucalypt woodlands around salt lakes, ranges and in the broad valleys. The surrounds of salt lakes support a variety of chenopods.

2.2 LAND USE HISTORY

The dominant land uses in the IBRA subregion are unallocated Crown land and reserves, grazing on native vegetation pastures and mining leases.

2.3 CLIMATE

The project area is characterised as semi-arid. Menzies, which is adjacent to the project area, has an annual rainfall of approximately 254mm, although this varies considerably from year to year. The highest mean maximum and minimum temperatures in Menzies are in January, with an average of 35.1°C and 19.7°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 from January to March.

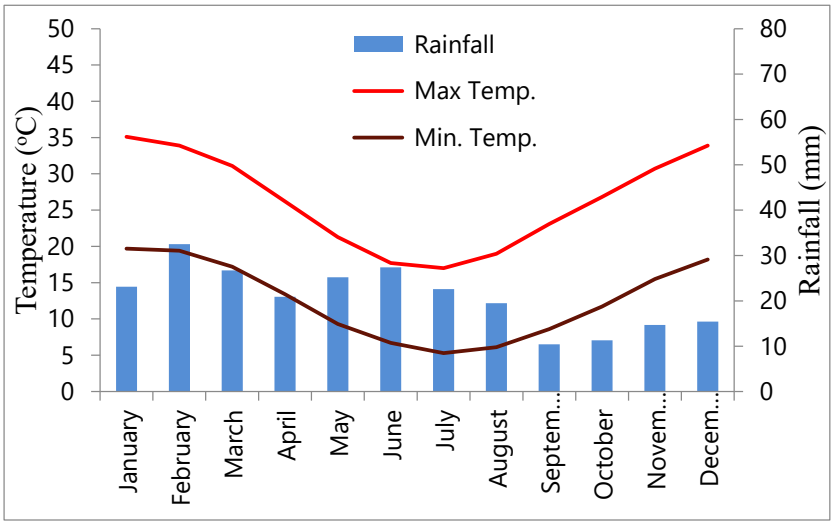


Chart 1. Climatic averages for Menzies

2.4 REGIONAL BIOLOGICAL FAUNA CONTEXT OF THE PROJECT AREA

The frogs, reptiles, mammals and birds near the project area have been surveyed for other environmental assessments and research purposes and are therefore known. Fauna surveys and assessments undertaken in the vicinity of the project area or within the project area that have been reviewed for this assessment include:

- Anon (2015) *Credo Station Reserve WA 2011. A Bush Blitz survey report*, Unpublished report for Commonwealth of Australia, Canberra.
- ATA Environmental (2006a) *Fauna assessment proposed clearing around Black Flag*. Unpublished report for Placer Dome Australia Pty Ltd., Perth.
- ATA Environmental (2006b) *Fauna assessment proposed clearing around the Grants Patch Mine Site*. Unpublished report for Placer Dome Australia Pty Ltd., Perth.
- ATA Environmental (2006c) *Fauna Assessment Proposed Clearing at the Janet Ivy Site. Unpublished report for Placer Dome Australia Pty Ltd*. Perth.
- ATA Environmental (2006d) *Fauna assessment proposed clearing around the Moonbeam Mine Site*. Unpublished report for Placer Dome Australia Pty Ltd., Perth.
- ATA Environmental (2006e) *Fauna assessment proposed clearing around the Natal Mine Site*. Unpublished report for Placer Dome Australia Pty Ltd., Perth.
- ATA Environmental (2006f) *Fauna assessment proposed clearing around the Ora Banda Mine Site*. Unpublished report for Placer Dome Australia Pty Ltd, Perth.
- ATA Environmental (2006g) *Fauna assessment proposed clearing around the Rose West Site*. Unpublished report for Placer Dome Australia Pty Ltd., Perth.
- ATA Environmental (2006h) *Malleefowl assessment for clearing application at Janet Ivy Site*. Unpublished report for Placer Dome Australia Pty Ltd. Perth.
- Bamford Consulting Ecologists (2016) *Tellus Holdings Limited Sandy Ridge Project Malleefowl Assessment, January 2016*. Unpublished report for Tellus Holdings, Perth
- Bamford, M.J., Davies, S.J.J.F. and Ladd, P.G. (1990) *Biological Survey of the Kangaroo Hills and Calooli Timber Reserves, Coolgardie, Western Australia*. Perth.
- Barrett, G. (1991) *A Biological Survey of Victoria Rock Nature Reserve*, Unpublished report for the Goldfields Naturalist Club, Perth.
- Bell, D. T., Bell, R. C. and Loneragan, W. A. (2007) Winter bird assemblages across an arid gradient in south-west Western Australia. *Journal of the Royal Society of Western Australia,* 90, 219-227.
- Botanic Consulting (2023a) *Kangaroo Hills Project Reconnaissance Flora/Vegetation Survey and Basic Fauna Assessment*. Unpublished report for Future Battery Minerals Ltd, Perth.
- Botanica Consulting (2020) *Reconnaissance Flora/Vegetation & Fauna Survey Mulgarrie Project*. Unpublished report for Norton Gold Fields Pty Ltd, Perth
- Botanica Consulting (2021) *Flora and Fauna Assessment of the Strategic Water Management Project Stage 1 (SWMP1)*. Unpublished report for Norton Gold Fields Pty Ltd, Perth.
- Botanica Consulting (2023b) *Paddington Project Annual Malleefowl Monitoring*. Unpublished report for Norton Goldfields Pty Ltd, Perth.
- Cowan, M.A. and How, R.A. (2004) Comparisons of ground vertebrate assemblages in arid Western Australia in different seasons and decades, *Records of the Western Australian Museum*, 22, 91-100.
- Dell J. and How R.A. (1985) Vertebrate fauna. In Dell, J., How, R.A., Newbey, K.R. and Hnatiuk, R.J. The Biological Survey of the Eastern Goldfields of Western Australia Part 3; Jackson - Kalgoorlie. *Records of the Western Australian Museum,* Supplement No 23; pp. 39-66.
- 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 38-68.
- Dell, J., How, R.A., Newbey, K.R. and Hnatiuk, R.J. (1985) The Biological Survey of the Eastern Goldfields of Western Australia Part 3; Jackson – Kalgoorlie, *Records of the Australian Museum*, Supplement No 23.
- Eco Logical Australia, (2016) *Biological Assessment - Binduli Expansion Project. Level 1 vertebrate fauna and Short-range Endemic invertebrate survey*, Unpublished report for Norton Gold Fields Limited, Perth.
- Ecologia Environment (2007) *Jump Up Dam Fauna Assessment*, Unpublished report for Heron Resources Limited, Perth.
- Ecotec (WA) Pty Ltd (2021) *Lady Ida Area and Proposed Haul Road Route Fauna and Habitat Assessment January 2021*, Unpublished report for Ora Banda Mining, Perth.
- Hart and Associates (2000) *Anaconda Nickel Ltd, Cawse Expansion Project, Fauna Survey*, Unpublished report for Anaconda Nickel Ltd, Perth.

- Keighery, B.J., McKenzie, N.L. and Hall, B. (1995) The Biological Survey of the Eastern Goldfields of Western Australia. Part 11. Boorabbin-Southern Cross Study Area, *Records of the Western Australian Museum*, Supplement No. 49.
- Keith Lindbeck and Associates (2012) *Central Yilgarn Iron Project (CYIP) Fauna Assessment*, Unpublished report for Jupiter Mines 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.
- McKenzie, N.L. and Hall, B. (1992) 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.
- McKenzie, N.L., Rolfe, J.K. and Youngson, W.K. (1992) IV Vertebrate fauna, *Records of the Western Australian Museum*, Supplement, No 41, 37-64.
- Ninox Wildlife Consulting (1998) *A Vertebrate Fauna Survey of the Murrin Expansion Project*. Unpublished report for Anaconda Nickel Ltd, Perth.
- Ninox Wildlife Consulting (1999) *Fauna Survey for the White Foil Gold Project*, Unpublished report for Mines and Resources Australia Pty Ltd, Perth.
- Ninox Wildlife Consulting (2002) *A Vertebrate Fauna Assessment of the Proposed White Foil Haul Road Route near Kalgoorlie, Western Australia*, Unpublished report for Mines and Resources Pty Ltd, Perth.
- Risbey (2000) *An assessment of the populations of feral cats and foxes in the Ora Banda region for Cawse Nickel Operations, Western Australia*. Kalgoorlie.
- Shepherdson Environmental Services (2001a) *Fauna of the Black Cat and Panther Leases, M16/34 and M16/365 (P16/1675)*. Unpublished report for Kinver Mining NL.
- Shepherdson Environmental Services (2001b) *Fauna of the proposed Golden Cities to Paddington Haul Road and surrounding area*. Perth.
- Terrestrial Ecosystems (2010) *Level 1 Fauna Risk Assessment for La Mancha Resources White Foil Gold Deposit Project Area*. Perth.
- Terrestrial Ecosystems (2013) *Level 1 Vertebrate Fauna Risk Assessment for the Borefields Road at Coolgardie, V2*. Perth.
- Terrestrial Ecosystems (2016) *Level 1 Vertebrate Fauna Risk Assessment for the Mungari Tailing Storage Facility Cell 3 (TSF3)*. Perth.
- Terrestrial Ecosystems (2017) *Level 1 Vertebrate Fauna Risk Assessment for the Jaurdi Hills Mining Area*. Perth.
- Terrestrial Ecosystems (2018a) *Annual Malleefowl Survey - Enterprise, Mulgarrie and north of Federal*. Perth.
- Terrestrial Ecosystems (2018b) *Annual Malleefowl Survey - Enterprise, Carbine and Golden Cities*. Perth.
- Terrestrial Ecosystems (2018c) *Level 1 Fauna Risk Assessment and the results of a Malleefowl search for the Golden Cites project area*. Perth.
- Terrestrial Ecosystems (2018d) *Level 1 Vertebrate Fauna Risk Assessment for Lot 500 Great Eastern Highway*, Kalgoorlie. Perth.
- Terrestrial Ecosystems (2024) *Annual Malleefowl Monitoring Survey (November 2023) for Paddington Operations*, Kalgoorlie. Unpublished report for Paddington Gold Pty Ltd, Perth.
- Thompson, S. (2004) *Mine site rehabilitation index using reptile assemblage as a bio-indicator*, PhD Thesis, Edith Cowan University, Perth Ora Banda Thompson PHD and other data, Perth and additional data collected after submission of the thesis.

Data in the Atlas of Living Australia, Western Australian Museum and DBCA's threatened species database have also been added to the information contained in Appendix B, and the compilation of the species lists for the project area.

The most relevant fauna assessments are the ones undertaken by Thompson (2004), which include more than 120,000 trap nights of data in habitats similar to that in the project area (~55km away), Cowan and How (2004) and Dell and How (1988). These fauna surveys provide a near-complete list of the vertebrate species likely to be found in the project area. The composition of vertebrate fauna assemblages varies from habitat to habitat

and site to site within the bioregion, however, the survey data contained in the attached appendices provide a good indication of the vertebrate fauna assemblage that is likely to be found in the project area. These data, therefore, provide a good regional context and indicate the extent of fauna assemblage variation that might be anticipated from site to site and temporally.

2.4.1 Fauna species at risk

Cowan (2002) reported multiple vertebrate fauna species at risk in the subregion [i.e. Malleefowl (*Leipoa ocellata*), Carpet Python (*Morelia imbricata*), Peregrine Falcon (*Falco peregrinus*), Chuditch (*Dasyurus geoffroii*) and Freckled Duck (*Stictonetta naevosa*)]. Since then, the Night Parrot (*Pezoporus occidentalis*) and Southern Whiteface (*Aphelocephala leucopsis*) have been added to the list of species of conservation significance potentially in the area.

3. METHODOLOGY

3.1 DATABASE SEARCHES

A review of the *EPBC Act* list of protected species was undertaken within 50km of the project area to identify species of conservation interest to the Commonwealth Government (Appendix A). In addition, a desktop search of the 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 vertebrate fauna in the bioregion, including Tyler et al. (2000) for frogs; Storr et al. (1983, 1990, 1999, 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 that were 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, and they will not generally be found in the project area due to a lack of suitable habitat (e.g. water and shore birds). Vagrants can be recorded almost anywhere. Many records are historical, and the species are no longer in the local area (e.g. Bilby). 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. 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 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 entering 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 RECONNAISSANCE SURVEY

The project area was assessed on foot, and UTV to search for species of conservation significance. The fieldwork was undertaken on 28 November, and 17-20 December 2024. The reconnaissance survey was also used to record fauna habitat types in the project area.

3.3 FAUNA HABITAT ASSESSMENT

The fauna habitat assessment was undertaken for the project area. This field assessment had two foci:

- assess fauna habitat types and their condition; and
- assess the possible presence of and record evidence of species of conservation significance so that mitigation and management strategies might be implemented to reduce potential impacts.

The fauna habitat assessors stopped at multiple locations within the project area and recorded a suite of factors about the fauna habitat and its condition. This information included a description of the habitat structure, habitat condition, landform, soils and vegetation and time since the last fire (Table 1).

Table 1. Fauna habitat assessment checklist

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 is connected 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 is connected with other habitats and fauna assemblages in these areas are likely to be minimally affected by disturbance.	
☐ *Good fauna habitat* – These areas showed signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retained 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 damaged by vehicles or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas will likely 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	

Observer's Name:	
assemblages in these areas will likely be significantly different from 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)	

3.4 MALLEEFOWL MOUNDS

The national Malleefowl monitoring program was used to record details about each Malleefowl mound profile (National Malleefowl Recovery Team 2016). This report classifies mounds as:

Profile 1 (Typical crater with raised rim) – this is the typical mound shape of an inactive (dormant) mound, and without any accumulated vegetation in the crater.

Profile 2 (mound dug out) – this is a recently fully dug out mound with steep sides to the crater, with the base forming a box like structure with the sides normally 20-30cm deep. Sometimes litter has been raked into windrows in readiness to be placed in the mound.

Profile 3 (mound filled with litter) – this mound contains litter in the crater and is the next construction stage after profile 2. Layers of litter are evident on the surface, and there may or may not be sand mixed with the litter.

Profile 4 (active mound with no crater) – this active mound is closed, and dome shaped. Note that some mounds have a dome and no crater but are not active.

Profile 5 (mound with crater and often a peak at the centre) – this is an active mound that is being opened or closed by Malleefowl.

Profile 6 (disused or extinct mound) – this mound has not been used for some time and weathering and erosion have 'flattened' the original mound.

Profile 7 (very large flat mound) – this mound is very broad and flat and generally measures in excess of 10m in diameter. The mounds are thought to have been made by a species of mega-fauna (bird similar to a Malleefowl) or in Western Australia are likely to be extinct Burrowing Bettong or Boodie warrens.

For mounds that could potentially be used again, crossed sticks were placed at the centre of the mound, so if they were moved, then there was a method of indicating use (Plate 1).



Plate 1. Crossed sticks on a Malleefowl mound used to determine use

Note: this mound is not from the project area

3.5 ARID BRONZE AZURE BUTTERFLY AND INLAND HAIRSTREAK

The Arid Bronze Azure Butterfly (ABAB) is associated with colonies of the ant *Camponotus terebrans* in mallee vegetation on sandy soil, often near flood plains, and the ant typically digs its nest at the base of eucalypts (Threatened Species Scientific Committee 2014). Butterfly larvae hatching from eggs laid near an ant nest entrance (often near the bases of various mallee eucalypts) are carried by the ants into their nest. Details of *C. terebrans* biology and any form of herbivory by the larvae are unknown, however, the larvae are likely myrmecophagous. These butterflies fly close to the ground and have been observed flying over agricultural lands near presumed breeding colonies (Williams and Williams 2008). The goldfields population was originally known from Lake Douglas, about 12kms south-west of Kalgoorlie (Field 1999), however, this population is reported to have become extinct (Williams et al. 2008, Williams and Williams 2008, Williams et al. 2018). There is an extant population in the Barbalin Nature Reserve (~11km west of Mukinbudin) in the Avon Wheatbelt (Threatened Species Scientific Committee 2014) and a more recently discovered population 40-60km north of

Kalgoorlie (M. Byrne, DBCA pers comm.). There is also an additional extant population 100km from Barbalin Nature Reserve but the DBCA have not provided its location nor direction from Barbalin Nature Reserve. There are some more recently discovered populations ~50km north of Kalgoorlie and ~20km north of Kalgoorlie near the Gidji Roaster.

Camponotus terebrans is typically only found in areas with smooth bark Eucalypts including Gimlet (*Eucalyptus salubris*) and Lake Grace Gum (*Eucalyptus loxophleba* ssp. *gratiae*), but also Wheatbelt Wandoo (*E. capillosa capillosa*) and Salmon Gum (*E. salmonophloia*). At Lake Douglas, the host tree was *Eucalyptus concinna* (Field 1999, Threatened Species Scientific Committee 2014).

Williams and Williams (2008; p.8) commented that 'Over 30 surveys have been conducted in the region by DEC staff and experienced volunteers between 1992 and 2008' and 'include extensive surveys between Payne's Find and Kalgoorlie, including most of the major conservation reserves. The surveys have covered extensive parts of the region in which *O. s. petrina* might occur, but have not detected any individuals or additional populations of the butterfly' (Williams and Williams 2008; p.8). The fact that further populations have not been located, despite the species being conspicuous, demonstrates the rarity of this butterfly and the significance of the Barbalin site.' (Williams and Williams 2008; p.9). The host ant colonies are widespread throughout the goldfields.

Due to the presence of smooth-barked Eucalypt trees and proximity to the goldfields populations a targeted survey was undertaken. Due to the obligate association of the ABAB with the host ant, surveys to detect this species need to consider both species. The habitat critical for the ABAB is the optimal habitat for the host ant. If the ant does not occur in a survey area, then ABAB will be absent. However, ant presence does not guarantee the ABAB is present, given that only the larger colonies will support a butterfly population. A large ant colony is a strong indicator of potential presence of the Arid Bronze Azure Butterfly.

Terrestrial Ecosystems visited the Barbalin Nature Reserve November 2025 to confirm activity of the ants at a known population.

3.5.1 Targeted ant survey

Ant surveys can be conducted at any time of year, although lower ant activity in winter may result in lower activity levels and may reduce chances of detection, which increases the risks of regulators not approving the methods. The optimal time to conduct ant surveys is when the ABAB is active from mid-September to late October, however the ABAB is still active in lower numbers between late October and late April. The field survey was completed between 17-20 December 2024. The field survey was outside the primary period when the butterflies fly, however, ants were confirmed as active and easy to locate at a known population at Barbalin Nature Reserve. The survey was therefore undertaken at an appropriate time.

Using Formulae 1 and 2, the number of mature trees required to adequately sample the area and their approximate spacing was calculated (Department of Biodiversity Conservation and Attractions 2020).

Formula 1. Number of sample trees = 10 x √ (site area in hectares)

Formula 2. Spacing of tree sampling = √ [(site area in hectares x 10,000) / No. sample trees]

The ant survey comprised of the following technique:

After selecting a sample tree, we used a pick to disturb the soil/bark/detritus at the base of the tree to a depth of ~10cm; and

Observed for about 20-30 seconds to see if any host ants appear.

Terrestrial Ecosystems calculated that a maximum of 201 trees with an approximate spacing of ~140m between trees needed to be sampled (Figure 3) if all of the project area was suitable habitat. Four hundred and twenty trees were assessed.

The following details were recorded for each tree:

- Tree type (smooth-bark or rough bark);
- GPS location;
- Tree diameter at ~1.5m height; and
- Ant and leafhopper presence/absence.

The tree data are shown in Appendix E and images in Appendix F.

The targeted ant survey was undertaken in accordance with the DBCA guidelines (2020) for the survey of Arid Bronze Azure Butterfly in Western Australia.

3.5.2 Butterfly survey

Due to their dependence on the host ant, adult ABABs will always be found close to the breeding areas. As such, areas within and around places that have high densities of the ants are a priority for surveys. Male ABABs are territorial, and they often establish small territories in open areas or along tracks so any tracks near the ant occurrences should be included in the survey area.

Surveys to detect the ABABs follow the standard butterfly walk transect method. Once the route of the transects is determined, it is investigated at a steady pace by one or more observers. Any ABABs seen to each side and ahead of the observers are recorded. There are no specific survey techniques for surveying Inland Hairstreaks so we took the same approach as ABABs and completed a wandering transect survey approach.

ABABs and Inland Hairstreak are active in fine, warm weather and prefer sunny days with temperatures >23ºC and light winds. The optimal time of day to observe them is between 10am and 3pm. Before commencing each transect survey the following details were recorded:

- site name;
- date of survey;
- number and identify of observers;
- weather conditions – air temperature, wind speed and direction, estimate of cloudiness (% cloud cover); and
- the start and end time of transect which can be used to quantify survey effort.

At the completion of the survey the temperature, wind speed and direction and cloud cover were recorded again.

The length of butterfly search transect is determined using Formula 3.

Formula 3. Transect length = 0.7 x √ (ant habitat area in hectares) km.

Terrestrial Ecosystems calculated that 14.1km of butterfly search transect was required to adequately survey the project area. Terrestrial Ecosystems completed 152km of transects across the project area, but it is acknowledged that some of this track survey was along the same transect multiple times. Figure 4 shows the track logs and assessed tree locations.

The butterfly survey was undertaken in accordance with the DBCA guidelines (2020) for the survey of Arid Bronze Azure Butterfly in Western Australia.

3.6 SURVEY AND REPORTING STAFF

Mitch Plozza, Tom Raymond and Dr James Barr undertook the site survey and fauna habitat assessment. Simon Pitt and Tom Raymond completed fauna habitat mapping. Dr Graham Thompson prepared this report, and Dr Scott Thompson reviewed it before sending it to the client.

Senior scientists have appropriate, relevant post-graduate qualifications, extensive experience in conducting fauna assessments in the region, have published research articles on biodiversity, fauna assemblages, conservation significant species (including Malleefowl), trapping techniques and temporal variations in trapped fauna assemblages based on Western Australian arid zone surveys and are therefore appropriately trained and experienced to undertake the survey and prepare the 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 licenced pest management technician (LPMT). This unique set of skills and qualifications ensures Dr S Thompson 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. Staff qualifications, role and experience

Staff	Relevant qualifications	Experience and project role
Dr Scott Thompson	BSc (Env. Sci); MSc (Env. Sci/Mgt); PhD (Env. Mgt); Cert IV (WHS); Cert III (Vert. Pest Mgt); CEnvP (Specialist Ecology).	Project manager; analysis and reporting; >20yrs experience
Dr Graham Thompson	Post Grad Dip (Zool); MEd; PhD (Zool); Cert III (Vert. Pest Mgt).	Analysis and reporting; >20yrs experience
Tom Raymond	BSc Hons (Zoology); Cert III (Rural and Env Pest Mngt).	Fieldwork, habitat analysis and mapping; >3yrs experience
Dr James Barr	BSc Hons (Zoology); PhD; Cert III (Rural and Env Pest Mngt).	Fieldwork and habitat analysis; >5yrs experience
Mitch Plozza	BSc (Conservation and Wildlife Biology); Cert III (Rural and Env Pest Mngt).	Fieldwork and habitat analysis; >3yrs experience

3.7 TAXONOMY AND NOMENCLATURE

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

3.8 LIMITATIONS

This Basic fauna risk assessment is based on information in the Commonwealth Government database, other published and unpublished fauna survey data for the bioregion and a site visit. It is acknowledged that multiple surveys conducted in different seasons, repeated over several years, are necessary to appreciate the fauna assemblage in the project area fully.

Lists of species potentially in and around the project area have been compiled from WAM records, Atlas of Living Australia and reports of fauna surveys undertaken nearby. Some records in the Atlas of Living Australia and the WAM are very old, and those species are no longer present in the area. Terrestrial Ecosystems has not been able to verify the primary data, and therefore, we cannot vouch for the accuracy of these records. All of

these data sources are known to contain errors, which should be considered when reading this assessment. These errors occur because of a misidentification of individuals, taxonomic name changes and incorrect coordinates being entered in the database.

The *EPBC Act* online MNES database for terrestrial fauna includes historical records and places a wide buffer around previously known locations of threatened species in its database. A search of this database will invariably include species that are either locally extinct or were never present in parts of the search area (e.g. Western Spiny-tailed Skink).

The EPA's (2020) *Technical Guidance Terrestrial Fauna Surveys* suggested that fauna surveys may be limited by many variables. 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	Vertebrate fauna survey data are available for similar habitats near the project area.
Competency/experience of the survey team, including experience in the bioregion surveyed	No	The zoologists who undertook the field work and senior zoologists who authored the report have appropriate post-graduate 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 and survey protocols for the bioregion.
Scope of the survey, e.g. where faunal groups were excluded from the survey	No	The targeted searches for Malleefowl mounds and Arid Bronze Azure were adequate to detect the presence of recently active breeding mounds and any Malleefowl tracks in the project area.
Timing, weather and season	No	The survey was delayed in November due to rain, but the weather was suitable for the site visit in December 2024.
Disturbance that may have affected results, e.g. fire, flood	No	The disturbance in the project area has 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 and targeted fauna survey requirements were met.
Access problems	No	The site was accessible to UTV and walking in the more densely vegetated areas.
Problems with data and analysis, including sampling biases	N/A	

N/A = not applicable, Significant = major impact on the risk assessment outcome, Moderate = impacted parts of the field survey and risk assessment, Negligible = almost no impact on the survey and risk assessment.

4. RESULTS

4.1 FAUNA HABITAT

One hundred and twelve habitat assessments were completed in the project area (Figure 2). Excluding the few disturbed and cleared areas, there are the following two broad fauna habitats in the project area:

- Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland; and
- Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland

Plates 2 to 5 provide representative images of the fauna habitat types. The density of trees and shrubs varied across the project area. The fauna habitat quality varied in condition but was mostly very good.



Plate 2. Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Plate 3. Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Plate 4. Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Plate 5. Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland

4.2 MALLEEFOWL

One active and one inactive Malleefowl mound were recorded. One individual Malleefowl was also observed.

Table 4. Malleefowl mound data

#	Easting	Northing	Profile	Dia. of mound (m)	Height of mound (cm)	Dia. of crater (m)	Depth of crater (cm)	Substrate - outer	Substrate - inner	Comment
1	270470	6673116	5	4.6	45	1.8	18	Sand, Pebbles, organic matter	Sand, Pebbles, organic matter	Active, freshly raked soil, feathers and footprints
2	269658	6673181	6	3.4	33	N/A	N/A	Sand, Pebbles, organic matter	Debris	Old goanna diggings



Plate 6. Mound #1 (active)



Plate 7. Malleefowl feather



Plate 8. Malleefowl scat



Plate 9. Mound #2 (inactive)

4.3 ARID BRONZE AZURE AND INLAND HAIR STREAK

No host ants, Arid Bronze Azure or Inland Hairstreak were recorded.

4.4 FERAL ANIMALS

Tracks of wild dogs, feral cats, and rabbit scats were recorded in the project area.

4.5 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 5-8 provide a list of vertebrate species found near the project area that have been compiled based on the fauna survey report results shown in Appendix B.

Table 5. Avifauna potentially in the project area

Family	Species	Common Name
Anatidae	*Oxyura australis*	Blue-billed Duck
	Anas gracilis	Grey Teal
	Anas rhynchotis	Australasian Shoveler
	Anas superciliosa	Pacific Black Duck
	Aythya australis	Hardhead
	Biziura lobata	Musk Duck
	Chenonetta jubata	Australian Wood Duck
	Cygnus atratus	Black Swan
	Malacorhynchus membranaceus	Pink-eared Duck
	Oxyura australis	Blue-billed Duck
	Stictonetta naevosa	Freckled Duck
	Tadorna tadornoides	Australian Shelduck
Ardeidae	*Ardea pacifica*	White-necked Heron
	Egretta novaehollandiae	White-faced Heron
Megapodiidae	*Leipoa ocellata*	Malleefowl
Columbidae	*Phaps chalcoptera*	Common Bronzewing
	Ocyphaps lophotes	Crested Pigeon
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar
Podargidae	*Podargus strigoides*	Tawny Frogmouth
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar
Apodidae	*Apus pacificus*	Pacific Swift
Charadriidae	*Charadrius veredus*	Oriental Plover
	Thinornis cucullatus	Hooded Plover
	Charadrius ruficapillus	Red-capped Plover
	Elseyornis melanops	Black-fronted Dotterel
	Erythrogonys cinctus	Red-kneed Dotterel
	Vanellus tricolor	Banded Lapwing
Scolopacidae	*Arenaria interpres*	Ruddy Turnstone
	Calidris acuminata	Sharp-tailed Sandpiper
	Calidris ferruginea	Curlew Sandpiper
	Calidris ruficollis	Red-necked Stint
	Actitis hypoleucos	Common Sandpiper
	Tringa nebularia	Common Greenshank
	Tringa glareola	Wood Sandpiper
Turnicidae	*Turnix velox*	Little Buttonquail
Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis
	Platalea flavipes	Yellow-billed Spoonbill
	Threskiornis molucca	Australian White Ibis
	Threskiornis spinicollis	Straw-necked Ibis
Accipitridae	*Hieraaetus morphnoides*	Little Eagle
	Aquila audax	Wedge-tailed Eagle
	Accipiter fasciatus	Brown Goshawk
Cuculidae	*Heteroscenes pallidus*	Pallid Cuckoo
Strigidae	*Ninox boobook*	Southern Boobook
Tytonidae	*Tyto javanica*	Eastern Barn Owl
Alcedinidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher
	Todiramphus sanctus	Sacred Kingfisher
Meropidae	*Merops ornatus*	Rainbow Bee-eater
Falconidae	*Falco cenchroides*	Nankeen Kestrel
	Falco berigora	Brown Falcon
	Falco longipennis	Australian Hobby
	Falco peregrinus	Peregrine Falcon
Cacatuidae	*Calyptorhynchus banksii*	Red-tailed Black-Cockatoo
	Eolophus roseicapilla	Galah
Psittaculidae	*Barnardius zonarius*	Australian Ringneck
	Glossopsitta porphyrocephala	Purple-crowned Lorikeet
Ptilonorhynchidae	*Chlamydera guttata*	Western Bowerbird
Climacteridae	*Climacteris affinis*	White-browed Treecreeper
	Climacteris rufus	Rufous Treecreeper
Maluridae	*Malurus pulcherrimus*	Blue-breasted Fairywren
	Malurus splendens	Splendid Fairywren

Family	Species	Common Name
	Malurus leucopterus	White-winged Fairywren
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater
	Purnella albifrons	White-fronted Honeyeater
	Lichenostomus cratitius	Purple-gaped Honeyeater
	Manorina flavigula	Yellow-throated Miner
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater
	Anthochaera carunculata	Red Wattlebird
	Gavicalis virescens	Singing Honeyeater
	Ptilotula ornata	Yellow-plumed Honeyeater
	Ptilotula penicillata	White-plumed Honeyeater
	Epthianura tricolor	Crimson Chat
	Epthianura aurifrons	Orange Chat
	Epthianura albifrons	White-fronted Chat
	Sugomel nigrum	Black Honeyeater
	Lichmera indistincta	Brown Honeyeater
	Nesoptilotis leucotis	White-eared Honeyeater
	Nesoptilotis flavicollis	Yellow-throated Honeyeater
	Melithreptus brevirostris	Brown-headed Honeyeater
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote
	Pardalotus striatus	Striated Pardalote
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat
	Calamanthus fuliginosus	Striated 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
	Gerygone fusca	Western Gerygone
	Aphelocephala leucopsis	Southern Whiteface
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler
Cinclosomatidae	*Cinclosoma castanotum*	Chestnut Quail-thrush
Campephagidae	*Coracina maxima*	Ground Cuckooshrike
	Coracina novaehollandiae	Black-faced Cuckooshrike
	Lalage tricolor	White-winged Triller
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella

Family	Species	Common Name
Oreoicidae	*Oreoica gutturalis*	Crested Bellbird
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush
	Pachycephala inornata	Gilbert's Whistler
	Pachycephala pectoralis	Golden Whistler
	Pachycephala rufiventris	Rufous Whistler
Artamidae	*Artamus personatus*	Masked Woodswallow
	Artamus cinereus	Black-faced Woodswallow
	Artamus cyanopterus	Dusky Woodswallow
	Artamus personatus	Masked Woodswallow
	Artamus minor	Little Woodswallow
	Cracticus torquatus	Grey Butcherbird
	Cracticus nigrogularis	Pied Butcherbird
	Gymnorhina tibicen	Australian Magpie
	Cracticus torquatus	Grey Butcherbird
	Strepera versicolor	Grey Currawong
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail
	Rhipidura albiscapa	Grey Fantail
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
	Eopsaltria griseogularis	Western Yellow Robin
	Drymodes brunneopygia	Southern Scrub-Robin
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark
	Cincloramphus cruralis	Brown Songlark
Hirundinidae	*Hirundo neoxena*	Welcome Swallow
	Petrochelidon ariel	Fairy Martin
	Petrochelidon nigricans	Tree Martin
	Cheramoeca leucosterna	White-backed Swallow
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird
Estrildidae	*Taeniopygia guttata*	Zebra Finch
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit

Table 6. Amphibians potentially in the project area

Family	Species	Common Name
Limnodynastidae	*Neobatrachus kunapalari*	Wheatbelt Frog
	Neobatrachus sutor	Shoemaker Frog
Myobatrachidae	*Pseudophryne occidentalis*	Western Toadlet

Table 7. Mammals potentially in the project area

Family	Species	Common Name	Family	Species	Common Name
Camelidae	*Camelus dromedarius*	Camel		*Sminthopsis dolichura*	Little Long-tailed Dunnart
Canidae	*Canis familiaris*	Dog		*Sminthopsis hirtipes*	Hairy-footed Dunnart
	Vulpes vulpes	Fox		*Sminthopsis ooldea*	Ooldea Dunnart
Felidae	*Felis catus*	Cat	Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum
Dasyuridae	*Sminthopsis fulinginosa*	Grey-bellied Dunnart	Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo
Molossidae	*Austronomus australis*	White-striped Freetail Bat		*Osphranter robustus*	Euro
	Mormopterus planiceps	Southern Free-tail Bat		*Macropus rufus*	Red Kangaroo
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	Leporidae	*Oryctolagus cuniculus*	Rabbit
	Chalinolobus morio	Chocolate Wattled Bat	Muridae	*Mus musculus*	House Mouse
	Nyctophilus geoffroyi	Lesser Long-eared Bat		*Notomys alexis*	Spinifex Hopping Mouse
	Nyctophilus major	Greater Long-eared Bat		*Notomys mitchellii*	Mitchell's Hopping Mouse
	Scotorepens balstoni	Inland Broad-nosed Bat		*Pseudomys albocinereus*	Ash-grey Mouse
	Vespadelus regulus	Southern Forest Bat		*Pseudomys bolami*	Bolam's Mouse
Dasyuridae	*Ningaui ridei*	Wongai Ningaui		*Pseudomys hermannsburgensis*	Sandy Inland Mouse
	Ningaui yvonneae	Mallee Ningaui		*Pseudomys nanus*	Western Chestnut Mouse
	Sminthopsis crassicaudata	Fat-tailed Dunnart			

Table 8. Reptiles potentially in the project area

Family	Species	Common Name
Agamidae	*Diporiphora amphiboluroides*	Mulga Dragon
	Ctenophorus cristatus	Crested Dragon
	Ctenophorus fordi	Mallee Dragon
	Ctenophorus isolepis	Central Military Dragon
	Ctenophorus ornatus	Ornate Crevice Dragon
	Ctenophorus reticulatus	Western Netted Dragon
	Ctenophorus salinarum	Claypan Dragon
	Ctenophorus scutulatus	Lozenge-marked Dragon
	Moloch horridus	Thorny Devil
	Pogona minor	Western Bearded Dragon
	Tympanocryptis cephalus	Pebble Dragon
Carphodactylidae	*Nephrurus stellatus*	Stellate Knob-tail
	Underwoodisaurus milii	Barking Gecko
Diplodactylidae	*Amalosia reticulata*	Reticulated Velvet Gecko
	Crenadactylus ocellatus	Clawless Gecko
	Diplodactylus granariensis	Wheatbelt Stone Gecko
	Diplodactylus pulcher	Beautiful Gecko
	Hesperoedura reticulata	Reticulated Velvet Gecko
	Lucasium bungabinna	Southern Sandplain Gecko
	Lucasium maini	Main's Ground Gecko
	Lucasium stenodactylum	Crowned Gecko
	Rhynchoedura ornata	Beaked Gecko
	Strophurus assimilis	Goldfields Spiny-tailed Gecko
	Strophurus elderi	Jewelled Gecko
	Strophurus intermedius	Southern Spiny-tailed Gecko

Family	Species	Common Name
	Strophurus wellingtonae	Western Shield Spiny-tailed Gecko
Elapidae	*Brachyurophis fasciolatus*	Narrow-banded Burrowing Snake
	Brachyurophis semifasciata	Half-girdled Snake
	Demansia psammophis	Yellow-faced Whipsnake
	Furina ornata	Orange-naped Snake
	Suta monachus	Hooded Snake
	Pseudechis australis	Mulga Snake
	Pseudonaja mengdeni	Western Brown Snake
	Pseudonaja modesta	Ringed Brown Snake
	Simoselaps bertholdi	Jan's Banded Snake
	Suta fasciata	Rosen's Snake
Gekkonidae	*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	*Antaresia stimsoni*	Stimson's Python
Scincidae	*Cryptoblepharus australis*	Inland Snake-eyed Skink
	Cryptoblepharus buchananii	Buchanan's Snake-eyed Skink
	Cryptoblepharus plagiocephalus	Peron's Snake-eyed Skink
	Ctenotus atlas	Southern Mallee Ctenotus
	Ctenotus brooksi	Brooks Ctenotus
	Ctenotus leonhardii	Leonhardi's Ctenotus
	Ctenotus pantherinus	Leopard Ctenotus
	Ctenotus schomburgkii	Barred Wedgesnout Ctenotus
	Ctenotus uber	Spotted Ctenotus
	Ctenotus xenopleura	Wide-striped Ctenotus
	Cyclodomorphus branchialis	Common Slender Bluetongue
	Cyclodomorphus melanops	Spinifex Slender Blue-tongue
	Egernia depressa	Pygmy Spiny-tailed Skink
	Egernia formosa	Goldfields Crevice Skink
	Eremiascincus richardsonii	Broad-banded Sand-swimmer
	Hemiergis initialis	South-western Earless Skink
	Lerista gerrardii	Bold-striped Slider
	Lerista kingi	King's Slider
	Lerista macropisthopus	Unpatterned Robust Slider
	Lerista picturata	Southern Robust Slider
	Lerista timida	Timid Slider
	Liopholis inornata	Desert Skink
	Menetia greyii	Common Dwarf Skink
	Morethia adelaidensis	Saltbush Morethia Skink
	Morethia butleri	Woodland Morethia Skink
	Morethia obscura	Shrubland Pale-flecked Morethia
	Tiliqua occipitalis	Western Blue-tongued Lizard
	Tiliqua rugosa	Bobtail
Typhlopidae	*Anilios ammodytes*	Ammodyte Blind Snake
	Anilios australis	Austral Blind Snake
	Anilios bituberculatus	Stripe-snouted Blind Snake
	Anilios hamatus	Pale-headed Blind Snake
Varanidae	*Varanus caudolineatus*	Striped-tailed Monitor
	Varanus giganteus	Perentie
	Varanus gouldii	Gould's Goanna
	Varanus tristis	Black-headed Monitor

These lists include species commonly found in mulga and eucalypt woodlands in the Goldfields.

4.6 SPECIES OF CONSERVATION SIGNIFICANCE

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 Western Australia (WA) *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, 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 vegetation clearing and developments are encouraged to avoid and minimise impacts on Threatened and Priority species. Definitions of the significant fauna under the *BC Act 2016* are provided in Appendix C.

The fauna species that have a special status in either State or Commonwealth government legislation or are on the DBCA Priority species list and are potentially present in the vicinity of the project area are listed in Table 9. Although they were recorded in a search of the MNES online database, migratory species typically found around the edge of salt lakes, clay pans, estuaries and marshes have been excluded as no suitable habitat is nearby. The following is an assessment of the likelihood of each of the species listed in Table 9 being found in the project area.

Table 9. Assessment of the potential presence of a conservation significant fauna species in the project area

Species	Status under Commonwealth EPBC Act	BC Act/ DBCA Schedule / Priority	Comment on the potential presence of a species
Night Parrot *Pezoporus occidentalis*	Endangered	Critically Endangered	It is unlikely to be in the project area due to a lack of suitable habitat.
Western Spiny-tailed Skink *Egernia stokesii badia*	Endangered	Endangered	It is unlikely to be in the project area because it is outside its geographical range and has no suitable habitat.
Southern Whiteface *Aphelocephala leucopsis*	Vulnerable	Vulnerable	Potentially present in the project area.
Grey Falcon *Falco hypoleucos*	Vulnerable	Vulnerable	Unlikely to be present.
Malleefowl *Leipoa ocellata*	Vulnerable	Vulnerable	Much of the habitat in the project area is suitable for Malleefowl, and an active Malleefowl mound and one individual were recorded.
Chuditch *Dasyurus geoffroii*	Vulnerable	Vulnerable	Unlikely to be present.
Fork-tailed Swift *Apus pacificus*	Migratory	Migratory	May very infrequently be seen flying in the region.
Grey Wagtail *Motacilla cinerea*	Migratory	Migratory	It is highly unlikely to be seen in the project area.
Peregrine Falcon *Falco peregrinus*		OS	It may very infrequently be seen in the project area.
Woma *Aspidites ramsayi*		Priority 1	Unlikely to be present in the project area.
Central Long-eared Bat *Nyctophilus major tor*		Priority 3	Potentially in the treed areas of the project area
Western Rosella *Platycercus icterotis xanthogenys*		Priority 4	It is improbable that it would be present in the project area.
Southern Death Adder *Acanthophis antarcticus*		Priority 3	It is improbable that it would be present in the project area.

OS – Species otherwise in need of special protection.

Results of the Commonwealth *EPBC Act 1999* protected matters database search is provided in Appendix A.

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 initially distributed over much semi-arid and arid Australia (Garnett et al. 2011, Threatened Species Scientific Committee 2016). Recordings in north-west and western Queensland in the early 1990-2000s were in a broad cross-section of available habitats (Cupitt and Cupitt 2008, Garnett et al. 2011, 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), the northern Goldfields (Jackett et al. 2017) and Great Sandy Desert (Lindsay et al. 2024, Ngururrpa Rangers et al. 2024). Garnett *et al*. (2011) suggested that there were between 50-250 mature individuals in less than 5% of its previous range, but in recent research, there is estimated to be 40-50 birds in one region (Ngururrpa Rangers et al. 2024) so the Australia-wide estimate might be higher.

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 (25-30^{o} and 0^{o} 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 (27^{o}), 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. They then flew to more floristically diverse habitats dominated by large-seeded, prolifically seeding species to feed.

The Department of Biodiversity, Conservation and Attractions (Department of Parks and Wildlife 2017) 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 40-50 cm in height) are not likely to provide adequate shelter.' Although there are old rings of spinifex in some areas, none of the spinifex hummocks were above 40cm, suggesting the habitat is unsuitable for this parrot.

There are no areas with mature spinifex hummocks in the project area. The project area is not considered suitable roosting and nesting habitat for Night Parrots, so it is highly unlikely that Night Parrots are present. They will, therefore, not be impacted by any proposed vegetation clearing.

Western Spiny-tailed Skink (*Egernia stokesii badia*) - Endangered under the *BC Act 2016* and the *EPBC Act 1999*

Egernia stokesii badia is a stout skink species with a SVL of approximately 194mm and is reddish brown with pale blotches in irregular bands (Wilson and Swan 2021). As with other *E. stokesii* subspecies, *E. badia* has two spines on each dorsal scale that become large spines on their short flat tails (Wilson and Swan 2021).

The subspecies *Egernia stokesii badia* is found in the northern and central wheatbelt from Kellerberrin north to Mullewa and as far east as Mukinbudin and Perenjori in Western Australia (Department of Environment and Conservation 2012). *Egernia stokesii* species are known for living in small groups of related individuals numbering up to 17 and staying together for up to five years. These families have small home ranges of up to 1.5 hectares (Department of Environment and Conservation 2012).

Western Spiny-tailed skinks inhabit open eucalypt woodlands and Acacia-dominated shrublands (Department of Environment and Conservation 2012). The most common woodland types include York Gum (*Eucalyptus loxophleba*), Gimlet (*E. salubris*) and Salmon Gum (*E. salmonophloia*) (Department of Environment and Conservation 2012). It utilises logs, cavities, tree trunks and branches, and old corrugated iron, houses and ruins for shelter (Department of Environment and Conservation 2012). It is mainly insectivorous, but some plant material maybe occasionally eaten (Department of Environment and Conservation 2012).

Currently, known threats to the Western Spiny-tailed Skink include habitat loss due to clearing, degradation and unregulated modifications, firewood collection and removal of alternative refugia (old infrastructures and anthropogenic environments (Department of Environment and Conservation 2012). Other potential threats include invasive predators, illegal collection of wild specimens and climate change (Department of Environment and Conservation 2012).

The project area is outside its known geographical distribution, so it is highly improbable it is present.

Southern Whiteface (*Aphelocephala leucopsis*) - Vulnerable under the *BC Act 2016* and *EPBC Act 1999*

The Southern Whiteface is a recent addition to the threatened species lists. It is a small bush bird found in the arid and semi-arid interior from the WA coast near Hamelin Bay through the Great Victoria Desert into the arid areas of South Australia, Victoria, NSW and Queensland (Johnstone and Storr 2004, Department of Climate Change Energy the Environment and Water 2023).

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

The Southern Whiteface has been recorded in multiple fauna surveys in the region (Plate 10), so it is likely to be present in the project area. In recent years, almost every comprehensive avifauna survey in the region has recorded the presence of Southern Whiteface. It will readily move if disturbed. Given its widespread

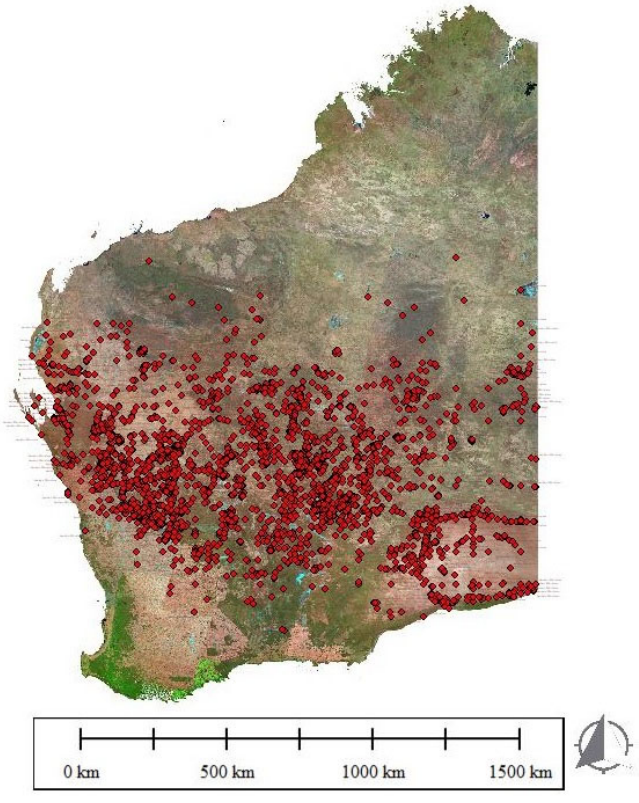


Plate 10. Southern Whiteface records in Terrestrial Ecosystems' fauna survey database

distribution, abundance in surveys and ability to move if disturbed, it is unlikely to be significantly impacted by vegetation clearing and low impact activities in the project area.

Removing or destroying a Southern Whiteface active nest could be considered a significant impact; therefore, if vegetation clearing is to be undertaken during the breeding season (i.e. July to October, presuming there have not been early rains, which will bring the breeding season forward), then there needs to be a check that no Southern Whiteface active nests will be impacted.

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 removes 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, and once breeding commences, they pair for life. The presence of nest mounds indicates the presence of Malleefowl in the area.

One active mound and one individual were recorded in the project area and most of the project area is suitable habitat (i.e. relatively dense shrubland). If appropriate buffers are enforced near the mounds, habitat clearing is unlikely to significantly impact Malleefowl. There is potential for birds to be killed by vehicles once the site is operational and the habitat clearing will increase habitat fragmentation and movement pathways for feral and pest species.

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

This is Australia's rarest falcon, and it is mostly found in areas of less than 500mm rainfall south of latitude 26^{o}S in Western Australia (Threatened Species Scientific Committee 2020). It is mostly found in timbered lowland plains, particularly *Acacia* shrublands that are crossed by tree-lined watercourses (Threatened Species Scientific Committee 2020). However, this species has been observed in treeless areas and frequents tussock grassland and open woodland (Threatened Species Scientific Committee 2020).

This species was not seen during the site visit, has not been recorded in other fauna surveys in the project or adjacent areas, and if it were present, then would move away once disturbed.

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. There is a historical Chuditch record from 1974 near Kambalda; however, the closest known recent populations of Chuditch are over 150km southwest of the project area.

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).

None of the fauna surveys in the adjacent areas have recorded the presence of Chuditch, and the presence of feral predators indicates that it is unlikely to be present in the project area.

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 earth, 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 11).

Terrestrial Ecosystems assess that the Fork-tailed Swift may infrequently be seen in the region, however, any proposed vegetation clearing or development is unlikely to significantly impact this species as it is an aerial species and will move away to other areas if disturbed.

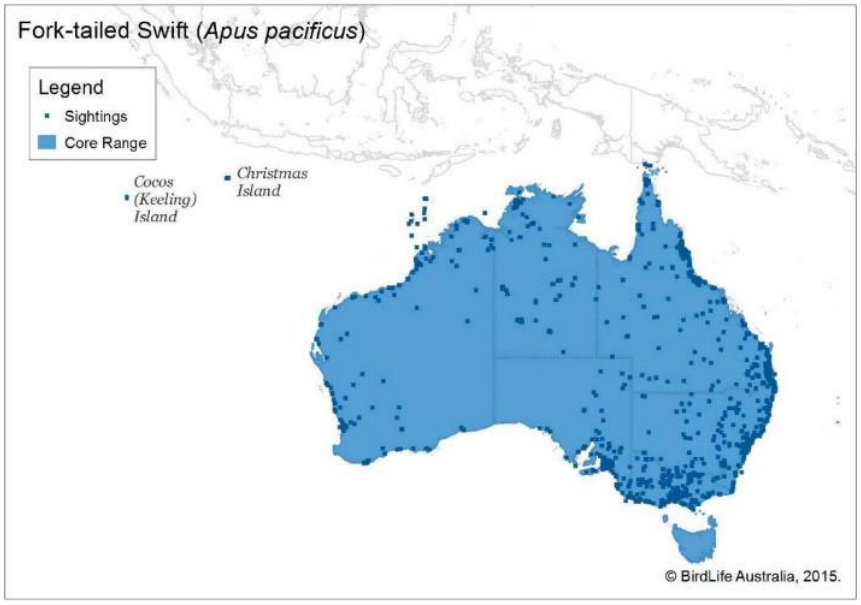


Plate 11. Range and actual reported sightings of the Fork-tailed Swift

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

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.

The Peregrine Falcon may infrequently be seen in the project area. The proposed vegetation clearing is unlikely to significantly impact this species as it will readily move away from disturbance, and there are abundant areas with similar habitats nearby.

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

The Woma Python was once found in a crescent-shaped geographic distribution from Shark Bay to Kitchener, but its distribution has been reduced to an area on the western Australian coast near Shark Bay, in the eastern section around Kitchener and a small population on the sand plain near Mt Dimer/Mt Walton, with individuals being occasionally recorded in the sand plains west and east of Kalgoorlie.

In Western Australia, it is found in arid woodland or shrubland areas, typically on sand plains. Much of the habitat in the project area is not typical of the preferred Woma habitat. There have been no recent nearby so it is unlikely to be present.

Central Long-eared Bat (*Nyctophilus major tor*) – Priority 3 with the DBCA

Records in the Atlas of Living Australia indicated this species has been found in the general area. It roosts in tree cavities, foliage and under loose bark, potentially in the project area.

Given that the project area represents a small fraction of similar habitat in the general area and there are limited recent records, vegetation clearing in the project area is unlikely to impact this species significantly.

Western Rosella (*Platycercus icterotis xanthogenys*) – Priority 4 with the DBCA

The mallee form of the Western Rosella is found mostly in eucalypt and *Casuarina* woodland and shrublands, especially Wandoo, Flooded Gums and Salmon Gums. It has been recorded in other surveys south of the project area but not in the nearby area (see Appendix B).

Given a lack of records for this species in adjacent areas, it is improbable that it is present in the project area.

Southern Death Adder (*Acanthophis antarcticus*) - Priority 3 species with DBCA

The Southern Death Adder is found in various habitats, from rainforests to shrublands and heaths. The distribution map in the Atlas of Living Australia indicates that it has not been recorded around the project area and there are no records in the DBCA threatened species database in this area.

It is improbable the Southern Death Adder is present in the project area and, therefore, impacted by the proposed vegetation clearing.

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 survey data from Thompson, (2004) provide a comprehensive list of the reptiles and mammals likely to be in the project area. Additional data from Cowan and How (2004) and Dell and How (1988) supplement the reptile and mammal assemblage data and provide bird assemblage data. Although the composition of vertebrate fauna assemblages varies from habitat to habitat and site to site in the bioregion, these combined fauna surveys provide a near-complete list of the vertebrate species likely to be found in the project area.

The EPA's (2020) *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* are not specific about when a Detailed or Targeted vertebrate fauna survey is required. Rather, it has indicated that the level of survey effort should be determined after consideration of the criteria in Table 10.

Table 10. Criteria for determining survey requirements

Criteria	Response
Level of existing regional knowledge	Surveys have been conducted in the region, and similar habitat types are common regionally. The local vertebrate fauna species are well known. Additional trapping efforts are unlikely to add new fauna species to the existing knowledge.
Type and comprehensiveness of recent local surveys	Multiple surveys are available for the bioregion. They provide contextual information concerning the project area and compile a species list.
Degree of existing disturbance or fragmentation at the regional scale	There is existing disturbance from historical and recent exploration activity in the project area.
Extent, distribution, and significance of habitats	The available fauna habitats are not unique and are widely represented in the bioregion.
Significance of species likely to be present	The Southern Whiteface (Vulnerable) will likely be, and Mallefowl (Vulnerable) are in the project area.
Sensitivity of the environment to the proposed activities	There was no evidence to suggest that the project area has a unique fauna habitat that is environmentally sensitive from a vertebrate fauna perspective.
Scale and nature of impact.	The project's scale is small-moderate relative to the availability of similar fauna habitats in adjacent areas, and it is unlikely to have a large impact on fauna in the bioregion.

5.1.1 Amphibians

Frogs are usually only detected immediately after rainfall or around semi-permanent pools. There was no evidence of long-standing drainage channels filled with water in the project area, a habitat that would support arid-adapted frogs. *Cyclorana maini*, *C. occidentalis*, *Pseudophryne occidentalis, Neobatrachus kunapalari* and *Neobatrachus wilsmorei,* and *Litoria rubella* could be recorded near the project area. The *Cyclorana* sp. and

Neobatrachus sp. burrow into the ground and aestivate between rainfall events. *Pseudophryne occidentalis* and *L. rubella* find shelter under rocks and in crevices during the dry periods and enter temporary ponds to breed after major rainfall events. All species have a wide-spread distribution and are abundant. Development of the project area is likely to result in a loss of individuals within the disturbed area; however, it is unlikely to impact these species significantly when assessed in a regional context.

There are no amphibians of conservation significance in the Goldfields.

5.1.2 Reptiles

Reptile species richness in the project area will be comparable with similar eucalypt woodlands and sandplain shrublands elsewhere in the bioregion (Thompson 2004, Thompson and Thompson 2006). The list provided in Table 8 represents species likely to be found over a large area of diverse habitat types. Eucalypt woodlands with mixed shrubland would typically support up to 25-35 species of reptiles. No characteristics of the reptile assemblage are anticipated to be unique in the project area. The reptile fauna assemblage is also unlikely to be significantly 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 regional context.

The project area's fauna habitats are like adjacent areas, so the loss of reptiles during vegetation clearing is unlikely to be significant in a bioregional context.

5.1.3 Birds

Avian species richness in the Goldfields is influenced by rainfall (Craig and Chapman 2003) and is generally higher in woodlands than chenopod shrublands and more sparsely vegetated areas. The list provided in Table 5 represents species likely to be found over a large area of diverse habitat types. Eucalypt and mallee woodlands typically support up to 50-70 species of birds, but many of these would be in very low numbers and are only present after significant rainfall. Birds typically move from an area once vegetation clearing commences, so the impact is relatively low if the area is small. However, eggs and chicks in nests are often lost during the clearing process.

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 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.

Predation by feral cats and foxes has significantly reduced the abundance of Malleefowl in the Goldfields. There are a few remaining small populations, mainly in areas of dense shrubland, as the dense vegetation provides the adult birds with some protection from predators. One recently active Malleefowl breeding mound was recorded and one bird was observed.

The Southern Whiteface and Peregrine Falcon could be present, and they would move to adjacent areas if disturbed. Vegetation clearing in the project area, particularly when similar habitats exist in the adjacent areas, is unlikely to significantly impact any conservation of significant avifauna species, as most birds will readily shift to other areas when there is a disturbance.

5.1.4 Mammals

The diversity of small terrestrial mammals in the project area would be typical of the surrounding areas. None of the mammals potentially found in the project area are of conservation significance, except the Central Long-eared Bat, and the impacts on small terrestrial mammals during vegetation clearing are unlikely to be significant

in a bioregional context. The Central Long-eared Bat may be present in the project area, but it will readily move if disturbed, and any impacts will likely be insignificant.

The project area supports a population of wild dogs, feral cats and rabbits.

Vegetation clearing in the project area is unlikely to impact the mammal fauna of the bioregion significantly.

5.2 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 exist to assess the ecological value at the genetic level, however, this is not a significant constraint as the only species of conservation significance (i.e. Malleefowl, Southern Whiteface, Central Long-eared Bat) potentially resident in the project area will readily move if disturbed.

Fauna habitats in the project area are abundant and in similar conditions in adjacent areas. Therefore, the fauna assemblage in the project area will also likely be present in adjacent areas. The available fauna survey data (Appendix B) indicates the vertebrate fauna that are potentially in the project area.

5.2.1 Ecological functional value at the ecosystem level

Most vertebrate species potentially occurring in the project area are wide-ranging and have been recorded in various other fauna surveys in the bioregion (Appendix B). Overall, the project area supports moderate-high-quality fauna habitats typical of those present for many decades. Landscape-scale fires and patch burning, feral cats, and wild dogs will have had the most significant impact on vertebrate fauna in the project area and surrounding areas.

5.2.2 Maintenance of threatened ecological communities

The project area does not support a threatened vertebrate ecological community.

5.2.3 Condition of fauna habitat

The uncleared fauna habitat in the project area is in good to very good condition; however, multiple areas have recently been burned. Over an extended period, introduced predators are likely to have had one of the most significant impacts on the vertebrate fauna in the project area. The uncleared fauna habitat of the project area is like that in the many square kilometres of adjacent habitat; therefore, clearing of the vegetation is unlikely to significantly impact the vertebrate fauna when considered in a bioregional context.

5.2.4 Ecological linkages

The project area does not provide an important ecological linkage or fauna movement corridor, as the surrounding bioregion is mainly intact.

5.2.5 Size and scale of the proposed disturbance

The project area is small (i.e. ~406ha) compared to the availability of similar habitats in adjacent areas. Although the assessed project area was >400ha, it is not intended that the vegetation clearing, and development will be that large.

5.2.6 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 to be like the many square kilometres of similar habitats in adjacent areas and the bioregion.

6. POTENTIAL IMPACTS

6.1 POTENTIAL IMPACTS ON FAUNA

Clearing vegetation will potentially affect vertebrate fauna in numerous ways, including death/injury of fauna during clearing, grading, impacts on vehicles, and loss of habitat.

Although there are anticipated short-term impacts on fauna, they are not considered to significantly impact fauna habitat and assemblages in a bioregional context in the long term. The overall impact on fauna species and species of conservation significance will be minimal, provided the recommended management procedures are implemented and adhered to.

6.2 DIRECT IMPACTS

Vegetation clearing in the project area will potentially affect fauna in the following ways.

6.2.1 Animal deaths during the clearing process and displacement of fauna

Clearing vegetation and activities associated with exploration and the development of a mining operation 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 land clearing and construction work occurs. This will inevitably result in these individuals being killed or injured in their burrows or as they attempt to escape. Larger terrestrial animals and avian species will most often move to adjacent areas. These species will be required to establish new activity areas and home ranges, which could result in the temporary displacement of resident species, however, this loss of fauna is unlikely to have a significant impact when considered in a bioregional context.

Clearing large areas increases fauna habitat edges. 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). Goldingay and Whelan (1997) and Clarke and Oldland (2007) reported that edge effects can extend up to 150-200m from the edge for some species, meaning the impact area on vertebrate fauna is likely larger than the cleared footprint.

6.2.2 Reduction or loss of activity areas and closure of burrows

Clearing vegetation to allow for exploration or mining is likely to remove reptile and mammal burrows or foraging habitats that are currently in use or could be used again. Clearing vegetation in areas that form part of an individual's activity area can potentially force these animals into adjacent areas. These areas may offer fewer resources, placing individuals under survival pressure. It could also cause individuals to move into the territories of other individuals, increasing competition for resources. Forced relocations could increase the possibility of predation.

6.3 INDIRECT IMPACTS

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'. Edge effects can disrupt ecological processes such as predation, dispersal, and animal movements and can change assemblage structure. Consequently, the impact area will always be much larger than the cleared area. Vehicle tracks and areas cleared for mining activity also tend to develop weed infestations that can impact natural fauna habitats.

Numerous potential threats associated with vegetation clearing and mining operations could impact the vertebrate fauna in the project area. Some of these are discussed below.

6.3.1 Habitat fragmentation and edge effects

In addition to the direct impacts of vegetation clearing, infrastructure, including tracks, has the potential to fragment habitat. Cleared linear tracks of land are 'unnatural' in much of the habitat. These linear structures partition existing activity areas, isolate sections of established communities and 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 of most small mammals in the area. The project area contains disturbed vegetation and existing vehicle tracks. The impacts of habitat fragmentation due to additional vehicle tracks would be quite low.

6.3.2 Introduced fauna and weeds

An increase in human activity is often associated with an increase in the abundance of introduced species, such as the house mouse (*Mus musculus*), fox (*Vulpes vulpes*), cat (*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.

House mice, foxes, cats and wild dogs are known to be established in the area. In many situations, they have become a 'naturalised' species in the Australian bush. Increases in fox, dog or cat numbers can harm native fauna because they predate on and compete with native species, severely disrupting the natural balance. Increases in fox, dog or cat numbers can harm native fauna because they predate on and compete with native species, severely disrupting the natural balance. The feral cat is a particularly damaging predator of native fauna, and 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 feral predator populations, such as cats, are controlled.

Infrastructure that supports feral species, such as rubbish disposal sites and bins, should be managed to minimise increases in these populations.

Introduced plant species can successfully and rapidly invade areas of cleared native vegetation or otherwise disturbed by humans. Introduced plant species may replace native species that provide shelter or foraging areas for native fauna. Significant changes to vegetation structure will alter the fauna habitat and consequently may influence fauna species composition. Preparing and implementing a weed management plan will reduce their threat to native fauna species.

6.3.3 Road fauna deaths

Increased road fauna deaths are likely to occur when new roads and tracks are constructed or upgraded, affecting kangaroos, nocturnal birds, and ground-dwelling large carnivorous predators. 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. Given the size of the project area and the likely low level of additional vehicle movements, the impact of road fauna deaths is likely to be low once the area becomes operational.

6.3.4 Fire

Increased human activity is often associated with an altered fire regime, which can lead to the degradation of natural ecosystems. Fire has been identified as one of the threatening processes for some species of conservation significance as many small mammal and bird species rely on long, unburnt vegetation.

Unplanned wildfires can threaten native fauna species near the project area.

6.3.5 Anthropogenic activity

Unnatural noises, vibrations, artificial light sources, and vehicle and human movement in an area may be sufficient to force individuals or fauna species to move from adjacent areas or alter their activity periods. This disturbance will likely occur during the vegetation clearing and when mining activity commences. The overall impact is likely confined to a relatively small area and is unlikely to be significant.

6.3.6 Dust

Dust generated from shifting topsoil and spoil and vehicle traffic can degrade surrounding vegetation, reducing its ability to absorb sunlight and influencing photosynthetic rates. Degradation of these areas may potentially render the habitat unsuitable for fauna. Dust suppression and management programs are essential to minimising impacts on fauna in areas adjacent to the mine. An effective dust management and monitoring program is required.

6.3.7 Potential impacts on ecosystem function

Clearing native vegetation will likely result in the loss of small vertebrate fauna that cannot move away during the clearing process. Larger animals, such as kangaroos, large snakes, 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 impacts associated with clearing vegetation in the project area in a landscape or bioregional context on the vertebrate fauna are likely to be low as the proposed disturbance area is small relative to the quantity of similar habitat in the bioregion.

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. Potential impacts on fauna from the proposed development are identified and briefly described above. Tables 11, 12 and 13 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 vegetation clearing. 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 on 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 13.

Table 11. Fauna impact risk assessment descriptors

Likelihood		
Level	Description	Criteria
A	Rare	The environmental event may occur, or one or more fauna species of conservation significance may be present in exceptional circumstances.
B	Unlikely	The environmental event could occur, or one or more fauna species of conservation significance could be present at some time.
C	Moderate	The environmental event should occur, or one or more fauna species of conservation significance should be present at some time.
D	Likely	The environmental event will probably occur, or one or more fauna species of conservation significance will be present in most circumstances.
E	Almost certain	The environmental event is expected to occur, or one or more fauna species of conservation significance are expected to be present in most circumstances.
Consequences		
Level	Description	Criteria
1	Insignificant	Insignificant impacts on fauna of conservation significance or regional biodiversity, and the loss of individuals will be negligible 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 study 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 study area.
4	Major	Significant impact on species 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 is required.	
Moderate	Avoid if possible. This will require routine management with internal audits and a 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, and the project should be redesigned or not proceed.	

Table 12. 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 13. 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	Where possible, reduce the extent of clearing.	E	2	Mod
	Loss of fauna habitat – landscape scale	Loss of some fauna during vegetation clearing.	B	1	Low				
	Loss of fauna habitat – regional scale	Small loss of some fauna from the region.	B	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 death and biodiversity loss.	A	2	Low				
Death or loss of conservation significant fauna	Loss of a unique terrestrial fauna ecosystem	Loss of an ecosystem containing fauna with 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	Low				
	Malleefowl	Loss of a Malleefowl or small population of Malleefowl	E	3	High	A mitigation plan is required to reduce the potential impact of vegetation clearing and			

			Before management				With management		
						development on Malleefowl.			
	Chuditch	Loss of a Chuditch or small population of Chuditch	A	2	Low				
	Grey Falcon	Loss of a Grey Falcon or small population of Grey Falcon	A	2	Low				
	Western Rosella	Loss of a Western Rosella or small population of Western Rosella	A	2	Low				
	Central Long-eared Bat	Loss of a Central Long-eared Bat or small population of Central Long-eared Bat	B	2	Low				
	Oriental Plover	Loss of a Oriental Plover or small population of Oriental Plover	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				
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	Mod
	Road kills	Animals being killed by vehicles as they cross roads	E	2	Mod	Limiting speeds	E	1	Low
	Dust	Increased potential for dust	E	2	Mod	Implementation of a dust management plan.	C	2	Low

7.2 NATIVE VEGETATION CLEARING PRINCIPLES AS THEY PERTAIN TO VERTEBRATE FAUNA

The *Environmental Protection Act (1986)* provides criteria to judge the potential impact of a development on clearing native vegetation on flora and fauna. These criteria have been listed below with a response to indicate how clearing the vegetation in the project area might be judged against these principles as they relate to fauna and fauna assemblages (Table 14). Where possible, native vegetation should not be cleared if the following principles are compromised.

Table 14. Assessment of impact using the native vegetation clearing principles

Principle	Response
It comprises a high level of biological diversity.	The project area and surrounds support a small population of Malleefowl (Vulnerable). These birds have little 'road sense' therefore, they will get killed on the access tracks and haul roads by both light and heavy vehicles. They are also impacted by habitat fragmentation and directly if breeding mounds are cleared. The Southern Whiteface (Vulnerable), Peregrine Falcon and Central Long-eared Bat may be found in the project area. However, they will readily move if disturbed, so assuming an active Southern Whiteface nest is not impacted, then the potential impacts of vegetation clearing will be low.
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 of vegetation will not compromise significant habitat necessary for the maintenance of fauna indigenous to Western Australia.
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 project area supports a population of Malleefowl, and possibly Southern Whiteface, Peregrine Falcon and Central Long-eared Bat.
It is significant as a remnant of native vegetation in an area that has been extensively cleared.	The area contains no significant remnant vegetation communities.
It is growing in, or in association with, an environment associated with a watercourses or wetland.	There is no watercourse or wetland near the project area.
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 CRITERIA FOR ASSESSING POTENTIAL IMPACTS ON VULNERABLE SPECIES

One active and one inactive Malleefowl mound were recorded in the area. The significance of the potential impacts of vegetation clearing in the project area on Vulnerable fauna is assessed per the criteria in the Commonwealth Government's significant impact assessment criteria (Department of the Environment 2013) in Table 15. In completing this assessment it is assumed that an appropriate buffer can be set up around the active Malleefowl mound.

Table 15. Criteria for assessing the potential impacts on Southern Whiteface and Malleefowl
(taken from: Department of the Environment 2013)

Vulnerable Species	Southern Whiteface	Malleefowl
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
• lead to a long-term decrease in the size of an important population of a species	No	No
• reduce the area of occupancy of an important population	No	No
• fragment an existing important population into two or more populations	No	No
• adversely affect habitat critical to the survival of a species	No	No
• disrupt the breeding cycle of an important population	No	No
• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	No
• result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No	No
• introduce disease that may cause the species to decline, or	No	No
• interfere substantially with the recovery of the species.	No	No
• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	No

An important population is defined (Department of the Environment 2013) as:

- key source populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species range.

There are ~170 records of Southern Whiteface within 100km of the project area, so the number of individuals that are periodically onsite does not constitute an 'important population'. In addition, any Southern Whiteface living in the project area immediately before it is cleared will readily move to surrounding areas. One active and one inactive Malleefowl mound were recorded. Appropriate buffers will be required around the mounds. The answer to Criteria 1 is 'No'.

Southern Whiteface records indicate this small bush bird is widespread in the bioregion. Had the Southern Whiteface occupancy area in Western Australia been randomly surveyed instead of survey sites being selected (i.e. mining locations and places where there is vehicle access), then it would have been evident that this bird is geographically widely distributed in Western Australia. No evidence indicates that the number of Southern

Whiteface recorded in and around the project area represents an important population. Therefore, the loss of a small quantity of vegetation in the project area will not reduce its area of occupancy or displace an important population. Malleefowl are in the project area and infrequently recorded but widely dispersed in the region. Active mounds are not regularly found however, there is no evidence to suggest that the Malleefowl in the project area constitute an important population. The answer to Criteria 2 is 'No'.

The Southern Whitefaces' geographic distribution includes the entire width of southern Western Australia, extending into South Australia and the Northern Territory. The loss of a very small part of these many thousands of square kilometres of similar habitat, particularly when the bird is mobile, probably has a shifting activity area and will readily move if disturbed, will not fragment an existing population into two or more populations to the extent that it will impact on the species. There is no evidence that the very small number of Southern Whiteface recorded in and around the project area represents an important population.

Malleefowl are found in various habitat types across the southern third of Western Australia. There is no evidence to suggest that Malleefowl in and around the project area represent an important population

There is no evidence to suggest that the small population of Southern Whiteface or Malleefowl in and near the project area is a key source population, a population necessary to maintain genetic diversity, or is near the limit of its geographic range. The answer to Criteria 3 is 'No'.

Habitat that is critical to the survival of Southern Whiteface is described in the Commonwealth Conservation Advice as:

- relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both;
- habitat with low tree densities and an herbaceous understory litter cover which provides an essential foraging habitat; and
- living and dead trees with hollows and crevices which are essential for roosting and nesting.

This critical habitat description is vague and applies to thousands of square kilometres of inland Western Australia in the Midwest, Murchison, Goldfields, and elsewhere. The loss of a very small part of these many thousands of square kilometres of similar habitat, particularly when the bird is mobile, probably has a shifting activity area, and will readily move if disturbed, will not adversely affect habitat critical to the survival of the species to the extent of adversely impacting on the survival of the species. The answer to Criteria 4 is 'No'.

Johnstone and Storr (2004) reported that the Southern Whiteface builds a dome-shaped nest with a side entrance mainly in a hollow branch, a tree trunk, a crevice between branches, a stump, a fence post, or a recumbent log entrance through a knot-hole or crack. Nests are made with grass, bark, rootlets, feathers and wool and lined with feathers, wool, fur and soft plant down (Johnstone and Storr 2004). Such habitats and materials are widely available in the Midwest, Murchison and Goldfields of Western Australia. Based on the geographic records, this small bush bird very obviously breeds in thousands of locations in the semi-arid areas of Western Australia. Malleefowl can make breeding mounds in shrublands on sandy, clay or stony soils. The density of habitat and ability to avoid feral fauna is more critical than the habitat type. There is no evidence that the small number of Southern Whiteface or Malleefowl recorded in and around the project area represents an important population. The answer to Criteria 5 is 'No'.

Quality habitat is not defined for the Southern Whiteface, but presumably, it is areas with a high abundance of this species concentrated in a particular area. Even the defined 'habitat critical to its survival' (Department of Climate Change Energy the Environment and Water 2023) is very widely available in the Goldfields, Murchison, and Midwest of Western Australia. Although the Southern Whiteface and Malleefowl have been recorded near the project area, there is no evidence to suggest or indicate that it is a 'quality habitat', and it does not differ appreciably from the habitat in the many square kilometres of surrounding habitat in which they have been recorded. The answer to Criteria 6 is 'No'.

The proposed action will not result in invasive species harmful to the Southern Whiteface or Malleefowl (e.g. cats) becoming established in the species habitat, as these invasive species are already present in the area. The answer to Criteria 7 is 'No'.

There is no suggestion or evidence to indicate that the proposed action will introduce disease into the Southern Whiteface or Malleefowl habitats that would adversely significantly impact these species. The answer to Criteria 8 is 'No'.

There is no recovery plan for Southern Whiteface. It is highly improbable that the proposed action will significantly and detrimentally impact the overall Southern Whiteface or Malleefowl population or the bioregional Southern Whiteface or Malleefowl population. The answer to Criteria 9 is 'No'.

Based on an assessment using criteria in the Commonwealth Government's (Department of the Environment 2013) significant impact assessment criteria, the proposed action will not significantly impact these species provided that recommended management actions are implemented.

The Department of Climate Change, Energy, the Environment and Water's (2023) conservation advice listed the issues shown in Table 16 as threats to the Southern Whiteface. Against each threat is a comment on whether the proposed action will significantly increase this threat.

Table 16. Threats to Southern Whiteface as described in the Conservation Advice to the Commonwealth Government Minister

Threat	Response
Habitat loss caused by clearing for agriculture	The proposed action is not clearing land for agriculture.
Habitat degradation caused by domestic livestock grazing	The cattle on the pastoral stations nearby were present long before the exploration and mining activity started.
Increased frequency or length of droughts	The proposed exploration and mining operations cannot influence the frequency or length of droughts in the Goldfields.
Increased likelihood of extreme events (i.e., wildfire, drought and heatwaves)	The proposed operations cannot influence the likelihood of extreme events in the Goldfields.

Mitigation

The following two mitigation measures will reduce the potential impact of vegetation clearing on the Southern Whiteface:

- Clearing vegetation outside the breeding season of July to October and having a zoologist search each area for Southern Whiteface active nests before vegetation clearing will reduce the probability of disturbing an active Southern Whiteface nest. If an active nest(s) is found, then a 250m buffer is implemented around the nest site until all chicks have fledged; and
- Minimising vegetation clearing by redesigning the infrastructure location to avoid the more densely vegetated areas.

7.4 REFERRAL UNDER THE EPBC ACT

Vehicles could kill Malleefowl in the project area, as these birds have little 'road sense' and will not necessarily get off the road when a vehicle approaches. Unauthorised clearing could also fragment or directly impact Malleefowl mounds. A fauna management plan should be prepared to reduce and mitigate potential impacts on Malleefowl. If the recommended management actions are implemented, there is unlikely to be a significant impact on Malleefowl.

The project area does not support old-growth spinifex with a structure used as both retreat and nesting sites by the Night Parrot, so it is highly improbable that this species is present.

The Southern Whiteface is widespread and relatively abundant in the Goldfields and Midwest of Western Australia. They will readily move if disturbed, so clearing vegetation in the project area is unlikely to have a significant impact if an active nest is not disturbed.

8. SUMMARY

Minstrel Resources Pty Ltd (Minstrel) requested a Basic and targeted fauna assessment of a proposed mining area. The assessed area was ~110km northwest of Kalgoorlie and 55km southwest of Menzies and is ~406ha.

Terrestrial Ecosystems completed a basic and targeted fauna survey and assessment of the project area. The area has two broad fauna habitats: mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland and mixed Eucalyptus woodland over open acacia and sclerophyll shrubland.

Malleefowl (listed as Vulnerable) tracks, mounds and one individual were recorded. Two Malleefowl mounds were recorded of which one was active. The Southern Whiteface (listed as Vulnerable) has been recorded in a region so it could be present in the project area. This small bush bird is widespread in the Midwest and Goldfields and readily moves if disturbed. Removing or destroying a Southern Whiteface active nest could be considered a significant impact; therefore, if vegetation clearing is to be undertaken during the breeding season (i.e. July to October, presuming there have not been early rains, which will bring the breeding season forward), then there needs to be a check that no Southern Whiteface active nests will be impacted.

Once there is an understanding of proposed disturbance areas, a mitigation and management plan can be developed to reduce the impact on Malleefowl. An assessment of the residual impacts can then be determined, and an assessment of the significance of any impacts on Malleefowl can be undertaken to decide whether a referral to the Commonwealth Government under the *EPBC Act* is required.

Peregrine Falcons and the Central Long-eared Bat may be in the project area. Both species will readily move if disturbed and are unlikely to be significantly impacted by vegetation clearing. Wild dogs, feral cats, and rabbits are also in the project area.

9. MANAGEMENT STRATEGIES

The purpose of this section is to identify generic management and mitigation strategies to address the potential impacts of development in the project area.

9.1 INDUCTION AND AWARENESS

All contractors and staff involved in vegetation clearing, development and ongoing operations in the project area should be aware of the possible presence and issues associated with terrestrial fauna through the induction process.

Recommendation 1: The induction program includes a component on managing fauna in the project area.

Recommendation 2: The induction program includes a component on reporting deaths and sightings of Malleefowl and other conservation-significant species.

9.2 DUST

Dust generated from vegetation clearing and development could potentially degrade surrounding vegetation, reducing its ability to absorb sunlight and influencing photosynthetic rates. Degradation of these areas will potentially render the habitat unsuitable for fauna. Dust suppression and management programs are essential to minimising impacts on fauna during the exploration program.

Recommendation 3: The impact of dust on adjacent vegetation and fauna habitat is managed against appropriate KPIs and following the site processes and procedures.

9.3 MINIMISING HABITAT FRAGMENTATION

Loss of vegetation and habitat may contribute to the decline in the number of fauna on and in the vicinity of survey area. Where possible, access routes should be aligned to existing tracks and other barriers or follow the boundaries of broad-scale vegetation associations in the area to minimise the impact on the terrestrial fauna, which are often dependent upon specific habitat types. Clearing should be minimised, and fragmentation of remnant vegetation should be avoided wherever possible. Once areas are no longer required then they should be rehabilitated.

Recommendation 4: All areas disturbed during exploration are rehabilitated as soon as practical after they are no longer required.

Recommendation 5: Where possible, access routes are aligned to existing roads, tracks and other barriers or follow the boundaries of broad-scale vegetation associations in the area.

9.4 MINIMISING SECONDARY IMPACTS ON FAUNA AND FAUNA HABITAT

Pets and feral animals have the potential to impact on 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.

It is likely that the survey area supports a population of feral and pest species. Reducing the impacts of feral cats will reduce the stress on fauna and fauna assemblages in the area. Increased activity will result in increased traffic and a consequential increase in fauna deaths on tracks. Limiting vehicle speed on mine roads can reduce

collisions with fauna, particularly larger animals such as kangaroos and emus. Dead animals on the road also have the propensity to attract raptors, goannas and even cattle, which are then likely to be killed.

Recommendation 6: Pets are not permitted on the survey.

Recommendation 7: All waste and rubbish to be contained in bins and regularly removed from the survey or placed in land fill and suitably covered to exclude access to predator species.

Recommendation 8: Feeding of native fauna is prohibited.

Recommendation 9: A feral pest control program is implemented in the survey area and surrounds.

9.5 UNCAPPED DRILL HOLES

Uncapped drill holes can seriously threaten small animals, including ground-dwelling reptiles, frogs and small mammals. A log of all on-site drill holes should be maintained, detailing when they were capped, how and by whom. All drill holes should be temporarily capped on completion of drilling and permanently capped or closed as soon as possible after exploration activities have ceased.

Recommendation 10: A log of all on-site drill holes be maintained detailing when they were capped, how and by whom.

9.6 VERTEBRATE FAUNA MANAGEMENT PLAN

A Vertebrate Fauna Management Plan should be prepared before any ground disturbance activities are undertaken in the project area to mitigate potential impacts on vertebrate species. Such a plan would deal with the method of vegetation clearing, reducing fauna deaths on the roads, the effects of artificial light spill, vibration, dust, feral species management, monitoring and recording conservation species, monitoring impacts on fauna in adjacent areas, staff inductions, etc. The plan should include:

- Control and reduction methods for feral and pest fauna;
- Management of pets on site;
- Habitat fragmentation and barriers to fauna movement;
- Vegetation clearing and development protocols;
- Vehicle impacts on vertebrate fauna (short and long term);
- Vehicle speed limits on site; and
- Anthropogenic activity.

Recommendation 11: A vertebrate fauna management plan be prepared and implemented for the project's life.

9.7 FAUNA SPECIES OF CONSERVATION SIGNIFICANCE

The presence of Malleefowl and Southern Whiteface needs to be considered in the context of the proposed disturbance area and disturbance activities to determine whether this species will be significantly impacted by the proposed vegetation clearing, exploration activity and operations, and thus whether a referral is required under the *EPBC Act*. Additional information is required to make this judgement.

Recommendation 12: A 200m buffer is set up around the Malleefowl mound in breeding season and 50m in non-breeding season.

Clearing vegetation in the project area may remove habitat that Southern Whiteface has used and could use in the future. These impacts are unlikely to be significant in a regional context, however, mitigation can further reduce potential impacts.

Recommendation 13: Clearing vegetation is undertaken outside the Southern Whiteface breeding season of July to October, acknowledging that rainfall events can influence the breeding season**.**

Recommendation 14: If clearing is to occur in the Southern Whiteface breeding season, a zoologist familiar with the species will search the area for active nests before vegetation clearing is undertaken.

Recommendation 15: If an active Southern Whiteface nest(s) is found, a 250m buffer is implemented around the nest site until all chicks have fledged.

10. REFERENCES

AG staff. 2017. Night parrot feather discovered in South Australia gives hope to ecologists. Australian Geographic **September**.

AG staff. 2018. Critically endangered night parrot fledging photographed on Queensland reserve. Australian Geographic **February**.

ATA Environmental. 2006a. Fauna assessment proposed clearing around Black Flag. Unpublished report for Placer Dome Australia Pty Ltd., Perth.

ATA Environmental. 2006b. Fauna assessment proposed clearing around the Grants Patch Mine Site. Unpublished report for Placer Dome Australia Pty Ltd., Perth.

ATA Environmental. 2006c. Fauna assessment proposed clearing around the Janet Ivy Site. Unpublished report for Placer Dome Australia Pty Ltd., Perth.

ATA Environmental. 2006d. Fauna assessment proposed clearing around the Moonbeam Mine Site. Unpublished report for Placer Dome Australia Pty Ltd., Perth.

ATA Environmental. 2006e. Fauna assessment proposed clearing around the Natal Mine Site. Unpublished report for Placer Dome Australia Pty Ltd., Perth.

ATA Environmental. 2006f. Fauna assessment proposed clearing around the Ora Banda Mine Site. Unpublished report for Placer Dome Australia Pty Ltd, Perth.

ATA Environmental. 2006g. Fauna assessment proposed clearing around the Rose West Site. Unpublished report for Placer Dome Australia Pty Ltd., Perth.

ATA Environmental. 2006h. Malleefowl assessment for clearing application at Janet Ivy Site. Perth.

Baker, J., R. L. Goldingay, and R. J. Whelan. 1998. Powerline easement through forests: a case study of impacts on avifauna. Pacific Conservation Biology **4**:79-89.

Bamford Consulting Ecologists. 2016. Tellus Holdings Limited: Sandy Ridge Project - Malleefowl Assessment, January 2016. Perth.

Bamford, M. J. 1995. Predation by feral cats upon lizards. The Western Australian Naturalist **20**:191-196.

Bamford, M. J., S. J. J. F. Davies, and P. G. Ladd. 1990. Biological Survey of the Kangaroo Hills and Calooli Timber Reserves, Coolgardie, Western Australia.

Barrett, G. 1991. A Biological Survey of Victoria Rock Nature Reserve. Kalgoorlie.

Bell, D. T., R. C. Bell, and W. A. Loneragan. 2007. Winter bird assemblages across an arid gradient in south-west Western Australia. Journal of the Royal Society of Western Australia **90**:219-227.

Benshemesh, J. 2007. National Recovery Plan for Malleefowl. South Australia.

Benshemesh, J., and P. Burton. 1999. Fox predation on Malleefowl three years after the spread of RCD in Victoria. Unpublished report for Parks Victoria and Department of Natural Resources and Environment, Mildura.

Boles, W. E., N. W. Longmore, and M. C. Thompson. 2016. A Recent Specimen of the Night Parrot *Geopsittacus occidentalis*. Emu **94**:37-40.

Botanica Consulting. 2020. Reconnaissance Flora/ Vegetation & Fauna Survey Mulgarrie Project. Boulder.

Botanica Consulting. 2021. Flora and Fauna Assessment of the Strategic Water Management Project Stage 1 (SWMP1). Boulder.

Botanica Consulting. 2023a. Kangaroo Hills Project Reconnaissance Flora/Vegetation Survey and Basic Fauna Assessment. Perth.

Botanica Consulting. 2023b. Paddington Project Annual Malleefowl Mound Monitoring. Perth.

Charalambous, S. 2016. First night parrot fledgling spotted in 100 years spotted in western Queensland. Australian Geographic **November**.

Clarke, M. F., and J. M. Oldland. 2007. Penetration of remnant edges by noisy miners (*Manorina melanocphala*) and implications for habitat restoration. Wildlife Research **34**:253-261.

Commonwealth of Australia. 2015. Credo Station Reserve WA 2011. A Bush Blitz survey report. Canberra.

Cowan, M. 2002. Coolgardie 3 (COO3 - Eastern Goldfields subregion). Pages 156-169 A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002. Department of Conservation and Land Management, Perth.

Cowan, M. A., and R. A. How. 2004. Comparisons of ground vertebrate assemblages in arid Western Australia in different seasons and decades. Records of the Western Australian Museum **22**:91-100.

Craig, M. D., and A. Chapman. 2003. Effects of short-term drought on the avifauna of Wanjarri Nature Reserve: What do they tell us about drought refugia? Journal of the Royal Society of Western Australia **86**:133-137.

Cupitt, R., and S. Cupitt. 2008. Another recent specimen of the Night Parrot *Pezoporus occidentalis* from Western Queensland. Australian Field Ornithology **25**:69-75.

Davis, R. A., and B. M. Metcalf. 2008. The Night Parrot (*Pezoporus occidentalis*) in northern Western Australia: a recent sighting from the Pilbara region. Emu **108**:233-236.

Dell, J., and R. A. How. 1985. Vertebrate Fauna: In the Biological Survey of the Eastern Goldfields of Western Australia Part 3; Jackson - Kalgoorlie. Records of the Western Australian Museum **Supplement No 23**:39-68.

Dell, J., R. A. How, A. V. Milewski, and G. J. Keighery. 1988. 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**:38-69.

Dell, J., R. A. How, K. R. Newbey, and R. J. Hnatiuk. 1985. The Biological Survey of the Eastern Goldfields of Western Australia Part 3; Jackson - Kalgoorlie. Records of the Western Australian Museum **Supplement No 23**:168.

Department of Biodiversity Conservation and Attractions. 2020. Guideline for the survey of arid bronze azure butterfly (ABAB) in Western Australia. Perth.

Department of Climate Change Energy the Environment and Water. 2023. Conservation Advice for *Aphelocephala leucopsis* (southern whiteface). Canberra.

Department of Environment and Conservation. 2012. Western Spiny-tailed Skink (*Egernia stokesii*) Recovery Plan.

Department of Parks and Wildlife. 2017. Interim guideline for preliminary surveys of night parrot (*Pezoporus occidentalis*) in Western Australia. Perth.

Department of the Environment. 2013. Matters of National Environmental Significance Significant impact guidelines 1.1 *Environment Protection and Biodiversity Conservation Act 1999*. Canberra.

Eco Logical Australia. 2016. Biological Assessment - Binduli Expansion Project. Level 1 vertebrate fauna and Short-range Endemic invertebrate survey. Perth.

ecologia Environment. 2007. Jump Up Dam Fauna Assessment.

Ecotec (WA) Pty Ltd. 2021. Lady Ida Area and Proposed Haul Road Route Fauna and Habitat Assessment January 2021. Perth.

Environmental Protection Authority. 2020. Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment. Western Australia.

Field, R. P. 1999. A new species of *Ogyris* Angus (Lepidoptera: Lycaenidae) from southern arid Australia. Memoirs of Museum Victoria **57**:251-251.

Garnett, S. T., J. K. Szabo, and G. Dutson. 2011. The Action Plan for Australian Birds 2010. CSIRO, Collingwood, Melbourne.

Goldingay, R. L., and R. J. Whelan. 1997. Powerline easements: do they promote edge effects in eucalypt forest for small mammals? Wildlife Research **24**:737-744.

Goosem, M. 2000. Effects of tropical rainforest roads on small mammals: Edge changes in community composition. Wildlife Research **27**:151-163.

Goosem, M., Y. Izumi, and S. Turton. 2001. Efforts to restore habitat connectivity for an upland tropical rainforest fauna: A trial of underpasses below roads. Ecological Management and Restoration **2**:196-202.

Goosem, M. W., and H. Marsh. 1997. Fragmentation of small mammal community by a powerline corridor through tropical rainforest. Wildlife Research **24**:613-629.

Hamilton, N., A. Burbidge, T. Douglas, and L. Gilbert. 2017. Piecing the puzzle together: the fate of the Night Parrot nest found in Western Australia by Jackett et al. (2017). Australian Field Ornithology **34**:151-154.

Hart Simpson and Associates. 2000. Anaconda Nickel Ltd, Cawse Expansion Project, Fauna Survey. Perth.

Jackett, N., B. Greatwich, G. Swann, and A. Boyle. 2017. A nesting record and vocalisations of the Night Parrot Pezoporus occidentalis from the East Murchison, Western Australia. Australian Field Ornithology **34**:144-150.

Johnstone, R. E., and G. M. Storr. 1998. Handbook of Western Australian Birds. Volume I - Non-Passerines (Emu to Dollarbird). Western Australian Museum, Perth.

Johnstone, R. E., and G. M. Storr. 2004. Handbook of Western Australian Birds. Volume II - Passerines (Blue-winged Pitta to Goldfinch). Western Australian Museum, Perth.

Jones, A. 2017. Night parrot sighting in Western Australia shocks birdwatching world. ABC News.

Keighery, B. J., N. L. McKenzie, and B. Hall. 1995. The Biological Survey of the Eastern Goldfields of Western Australia. Part 11. Boorabbin-Southern Cross Study Area. Records of the Western Australian Museum **Supplement No. 49**:31-66.

Keith Lindbeck and Associates. 2012. Central Yilgarn Iron Project (CYIP) Fauna Assessment. Perth.

Kinnear, J. 1993. Masterly marauders: The cat and the fox. Landscope **8**:20-28.

Laurance, W. F. 1991. Edge effects in tropical forest fragments: application of a model for design of nature reserves. Biological Conservation **57**:205-219.

Laurance, W. F. 1994. Rainforest fragmentation and the structure of small mammal communities in tropical Queensland. Biological Conservation **69**:23-32.

Lewis, M., and M. Hines. 2014. Malleefowl activity at nesting sites increase fox and other feral animal visitation rates. Pages 242-247 Proceedings of the 5th National Malleefowl Forum 2014.

Lindsay, M., R. Paltridge, N. Leseberg, N. Jackett, S. Murphy, A. Boyle, A. Watson, B. Greatwich, N. Hamaguchi, and S. Shipway. 2024. Aboriginal rangers co-lead night parrot conservation: background, survey effort and success in Western Australia 2017–2023. Wildlife Research **51**.

Luck, G. W., H. P. Possingham, and D. C. Paton. 1999. Bird responses at inherent and induced edges in the Murray Mallee, South Australia. 1. Differences in abundance and diversity. Emu **99**:157-169.

McCarthy, M. 2017. Night parrot feather discovery proves Australia's most elusive bird is alive in South Australia. ABC News.

McKenzie, N. L., and N. J. Hall. 1992. 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**.

McKenzie, N. L., J. K. Rolfe, and W. K. Youngson. 1992. IV Vertebrate fauna. Records of the Western Australian Museum, Supplement, No 41:37-64.

Murphy, B. P., L.-A. Woolley, H. M. Geyle, S. M. Legge, R. Palmer, C. R. Dickman, J. Augusteyn, S. C. Brown, S. Comer, T. S. Doherty, C. Eager, G. Edwards, D. A. Fordham, D. Harley, P. J. McDonald, H. McGregor, K. E. Moseby, C. Myers, J. Read, J. Riley, D. Stokeld, G. J. Trewella, J. M. Turpin, and J. C. Z. Woinarski. 2019. Introduced cats (*Felis catus*) eating a continental fauna: The number of mammals killed in Australia. Biological Conservation **237**:28-40.

Murphy, S. 2015. Shining a light: The research unlocking the secrets of the mysterious Night Parrot. Australian Birdlife **4**:30-35.

Murphy, S. A., J. J. Austin, R. K. Murphy, J. Silcock, L. Joseph, S. T. Garnett, N. P. Leseberg, J. E. M. Watson, and A. H. Burbidge. 2017a. Observations on breeding Night Parrots (*Pezoporus occidentalis*) in western Queensland. Emu **117**:107-113.

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

National Malleefowl Recovery Team. 2016. National Malleefowl Monitoring Manual.

Ngururrpa Rangers, C. Sunfly, A. Schubert, A. M. Reid, N. Leseberg, L. Parker, R. Paltridge, and M. Hutton. 2024. Potential threats and habitat of the night parrot on the Ngururrpa Indigenous Protected Area. Wildlife Research **51**.

Ninox Wildlife Consulting. 1998. A Vertebrate Fauna Survey of the Murrin Murrin Expansion Project. Perth.

Ninox Wildlife Consulting. 1999. Fauna Survey for the White Foil Gold Project. Perth.

Ninox Wildlife Consulting. 2002. A Vertebrate Fauna Assessment of the Proposed White Foil Haul Road Route near Kalgoorlie, Western Australia. Perth.

Oxley, D. J., M. B. Fenton, and G. R. Carmody. 1974. The effects of roads on populations of small mammals. Journal of Applied Ecology **11**:51-59.

Palaszxzuk, A., and S. Miles. 2017. New night parrot community discovered in central west Queensland.

Paton, P. W. C. 1994. The effect of edge on avian nest success: How strong is the evidence? Conservation Biology **8**:17-26.

Pickrell, J. 2016. The night parrot's secret sanctuary. Australian Geographic **August**.

Priddel, D., and R. Wheeler. 1990. Survival of Malleefowl *Leipoa ocellata* chicks in the absence of ground-dwelling predators. Emu **90**:81-87.

Risbey, D. 2000. An assessment of the populations of feral cats and foxes in the Ora Banda region for Cawse Nickel Operations, Western Australia. Kalgoorlie.

Rykers, E. 2017. Night parrot call recordings released online for first time. Australian Geographic **February**.

Shepherdson Environmental Services. 2001a. Fauna of the Black Cat and Panther Leases, M16/34 and M16/365 (P16/1675). Unpublished report for Kinver Mining NL.

Shepherdson Environmental Services. 2001b. Fauna of the proposed Golden Cities to Paddington Haul Road and surrounding area. Perth.

Storr, G. M., L. A. Smith, and R. E. Johnstone. 1983. Lizards of Western Australia. II: Dragons and Monitors. Western Australian Museum, Perth, Western Australia.

Storr, G. M., L. A. Smith, and R. E. Johnstone. 1990. Lizards of Western Australia. III: Geckos and Pygopods. Western Australian Museum, Perth.

Storr, G. M., L. A. Smith, and R. E. Johnstone. 1999. Lizards of Western Australia. I: Skinks. Western Australian Museum, Perth.

Storr, G. M., L. A. Smith, and R. E. Johnstone. 2002. Snakes of Western Australia. Western Australian Museum, Perth.

Temple, S. A. 1998. The edge of the cut: implications for wildlife populations. Journal of Forestry **96**:22-26.

Terrestrial Ecosystems. 2010. Level 1 Fauna Risk Assessment for La Mancha Resources White Foil Gold Deposit Project Area. Perth.

Terrestrial Ecosystems. 2013. Level 1 Vertebrate Fauna Risk Assessment for the Borefields Road at Coolgardie, V2. Perth.

Terrestrial Ecosystems. 2016. Level 1 Vertebrate Fauna Risk Assessment for the Mungari Tailing Storage Facility Cell 3 (TSF3). Perth.

Terrestrial Ecosystems. 2017. Level 1 Vertebrate Fauna Risk Assessment for the Jaurdi Hills Mining Area. Perth.

Terrestrial Ecosystems. 2018a. Annual Malleefowl Survey - Enterprise, Mulgarrie and north of Federal. Perth.

Terrestrial Ecosystems. 2018b. Annual Malleefowl Survey – Enterprise, Carbine and Golden Cities. Perth.

Terrestrial Ecosystems. 2018c. Level 1 Fauna Risk Assessment and the results of a Malleefowl search for the Golden Cites project area. Perth.

Terrestrial Ecosystems. 2018d. Level 1 Vertebrate Fauna Risk Assessment for Lot 500 Great Eastern Highway, Kalgoorlie. Perth.

Terrestrial Ecosystems. 2024. Annual Malleefowl Monitoring Survey (November 2023) for Paddington Operations, Kalgoorlie. Perth.

Thompson, S. A. 2004. Mine site rehabilitation index using reptile assemblage as a bio-indicator. PhD. Edith Cowan University, Perth.

Thompson, S. A., and G. G. Thompson. 2006. Reptiles of the Western Australian Goldfields. Goldfields Environmental Management Group, Kalgoorlie, WA.

Threatened Species Scientific Committee. 2014. Conservation Advice *Ogyris subterrestris petrina* Arid bronze azure (a butterfly). Canberra.

Threatened Species Scientific Committee. 2016. Conservation Advice *Pezoporus occidentalis* Night Parrot. Canberra.

Threatened Species Scientific Committee. 2020. Conservation Advice *Falco hypoleucos* Grey Falcon. Canberra.

Tyler, M. J., L. A. Smith, and R. E. Johnstone. 2000. Frogs of Western Australia. Western Australian Museum, Perth.

Van Dyck, S., and R. Strahan. 2008. The Mammals of Australia. Reed New Holland, Sydney.

Williams, A., T. Gamblin, J. Richardson, M. Williams, and P. Blechynden. 2008. The critically endangered Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*): progress report and recommendations for future actions. Perth.

Williams, A. A. E., M. Williams, and R. A. Coppen. 2018. Conservation of the Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*) and host sugar ant (*Camponotus terebrans*). Survey results from *Camponotus terebrans* sites GIM 01, GIM 03, GIM 09, GIM 10, GIM 11, GIM 13, GIM 14, GIM 51, GIM 63, GIM 66, and GIM 68 south of Southern Cross (2014), and from *C. terebrans* site east of Merredin., Perth.

Williams, M. R., and A. A. E. Williams. 2008. Threats to the critically endangered Arid Bronze Azure butterfly (*Ogyris subterrestris petrina*) by proposed vegetation clearing. Perth.

Wilson, H. 1937. Notes on the Night Parrot, with references to recent occurrences. Emu **37**:79-87.

Wilson, S., and G. Swan. 2021. A Complete Guide to Reptiles of Australia. 6 edition. New Holland, Sydney.

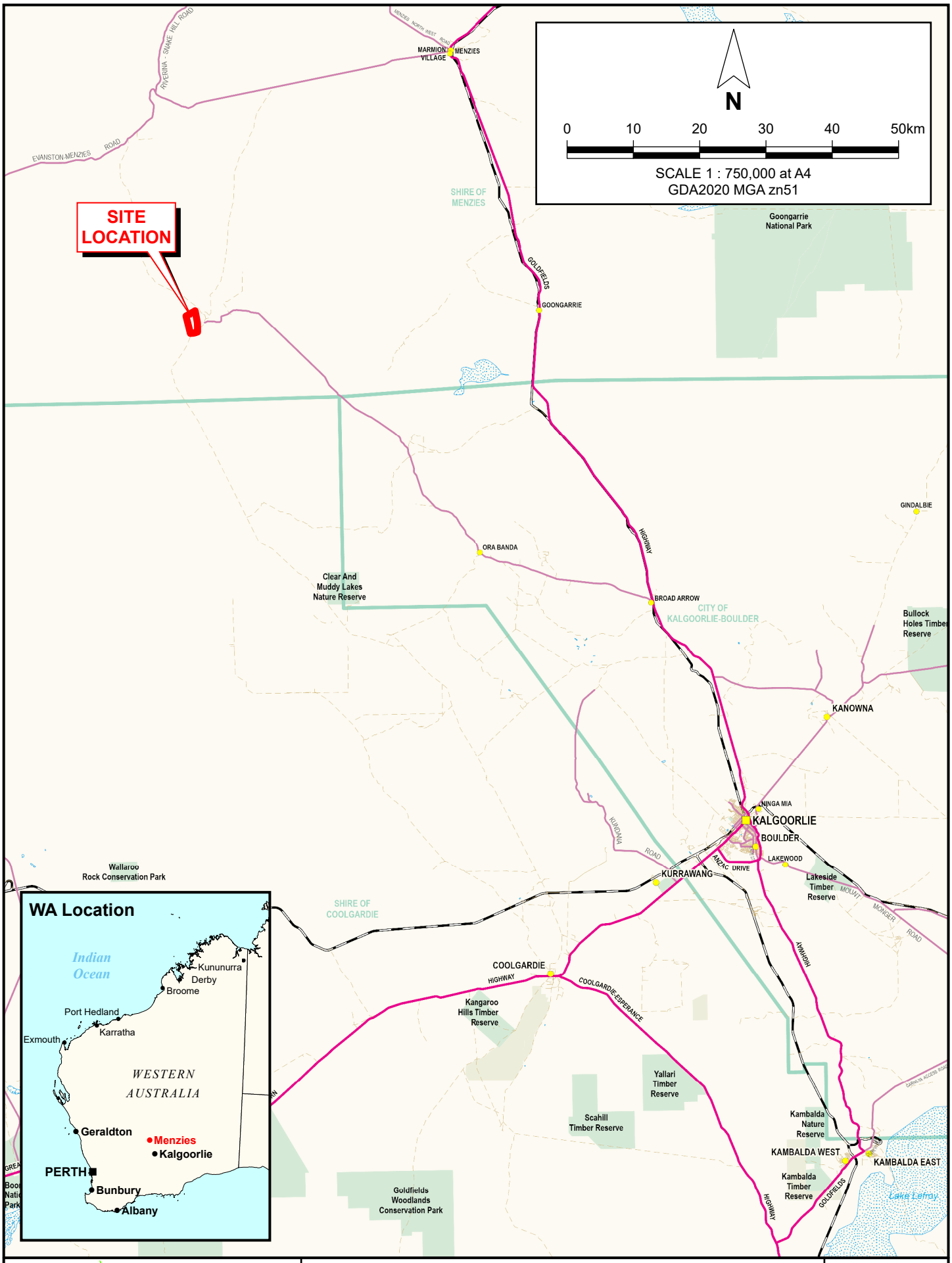
Woinarski, J. C. Z., B. P. Murphy, S. M. Legge, S. T. Garnett, M. J. Lawes, S. Comer, C. R. Dickman, T. S. Doherty, G. Edwards, A. Nankivell, D. Paton, R. Palmer, and L. A. Woolley. 2017. How many birds are killed by cats in Australia? Biological Conservation **214**:76-87.

Woinarski, J. C. Z., B. P. Murphy, R. Palmer, S. M. Legge, C. R. Dickman, T. S. Doherty, G. Edwards, A. Nankivell, J. L. Read, and D. Stokeld. 2018. How many reptiles are killed by cats in Australia? Wildlife Research **45**:247-266.

Figures

Fauna survey and assessment
M30/257





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TERRESTRIAL ECOSYSTEMS

Minstrel Resources
FAUNA SURVEY AND ASSESSMENT
M30/257

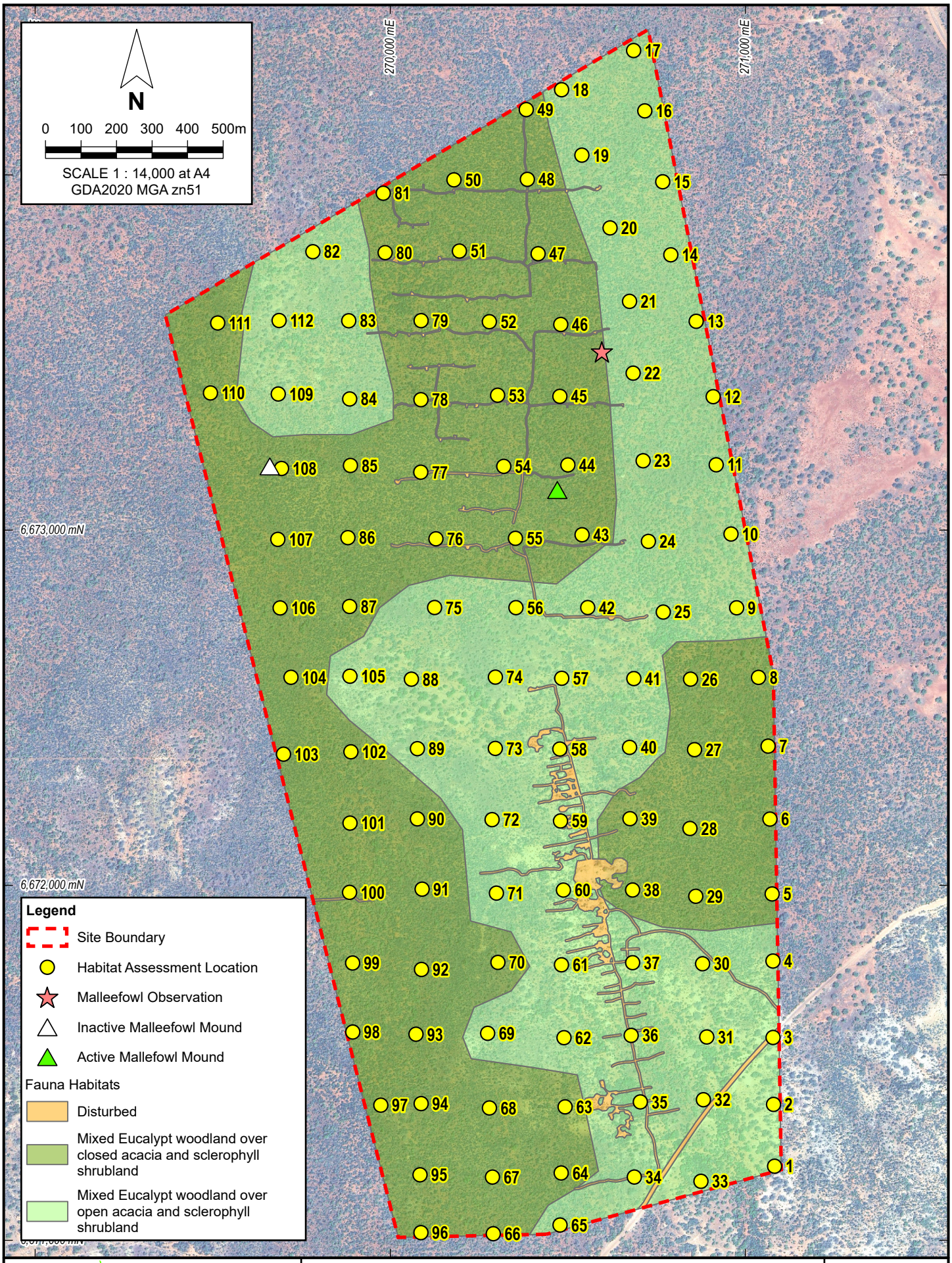
Figure 1

REGIONAL LOCATION

Drawn: S. Thompson

Date: 16 Feb 2025

Job: 20224-0143



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TERRESTRIAL ECOSYSTEMS

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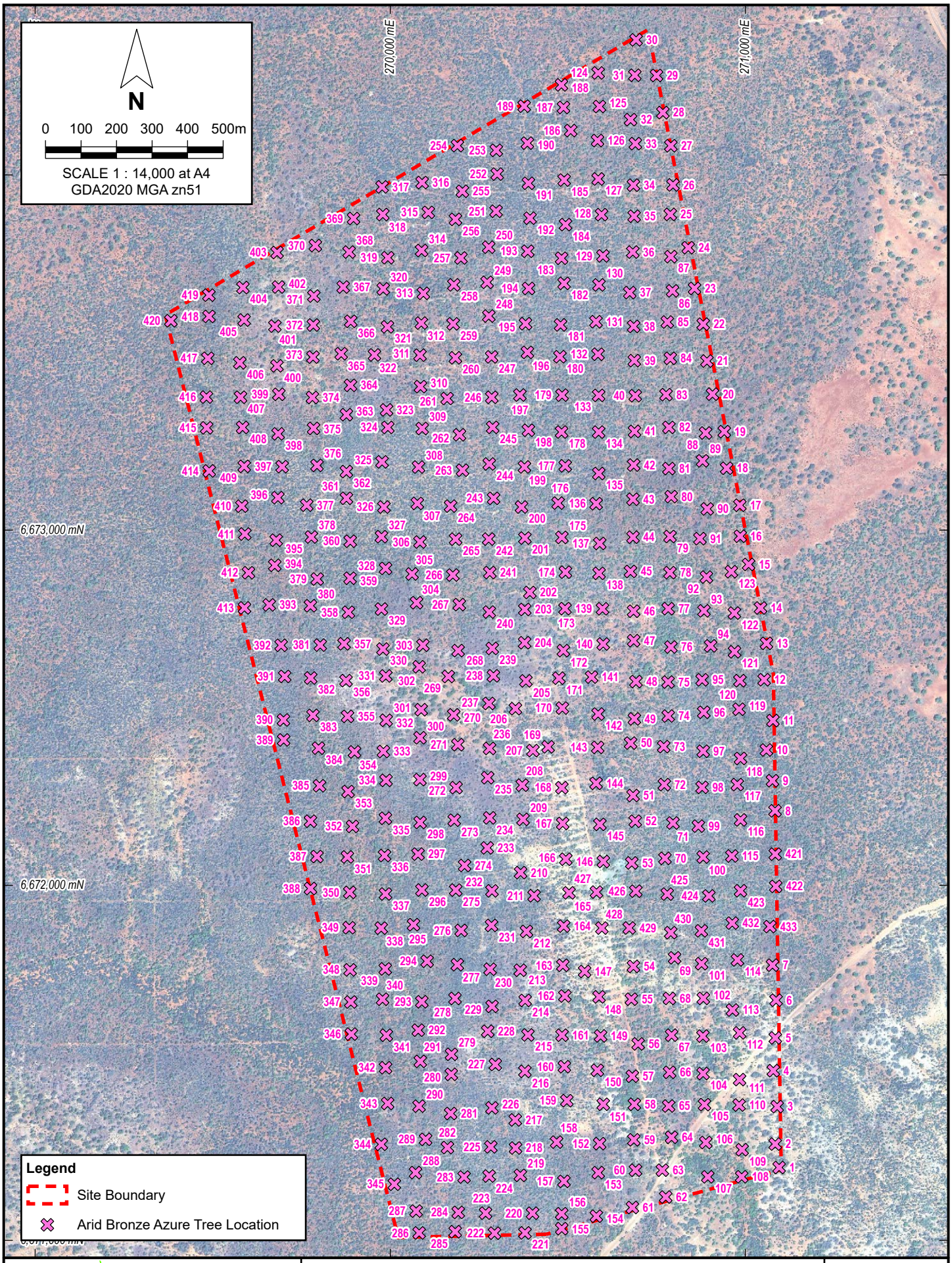
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Minstrel Resources
FAUNA SURVEY AND ASSESSMENT
M30/257

FAUNA HABITAT TYPES, MALLEEFOWL AND HABITAT ASSESSMENT LOCATIONS

Figure 2

Job: 20224-0143



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TERRESTRIAL ECOSYSTEMS

Minstrel Resources
FAUNA SURVEY AND ASSESSMENT
M30/257

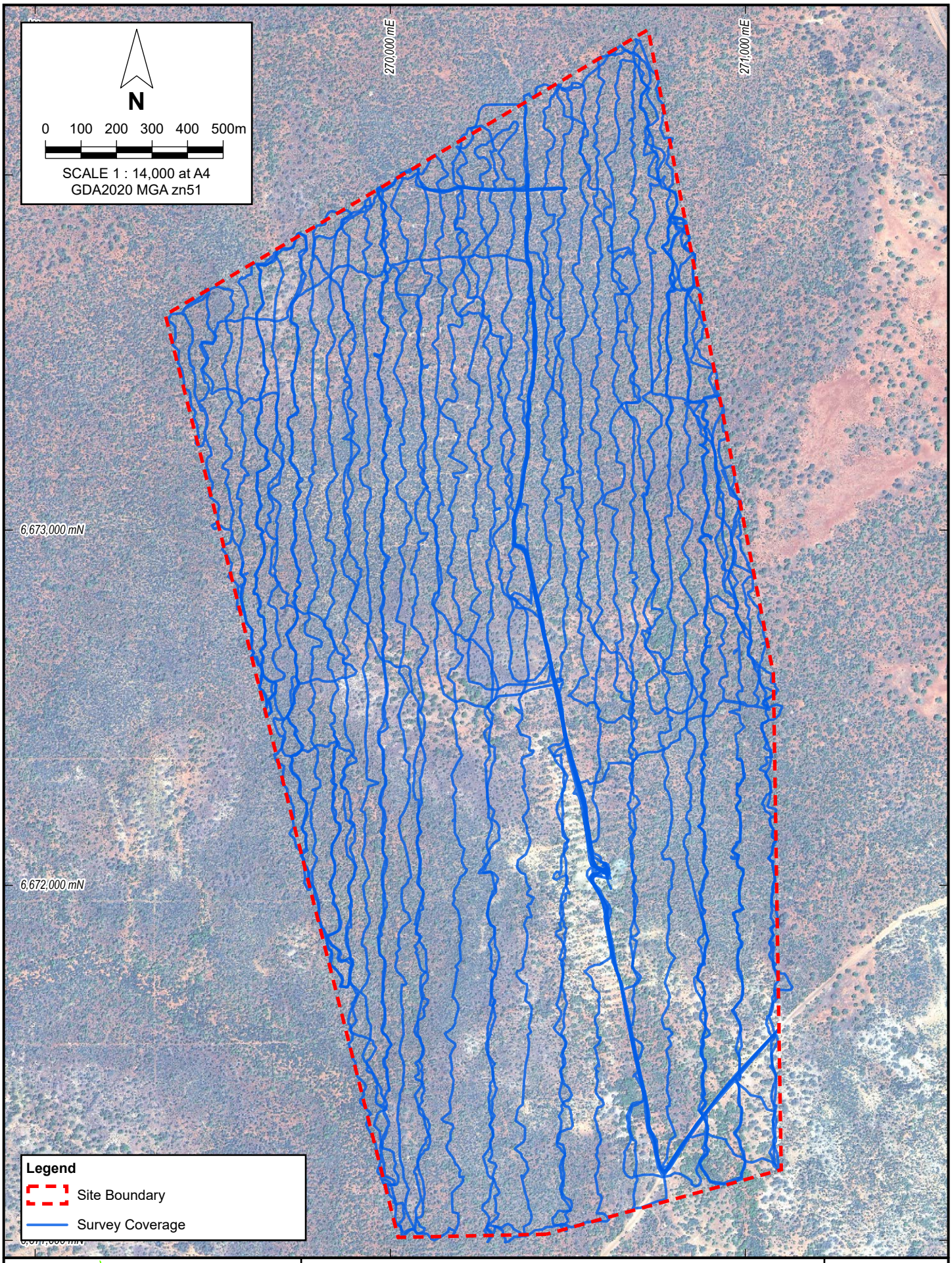
ARID BRONZE AZURE TREES

Figure 3

Drawn: S. Thompson

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TERRESTRIAL ECOSYSTEMS

Minstrel Resources
FAUNA SURVEY AND ASSESSMENT
M30/257

SAMPLING COVERAGE

Figure 4

Drawn: S. Thompson

Date: 16 Feb 2025

Job: 20224-0143

Appendix A.
Results of the EPBC Act Protected Matters Search

Fauna survey and assessment
M30/257



Australian Government

Department of Climate Change, Energy, the Environment and Water

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: 17-Feb-2025

Summary

Details

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

Caveat

Acknowledgements

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:	13
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:	3
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
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 buffer area only
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
MAMMAL			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dasyurus geoffroii			
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
PLANT			
Eleocharis papillosa			
Dwarf Desert Spike-rush [2519]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Myriophyllum lapidicola			
Chiddarcooping Myriophyllum [55940]	Endangered	Species or species habitat known to occur within area	In buffer area only
Ricinocarpos brevis			
[82879]	Endangered	Species or species habitat likely to occur within area	In feature area
REPTILE			
Egernia stokesii badia			
Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	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 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 buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
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 known to 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 buffer area only
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 known 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 may occur within area overfly marine area	In buffer area only
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
Clear And Muddy Lakes	Nature Reserve	WA	In buffer area only
Credo	NRS Addition - Gazettal in Progress	WA	In feature area
Rowles Lagoon	Conservation Park	WA	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Rowles Lagoon System	WA	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Comet Vale Sand Project	2023/09460		Assessment	In buffer area only
Not controlled action				

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

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

Fauna survey and assessment
M30/257



B.1 VERTEBRATE FAUNA ASSESSMENTS

		Survey	A	B											C	D				E	F	G
Family	Species	Common name		Site 8a	Site 15a	Site 18	Site 15	Site 44	Site 35	Site 39	Site 8b	Site 37	Site 18a	Site 15b	Mt Walton	POVS5	POVS1	POVS2			Kurrawang	
Amphibians																						
Limnodynastidae	*Neobatrachus kunapalari*	Wheatbelt Frog	X																			X
	Neobatrachus sutor	Shoemaker Frog	X	1	6	1																
Myobatrachidae	*Pseudophryne occidentalis*	Western Toadlet	X				1															X
Reptiles																						
Agamidae	*Diporiphora amphiboluroides*	Mulga Dragon																				
	Ctenophorus cristatus	Crested Dragon	X	1		1		2							1							X
	Ctenophorus fordi	Mallee Dragon	X						1						9							
	Ctenophorus isolepis	Central Military Dragon	X						8	13												X
	Ctenophorus ornatus	Ornate Crevice Dragon	X																			X
	Ctenophorus reticulatus	Western Netted Dragon	X		2		1		1		8				2							X
	Ctenophorus salinarum	Claypan Dragon																				X
	Ctenophorus scutulatus	Lozenge-marked Dragon	X	1			1	1			3				3							X
	Moloch horridus	Thorny Devil	X									1			1							X
	Pogona minor	Western Bearded Dragon	X			1			3	3		1	1		2							X
	Tympanocryptis cephalus	Pebble Dragon	X			2					4											X
Carphodactylidae	*Nephrurus stellatus*	Stellate Knob-tail	X						2	2					26							
	Underwoodisaurus milii	Barking Gecko	X					4			1					1	2					X
Diplodactylidae	*Amalosia reticulata*	Reticulated Velvet Gecko		6		1	1	2			1											
	Crenadactylus ocellatus	Clawless Gecko	X	1				3										1				
	Diplodactylus granariensis	Wheatbelt Stone Gecko	X	1	8	2		3							1			1				X
	Diplodactylus pulcher	Beautiful Gecko	X	1	6	4		2	2		2						2					X
	Hesperoedura reticulata	Reticulated Velvet Gecko	X																			X
	Lucasium bungabinna	Southern Sandplain Gecko	X																			
	Lucasium maini	Main's Ground Gecko	X		10	1		9					2		1	4						
	Lucasium stenodactylum	Crowned Gecko							2	1												
	Rhynchoedura ornata	Beaked Gecko	X	1	5						1	2										X
	Strophurus assimilis	Goldfields Spiny-tailed Gecko	X												1							
	Strophurus elderi	Jewelled Gecko	X							1												
	Strophurus intermedius	Southern Spiny-tailed Gecko		10	2	1		9														
	Strophurus wellingtonae	Western Shield Spiny-tailed Gecko	X																			X
Elapidae	*Brachyurophis fasciolatus*	Narrow-banded Burrowing Snake	X																			
	Brachyurophis semifasciata	Half-girdled Snake	X	2																		
	Demansia psammophis	Yellow-faced Whipsnake															1	3				
	Furina ornata	Orange-naped Snake	X																			X

		Survey	A	B										C	D				E	F	G
Family	Species	Common name		Site 8a	Site 15a	Site 18	Site 15	Site 44	Site 35	Site 39	Site 8b	Site 37	Site 18a	Site 15b	Mt Walton	POVS5	POVS1	POVS2			Kurrawang	
	Suta monachus	Hooded Snake															1					X
	Pseudechis australis	Mulga Snake	X								2											X
	Pseudonaja mengdeni	Western Brown Snake												1								X
	Pseudonaja modesta	Ringed Brown Snake	X																			
	Simoselaps bertholdi	Jan's Banded Snake	X		1		1				1							2				X
	Suta fasciata	Rosen's Snake	X																			
Gekkonidae	*Gehyra purpurascens*	Purplish Dtella	X																			X
	Gehyra variegata	Variegated Gehyra	X	2	11	3		11			4	1	1				2					X
	Heteronotia binoei	Bynoe's Gecko	X		4						2		3				2					X
Pygopodidae	*Delma australis*	Marble-faced Delma	X	3			1	8														X
	Delma butleri	Unbanded Delma	X																			
	Delma nasuta	Sharp-snouted Delma								1												
	Lialis burtonis	Burton's Legless Lizard	X														1	1				X
	Pygopus lepidopodus	Common Scaly-foot	X													1						
	Pygopus nigriceps	Western Hooded Scaly-foot	X								1											
Pythonidae	*Antaresia stimsoni*	Stimson's Python									1											
Scincidae	*Cryptoblepharus australis*	Inland Snake-eyed Skink	X																			
	Cryptoblepharus buchananii	Buchanan's Snake-eyed Skink	X		1			3			2		2				1	3				X
	Cryptoblepharus plagiocephalus	Peron's Snake-eyed Skink	X																			
	Ctenotus atlas	Southern Mallee Ctenotus	X						4	3												
	Ctenotus brooksi	Brooks Ctenotus	X																			
	Ctenotus leonhardii	Leonhardi's Ctenotus	X		1																	X
	Ctenotus pantherinus	Leopard Ctenotus	X																			
	Ctenotus schomburgkii	Barred Wedgesnout Ctenotus	X	2					2			7			13							X
	Ctenotus uber	Spotted Ctenotus	X			2					4		1				4	2				X
	Ctenotus xenopleura	Wide-striped Ctenotus	X						11	17		1										X
	Cyclodomorphus branchialis	Common Slender Bluetongue									1		4							7		
	Cyclodomorphus melanops	Spinifex Slender Blue-tongue	X														4					
	Egernia depressa	Pygmy Spiny-tailed Skink																				X
	Egernia formosa	Goldfields Crevice Skink	X																			X
	Eremiascincus richardsonii	Broad-banded Sand-swimmer	X																			X
	Hemiergis initialis	South-western Earless Skink	X			2		2			4		13				1					
	Lerista gerrardii	Bold-striped Slider	X													1						
	Lerista kingi	King's Slider	X													1	1	2				
	Lerista macropisthopus	Unpatterned Robust Slider	X		4		1	1	1						1							X
	Lerista picturata	Southern Robust Slider	X																			X
	Lerista timida	Timid Slider	X																			X
	Liopholis inornata	Desert Skink	X	1											3							X
	Menetia greyii	Common Dwarf Skink	X	3	1		1	3	2			1			3	1						X

		Survey	A	B										C	D				E	F	G
Family	Species	Common name		Site 8a	Site 15a	Site 18	Site 15	Site 44	Site 35	Site 39	Site 8b	Site 37	Site 18a	Site 15b	Mt Walton	POVS5	POVS1	POVS2			Kurrawang	
	Morethia adelaidensis	Saltbush Morethia Skink	X																		X
	Morethia butleri	Woodland Morethia Skink	X	2				6			4							3				X
	Morethia obscura	Shrubland Pale-flecked Morethia	X												1							
	Tiliqua occipitalis	Western Blue-tongued Lizard	X									1			2							X
	Tiliqua rugosa	Bobtail																				X
Typhlopidae	*Anilios ammodytes*	Ammodyte Blind Snake																				
	Anilios australis	Austral Blind Snake	X			1		1							1		1					X
	Anilios bituberculatus	Stripe-snouted Blind Snake																				X
	Anilios hamatus	Pale-headed Blind Snake						1														
Varanidae	*Varanus caudolineatus*	Striped-tailed Monitor																				X
	Varanus giganteus	Perentie											1				1					X
	Varanus gouldii	Gould's Goanna	X									1			2							X
	Varanus tristis	Black-headed Monitor	X								1				1		1					
Birds																						
Anatidae	*Oxyura australis*	Blue-billed Duck																		24		
	Anas gracilis	Grey Teal																				X
	Anas rhynchotis	Australasian Shoveler																				X
	Anas superciliosa	Pacific Black Duck																				X
	Aythya australis	Hardhead																				X
	Biziura lobata	Musk Duck																				X
	Chenonetta jubata	Australian Wood Duck																				X
	Cygnus atratus	Black Swan																				X
	Malacorhynchus membranaceus	Pink-eared Duck																				X
	Oxyura australis	Blue-billed Duck																				X
	Stictonetta naevosa	Freckled Duck																				X
	Tadorna tadornoides	Australian Shelduck																				X
Ardeidae	*Ardea pacifica*	White-necked Heron																				X
	Egretta novaehollandiae	White-faced Heron																				X
Megapodiidae	*Leipoa ocellata*	Malleefowl		1							1								X	251		X
Columbidae	*Phaps chalcoptera*	Common Bronzewing									1			102								X
	Ocyphaps lophotes	Crested Pigeon																			1	X
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar		2				1			9		1									
Podargidae	*Podargus strigoides*	Tawny Frogmouth						1			1											
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar											4	3								
Apodidae	*Apus pacificus*	Pacific Swift																		4		X
Charadriidae	*Charadrius veredus*	Oriental Plover																		12		
	Thinornis cucullatus	Hooded Plover																		4		
	Charadrius ruficapillus	Red-capped Plover																				X

		Survey	A	B										C	D				E	F	G
Family	Species	Common name		Site 8a	Site 15a	Site 18	Site 15	Site 44	Site 35	Site 39	Site 8b	Site 37	Site 18a	Site 15b	Mt Walton	POVS5	POVS1	POVS2			Kurrawang	
	Elseyornis melanops	Black-fronted Dotterel																				X
	Erythrogonys cinctus	Red-kneed Dotterel																				X
	Vanellus tricolor	Banded Lapwing																				X
Scolopacidae	*Arenaria interpres*	Ruddy Turnstone																		6		X
	Calidris acuminata	Sharp-tailed Sandpiper																		1		X
	Calidris ferruginea	Curlew Sandpiper																		1		X
	Calidris ruficollis	Red-necked Stint																		1		X
	Actitis hypoleucos	Common Sandpiper																		15		X
	Tringa nebularia	Common Greenshank																		7		X
	Tringa glareola	Wood Sandpiper																		12		X
Turnicidae	*Turnix velox*	Little Buttonquail											1									X
Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis																		3		X
	Platalea flavipes	Yellow-billed Spoonbill																				X
	Threskiornis molucca	Australian White Ibis																				X
	Threskiornis spinicollis	Straw-necked Ibis																				X
Accipitridae	*Hieraaetus morphnoides*	Little Eagle						1	2												1	
	Aquila audax	Wedge-tailed Eagle											2								1	
	Accipiter fasciatus	Brown Goshawk																			1	X
Cuculidae	*Heteroscenes pallidus*	Pallid Cuckoo																			1	
Strigidae	*Ninox boobook*	Southern Boobook						2			2			1								
Tytonidae	*Tyto javanica*	Eastern Barn Owl																				X
Alcedinidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher														1						X
	Todiramphus sanctus	Sacred Kingfisher																				X
Meropidae	*Merops ornatus*	Rainbow Bee-eater											2	2			3	4				X
Falconidae	*Falco cenchroides*	Nankeen Kestrel		5					1	2												X
	Falco berigora	Brown Falcon						1					2									X
	Falco longipennis	Australian Hobby																				X
	Falco peregrinus	Peregrine Falcon											1							59		X
Cacatuidae	*Calyptorhynchus banksii*	Red-tailed Black-Cockatoo						6						6								
	Eolophus roseicapilla	Galah												25		6	1					
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		24		11		41		2	12	1	3	2		2	8				1	
	Glossopsitta porphyrocephala	Purple-crowned Lorikeet						17													1	
Ptilonorhynchidae	*Chlamydera guttata*	Western Bowerbird	X																			
Climacteridae	*Climacteris affinis*	White-browed Treecreeper																				X
	Climacteris rufus	Rufous Treecreeper	X			2		42								28						
Maluridae	*Malurus pulcherrimus*	Blue-breasted Fairywren	X									5									1	
	Malurus splendens	Splendid Fairywren	X									7		2								X
	Malurus leucopterus	White-winged Fairywren	X																			X
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater	X																			

		Survey	A	B										C	D					E	F	G
Family	Species	Common name		Site 8a	Site 15a	Site 18	Site 15	Site 44	Site 35	Site 39	Site 8b	Site 37	Site 18a	Site 15b	Mt Walton	POVS5	POVS1	POVS2			Kurrawang	
	Purnella albifrons	White-fronted Honeyeater	X	17		2		18	3	3	9	7				5	8	3			1	
	Lichenostomus cratitius	Purple-gaped Honeyeater																			1	
	Manorina flavigula	Yellow-throated Miner	X								8					4		23			1	
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater	X	7		1		10	2	2	12	15	8	2		7		3			1	
	Anthochaera carunculata	Red Wattlebird	X	18		4		34			1		2			21	1	1			1	
	Gavicalis virescens	Singing Honeyeater	X	6		3		4	6	3	4	3	8	1			13	7			1	
	Ptilotula ornata	Yellow-plumed Honeyeater	X			2		278			1					24		4			1	
	Ptilotula penicillata	White-plumed Honeyeater	X																			
	Epthianura tricolor	Crimson Chat	X										1									
	Epthianura aurifrons	Orange Chat	X																			
	Epthianura albifrons	White-fronted Chat	X																			
	Sugomel nigrum	Black Honeyeater	X														1					
	Lichmera indistincta	Brown Honeyeater	X					20			22		6				26	23			1	
	Nesoptilotis leucotis	White-eared Honeyeater	X	16				7	3		26	1	25			1	15	21			1	
	Nesoptilotis flavicollis	Yellow-throated Honeyeater		27				57					2									
	Melithreptus brevirostris	Brown-headed Honeyeater	X	2		4		2			32		10			4	4	16			1	
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote	X																			
	Pardalotus striatus	Striated Pardalote	X	65		50		138			32	4	1			27	6	9			1	
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat	X	2		2			2		4	6	10				1					X
	Calamanthus fuliginosus	Striated Fieldwren							7	17												
	Hylacola cauta	Shy Heathwren	X									3										
	Acanthiza apicalis	Inland Thornbill	X	16		3			20	3	3	56	31				1	2			1	X
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill	X	2		8		7	1		4										1	X
	Acanthiza uropygialis	Chestnut-rumped Thornbill	X	99		13		15	11		21	24	4								1	X
	Acanthiza robustirostris	Slaty-backed Thornbill	X																			
	Smicrornis brevirostris	Weebill	X	142		91		133			155	27	29			22	21	66			1	X
	Gerygone fusca	Western Gerygone	X	3																		X
	Aphelocephala leucopsis	Southern Whiteface	X											6								X
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler	X	1							15		6					3			1	
Cinclosomatidae	*Cinclosoma castanotum*	Chestnut Quail-thrush	X					1			4	2	5									
Campephagidae	*Coracina maxima*	Ground Cuckooshrike	X																			
	Coracina novaehollandiae	Black-faced Cuckooshrike	X	10		5		32	3		4	6	2			6	9	2			1	
	Lalage tricolor	White-winged Triller	X																		1	
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	X			2					4											
Oreoicidae	*Oreoica gutturalis*	Crested Bellbird	X	2		4		13	6	6	10	2	10			1	1					
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush	X	5				6	1		12	11	9			3	5	5			1	
	Pachycephala inornata	Gilbert's Whistler	X																			
	Pachycephala pectoralis	Golden Whistler	X								3	4										
	Pachycephala rufiventris	Rufous Whistler	X	1		1		6			18	2	1									

		Survey	A	B										C	D				E	F	G
Family	Species	Common name		Site 8a	Site 15a	Site 18	Site 15	Site 44	Site 35	Site 39	Site 8b	Site 37	Site 18a	Site 15b	Mt Walton	POVS5	POVS1	POVS2			Kurrawang	
Artamidae	*Artamus personatus*	Masked Woodswallow	X																			
	Artamus cinereus	Black-faced Woodswallow	X						10	6		1										X
	Artamus cyanopterus	Dusky Woodswallow	X					1			5							1			1	X
	Artamus personatus	Masked Woodswallow																				X
	Artamus minor	Little Woodswallow	X									11	16					1				
	Cracticus torquatus	Grey Butcherbird	X	9		3		12			15		3			1	1				1	
	Cracticus nigrogularis	Pied Butcherbird	X	7		17		35			2		3			7					1	X
	Gymnorhina tibicen	Australian Magpie	X			6		8								9		1			1	X
	Cracticus torquatus	Grey Butcherbird																				X
	Strepera versicolor	Grey Currawong	X	4				5			2						4	5				X
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	X	2				2	4				1				1	2				
	Rhipidura albiscapa	Grey Fantail	X								2	1										
Monarchidae	*Grallina cyanoleuca*	Magpie-lark	X																		1	X
Corvidae	*Corvus orru*	Torresian Crow	X					10		2		1		5								
	Corvus bennetti	Little Crow	X	6							27											X
	Corvus coronoides	Australian Raven	X										1								1	X
Petroicidae	*Microeca fascinans*	Jacky Winter	X			9		41			1		1									
	Petroica goodenovii	Red-capped Robin	X	28		15		4	5	2	23	14	15	1							1	
	Melanodryas cucullata	Hooded Robin	X							2							2				1	
	Eopsaltria griseogularis	Western Yellow Robin	X	1								3					3	1				
	Drymodes brunneopygia	Southern Scrub-Robin	X								14											
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark	X																			X
	Cincloramphus cruralis	Brown Songlark																				X
Hirundinidae	*Hirundo neoxena*	Welcome Swallow	X																			X
	Petrochelidon ariel	Fairy Martin	X																			X
	Petrochelidon nigricans	Tree Martin	X					2														
	Cheramoeca leucosterna	White-backed Swallow	X																			X
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird	X					1	2		4						1	3				X
Estrildidae	*Taeniopygia guttata*	Zebra Finch	X								2			3								
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit	X											2								x
MammalS																						
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna													1							X
Bovidae	*Capra hircus*	Goat																				X
Camelidae	*Camelus dromedarius*	Camel																				X
Canidae	*Canis familiaris*	Dog																				X
	Vulpes vulpes	Fox																				X
Felidae	*Felis catus*	Cat													1							
Dasyuridae	*Sminthopsis fulinginosa*	Grey-bellied Dunnart	X																			

		Survey	A	B											C	D				E	F	G
Family	Species	Common name		Site 8a	Site 15a	Site 18	Site 15	Site 44	Site 35	Site 39	Site 8b	Site 37	Site 18a	Site 15b	Mt Walton	POVS5	POVS1	POVS2			Kurrawang	
Molossidae	*Austronomus australis*	White-striped Freetail Bat	X					1								X	X	X				X
	Mormopterus planiceps	Southern Free-tail Bat	X																			X
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	X					2								X	X	X				X
	Chalinolobus morio	Chocolate Wattled Bat	X														X	X				
	Mormopterus sp.	Free-tail Bat Sp.														X	X					
	Nyctophilus geoffroyi	Lesser Long-eared Bat	X													X		X				X
	Nyctophilus major	Greater Long-eared Bat	X													X	X			30		
	Scotorepens balstoni	Inland Broad-nosed Bat	X													X						
	Vespadelus regulus	Southern Forest Bat	X								2					X						
Dasyuridae	*Ningaui ridei*	Wongai Ningaui	X						3	4							1	1				
	Ningaui yvonneae	Mallee Ningaui	X						1	1												X
	Sminthopsis crassicaudata	Fat-tailed Dunnart	X																			X
	Sminthopsis dolichura	Little Long-tailed Dunnart	X	3		2		3	2	2		2			17	2		1				X
	Sminthopsis hirtipes	Hairy-footed Dunnart	X						1	1					1							
	Sminthopsis ooldea	Ooldea Dunnart																				X
Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum	X	2				1				1				1	1	3				X
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo				1			1						3							X
	Osphranter robustus	Euro									1		1									X
	Macropus rufus	Red Kangaroo																				X
Leporidae	*Oryctolagus cuniculus*	Rabbit		1						1												X
Muridae	*Mus musculus*	House Mouse	X	2		3		6		2	77				2	1	1					X
	Notomys alexis	Spinifex Hopping Mouse	X							1		1										
	Notomys mitchellii	Mitchell's Hopping Mouse	X									1										X
	Pseudomys albocinereus	Ash-grey Mouse	X					1	5	21					9		1					
	Pseudomys bolami	Bolam's Mouse	X																			X
	Pseudomys hermannsburgensis	Sandy Inland Mouse	X					1	2			2										
	Pseudomys nanus	Western Chestnut Mouse	X																			

Survey			A																	
Family	Species	Common name	Site 7A	Site 1B	Site 1	Site 1A	Site 1E	Site 2B	Site 3A	Site 3B	Site 7B	Site 2A	Site 6A	Site 6B	Site 2E	Site 2	Site 3	Site 7	Site 6
Reptiles																			
Agamidae	*Ctenophorus cristatus*	Crested Dragon	1																
	Ctenophorus reticulatus	Western Netted Dragon		1															
	Pogona minor	Western Bearded Dragon			1														
	Tympanocryptis cephalus	Pebble Dragon				1	1												
Carphodactylidae	*Underwoodisaurus milii*	Barking Gecko	1			1													
Diplodactylidae	*Diplodactylus granariensis*	Wheatbelt Stone Gecko	1					1	1	3	1								
	Diplodactylus pulcher	Beautiful Gecko		5				8	2	2		1							
	Lucasium maini	Main's Ground Gecko							5	1									
	Strophurus assimilis	Goldfields Spiny-tailed Gecko	1																
Elapidae	*Suta monachus*	Hooded Snake		1															
Gekkonidae	*Gehyra variegata*	Variegated Gehyra	1										3						
	Heteronotia binoei	Bynoe's Gecko	1			2								1					
Pygopodidae	*Pygopus lepidopodus*	Common Scaly-foot	1																
Scincidae	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink						1				3							
	Cryptoblepharus ruber	Tawny Snake-eyed Skink	5	2				1	4	6	2	2	3	1					
	Cyclodomorphus branchialis	Common Slender Bluetongue				1								1					
	Egernia formosa	Goldfields Crevice Skink							1										
	Eremiascincus richardsonii	Broad-banded Sand-swimmer							1	2									
	Menetia greyii	Common Dwarf Skink				1						4							
	Morethia butleri	Woodland Morethia Skink										2							
Typhlopidae	*Anilios australis*	Austral Blind Snake				1													
	Anilios bituberculatus	Prong-snouted Blind Snake							2										
	Anilios hamatus	Pale-headed Blind Snake								1									
Varanidae	*Varanus tristis*	Black-headed Monitor		2					1					1					
Birds																			
Casuariidae	*Dromaius novaehollandiae*	Emu																	X
Cuculidae	*Chrysococcyx osculans*	Black-eared Cuckoo													1				X
	Cacomantis flabelliformis	Fan-tailed Cuckoo																	X
	Cacomantis pallidus	Pallid Cuckoo																	X
	Chalcites basalis	Horsfield's Bronze-Cuckoo																	X
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar			1														
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar			1														
Accipitridae	*Aquila audax*	Wedge-tailed Eagle														1			
Podicipedidae	*Podiceps cristatus*	Great Crested Grebe																	
	Tachybaptus novaehollandiae	Hoary-headed Grebe																	

Survey			A																
Family	Species	Common name	Site 7A	Site 1B	Site 1	Site 1A	Site 1E	Site 2B	Site 3A	Site 3B	Site 7B	Site 2A	Site 6A	Site 6B	Site 2E	Site 2	Site 3	Site 7	Site 6
	Podiceps cristatus	Australasian Grebe																	
	Accipiter fasciatus	Brown Goshawk																	
	Circus assimilis	Spotted Harrier																	
	Haliastur sphenurus	Whistling Kite																	
	Hieraaetus morphnoides	Little Eagle																	
	Lophoictinia isura	Square-tailed Kite																	
Strigidae	*Ninox boobook*	Southern Boobook			1														
Psittacidae	*Barnardius zonarius*	*Australian Ringneck*																	
	Glossopsitta porphyrocephala	Purple-crowned Lorikeet																	
	Melopsittacus undulatus	Budgerigar															1		
	Polytelis anthopeplus	Regent Parrot																	
	Psephotus varius	Mulga Parrot																	
Falconidae	*Falco longipennis*	Australian Hobby														2			
	Falco peregrinus	Peregrine Falcon			1														
Psophodidae	*Cinclosoma castanotum*	Chestnut Quail-thrush																	
Meliphagidae	*Purnella albifrons*	White-fronted Honeyeater													1	2			X
	Manorina flavigula	Yellow-throated Miner													1				X
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater			1											1			X
	Anthochaera carunculata	Red Wattlebird			5														X
	Gavicalis virescens	Singing Honeyeater													1	1			X
	Ptilotula ornata	Yellow-plumed Honeyeater															2		X
	Lichmera indistincta	Brown Honeyeater			1											1			X
	Nesoptilotis leucotis	White-eared Honeyeater													2	1		3	X
	Epthianura tricolor	Crimson Chat																	X
	Melithreptus brevirostris	Brown-headed Honeyeater																	X
	Sugomel niger	Black Honeyeater																	X
Pardalotidae	*Pardalotus striatus*	Striated Pardalote													2	1	2		
Rallidae	*Fulica atra*	Eurasian Coot																	X
	Porzana fluminea	Australian Spotted Crake																	X
	Tribonyx ventralis	Black-tailed Native-hen																	X
Recurvirostridae	*Cladorhynchus leucocephalus*	Banded Stilt																	X
	Himantopus himantopus	Black-winged Stilt																	X
	Recurvirostra novaehollandiae	Red-necked Avocet																	X
Scolopacidae	*Calidris ruficollis*	Red-necked Stint																	X
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat														1			
	Hylacola cauta	Shy Heathwren																8	
	Acanthiza apicalis	Inland Thornbill			2										4			5	
	Smicrornis brevirostris	Weebill													4	1	3	1	

Survey			A																
Family	Species	Common name	Site 7A	Site 1B	Site 1	Site 1A	Site 1E	Site 2B	Site 3A	Site 3B	Site 7B	Site 2A	Site 6A	Site 6B	Site 2E	Site 2	Site 3	Site 7	Site 6
Otididae	*Ardeotis australis*	Australian Bustard																	X
Campephagidae	*Coracina maxima*	Ground Cuckoo-shrike																	X
	Coracina novaehollandiae	Black-faced Cuckooshrike			1														
	Lalage sueurii	White-winged Triller																	X
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella																7	X
Oreoicidae	*Oreoica gutturalis*	Crested Bellbird													1		1		
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush			7										1	5			X
	Pachycephala rufiventris	Rufous Whistler														2		1	X
	Oreoica gutturalis	Crested Bellbird																	X
	Pachycephala inornata	Gilbert's Whistler																	X
Artamidae	*Artamus minor*	Little Woodswallow					5												
	Cracticus torquatus	Grey Butcherbird			2														
	Cracticus nigrogularis	Pied Butcherbird													1				
	Strepera versicolor	Grey Currawong					2								3				
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail															1		
	Rhipidura fuliginosa	New Zealand Fantail																	
Petroicidae	*Petroica goodenovii*	Red-capped Robin																	1
	Eopsaltria griseogularis	Western Yellow Robin																1	
Mammals																			
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna													1				
Dasyuridae	*Sminthopsis dolichura*	Little Long-tailed Dunnart		2		1							1	1					
	Sminthopsis hirtipes	Hairy-footed Dunnart																	X
Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum				1				1									X
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo																	X
	Osphranter robustus	Euro					1								3				X
Leporidae	*Oryctolagus cuniculus*	Rabbit														1		1	X
Muridae	*Pseudomys hermannsburgensis*	Sandy Inland Mouse							1					1					

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

Fauna survey and assessment
M30/257



APPENDIX C
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 pwild. 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.
Fauna habitat assessment results

Fauna survey and assessment
M30/257



Date: 28/11/2024 Habitat Assessment #: 1 Observer: Tom Raymond

GDA94 51; 271082 mE 6671208 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 2 Observer: Tom Raymond

GDA94 51; 271079 mE 6671382 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 3 Observer: Tom Raymond

GDA94 51; 271077 mE 6671571 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 4 Observer: Tom Raymond

GDA94 51; 271077 mE 6671786 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 5 Observer: Tom Raymond

GDA94 51; 271075 mE 6671975 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 6 Observer: Tom Raymond

GDA94 51; 271068 mE 6672186 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 7 Observer: Tom Raymond

GDA94 51; 271063 mE 6672391 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland

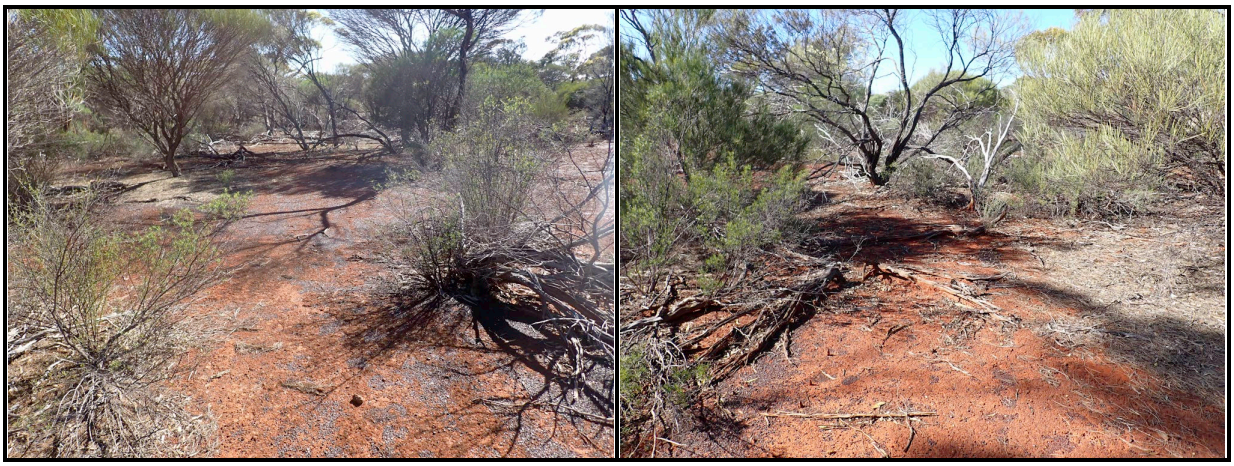


Date: 28/11/2024 Habitat Assessment #: 8 Observer: Tom Raymond

GDA94 51; 271036 mE 6672585 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 9 Observer: Tom Raymond

GDA94 51; 270975 mE 6672781 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 10 Observer: Tom Raymond

GDA94 51; 270959 mE 6672988 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 11 Observer: Tom Raymond

GDA94 51; 270917 mE 6673183 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 12 Observer: Tom Raymond

GDA94 51; 270909 mE 6673375 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 13 Observer: Tom Raymond

GDA94 51; 270861 mE 6673587 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 14 Observer: Tom Raymond

GDA94 51; 270789 mE 6673775 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 15 Observer: Tom Raymond

GDA94 51; 270767 mE 6673980 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 16 Observer: Tom Raymond

GDA94 51; 270716 mE 6674180 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 17 Observer: Tom Raymond

GDA94 51; 270685 mE 6674350 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 18 Observer: Tom Raymond

GDA94 51; 270482 mE 6674239 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 19 Observer: Tom Raymond

GDA94 51; 270539 mE 6674055 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 20 Observer: Tom Raymond

GDA94 51; 270618 mE 6673850 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 21 Observer: Tom Raymond

GDA94 51; 270673 mE 6673644 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 22 Observer: Tom Raymond

GDA94 51; 270683 mE 6673441 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 23 Observer: Tom Raymond

GDA94 51; 270711 mE 6673195 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 24 Observer: Tom Raymond

GDA94 51; 270726 mE 6672968 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 25 Observer: Tom Raymond

GDA94 51; 270768 mE 6672769 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 26 Observer: Tom Raymond

GDA94 51; 270845 mE 6672580 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 27 Observer: Tom Raymond

GDA94 51; 270856 mE 6672381 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 28 Observer: Tom Raymond

GDA94 51; 270843 mE 6672159 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 29 Observer: Tom Raymond

GDA94 51; 270860 mE 6671968 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 30 Observer: Tom Raymond

GDA94 51; 270879 mE 6671778 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 31 Observer: Tom Raymond

GDA94 51; 270891 mE 6671572 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 32 Observer: Tom Raymond

GDA94 51; 270881 mE 6671396 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 33 Observer: Tom Raymond

GDA94 51; 270874 mE 6671166 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland

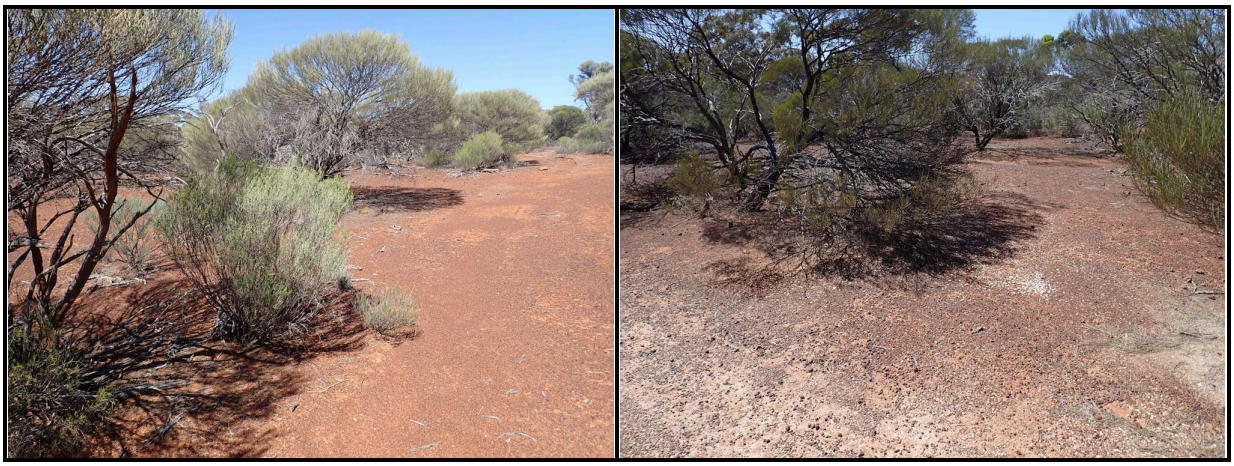


Date: 28/11/2024 Habitat Assessment #: 34 Observer: Tom Raymond

GDA94 51; 270687 mE 6671178 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 35 Observer: Tom Raymond

GDA94 51; 270678 mE 6671577 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 36 Observer: Tom Raymond

GDA94 51; 270682 mE 6671781 mN Fire History: > 5yrs Landform: Flat plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 37 Observer: Tom Raymond

GDA94 51; 270682 mE 6671986 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 38 Observer: Tom Raymond

GDA94 51; 270674 mE 6672187 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 39 Observer: Tom Raymond

GDA94 51; 270673 mE 6672388 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland

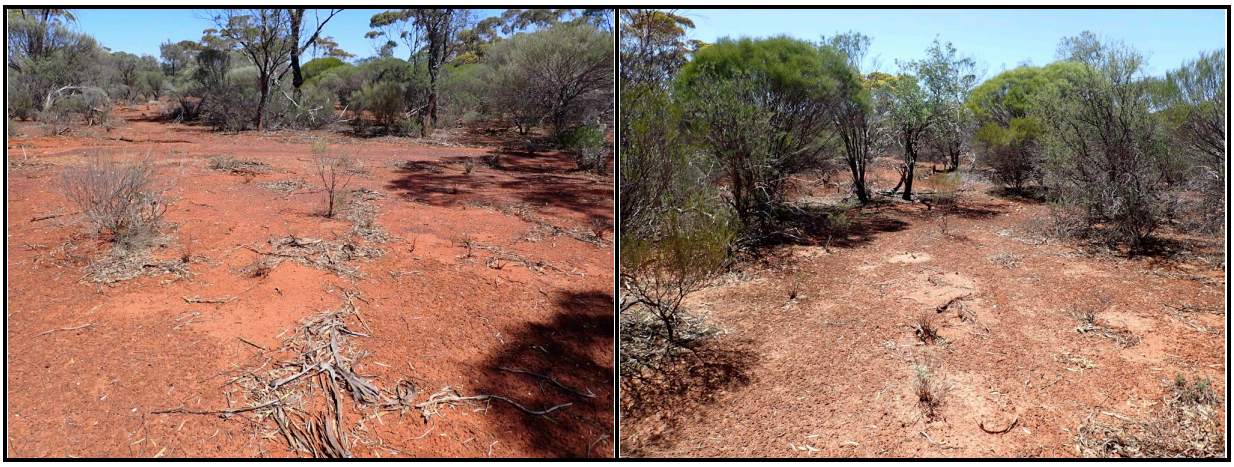


Date: 28/11/2024 Habitat Assessment #: 40 Observer: Tom Raymond

GDA94 51; 270704 mE 6671389 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 41 Observer: Tom Raymond

GDA94 51; 270685 mE 6672581 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 42 Observer: Tom Raymond

GDA94 51; 270555 mE 6672781 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



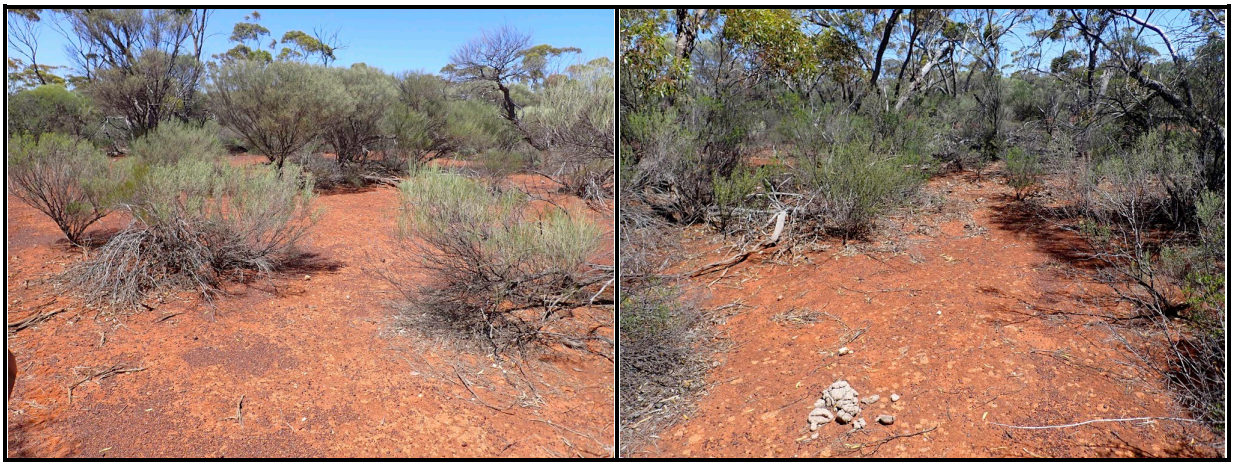
TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 43 Observer: Tom Raymond

GDA94 51; 270539 mE 6672986 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 44 Observer: Tom Raymond

GDA94 51; 270500 mE 6673183 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 45 Observer: Tom Raymond

GDA94 51; 270477 mE 6673376 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 46 Observer: Tom Raymond

GDA94 51; 270479 mE 6673578 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



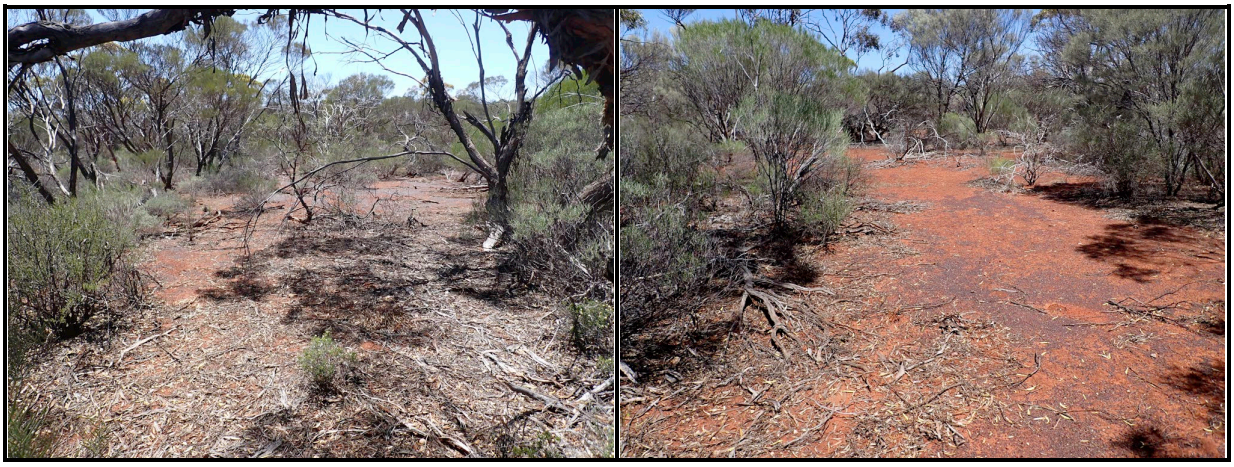
TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 47 Observer: Tom Raymond

GDA94 51; 270416 mE 6673778 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 48 Observer: Tom Raymond

GDA94 51; 270385 mE 6673987 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 49 Observer: Tom Raymond

GDA94 51; 270382 mE 6674183 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 50 Observer: Tom Raymond

GDA94 51; 270179 mE 6673986 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 51 Observer: Tom Raymond

GDA94 51; 270194 mE 6673785 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 52 Observer: Tom Raymond

GDA94 51; 270278 mE 6673586 mN Fire History: > 5yrs Landform: Flat plain

Soil Type: Sandy clay Habitat Quality: Very good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 53 Observer: Tom Raymond

GDA94 51; 270302 mE 6673379 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 54 Observer: Tom Raymond

GDA94 51; 270319 mE 6673179 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 55 Observer: Tom Raymond

GDA94 51; 270352 mE 6672976 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 56 Observer: Tom Raymond

GDA94 51; 270353 mE 6672781 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 57 Observer: Tom Raymond

GDA94 51; 270482 mE 6672582 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 58 Observer: Tom Raymond

GDA94 51; 270477 mE 6672383 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 59 Observer: Tom Raymond

GDA94 51; 270479 mE 6672180 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 60 Observer: Tom Raymond

GDA94 51; 270487 mE 6671986 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 61 Observer: Tom Raymond

GDA94 51; 270481 mE 6671775 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 62 Observer: Tom Raymond

GDA94 51; 270489 mE 6671570 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 63 Observer: Tom Raymond

GDA94 51; 270492 mE 6671375 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 64 Observer: Tom Raymond

GDA94 51; 270481 mE 6671189 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 65 Observer: Tom Raymond

GDA94 51; 270477 mE 6671043 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 66 Observer: Tom Raymond

GDA94 51; 270289 mE 6671018 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 67 Observer: Tom Raymond

GDA94 51; 270287 mE 6671178 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 68 Observer: Tom Raymond

GDA94 51; 270279 mE 6671372 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 69 Observer: Tom Raymond

GDA94 51; 270274 mE 6671583 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 70 Observer: Tom Raymond

GDA94 51; 270302 mE 6671782 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 71 Observer: Tom Raymond

GDA94 51; 270298 mE 6671977 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 72 Observer: Tom Raymond

GDA94 51; 270286 mE 6672184 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 73 Observer: Tom Raymond

GDA94 51; 270295 mE 6672385 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 74 Observer: Tom Raymond

GDA94 51; 270295 mE 6672585 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 75 Observer: Tom Raymond

GDA94 51; 270124 mE 6672781 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 76 Observer: Tom Raymond

GDA94 51; 270128 mE 6672975 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 77 Observer: Tom Raymond

GDA94 51; 270085 mE 6673163 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 78 Observer: Tom Raymond

GDA94 51; 270086 mE 6673367 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 79 Observer: Tom Raymond

GDA94 51; 270086 mE 6673589 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland

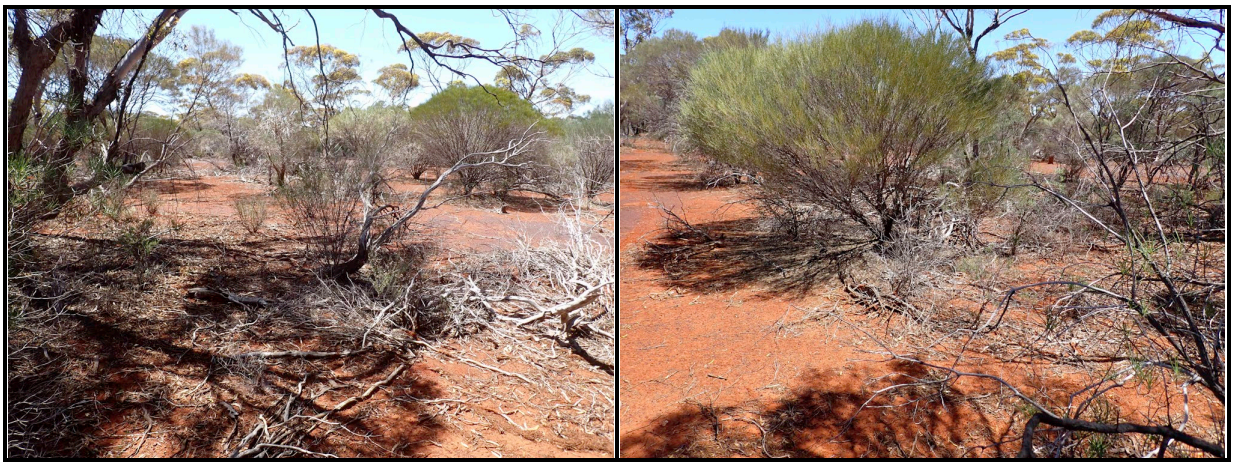


Date: 28/11/2024 Habitat Assessment #: 80 Observer: Tom Raymond

GDA94 51; 269985 mE 6673781 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



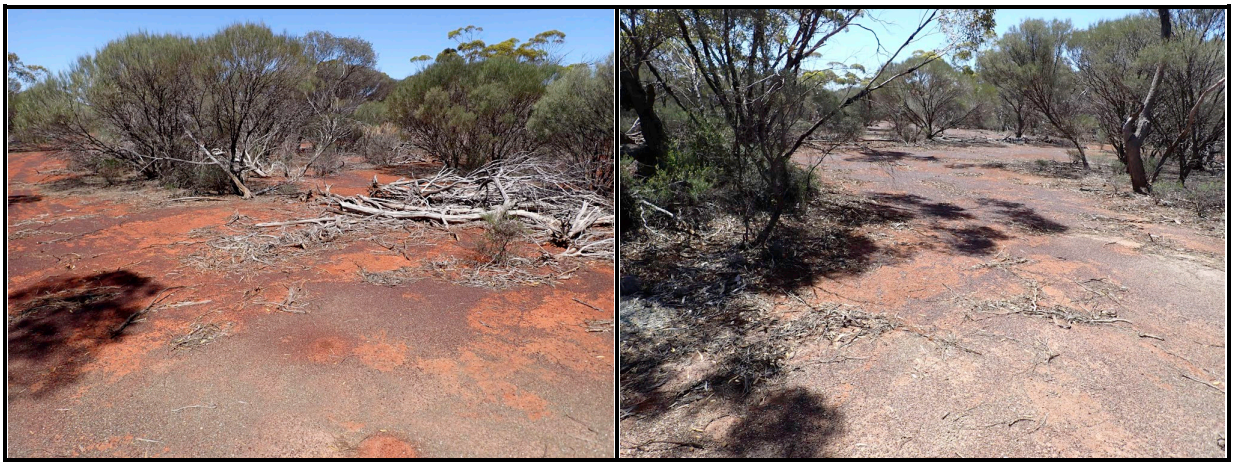
TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 81 Observer: Tom Raymond

GDA94 51; 269980 mE 6673948 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 82 Observer: Tom Raymond

GDA94 51; 269781 mE 6673783 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 83 Observer: Tom Raymond

GDA94 51; 269882 mE 6673589 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 84 Observer: Tom Raymond

GDA94 51; 269885 mE 6673369 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 85 Observer: Tom Raymond

GDA94 51; 269887 mE 6673181 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 86 Observer: Tom Raymond

GDA94 51; 269880 mE 6672978 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 87 Observer: Tom Raymond

GDA94 51; 269885 mE 6672784 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 88 Observer: Tom Raymond

GDA94 51; 270059 mE 6672580 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 89 Observer: Tom Raymond

GDA94 51; 270076 mE 6672384 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 90 Observer: Tom Raymond

GDA94 51; 270076 mE 6672186 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 91 Observer: Tom Raymond

GDA94 51; 270089 mE 6671988 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 92 Observer: Tom Raymond

GDA94 51; 270087 mE 6671762 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 93 Observer: Tom Raymond

GDA94 51; 270072 mE 6671580 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 94 Observer: Tom Raymond

GDA94 51; 270086 mE 6671385 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 95 Observer: Tom Raymond

GDA94 51; 270083 mE 6671184 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland

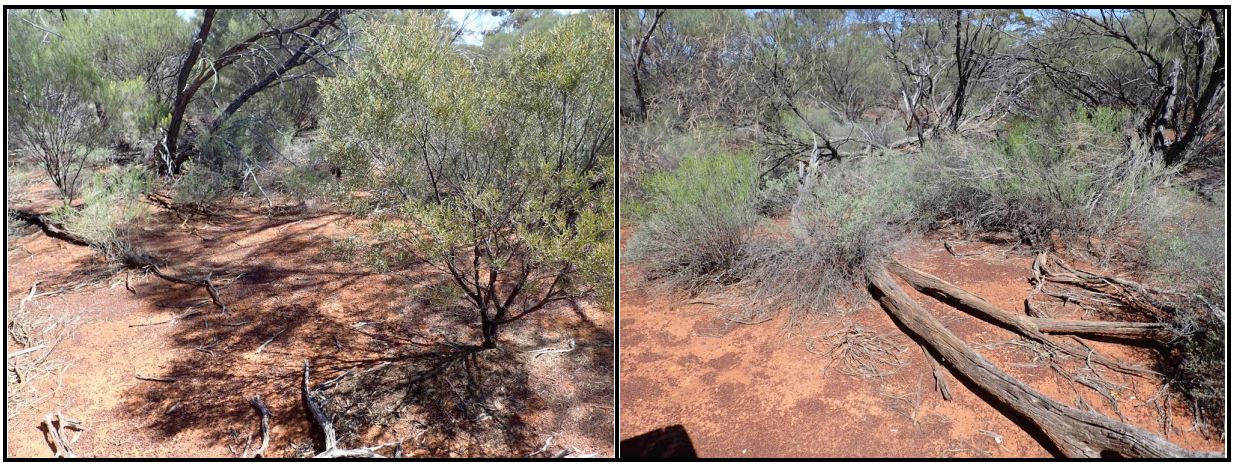


Date: 28/11/2024 Habitat Assessment #: 96 Observer: Tom Raymond

GDA94 51; 270086 mE 6671021 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 97 Observer: Tom Raymond

GDA94 51; 269973 mE 6671380 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 98 Observer: Tom Raymond

GDA94 51; 269894 mE 6671586 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 99 Observer: Tom Raymond

GDA94 51; 269893 mE 6671780 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 100 Observer: Tom Raymond

GDA94 51; 269885 mE 6671979 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 101 Observer: Tom Raymond

GDA94 51; 269886 mE 6672174 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 102 Observer: Tom Raymond

GDA94 51; 269888 mE 6672375 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 103 Observer: Tom Raymond

GDA94 51; 269699 mE 6672369 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 104 Observer: Tom Raymond

GDA94 51; 269720 mE 6672585 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 105 Observer: Tom Raymond

GDA94 51; 269886 mE 6672588 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 106 Observer: Tom Raymond

GDA94 51; 269689 mE 6672780 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 107 Observer: Tom Raymond

GDA94 51; 269683 mE 6672973 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 108 Observer: Tom Raymond

GDA94 51; 269693 mE 6673173 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 109 Observer: Tom Raymond

GDA94 51; 269684 mE 6673383 mN Fire History: > 5yrs Landform: Undulating plain

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

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 110 Observer: Tom Raymond

GDA94 51; 269493 mE 6673386 mN Fire History: > 5yrs Landform: Flat plain

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

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



TERRESTRIAL ECOSYSTEMS

Date: 28/11/2024 Habitat Assessment #: 111 Observer: Tom Raymond

GDA94 51; 269513 mE 6673583 mN Fire History: > 5yrs Landform: Flat plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over open acacia and sclerophyll shrubland



Date: 28/11/2024 Habitat Assessment #: 112 Observer: Tom Raymond

GDA94 51; 269686 mE 6673590 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed Eucalyptus woodland over thick acacia and sclerophyll shrubland



Appendix E.
Camponotus terebrans ant tree assessment results

Fauna survey and assessment
M30/257



Date	Tree #	Tree bark type	DBH (cm)	Ants present
27/11/2024	1	Rough Bark	360	N
27/11/2024	2	Rough Bark	470	N
27/11/2024	3	Rough Bark	350	N
27/11/2024	4	Rough Bark	190	N
27/11/2024	5	Rough Bark	280	N
27/11/2024	6	Rough Bark	550	N
27/11/2024	7	Rough Bark	240	N
27/11/2024	8	Rough Bark	550	N
27/11/2024	9	Rough Bark	150	N
27/11/2024	10	Rough Bark	190	N
27/11/2024	11	Rough Bark	230	N
27/11/2024	12	Rough Bark	390	N
27/11/2024	13	Rough Bark	410	N
17/12/2024	14	Rough Bark	250	N
17/12/2024	15	Rough Bark	450	N
17/12/2024	16	Rough Bark	370	N
17/12/2024	17	Rough Bark	650	N
17/12/2024	18	Rough Bark	270	N
17/12/2024	19	Rough Bark	380	N
17/12/2024	20	Rough Bark	370	N
17/12/2024	21	Smooth Bark	280	N
17/12/2024	22	Rough Bark	390	N
17/12/2024	23	Rough Bark	330	N
17/12/2024	24	Rough Bark	390	N
17/12/2024	25	Rough Bark	1100	N
17/12/2024	26	Rough Bark	200	N
17/12/2024	27	Rough Bark	230	N
17/12/2024	28	Smooth Bark	290	N
17/12/2024	29	Smooth Bark	340	N
17/12/2024	30	Rough Bark	370	N
17/12/2024	31	Rough Bark	630	N
17/12/2024	32	Smooth Bark	520	N
17/12/2024	33	Smooth Bark	430	N

Date	Tree #	Tree bark type	DBH (cm)	Ants present
17/12/2024	34	Rough Bark	220	N
17/12/2024	35	Rough Bark	170	N
17/12/2024	36	Rough Bark	150	N
17/12/2024	37	Rough Bark	310	N
17/12/2024	38	Rough Bark	240	N
17/12/2024	39	Rough Bark	450	N
17/12/2024	40	Rough Bark	260	N
17/12/2024	41	Smooth Bark	420	N
17/12/2024	42	Smooth Bark	250	N
17/12/2024	43	Rough Bark	250	N
17/12/2024	44	Smooth Bark	250	N
17/12/2024	45	Smooth Bark	370	N
17/12/2024	46	Rough Bark	180	N
17/12/2024	47	Rough Bark	240	N
17/12/2024	48	Rough Bark	460	N
17/12/2024	49	Smooth Bark	370	Y-Few
17/12/2024	50	Smooth Bark	320	N
17/12/2024	51	Rough Bark	250	N
17/12/2024	52	Rough Bark	400	N
17/12/2024	53	Smooth Bark	440	N
17/12/2024	54	Rough Bark	170	N
17/12/2024	55	Rough Bark	220	N
17/12/2024	56	Rough Bark	330	N
17/12/2024	57	Rough Bark	220	N
17/12/2024	58	Rough Bark	340	N
17/12/2024	59	Rough Bark	160	N
17/12/2024	60	Rough Bark	370	N
17/12/2024	61	Rough Bark	240	N
17/12/2024	62	Rough Bark	170	N
17/12/2024	63	Rough Bark	400	N
17/12/2024	64	Rough Bark	210	N
17/12/2024	65	Rough Bark	430	N
17/12/2024	66	Rough Bark	380	N

Date	Tree #	Tree bark type	DBH (cm)	Ants present
17/12/2024	67	Rough Bark	210	N
17/12/2024	68	Rough Bark	180	N
17/12/2024	69	Rough Bark	160	N
17/12/2024	70	Rough Bark	170	N
17/12/2024	71	Rough Bark	220	N
17/12/2024	72	Rough Bark	280	N
17/12/2024	73	Rough Bark	430	N
17/12/2024	74	Rough Bark	280	N
17/12/2024	75	Rough Bark	190	N
17/12/2024	76	Rough Bark	170	N
17/12/2024	77	Rough Bark	180	N
17/12/2024	78	Rough Bark	260	N
17/12/2024	79	Rough Bark	150	N
17/12/2024	80	Rough Bark	190	N
17/12/2024	81	Rough Bark	180	N
17/12/2024	82	Rough Bark	310	N
17/12/2024	83	Rough Bark	420	N
17/12/2024	84	Rough Bark	190	N
17/12/2024	85	Rough Bark	440	N
17/12/2024	86	Rough Bark	180	N
17/12/2024	87	Rough Bark	510	N
17/12/2024	88	Rough Bark	480	N
17/12/2024	89	Rough Bark	510	N
17/12/2024	90	Rough Bark	290	N
17/12/2024	91	Rough Bark	190	N
17/12/2024	92	Rough Bark	290	N
17/12/2024	93	Smooth Bark	260	N
17/12/2024	94	Smooth Bark	610	N
17/12/2024	95	Rough Bark	340	N
17/12/2024	96	Rough Bark	180	N
17/12/2024	97	Rough Bark	180	N
17/12/2024	98	Rough Bark	290	N
17/12/2024	99	Rough Bark	300	N

Date	Tree #	Tree bark type	DBH (cm)	Ants present
17/12/2024	100	Rough Bark	300	N
17/12/2024	101	Rough Bark	210	N
17/12/2024	102	Rough Bark	780	N
17/12/2024	103	Smooth Bark	620	N
17/12/2024	104	Rough Bark	320	N
17/12/2024	105	Rough Bark	360	N
17/12/2024	106	Rough Bark	360	N
17/12/2024	107	Rough Bark	190	N
17/12/2024	108	Rough Bark	130	N
17/12/2024	109	Rough Bark	220	N
17/12/2024	110	Rough Bark	240	N
17/12/2024	111	Rough Bark	280	N
17/12/2024	112	Rough Bark	400	N
17/12/2024	113	Rough Bark	190	N
17/12/2024	114	Rough Bark	390	N
17/12/2024	115	Rough Bark	330	N
17/12/2024	116	Rough Bark	310	N
17/12/2024	117	Rough Bark	330	N
17/12/2024	118	Rough Bark	180	N
17/12/2024	119	Rough Bark	160	N
17/12/2024	120	Rough Bark	280	N
17/12/2024	121	Rough Bark	220	N
17/12/2024	122	Rough Bark	200	N
17/12/2024	123	Rough Bark	220	N
17/12/2024	124	Rough Bark	280	N
17/12/2024	125	Rough Bark	480	N
17/12/2024	126	Rough Bark	340	N
17/12/2024	127	Rough Bark	380	N
17/12/2024	128	Rough Bark	180	N
17/12/2024	129	Smooth Bark	200	N
17/12/2024	130	Rough Bark	200	N
17/12/2024	131	Rough Bark	480	N
17/12/2024	132	Rough Bark	430	N

Date	Tree #	Tree bark type	DBH (cm)	Ants present
17/12/2024	133	Rough Bark	200	N
17/12/2024	134	Smooth Bark	610	N
17/12/2024	135	Rough Bark	290	N
17/12/2024	136	Rough Bark	460	N
17/12/2024	137	Rough Bark	210	N
17/12/2024	138	Rough Bark	220	N
17/12/2024	139	Rough Bark	580	N
17/12/2024	140	Rough Bark	320	N
17/12/2024	141	Rough Bark	260	N
17/12/2024	142	Rough Bark	210	N
17/12/2024	143	Smooth Bark	300	N
17/12/2024	144	Smooth Bark	190	N
17/12/2024	145	Smooth Bark	270	N
17/12/2024	146	Smooth Bark	330	N
17/12/2024	147	Rough Bark	160	N
17/12/2024	148	Smooth Bark	330	N
17/12/2024	149	Rough Bark	270	N
17/12/2024	150	Rough Bark	230	N
17/12/2024	151	Rough Bark	340	N
17/12/2024	152	Rough Bark	240	N
17/12/2024	153	Rough Bark	200	N
17/12/2024	154	Rough Bark	440	N
17/12/2024	155	Rough Bark	280	N
17/12/2024	156	Rough Bark	230	N
17/12/2024	157	Rough Bark	220	N
17/12/2024	158	Rough Bark	170	N
17/12/2024	159	Rough Bark	150	N
18/12/2024	160	Rough Bark	190	N
18/12/2024	161	Rough Bark	520	N
18/12/2024	162	Rough Bark	330	N
18/12/2024	163	Rough Bark	250	N
18/12/2024	164	Rough Bark	430	N
18/12/2024	165	Rough Bark	1170	N

Date	Tree #	Tree bark type	DBH (cm)	Ants present
18/12/2024	166	Smooth Bark	270	N
18/12/2024	167	Smooth Bark	160	N
18/12/2024	168	Smooth Bark	950	N
18/12/2024	169	Rough Bark	430	N
18/12/2024	170	Rough Bark	240	N
18/12/2024	171	Rough Bark	320	N
18/12/2024	172	Rough Bark	220	N
18/12/2024	173	Rough Bark	350	N
18/12/2024	174	Rough Bark	200	N
18/12/2024	175	Rough Bark	520	N
18/12/2024	176	Rough Bark	330	N
18/12/2024	177	Rough Bark	280	N
18/12/2024	178	Rough Bark	210	N
18/12/2024	179	Rough Bark	350	N
18/12/2024	180	Rough Bark	130	N
18/12/2024	181	Rough Bark	210	N
18/12/2024	182	Rough Bark	570	N
18/12/2024	183	Rough Bark	230	N
18/12/2024	184	Rough Bark	170	N
18/12/2024	185	Rough Bark	270	N
18/12/2024	186	Rough Bark	470	N
18/12/2024	187	Rough Bark	160	N
18/12/2024	188	Rough Bark	260	N
18/12/2024	189	Rough Bark	270	N
18/12/2024	190	Rough Bark	300	N
18/12/2024	191	Rough Bark	610	N
18/12/2024	192	Smooth Bark	510	N
18/12/2024	193	Rough Bark	250	N
18/12/2024	194	Smooth Bark	460	N
18/12/2024	195	Rough Bark	250	N
18/12/2024	196	Rough Bark	310	N
18/12/2024	197	Smooth Bark	260	N
18/12/2024	198	Rough Bark	290	Y-Few

Date	Tree #	Tree bark type	DBH (cm)	Ants present
18/12/2024	199	Rough Bark	310	N
18/12/2024	200	Rough Bark	240	N
18/12/2024	201	Smooth Bark	180	N
18/12/2024	202	Rough Bark	180	N
18/12/2024	203	Smooth Bark	250	N
18/12/2024	204	Rough Bark	400	N
18/12/2024	205	Rough Bark	210	N
18/12/2024	206	Smooth Bark	510	N
18/12/2024	207	Rough Bark	230	N
18/12/2024	208	Rough Bark	320	N
18/12/2024	209	Rough Bark	390	N
18/12/2024	210	Smooth Bark	490	N
18/12/2024	211	Smooth Bark	210	N
18/12/2024	212	Rough Bark	170	N
18/12/2024	213	Rough Bark	430	N
18/12/2024	214	Rough Bark	290	N
18/12/2024	215	Rough Bark	380	N
18/12/2024	216	Smooth Bark	160	N
18/12/2024	217	Rough Bark	300	N
18/12/2024	218	Smooth Bark	180	N
18/12/2024	219	Smooth Bark	410	N
18/12/2024	220	Rough Bark	560	N
18/12/2024	221	Rough Bark	240	N
18/12/2024	222	Rough Bark	150	Y?
18/12/2024	223	Rough Bark	250	N
18/12/2024	224	Rough Bark	330	N
18/12/2024	225	Rough Bark	590	N
18/12/2024	226	Rough Bark	430	N
18/12/2024	227	Rough Bark	220	N
18/12/2024	228	Rough Bark	240	N
18/12/2024	229	Rough Bark	270	N
18/12/2024	230	Rough Bark	520	N
18/12/2024	231	Smooth Bark	680	N

Date	Tree #	Tree bark type	DBH (cm)	Ants present
18/12/2024	232	Rough Bark	270	N
18/12/2024	233	Rough Bark	310	N
18/12/2024	234	Smooth Bark	160	N
18/12/2024	235	Smooth Bark	690	N
18/12/2024	236	Rough Bark	390	N
18/12/2024	237	Rough Bark	410	N
18/12/2024	238	Rough Bark	290	N
18/12/2024	239	Rough Bark	260	N
18/12/2024	240	Rough Bark	430	N
18/12/2024	241	Rough Bark	550	N
18/12/2024	242	Rough Bark	230	N
18/12/2024	243	Rough Bark	470	N
18/12/2024	244	Rough Bark	330	N
18/12/2024	245	Rough Bark	400	N
18/12/2024	246	Rough Bark	420	N
18/12/2024	247	Rough Bark	400	N
18/12/2024	248	Rough Bark	240	N
18/12/2024	249	Rough Bark	540	N
18/12/2024	250	Rough Bark	470	N
18/12/2024	251	Rough Bark	270	N
18/12/2024	252	Rough Bark	620	N
18/12/2024	253	Rough Bark	300	N
18/12/2024	254	Rough Bark	270	N
18/12/2024	255	Rough Bark	200	N
18/12/2024	256	Rough Bark	240	N
18/12/2024	257	Smooth Bark	410	N
18/12/2024	258	Rough Bark	830	N
18/12/2024	259	Rough Bark	530	N
18/12/2024	260	Rough Bark	900	N
18/12/2024	261	Rough Bark	330	N
18/12/2024	262	Rough Bark	460	N
18/12/2024	263	Rough Bark	430	N
18/12/2024	264	Rough Bark	350	N

Date	Tree #	Tree bark type	DBH (cm)	Ants present
18/12/2024	265	Rough Bark	270	N
18/12/2024	266	Rough Bark	300	N
18/12/2024	267	Rough Bark	190	N
18/12/2024	268	Rough Bark	160	N
18/12/2024	269	Rough Bark	310	N
18/12/2024	270	Rough Bark	330	N
18/12/2024	271	Rough Bark	200	Y- Many
18/12/2024	272	Rough Bark	310	N
18/12/2024	273	Rough Bark	230	N
18/12/2024	274	Smooth Bark	430	N
18/12/2024	275	Rough Bark	240	N
18/12/2024	276	Rough Bark	230	N
18/12/2024	277	Rough Bark	230	N
18/12/2024	278	Rough Bark	150	N
18/12/2024	279	Rough Bark	200	N
18/12/2024	280	Rough Bark	180	N
18/12/2024	281	Rough Bark	190	N
18/12/2024	282	Rough Bark	310	N
18/12/2024	283	Rough Bark	210	N
18/12/2024	284	Rough Bark	290	N
18/12/2024	285	Smooth Bark	760	N
18/12/2024	286	Rough Bark	150	N
18/12/2024	287	Rough Bark	230	N
18/12/2024	288	Rough Bark	480	N
18/12/2024	289	Rough Bark	740	N
18/12/2024	290	Rough Bark	480	N
18/12/2024	291	Rough Bark	230	N
18/12/2024	292	Rough Bark	560	N
18/12/2024	293	Rough Bark	220	N
18/12/2024	294	Rough Bark	230	N
18/12/2024	295	Rough Bark	190	N
18/12/2024	296	Rough Bark	300	N
18/12/2024	297	Rough Bark	670	N

Date	Tree #	Tree bark type	DBH (cm)	Ants present
18/12/2024	298	Rough Bark	360	N
18/12/2024	299	Rough Bark	250	N
18/12/2024	300	Rough Bark	410	N
18/12/2024	301	Rough Bark	310	N
18/12/2024	302	Rough Bark	490	N
18/12/2024	303	Rough Bark	730	N
18/12/2024	304	Rough Bark	240	N
18/12/2024	305	Smooth Bark	210	N
18/12/2024	306	Rough Bark	200	N
18/12/2024	307	Rough Bark	240	N
18/12/2024	308	Smooth Bark	430	N
18/12/2024	309	Smooth Bark	610	N
18/12/2024	310	Rough Bark	250	N
18/12/2024	311	Rough Bark	360	N
18/12/2024	312	Smooth Bark	240	N
18/12/2024	313	Smooth Bark	130	N
18/12/2024	314	Rough Bark	520	N
18/12/2024	315	Rough Bark	360	N
18/12/2024	316	Rough Bark	630	N
18/12/2024	317	Rough Bark	390	N
18/12/2024	318	Rough Bark	240	N
18/12/2024	319	Rough Bark	450	N
18/12/2024	320	Rough Bark	270	N
18/12/2024	321	Rough Bark	250	N
18/12/2024	322	Rough Bark	290	N
18/12/2024	323	Rough Bark	250	N
18/12/2024	324	Rough Bark	250	N
18/12/2024	325	Rough Bark	320	N
18/12/2024	326	Rough Bark	400	N
18/12/2024	327	Rough Bark	410	N
18/12/2024	328	Smooth Bark	440	N
18/12/2024	329	Smooth Bark	170	N
19/12/2024	330	Rough Bark	240	N

Date	Tree #	Tree bark type	DBH (cm)	Ants present
19/12/2024	331	Rough Bark	480	N
19/12/2024	332	Rough Bark	200	N
19/12/2024	333	Rough Bark	190	N
19/12/2024	334	Rough Bark	380	Y-Few
19/12/2024	335	Rough Bark	230	N
19/12/2024	336	Rough Bark	440	N
19/12/2024	337	Rough Bark	160	N
19/12/2024	338	Rough Bark	350	N
19/12/2024	339	Rough Bark	340	N
19/12/2024	340	Rough Bark	230	N
19/12/2024	341	Rough Bark	190	N
19/12/2024	342	Rough Bark	480	N
19/12/2024	343	Rough Bark	430	N
19/12/2024	344	Rough Bark	780	N
19/12/2024	345	Rough Bark	430	N
19/12/2024	346	Smooth Bark	240	N
19/12/2024	347	Rough Bark	230	N
19/12/2024	348	Smooth Bark	260	N
19/12/2024	349	Rough Bark	220	N
19/12/2024	350	Rough Bark	210	N
19/12/2024	351	Smooth Bark	170	N
19/12/2024	352	Smooth Bark	170	N
19/12/2024	353	Rough Bark	200	N
19/12/2024	354	Smooth Bark	190	N
19/12/2024	355	Smooth Bark	240	N
19/12/2024	356	Rough Bark	520	N
19/12/2024	357	Rough Bark	380	N
19/12/2024	358	Rough Bark	640	N
19/12/2024	359	Rough Bark	150	N
19/12/2024	360	Rough Bark	310	N
19/12/2024	361	Rough Bark	160	N
19/12/2024	362	Rough Bark	130	N
19/12/2024	363	Rough Bark	160	N

Date	Tree #	Tree bark type	DBH (cm)	Ants present
19/12/2024	364	Rough Bark	250	N
19/12/2024	365	Rough Bark	550	N
19/12/2024	366	Rough Bark	160	N
19/12/2024	367	Rough Bark	280	N
19/12/2024	368	Rough Bark	210	N
19/12/2024	369	Rough Bark	240	N
19/12/2024	370	Rough Bark	570	N
19/12/2024	371	Rough Bark	430	N
19/12/2024	372	Rough Bark	480	N
19/12/2024	373	Rough Bark	150	N
19/12/2024	374	Rough Bark	600	N
19/12/2024	375	Rough Bark	200	N
19/12/2024	376	Rough Bark	200	N
19/12/2024	377	Rough Bark	550	N
19/12/2024	378	Rough Bark	390	N
19/12/2024	379	Rough Bark	180	N
19/12/2024	380	Rough Bark	420	N
19/12/2024	381	Rough Bark	220	N
19/12/2024	382	Rough Bark	160	N
19/12/2024	383	Rough Bark	280	N
19/12/2024	384	Rough Bark	340	N
19/12/2024	385	Rough Bark	420	N
19/12/2024	386	Rough Bark	450	N
19/12/2024	387	Rough Bark	520	N
19/12/2024	388	Rough Bark	200	N
19/12/2024	389	Rough Bark	150	N
19/12/2024	390	Rough Bark	350	N
19/12/2024	391	Smooth Bark	270	N
19/12/2024	392	Rough Bark	250	N
19/12/2024	393	Rough Bark	260	N
19/12/2024	394	Rough Bark	140	N
19/12/2024	395	Rough Bark	340	N
19/12/2024	396	Rough Bark	200	N

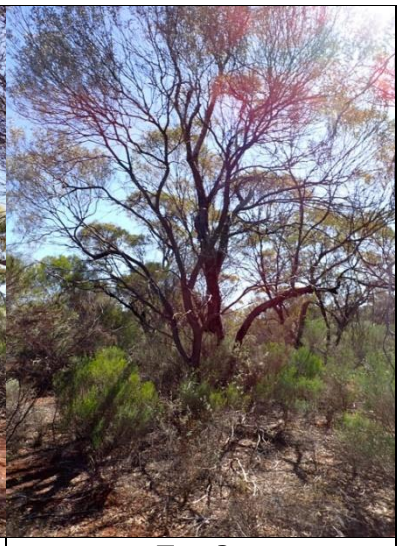
Date	Tree #	Tree bark type	DBH (cm)	Ants present
19/12/2024	397	Rough Bark	280	N
19/12/2024	398	Rough Bark	300	N
19/12/2024	399	Rough Bark	490	N
19/12/2024	400	Rough Bark	520	N
19/12/2024	401	Rough Bark	240	N
19/12/2024	402	Rough Bark	330	N
19/12/2024	403	Rough Bark	200	N
19/12/2024	404	Rough Bark	290	N
19/12/2024	405	Rough Bark	210	N
19/12/2024	406	Rough Bark	260	N
19/12/2024	407	Rough Bark	220	N
19/12/2024	408	Rough Bark	340	N
19/12/2024	409	Rough Bark	180	N
19/12/2024	410	Rough Bark	140	N
19/12/2024	411	Rough Bark	280	N
19/12/2024	412	Rough Bark	290	N
19/12/2024	413	Rough Bark	380	N
19/12/2024	414	Rough Bark	210	N
19/12/2024	415	Smooth Bark	130	N
19/12/2024	416	Rough Bark	150	N
19/12/2024	417	Rough Bark	400	N
19/12/2024	418	Rough Bark	250	N
19/12/2024	419	Rough Bark	260	N
19/12/2024	420	Rough Bark	140	N
19/12/2024	421	Rough Bark	430	N
19/12/2024	422	Rough Bark	420	N
19/12/2024	423	Rough Bark	590	N
19/12/2024	424	Smooth Bark	190	N
19/12/2024	425	Rough Bark	490	N
19/12/2024	426	Rough Bark	380	N
19/12/2024	427	Rough Bark	640	N
19/12/2024	428	Rough Bark	580	N
19/12/2024	429	Smooth Bark	260	N

Date	Tree #	Tree bark type	DBH (cm)	Ants present
19/12/2024	430	Rough Bark	190	N
19/12/2024	431	Rough Bark	280	N
19/12/2024	432	Rough Bark	330	N
19/12/2024	433	Smooth Bark	180	N

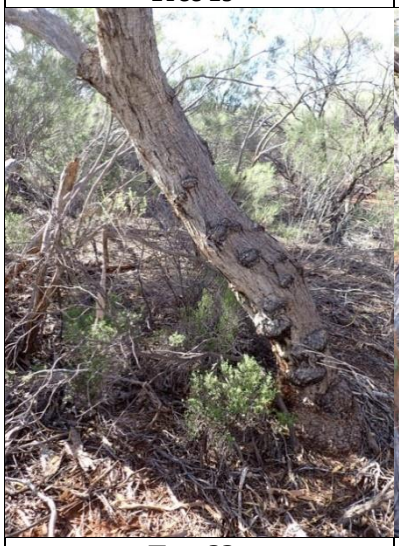
Appendix F.
Images of Eucalypt trees examined for the presence of *Camponotus terebrans* ants

Fauna survey and assessment
M30/257



		
Tree 1	**Tree 2**	**Tree 3**
		
Tree 4	**Tree 5**	**Tree 6**
		
Tree 7	**Tree 8**	**Tree 9**

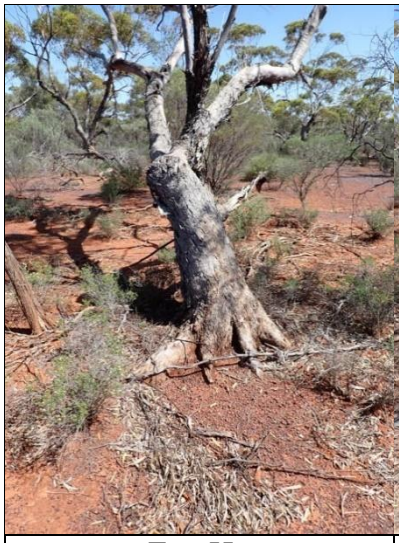
		
Tree 10	**Tree 11**	**Tree 12**
		
Tree 13	**Tree 14**	**Tree 15**
		
Tree 16	**Tree 17**	**Tree 18**

		
Tree 19	**Tree 20**	**Tree 21**
		
Tree 22	**Tree 23**	**Tree 24**
		
Tree 25	**Tree 26**	**Tree 27**

		
Tree 28	**Tree 29**	**Tree 30**
		
Tree 31	**Tree 32**	**Tree 33**
		
Tree 34	**Tree 35**	**Tree 36**

		
Tree 37	**Tree 38**	**Tree 39**
		
Tree 40	**Tree 41**	**Tree 42**
		
Tree 43	**Tree 44**	**Tree 45**

		
Tree 46	**Tree 47**	**Tree 48**
		
Tree 49	**Tree 50**	**Tree 51**
		
Tree 52	**Tree 53**	**Tree 54**

		
Tree 55	**Tree 56**	**Tree 57**
		
Tree 58	**Tree 59**	**Tree 60**
		
Tree 61	**Tree 62**	**Tree 63**

		
Tree 64	**Tree 65**	**Tree 66**
		
Tree 67	**Tree 68**	**Tree 69**
		
Tree 70	**Tree 71**	**Tree 72**

		
Tree 73	**Tree 74**	**Tree 75**
		
Tree 76	**Tree 77**	**Tree 78**
		
Tree 79	**Tree 80**	**Tree 81**

		
Tree 82	**Tree 83**	**Tree 84**
		
Tree 85	**Tree 86**	**Tree 87**
		
Tree 88	**Tree 89**	**Tree 90**

		
Tree 91	**Tree 92**	**Tree 93**
		
Tree 94	**Tree 95**	**Tree 96**
		
Tree 97	**Tree 98**	**Tree 99**

		
Tree 100	**Tree 101**	**Tree 102**
		
Tree 103	**Tree 104**	**Tree 105**
		
Tree 106	**Tree 107**	**Tree 108**

		
Tree 109	**Tree 110**	**Tree 111**
		
Tree 112	**Tree 113**	**Tree 114**
		
Tree 115	**Tree 116**	**Tree 117**

		
Tree 118	**Tree 119**	**Tree 120**
		
Tree 121	**Tree 122**	**Tree 123**
		
Tree 124	**Tree 125**	**Tree 126**



Tree 127



Tree 128



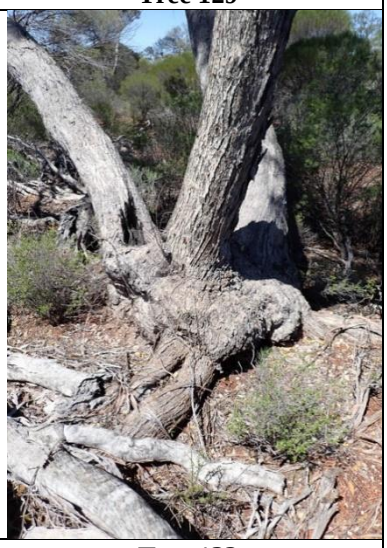
Tree 129



Tree 130



Tree 131



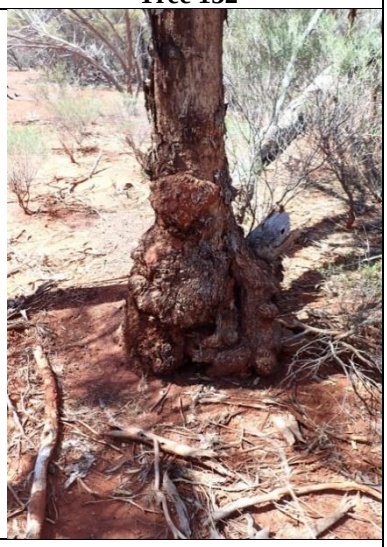
Tree 132



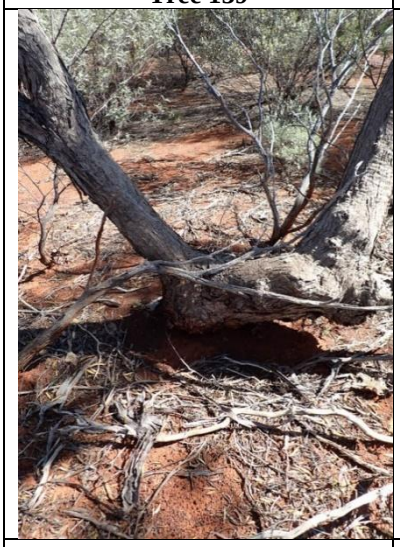
Tree 133

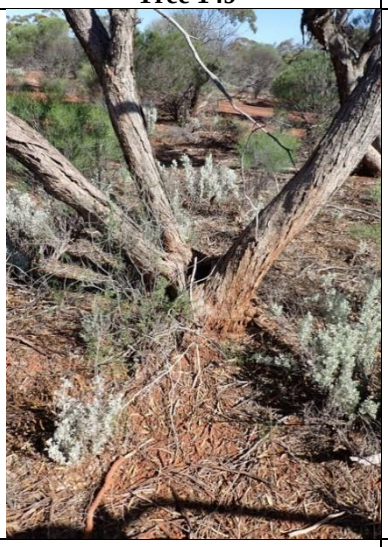


Tree 134



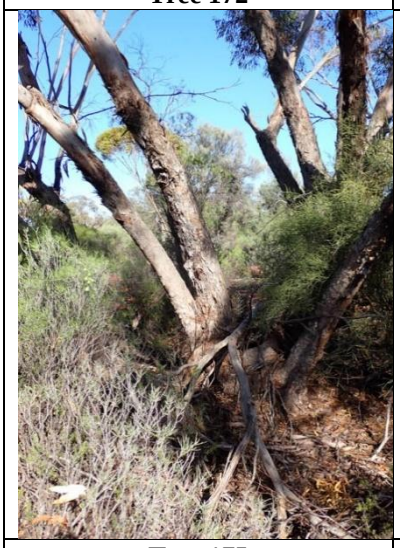
Tree 135

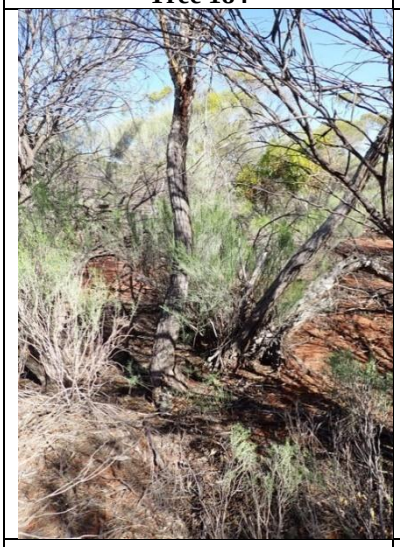
		
Tree 136	**Tree 137**	**Tree 138**
		
Tree 139	**Tree 140**	**Tree 141**
		
Tree 142	**Tree 143**	**Tree 144**

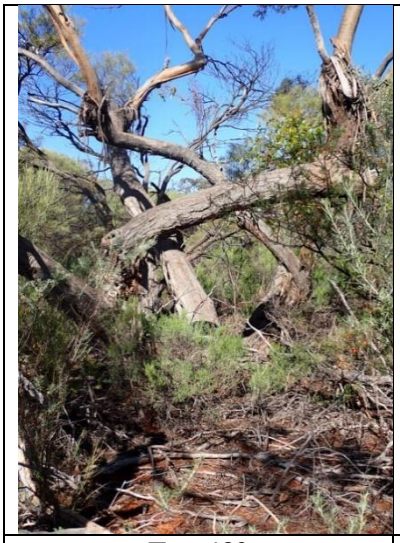
		
Tree 145	**Tree 146**	**Tree 147**
		
Tree 148	**Tree 149**	**Tree 150**
		
Tree 151	**Tree 152**	**Tree 153**

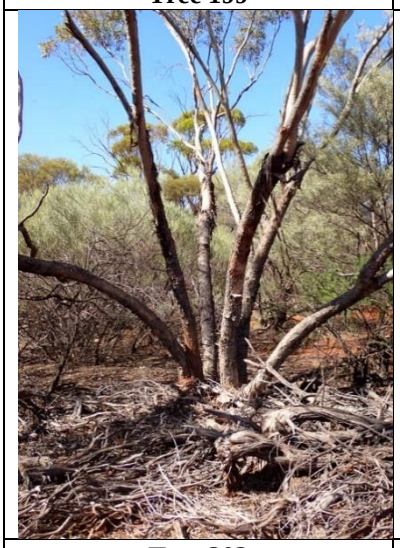
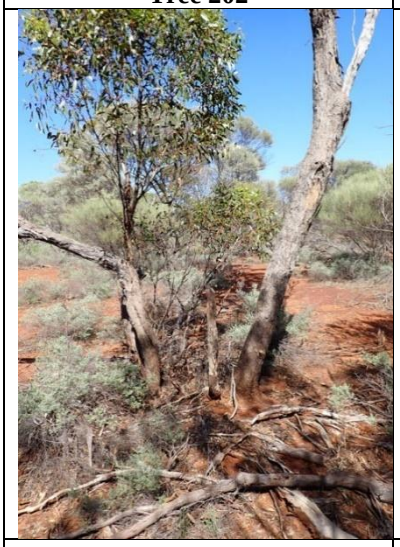
		
Tree 154	**Tree 155**	**Tree 156**
		
Tree 157	**Tree 158**	**Tree 159**
		
Tree 160	**Tree 161**	**Tree 162**

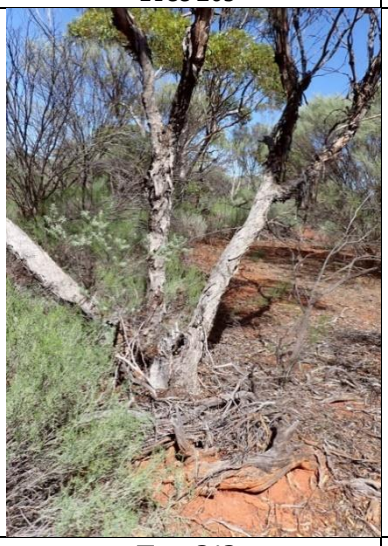
		
Tree 163	**Tree 164**	**Tree 165**
		
Tree 166	**Tree 167**	**Tree 168**
		
Tree 169	**Tree 170**	**Tree 171**

		
Tree 172	**Tree 173**	**Tree 174**
		
Tree 175	**Tree 176**	**Tree 177**
		
Tree 178	**Tree 179**	**Tree 180**

		
Tree 181	**Tree 182**	**Tree 183**
		
Tree 184	**Tree 185**	**Tree 186**
		
Tree 187	**Tree 188**	**Tree 189**

		
Tree 190	**Tree 191**	**Tree 192**
		
Tree 193	**Tree 194**	**Tree 195**
		
Tree 196	**Tree 197**	**Tree 198**

		
Tree 199	**Tree 200**	**Tree 201**
		
Tree 202	**Tree 203**	**Tree 204**
		
Tree 205	**Tree 206**	**Tree 207**

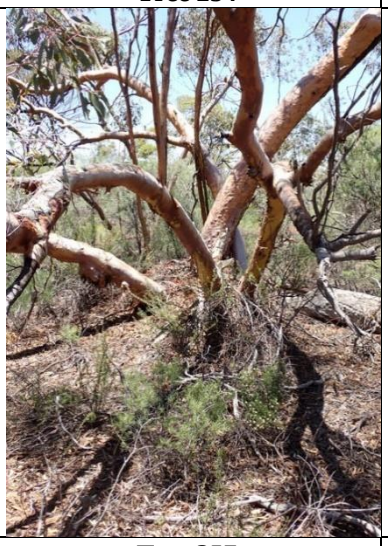
		
Tree 208	**Tree 209**	**Tree 210**
		
Tree 211	**Tree 212**	**Tree 213**
		
Tree 214	**Tree 215**	**Tree 216**

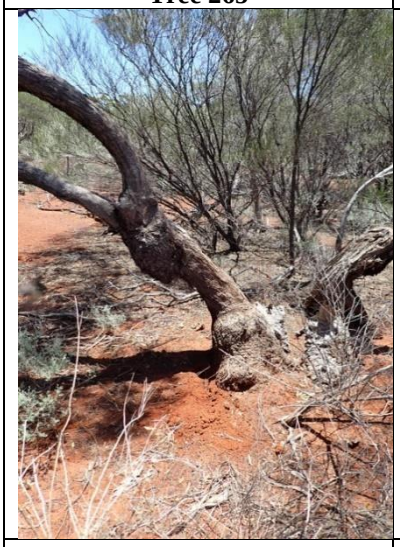
		
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Tree 220	**Tree 221**	**Tree 222**
		
Tree 223	**Tree 224**	**Tree 225**

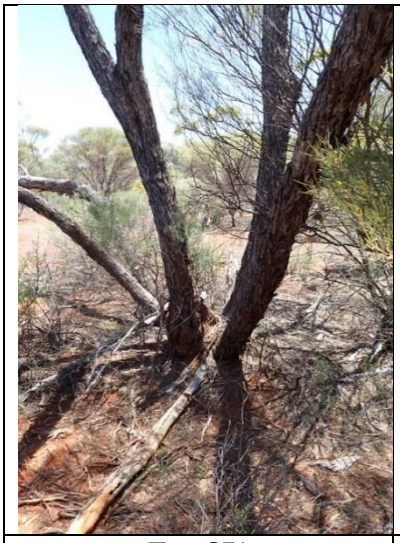
		
Tree 226	**Tree 227**	**Tree 228**
		
Tree 229	**Tree 230**	**Tree 231**
		
Tree 232	**Tree 233**	**Tree 234**

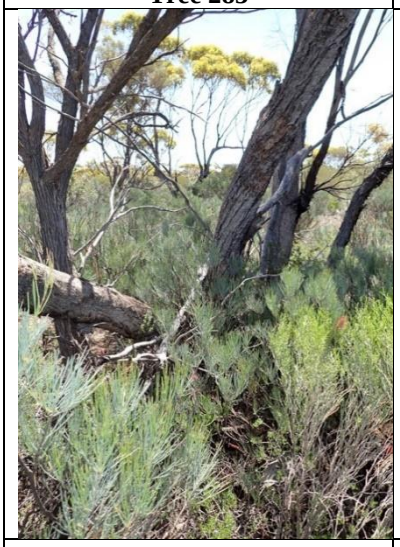
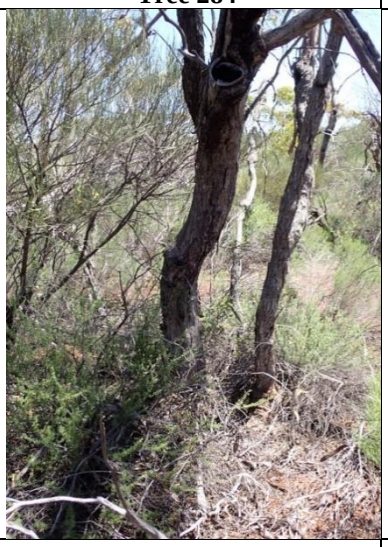
		
Tree 235	**Tree 236**	**Tree 237**
		
Tree 238	**Tree 239**	**Tree 240**
		
Tree 241	**Tree 242**	**Tree 243**

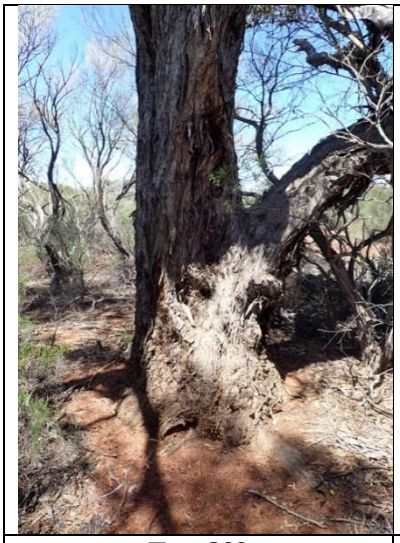
		
Tree 244	**Tree 245**	**Tree 246**
		
Tree 247	**Tree 248**	**Tree 249**
		
Tree 250	**Tree 251**	**Tree 252**

		
Tree 253	**Tree 254**	**Tree 255**
		
Tree 256	**Tree 257**	**Tree 258**
		
Tree 259	**Tree 260**	**Tree 261**

		
Tree 262	**Tree 263**	**Tree 264**
		
Tree 265	**Tree 266**	**Tree 267**
		
Tree 268	**Tree 269**	**Tree 270**

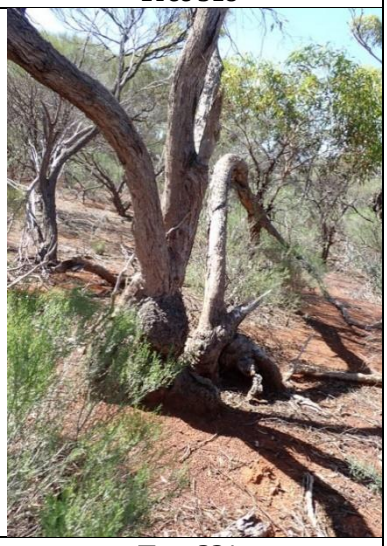
		
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Tree 274	**Tree 275**	**Tree 276**
		
Tree 277	**Tree 278**	**Tree 279**

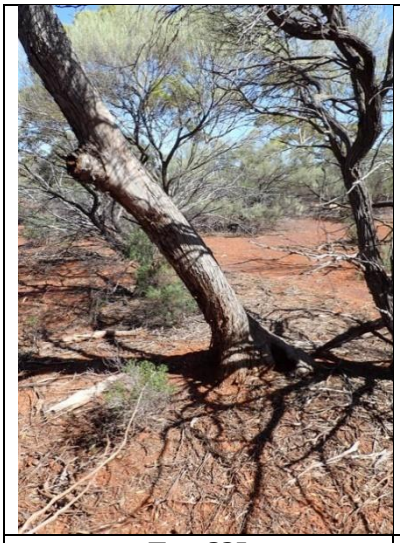
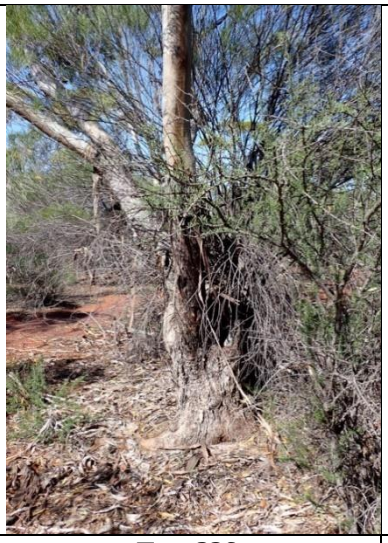
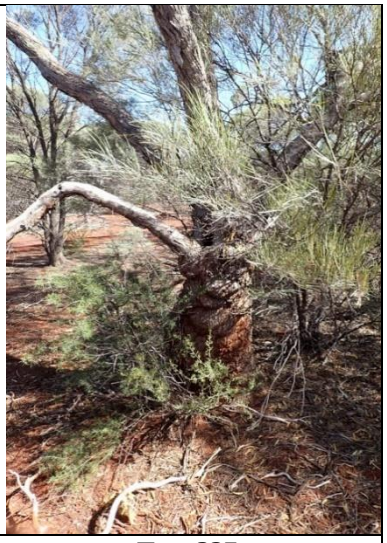
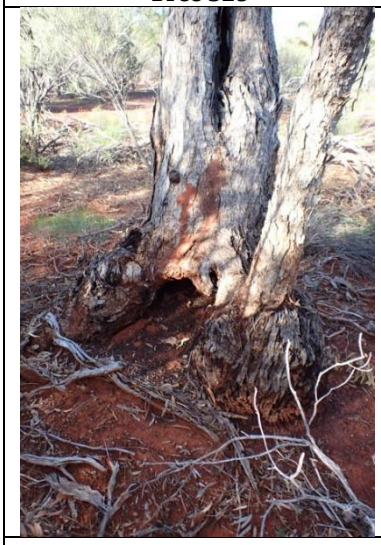
		
Tree 280	**Tree 281**	**Tree 282**
		
Tree 283	**Tree 284**	**Tree 285**
		
Tree 286	**Tree 287**	**Tree 288**

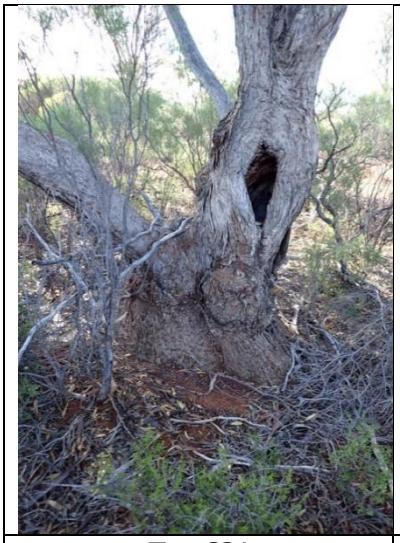
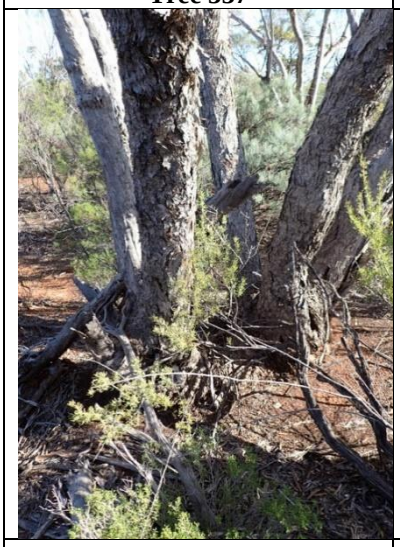
		
Tree 289	**Tree 290**	**Tree 291**
		
Tree 292	**Tree 293**	**Tree 294**
		
Tree 295	**Tree 296**	**Tree 297**

		
Tree 298	**Tree 299**	**Tree 300**
		
Tree 301	**Tree 302**	**Tree 303**
		
Tree 304	**Tree 305**	**Tree 306**

		
Tree 307	**Tree 308**	**Tree 309**
		
Tree 310	**Tree 311**	**Tree 312**
		
Tree 313	**Tree 314**	**Tree 315**

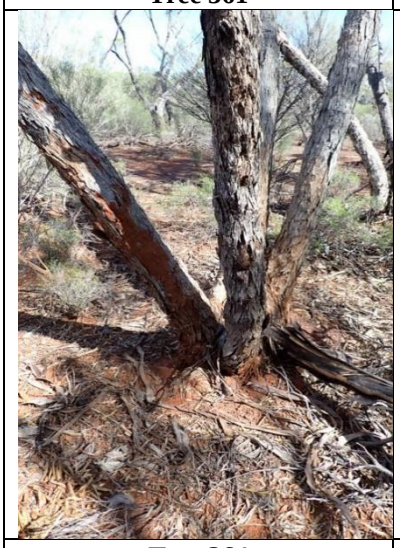
		
Tree 316	**Tree 317**	**Tree 318**
		
Tree 319	**Tree 320**	**Tree 321**
		
Tree 322	**Tree 323**	**Tree 324**

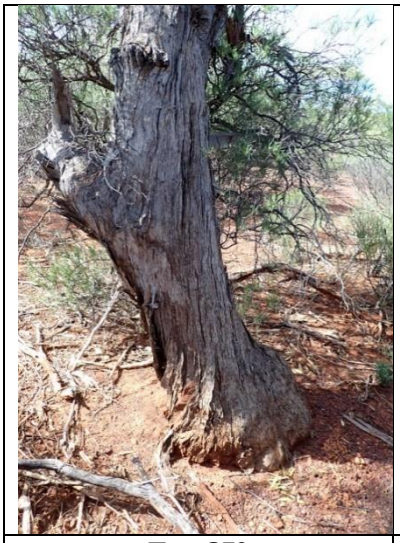
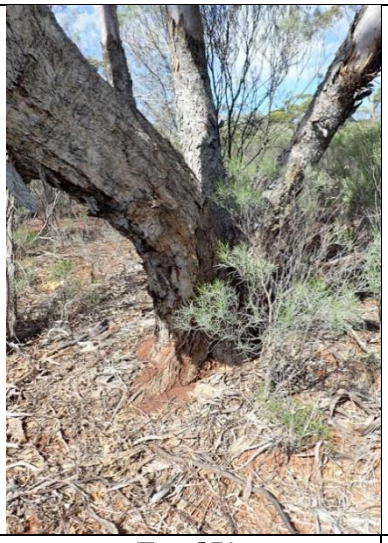
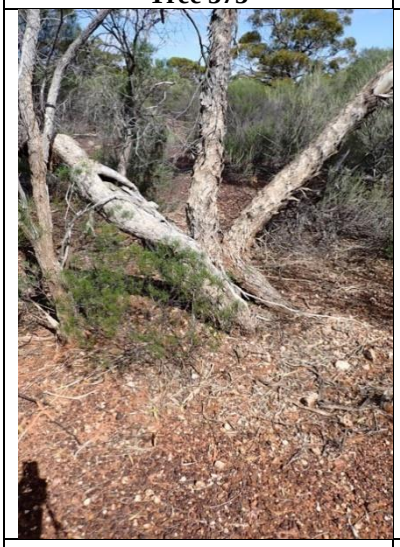
		
Tree 325	**Tree 326**	**Tree 327**
		
Tree 328	**Tree 329**	**Tree 330**
		
Tree 331	**Tree 332**	**Tree 333**

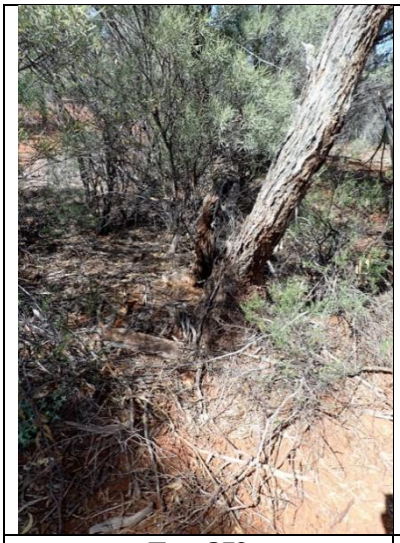
		
Tree 334	**Tree 335**	**Tree 336**
		
Tree 337	**Tree 338**	**Tree 339**
		
Tree 340	**Tree 341**	**Tree 342**

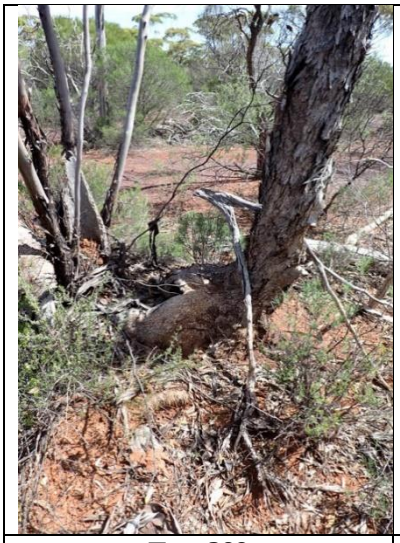
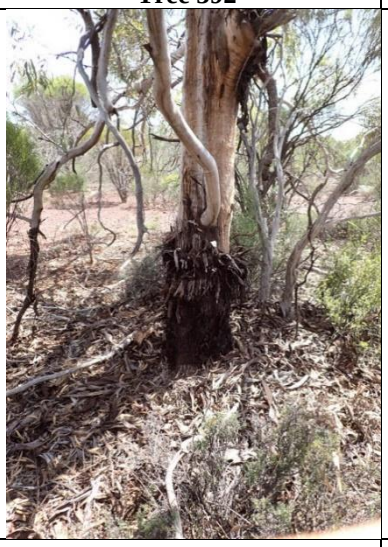
		
Tree 343	**Tree 344**	**Tree 345**
		
Tree 346	**Tree 347**	**Tree 348**
		
Tree 349	**Tree 350**	**Tree 351**

		
Tree 352	**Tree 353**	**Tree 354**
		
Tree 355	**Tree 356**	**Tree 357**
		
Tree 358	**Tree 359**	**Tree 360**

		
Tree 361	**Tree 362**	**Tree 363**
		
Tree 364	**Tree 365**	**Tree 366**
		
Tree 367	**Tree 368**	**Tree 369**

		
Tree 370	**Tree 371**	**Tree 372**
		
Tree 373	**Tree 374**	**Tree 375**
		
Tree 376	**Tree 377**	**Tree 378**

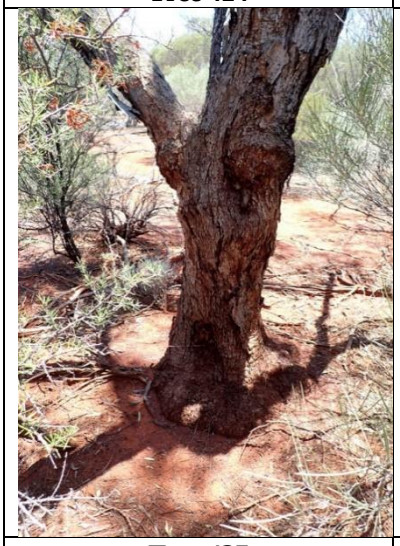
		
Tree 379	**Tree 380**	**Tree 381**
		
Tree 382	**Tree 383**	**Tree 384**
		
Tree 385	**Tree 386**	**Tree 387**

		
Tree 388	**Tree 389**	**Tree 390**
		
Tree 391	**Tree 392**	**Tree 393**
		
Tree 394	**Tree 395**	**Tree 396**

		
Tree 397	**Tree 398**	**Tree 399**
		
Tree 400	**Tree 401**	**Tree 402**
		
Tree 403	**Tree 404**	**Tree 405**

		
Tree 406	**Tree 407**	**Tree 408**
		
Tree 409	**Tree 410**	**Tree 411**
		
Tree 412	**Tree 413**	**Tree 414**

		
Tree 415	**Tree 416**	**Tree 417**
		
Tree 418	**Tree 419**	**Tree 420**
		
Tree 421	**Tree 422**	**Tree 423**

		
Tree 424	**Tree 425**	**Tree 426**
		
Tree 427	**Tree 428**	**Tree 429**
		
Tree 430	**Tree 431**	**Tree 432**

		
Tree 433		


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