

Basic Vertebrate Fauna Reconnaissance Survey and Risk Assessment

St Barbara Leonora Province Expansion

Prepared for: Native Vegetation Solutions

Version 1. February, 2023



RECORD OF DISTRIBUTION

No. of copies	Report File Name	Report Status	Date	Prepared for:	Initials
Electronic	2022-0103-002-GT V1	DRAFT	20 February 2023	Native Vegetation Solutions	GT

Suggested Citation: Terrestrial Ecosystems 2023 *Basic Vertebrate Fauna Reconnaissance Survey and Risk Assessment for St Barbara Leonora Province Expansion*, Unpublished report for Native Vegetation Solutions, Perth.

Prepared For: Native Vegetation Solutions
PO Box 41
Kalgoorlie WA 6430

Prepared By: Terrestrial Ecosystems
10 Houston Place
Mt Claremont WA 6010
Phone: 08 9385 2398, 0407 385 289
Website: www.terrestrialecosystems.com
ABN: 40921131346

DISCLAIMER

This document is prepared in accordance with and subject to an agreement between G & S Thompson Pty Ltd as Trustee for the Thompson Family Trust trading as Terrestrial Ecosystems and the client, Native Vegetation Solutions. It has been prepared and is restricted to those issues that have been raised by the client in its engagement of Terrestrial Ecosystems and prepared using the standard of skill and care ordinarily exercised by environmental scientists in the preparation of such reports.

Persons or agencies that rely on or use this document for purposes or reasons other than those agreed by Terrestrial Ecosystems and its client without first obtaining prior consent, do so at their own risk and Terrestrial Ecosystems denies all liability in tort, contract or otherwise for any loss, damage or injury of any kind whatsoever (whether in negligence or otherwise) that may be suffered as a consequence.

REPORT CONTENTS

EXECUTIVE SUMMARY

1.	INTRODUCTION	1
1.1	Background	1
1.2	Project objectives and scope of works	1
2.	EXISTING ENVIRONMENT	2
2.1	Location of project area	2
2.2	Land use history	2
2.3	Climate	2
2.4	Regional biological fauna context of project area	3
2.5	Fauna species at risk	5
3.	METHODOLOGY	6
3.1	Database searches	6
3.2	Site inspection and fauna habitat assessment	6
3.3	Survey and reporting staff	8
3.4	Taxonomy and nomenclature	8
3.5	Limitations	8
4.	RESULTS	10
4.1	Fauna habitat	10
4.2	Feral species	13
4.3	Bioregional vertebrate fauna assemblage	14
4.4	Conservation significant fauna	19
5.	DISCUSSION	28
5.1	Adequacy of the fauna survey data for fauna habitats represented in the project area	28
5.1.1	Amphibians	28
5.1.2	Reptiles	28
5.1.3	Birds	29
5.1.4	Mammals	29
5.2	Biodiversity value	29
5.2.1	Ecological functional value at the ecosystem level	29
5.2.2	Maintenance of threatened ecological communities	29
5.2.3	Condition of fauna habitat	30
5.2.4	Ecological linkages	30
5.2.5	Size and scale of the proposed disturbance	30
5.2.6	Abundance and distribution of similar habitat in the adjacent areas	30
6.	POTENTIAL ENVIRONMENTAL IMPACTS	31
6.1.1	Animal deaths during the clearing process and displacement of fauna	31
6.1.2	Impacts of the wind turbines on birds and bats	31
6.1.3	Reduction or loss of activity areas and closure of burrows	32
6.1.4	Habitat fragmentation	32

6.1.5	Introduced fauna and weeds	32
6.1.6	Road fauna deaths	33
6.1.7	Fire	33
6.1.8	Anthropogenic activity	33
6.1.9	Dust	33
6.1.10	Risk assessment	33
6.2	Native vegetation clearing principles as they pertain to vertebrate fauna	37
6.3	Referral under the EPBC Act	37
7.	SUMMARY	38
8.	MANAGEMENT STRATEGIES.....	39
8.1	Induction and awareness.....	39
8.2	Fauna management plan.....	39
8.3	Feral predators.....	39
9.	REFERENCES	40

LIST OF CHARTS

Chart 1. Climatic averages for Leonora	2

LIST OF PLATES

Plate 1. Salt lake.....	10
Plate 2. Ephemeral creek line.....	10
Plate 3. Ephemeral creek line.....	11
Plate 4. Tall shrubland.....	11
Plate 5. Tall shrubland.....	11
Plate 6. Tall shrubland.....	11
Plate 7. Low shrubland	11
Plate 8. Low shrubland	11
Plate 9. Open mulga woodland	12
Plate 10. Open mulga woodland.....	12
Plate 11. Disturbed area.....	12
Plate 12. Disturbed area.....	12
Plate 13. Evidence of earlier mining activity.....	12
Plate 14. Evidence of earlier mining activity.....	12
Plate 15. Malleefowl tracks	13
Plate 16. Malleefowl tracks	13
Plate 17. Rabbit scats	13
Plate 18. Cattle tracks.....	13
Plate 19. Horse scats.....	14
Plate 20. Dog tracks	14

LIST OF TABLES

Table 1. Variables assessed during the rapid habitat assessment	7
Table 2. Fauna survey limitations and constraints	9
Table 3. Location of Malleefowl tracks (GDA 94, UTM Zone 51)	13
Table 4. Birds potentially found near the project area.....	14
Table 5. Amphibians potentially found near the project area	16
Table 6. Mammals potentially found near the project area.....	17
Table 7. Reptiles potentially found near the project area	17
Table 8. Assessment of the potential presence of a conservation significant fauna species in the project area	20
Table 9. Bat species potentially in the Goldfields.....	31
Table 10. Fauna impact risk assessment descriptors	34
Table 11. Levels of acceptable risk	34
Table 12. A risk assessment of the impact of ground disturbance activity on fauna	35
Table 13. Assessment of impact using the native vegetation clearing principles.....	37

LIST OF FIGURES

Figure 1. Regional context	46
Figure 2. Fauna habitats and rapid habitat assessment locations	46

LIST OF APPENDICES

Appendix A. Results of the <i>EPBC Act</i> Protected Matters Search
Appendix B. Vertebrate fauna recorded in biological surveys in the region
Appendix C. Definitions of Significant Fauna under the <i>WA Biodiversity Conservation Act 2016</i> and Priority Species
Appendix D. Rapid habitat assessments

EXECUTIVE SUMMARY

Native Vegetation Solutions on behalf of St Barbara Ltd requested a vertebrate fauna risk assessment to support the preparation of environmental approval applications for the Leonora Province Expansion project area in Leonora (i.e. project area). The project is located north and south of Leonora and straddles the Goldfields Highway and the Leonora Mount Ida Road. The total assessed area was 3,581.2ha.

There are five broad fauna habitats in the project area:

- Bare salt lakes;
- Ephemeral creek lines;
- Tall shrublands;
- Low shrublands; and
- Open mulga woodlands.

In addition, there are disturbed areas that are largely devoid of vegetation, and if present are mostly weeds with few vertebrate fauna.

The density of trees and shrubs in the relatively undisturbed areas varied across the project area but was mostly sparse. The fauna habitat varied from highly degraded to good; the more degraded areas are due to historical and recent mining activity and grazing. There are numerous access tracks in the project area, but these are narrow and mostly only wheel tracks on a sand-clay substrate. There is extensive evidence of feral fauna in the area.

Tracks of Malleefowl were recorded at three locations in the project area, but there are no active or recently active Malleefowl mounds, so it is probable these are isolated birds that are moving around in the areas of slightly more-dense vegetation, but are not breeding. Clearing native vegetation in the project area is likely to result in the loss of small vertebrate fauna on-site that are unable to move away during the vegetation clearing process, however, this loss is not likely to be significant when viewed in a bioregional context. The few larger animals, such as kangaroos, large goannas and snakes, and most of the birds will move into adjacent areas once vegetation clearing commences, so potential impacts will be low. There may be an on-going loss of small native fauna to vehicle strikes on access tracks, but overall, this impact will be very low. Forced fauna migrants because of vegetation clearing increase competition for resources, which may result in the subsequent loss of migrants or local individuals. Individuals shifted out of their established activity areas are also vulnerable to predation until they have become established in their new areas.

There was evidence of rabbits, cattle, horses and wild dogs in the project area, and probably feral cats. These feral and pest fauna are likely to be doing more environmental damage than the combined impacts of proposed development.

Impacts on vertebrate fauna associated with clearing vegetation in the project area in a landscape or bioregional context are likely to be low as there are vast tracts of similar fauna habitat in adjacent areas.

The proposed project is unlikely to significantly impact on a conservation significant species, so a referral under the *EPBC Act* is not required.

The proposed windfarm will potentially impact on birds and bats in the project area, so a management plan is required, that may include increasing the wind-turbines cut-in speed to minimise the impact on birds and bats.

It is recommended that:

- an induction program that includes a component on managing vertebrate fauna is mandatory for staff working in the project area;

- the vertebrate fauna management plan for the project should specifically address potential impacts on birds and bats, and include mitigation strategies to minimise this impact;
- the management of wild dogs and feral cats is specifically addressed in the vertebrate fauna management plan; and
- the impact of dust on adjacent vegetation and therefore fauna habitat is managed and monitored against appropriate KPIs.

1. INTRODUCTION

1.1 BACKGROUND

Native Vegetation Solutions on behalf of St Barbara Ltd requested a vertebrate fauna risk assessment to support the preparation of environmental approval applications for the Leonora Province Expansion project area in Leonora (i.e. project area; Figure 1). The project is located north and south of Leonora and straddles the Goldfields Highway and the Leonora Mount Ida Road. The total assessed area was 3,581.2ha. The project area includes large and deep mining pits, some of which contain water, waste dumps, tailings storage facilities, mining infrastructure, part of the Leonora airstrip, the Leonora racecourse and some residential housing.

1.2 PROJECT OBJECTIVES AND SCOPE OF WORKS

Terrestrial Ecosystems was commissioned to undertake a Basic vertebrate fauna risk assessment including a targeted survey for Malleefowl and their mounds for the Leonora Province Expansion project area. The purpose of this Basic vertebrate fauna risk assessment was to provide information to the proponent on the potential impacts on the vertebrate fauna assemblage in the project area to enable the proposed development to be adequately assessed. The methodology broadly follows that described in the Environmental Protection Authority (2020) *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment*.

This Basic fauna risk assessment involved a desktop review and site visit. The assessment objectives were to:

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

To achieve these objectives, Terrestrial Ecosystems:

- reviewed Terrestrial Ecosystems' database [includes Atlas of Living Australia and Western Australian Museum records] to identify potential vertebrate fauna within the area;
- searched the Commonwealth Governments 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;
- reviewed previous fauna surveys conducted near the project area;
- undertook an assessment of the potential risks to the fauna associated with clearing additional areas of native vegetation and operation of wind turbines in the area;
- discussed the likelihood of *EPBC Act 1999* and *Biodiversity Conservation Act 2016 (BC Act)* listed species being present in the project area; and
- provided management recommendations to avoid, mitigate and minimise potential impacts on the fauna in the project area.

2. EXISTING ENVIRONMENT

2.1 LOCATION OF PROJECT AREA

The project area is in the Murchison 1 (MUR1 - East Murchison subregion) IBRA bioregion. Cowan (2001) described the subregion as mostly dominated by mulga woodlands that are often rich in ephemerals; hummock grasslands, salt bush shrub lands and haloscarya shrub lands. Cowan (2001) recorded no threatened ecological communities in the vicinity of the project areas. Threatening process for conservation significant fauna were listed by Cowan (2001) as foxes and cats.

2.2 LAND USE HISTORY

The dominant land uses for the bioregion are native pasture to support grazing and crown land reserves, and to a lesser extent mining and exploration. The region surrounding the project area has been disturbed for minerals exploration and there are many operational and non-operational mining projects in the region.

The project area includes large and deep mining pits, some of which contain water, waste dumps, tailings storage facilities, mining infrastructure, part of the Leonora airstrip, the Leonora racecourse and some residential housing.

2.3 CLIMATE

The project area is characterised as semi-arid. Leonora has an annual rainfall of approximately 235mm, although this varies considerably from year-to-year. The highest mean maximum and minimum temperatures in Leonora are in January with an average of 37°C and 21.8°C, respectively (Bureau of Meteorology, 2022). The lowest mean daily maximum and minimum temperatures occur in July (Chart 1). Average monthly rainfall is heaviest in January - March.

Summer rain is unpredictable and often results from thunderstorms coming from the north and the west or decaying cyclonic activity as low-pressure cells move from the Pilbara through the Goldfields.

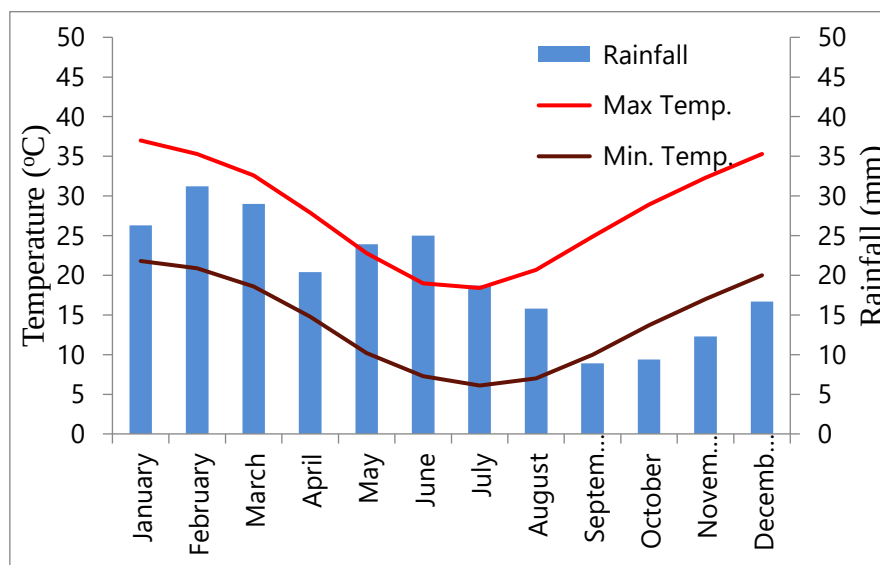


Chart 1. Climatic averages for Leonora

2.4 REGIONAL BIOLOGICAL FAUNA CONTEXT OF PROJECT AREA

The frogs, reptiles, mammals and birds in the vicinity of 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 that have been reviewed for this assessment include:

- Bamford Consulting Ecologists (2007) *Fauna Assessment and Targeted Mulgara Search of the Fish Deposit, Laverton Gold Project*.
- 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.
- Biota Environmental Sciences (2004) *Cosmos Nickel Mine Extension Fauna Survey*. Unpublished report for Sir Samuel Mines NL and URS, Perth.
- Biota Environmental Sciences (2007) *Bannockburn Fauna Habitat and Assemblage Survey*. Unpublished report for Jubilee Mines NL, Perth.
- Coffey Environments (2007) *Level 1 Fauna Assessment, Leinster Nickel Operations*, Perth.
- Coffey Environments (2008) *Level 2 Fauna Assessment for the Duketon Gold Project*. Unpublished report for Regis Resources, Perth.
- Craig, M. D. and Chapman, A. (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.
- 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, 38-77.
- Dell, J., How, R. A. and Milewski, A. V. (1992) The biological survey of the Eastern Goldfields, Part 6, Youanmi-Leonora Study Area. *Records of the Western Australian Museum*, Supplement No 40, 131.
- Donarto Environmental Services (2005a) *Leinster Nickel Operations Tailing Storage Facility and Water Storage Areas: Wildlife Interactions and Assessment of Risks*, Perth.
- Dunlop, J. N. (1990) The small vertebrate ground fauna of Mulga habitats near Wiluna, Western Australia. *Mulga Research Centre Journal*, 10, 19-27.
- ENV Australia (2008) *Agnew Prospects Fauna Assessment*. Unpublished report for Agnew Gold Mining Company Pty Limited, Perth.
- Halpern Glick Maunsell, (1999) *Rosemont Gold Project Biological Assessment Survey - Phases 1 & 2*. Unpublished report for Johnson's Well Mining NL, Perth.
- Hall, N.J, McKenzie, N.L. and Keighery, B.J. (1994b) The Biological Survey of the Eastern Goldfields of Western Australia Part 10. Sandstone-Sir Samuel and Laverton-Leonora Study Areas. *Records of the Western Australian Museum*. Supplement No. 47.
- Harewood, G (2011) *Terrestrial Fauna Survey (Level 1) of the West Laverton Area (P38/3717, P38/3718, P38/3491, P38/3492, P38/3314, P38/3490, P38/3315, M38/0046, M38/0049, M38/0040, M38/0358, M38/0048, M38/0101, M38/0364, M38/0342, M38/0345, L38/0179, L38/0177, L38/0178, L38/0153, L38/0092, E38/1930, E38/2347, E38/2084 & E38/1966)*. Unpublished report for Crescent Gold Limited.
- Hart, Simpson and Associates (2000) *Anaconda Nickel Ltd, Cawse Expansion Project Fauna Survey*. Unpublished report for Anaconda Nickel Ltd, Perth.
- How, R. A. and Dell, J. (1992) Vertebrate fauna. In: The Biological Survey of the Eastern Goldfields of Western Australia Part 7. Duketon - Sir Samuel Study Area. *Records of the Western Australian Museum*; Supplement 40, 90-109.
- Kingfisher Environmental Consulting (2014) *Murrin Murrin – Sunrise Dam Infrastructure Corridor Level 1 Fauna Survey*. Unpublished report for Anglogold Ashanti Australia, Perth.
- Kingfisher Environmental Consulting (2020) *Northern Goldfields Interconnect Pipeline Fauna Assessment*. Unpublished report for APA Group, Perth.
- MBS Environmental (2004) *Vegetation and Habitat Assessment of the Euro, Sickle and Admiral Hill Project Areas, Laverton*. Unpublished report for Crescent Gold Limited.

- 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., Rolfe, J. K. and Youngson, W. K. (1994a) Vertebrate fauna. In: The Biological Survey of the Eastern Goldfields of Western Australia Part 10, Sandstone-Sir Samuel and Laverton-Leonora Study Areas. *Records of the Western Australian Museum*, Supplement No 47, pp. 51-85.
- Moriarty, T. K. (1972) Birds of Wanjarri; WA (27°; 25'S; 120° 40'E) *The Emu*, 72, 1-7.
- Murphy, D. (1994) *Vertebrate fauna species of the North-eastern Goldfields*. Report to Western Mining's Leinster Nickel and Mount Keith Operations, Perth.
- Ninox Wildlife Consulting (1998) *A Vertebrate Fauna Survey of the Murrin Expansion Project*. Unpublished report for Anaconda Nickel Ltd, Perth.
- Ninox Wildlife Consulting (2005) *Vertebrate Fauna Habitat Assessment of the Proposed Expansions to the Cosmos Nickel Mine, near Leinster, Western Australia*. Unpublished report for URS Australia Pty Ltd, Perth.
- Phoenix Environmental Sciences (2021) Fauna and habitat survey for the Redcliffe Gold Project. Unpublished report for Dacian Gold Limited, Perth.
- Spectrum Ecology and Spatial (2022) Leonora Operations Flora and Vegetation Site Visit and Basic Vertebrate Fauna Assessment. Unpublished report for Talis Consultants and St Barbara Limited, Perth.
- Terrestrial Ecosystems (2010) *Level 2 Fauna Risk Assessment for the Garden Well Project Area*. Unpublished report for Regis Resources Ltd, Perth.
- Terrestrial Ecosystems (2011a) *Level 2 Fauna Risk Assessment for Granny Deeps Project Area*. Unpublished report for Barrick Gold Corporation, Perth.
- Terrestrial Ecosystems (2011c) *Targeted Survey for Long-tailed Dunnarts for the Granny Deeps Project Area*. Perth.
- Terrestrial Ecosystems (2012a) *Level 1 Vertebrate Fauna Risk Assessment for the Proposed Exploration Areas around the Granny Open Pit Project Area*. Unpublished report for Granny Smith Mining Pty Ltd, Perth.
- Terrestrial Ecosystems (2012b) *Level 1 Vertebrate Fauna Risk Assessment for the Proposed Mining Areas around the Granny Open Pit Project Area*. Unpublished report for Granny Smith Mining Pty Ltd, Perth.
- Terrestrial Ecosystems (2014) *Level 1 Fauna Risk Assessment for a proposed power station site, Perth*. Unpublished report for Granny Smith Mining Pty Ltd, Perth.
- Terrestrial Ecosystems (2015) *Fauna risk assessment of the proposed borrow pit expansion*. Unpublished report for Granny Smith Mining Pty Ltd, Perth.
- Terrestrial Ecosystems (2018) *Vertebrate Fauna Risk Assessment for the Granny Smith Solar Power Farm Project*, Unpublished report for Granny Smith Mining Company Pty Ltd, Perth.
- Terrestrial Ecosystems (2020) *Level 2 Vertebrate Fauna Assessment for the King of the Hills Project*, Unpublished report for Red 5, Perth.

In addition, there are individual records for fauna contained in the Atlas of Living Australia and the Western Australian Museum collection have also been accessed.

The most useful of these are the report by Terrestrial Ecosystems (2020) for the King of the Hills project area, which is approximately 25km to the north of the project area and includes very similar fauna habitats, the Western Australian Museum's (WAM) regional eastern goldfields biological surveys which were undertaken in the Duketon-Sir Samuel, Sandstone-Sir Samuel and Laverton areas (How and Dell 1992, McKenzie et al. 1994b) and the Murrin Murrin Expansion project fauna survey (Ninox Wildlife Consulting 1998) which is east of the project area and has similar fauna habitats and fauna assemblages.

These fauna surveys, when considered together, 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, but 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.

2.5 FAUNA SPECIES AT RISK

Cowan (2003), in a dated report, indicated fauna species at risk in the East Murchison subregion were the Bilby (*Macrotis lagotis*), Marsupial Mole (*Notoryctes typhlops*), Mulgara (*Dasycercus cristicauda* / *blythi*), Malleefowl (*Leipoa ocellata*), Princess Parrot (*Polytelis alexandrae*), Slender-billed Thornbill (*Acanthiza iredalei iredalei*), Giant Desert Skink (*Liopholis kintorei*) and Peregrine Falcon (*Falco peregrinus*). Since then, several additional species have been added to the list including Night Parrot (*Pezoporus occidentalis*), Sandhill Dunnart (*Sminthopsis psammophila*), Western Spiny-tailed Skink (*Egernia stokesii badia*), Grey Falcon (*Falco hypoleucos*), and Chuditch (*Dasyurus geoffroii*). This report assesses the potential for these species to be found in the project area and the potential impact that the proposed development might have on these species, and other conservation significant fauna.

3. METHODOLOGY

3.1 DATABASE SEARCHES

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

Other more general texts were also used to provide supplementary information on vertebrates in the bioregion, including Tyler et al. (2000) for frogs; Storr et al. (1983, 1990, 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 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. Many of the records are historical and the species is no longer present in the area (e.g. Bilby). Many of the 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 not well understood and it can sometimes be difficult to indicate those species whose specific habitat requirements are not present 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 NatureMap, Atlas of Living Australia and the WAM collection. These errors occur because of a misidentification of individuals, taxonomic name changes and incorrect coordinates being entered into the database. Terrestrial Ecosystems was unable to verify the primary records, so it has used the information provided. Readers should therefore appreciate that species lists and fauna surveys reported in the appendices may include these errors

3.2 SITE INSPECTION AND FAUNA HABITAT ASSESSMENT

A site visit was undertaken on 12 and 17 September 2022 to assess fauna habitat types and condition in the project area and to search for evidence of Malleefowl.

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

- assessing fauna habitat types and their condition; and
- assessing the possible presence of and recording evidence of conservation significant fauna so that mitigation and management strategies might be implemented to reduce potential impacts.

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

Table 1. Variables assessed during the rapid habitat assessment

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	
☐ <i>High quality fauna habitat</i> – These areas closely approximate the vegetation mix and quality that would have been in the area prior to any disturbance. The habitat has connectivity with other habitats and is likely to contain the most natural vertebrate fauna assemblage.	
☐ <i>Very good fauna habitat</i> - These areas show minimal signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) and generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be minimally effected by disturbance.	
☐ <i>Good fauna habitat</i> – These areas showed signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by disturbance.	
☐ <i>Disturbed fauna habitat</i> – These areas showed signs of significant disturbance. Many of the trees, shrubs and undergrowth are cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, containing weeds or have been damaged by vehicle or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.	
☐ <i>Highly degraded fauna habitat</i> – These areas often have a significant loss of vegetation, an abundance of weeds, and a large number of vehicle tracks or are completely cleared. Limited or no fauna habitat connectivity. Fauna	

assemblages in these areas are likely to be significantly different to what might have been in the area pre-disturbance.

Soil colour - options

☐ Black	☐ Red
☐ Brown	☐ White
☐ Grey	☐ Yellow
☐ Orange	

Surface stones – options

☐ None	☐ Boulders (>250mm)
☐ Pebbles (0-50mm)	☐ Rocks
☐ Cobbles (51-250)	

3.3 SURVEY AND REPORTING STAFF

Joel Wilson undertook the site investigation and fauna habitat assessment and searched the project area for Malleefowl and their mounds. Dr Graham Thompson prepared this report and Dr Scott Thompson reviewed the report before it was sent to the client. Both senior scientists have appropriate relevant post-graduate qualifications, extensive experience in conducting fauna assessments in the Goldfields, have published research articles on biodiversity, fauna assemblages, conservation significant species, trapping techniques and temporal variations in trapped fauna assemblages based on Goldfields surveys and are therefore appropriately trained and experienced for the task of preparing this assessment. Both Scott and Graham have undertaken multiple assessments near Leonora and are familiar with the habitat in the project area and surrounds.

3.4 TAXONOMY AND NOMENCLATURE

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

3.5 LIMITATIONS

This Basic fauna risk assessment is based on information contained in the Commonwealth Government database and 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 fully appreciate the fauna assemblage in the project area.

The EPA (2020) *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* suggested that fauna surveys may be limited by many variables. Limitations associated with each of these variables are assessed in Table 2.

Table 2. Fauna survey limitations and constraints

Possible limitations	Constraint (yes/no); significant, moderate or negligible	Comment
Availability of data and information	Yes, negligible	There are vertebrate fauna survey data available for similar habitats near the project area.
Competency/experience of the survey team, including experience in the bioregion surveyed	No	The field survey team and authors of this report have appropriate post-graduate qualifications, undertaken multiple surveys and assessments in the region, have published a book and multiple refereed journal articles based on fauna surveys in the goldfields and are familiar with the vertebrate fauna in this bioregion.
Scope of the survey, e.g. where faunal groups were excluded from the survey	N/A	
Timing, weather and season	No	Weather was suitable for a site and fauna habitat assessment.
Disturbance that may have affected results, e.g. fire, flood	No	Disturbances in the project area have been factored into this assessment.
The proportion of fauna identified, recorded or collected	N/A	
Adequacy of the survey intensity and proportion of survey achieved, e.g. the extent to which the area was surveyed	No	Discussed in the report.
Access problems	No	There were no access problems.
Problems with data and analysis, including sampling biases	N/A	
Timing, weather and season	No	Weather was suitable for a site survey and assessment.

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

4. RESULTS

4.1 FAUNA HABITAT

There are five broad fauna habitats in the project area:

- Bare salt lakes;
- Ephemeral creek lines;
- Tall shrublands;
- Low shrublands; and
- Open mulga woodlands.

In addition, there are disturbed areas that are largely devoid of vegetation, including large and deep mining pits, some of which contain water, waste dumps, tailings storage facilities, mining infrastructure, part of the Leonora airstrip, the Leonora racecourse and some residential housing.

The density of trees and shrubs in the relatively undisturbed areas varied across the project area but was mostly sparse. Trees and shrubs are most dense in the ephemeral creek lines. Fauna habitat quality varied from highly degraded to good; the more degraded areas are due to historical and recent exploration and mining activity, grazing, and existing tracks. There are numerous access tracks in the project area, but these are narrow and mostly only wheel tracks on a sand-clay substrate. There is extensive evidence of feral fauna in the area.

Plates 1-14 show some of the fauna habitats present in the project area.



Plate 1. Salt lake



Plate 2. Ephemeral creek line



Plate 3. Ephemeral creek line



Plate 4. Tall shrubland



Plate 5. Tall shrubland



Plate 6. Tall shrubland



Plate 7. Low shrubland



Plate 8. Low shrubland



Plate 9. Open mulga woodland



Plate 10. Open mulga woodland



Plate 11. Disturbed area



Plate 12. Disturbed area



Plate 13. Evidence of earlier mining activity



Plate 14. Evidence of earlier mining activity

Some very old disused Malleefowl mounds were recorded in other regional surveys. Malleefowl tracks were recorded in three locations (Table 3), two in the southern section and one in the western section of the project area (Plates 15 and 16). No Malleefowl mounds were recorded.

Table 3. Location of Malleefowl tracks (GDA 94, UTM Zone 51)

Easting	Northing
338186	6797369
336582	6797779
334013	6799946



Plate 15. Malleefowl tracks



Plate 16. Malleefowl tracks

4.2 FERAL SPECIES

The project area supports rabbits (Plate 17), cattle (Plate 18), horses (Plate 19) and wild dogs (Plate 20) and probably feral cats.



Plate 17. Rabbit scats



Plate 18. Cattle tracks



Plate 19. Horse scats



Plate 20. Dog tracks

4.3 BIOREGIONAL VERTEBRATE FAUNA ASSEMBLAGE

Appendix B provides a summary of the fauna survey data that are 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 and they also reflect variations in soils and vegetation as well as temporal variations in the fauna assemblages.

Tables 3-6 provide a list of vertebrate species potentially found near the project area that have been compiled based on the fauna survey report results shown in Appendix B.

Table 4. Birds potentially found near the project area

Family	Species	Common Name	Family	Species	Common Name
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu	Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth
Anatidae	<i>Biziura lobata</i>	Musk Duck	Caprimulgidae	<i>Eurostopodus argus</i>	Spotted Nightjar
	<i>Tadorna tadornoides</i>	Australian Shelduck	Aegothelidae	<i>Aegothales cristatus</i>	Australian Owlet-nightjar
	<i>Chenonetta jubata</i>	Australian Wood Duck	Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift
	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck	Otididae	<i>Ardeotis australis</i>	Australian Bustard
	<i>Anas gracilis</i>	Grey Teal	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant
	<i>Anas superciliosa</i>	Pacific Black Duck	Ardeidae	<i>Ardea pacifica</i>	White-necked Heron
	<i>Aythya australis</i>	Hardhead		<i>Egretta novaehollandiae</i>	White-faced Heron
Podicipedidae	<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe	Accipitridae	<i>Haliastur sphenurus</i>	Whistling Kite
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing		<i>Accipiter fasciatus</i>	Brown Goshawk
	<i>Phaps histrionica</i>	Flock Bronzewing		<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk
	<i>Ocyphaps lophotes</i>	Crested Pigeon		<i>Circus assimilis</i>	Spotted Harrier
	<i>Geopelia placida</i>	Diamond Dove		<i>Aquila audax</i>	Wedge-tailed Eagle
				<i>Hieraaetus morphnoides</i>	Little Eagle

Family	Species	Common Name
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel
Falconidae	<i>Falco berigora</i>	Brown Falcon
	<i>Falco longipennis</i>	Australian Hobby
	<i>Falco peregrinus</i>	Peregrine Falcon
Rallidae	<i>Tribonyx ventralis</i>	Black-tailed Native-hen
	<i>Fulica atra</i>	Eurasian Coot
Recurvirostridae	<i>Himantopus leucocephalus</i>	Pied Stilt
Recurvirostridae	<i>Cladorhynchus leucocephalus</i>	Banded Stilt
Charadriidae	<i>Charadrius ruficapillus</i>	Red-capped Plover
	<i>Elseyornis melanops</i>	Black-fronted Dotterel
	<i>Vanellus tricolor</i>	Banded Lapwing
Scolopacidae	<i>Actitis hypoleucos</i>	Common Sandpiper
Turnicidae	<i>Turnix velox</i>	Little Button-quail
Cacatuidae	<i>Eolophus roseicapillus</i>	Galah
	<i>Nymphicus hollandicus</i>	Cockatiel
Psittacidae	<i>Barnardius zonarius</i>	Australian Ringneck
	<i>Psephotus varius</i>	Mulga Parrot
	<i>Melopsittacus undulatus</i>	Budgerigar
	<i>Neopsephotus bourkii</i>	Bourke's Parrot
	<i>Neophema splendida</i>	Scarlet-chested Parrot
Cuculidae	<i>Chalcites basalus</i>	Horsfield's Bronze-cuckoo
	<i>Chalcites osculans</i>	Black-eared Cuckoo
	<i>Heteroscenes pallidus</i>	Pallid Cuckoo
Halcyonidae	<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater
Climacteridae	<i>Climacteris affinis</i>	White-browed Treecreeper
	<i>Climacteris rufa</i>	Rufous Treecreeper
Ptilonorhynchidae	<i>Ptilonorhynchus maculatus</i>	Spotted Bowerbird
	<i>Ptilonorhynchus guttatus</i>	Western Bowerbird

Maluridae	<i>Malurus splendens</i>	Splendid Fairy-wren
	<i>Malurus leucopterus</i>	White-winged Fairy-wren
	<i>Malurus lamberti</i>	Variegated Fairy-wren
Acanthizidae	<i>Calamanthus fuliginosus</i>	Striated Fieldwren
	<i>Pyrrholaemus brunneus</i>	Redthroat
	<i>Smicronis brevirostris</i>	Weebill
	<i>Gerygone fusca</i>	Western Gerygone
	<i>Acanthiza robustirostris</i>	Slaty-backed Thornbill
	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill
	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill
	<i>Acanthiza apicalis</i>	Inland Thornbill
	<i>Aphelocephala leucopsis</i>	Southern Whiteface
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote
Meliphagidae	<i>Certhionyx variegatus</i>	Pied Honeyeater
	<i>Gavicalis virescens</i>	Singing Honeyeater
	<i>Lichenostomus ornatus</i>	Yellow-plumed Honeyeater
	<i>Lichenostomus plumulus</i>	Grey-fronted Honeyeater
	<i>Purnella albifrons</i>	White-fronted Honeyeater
	<i>Manorina flavigula</i>	Yellow-throated Miner
	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater
	<i>Epthianura tricolor</i>	Crimson Chat
	<i>Epthianura aurifrons</i>	Orange Chat
	<i>Sugomel niger</i>	Black Honeyeater
	<i>Lichmera indistincta</i>	Brown Honeyeater
Pomatostomidae	<i>Pomatostomus superciliosus</i>	White-browed Babbler
Psophodidae	<i>Cinclosoma castaneothorax</i>	Chestnut-breasted Quail-thrush
Neositidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella
Campephagidae	<i>Coracina maxima</i>	Ground Cuckoo-shrike
	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike

Family	Species	Common Name	Family	Species	Common Name
	<i>Lalage tricolor</i>	White-winged Triller		<i>Corvus bennetti</i>	Little Crow
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler		<i>Corvus orru</i>	Torresian Crow
	<i>Colluricincla harmonica</i>	Grey Shrike-thrush	Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark
	<i>Oreica gutturalis</i>	Crested Bellbird	Petroicidae	<i>Microeca fascians</i>	Jacky Winter
Artamidae	<i>Artamus personatus</i>	Masked Woodswallow		<i>Petroica goodenovii</i>	Red-capped Robin
	<i>Artamus cinereus</i>	Black-faced Woodswallow		<i>Melanodryas cucullata</i>	Hooded Robin
	<i>Artamus minor</i>	Little Woodswallow	Megaluridae	<i>Cinloramphus mathewsi</i>	Rufous Songlark
	<i>Cracticus torquatus</i>	Grey Butcherbird		<i>Cinloramphus cruralis</i>	Brown Songlark
	<i>Cracticus nigrogularis</i>	Pied Butcherbird	Hirundinidae	<i>Cheramoeca leucosterna</i>	White-backed Swallow
	<i>Gymnorhina tibicen</i>	Australian Magpie		<i>Hirundo neoxena</i>	Welcome Swallow
	<i>Strepera versicolor</i>	Grey Currawong		<i>Petrochelidon ariel</i>	Fairy Martin
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail		<i>Petrochelidon nigricans</i>	Tree Martin
	<i>Rhipidura leucophrys</i>	Willie Wagtail	Nectariniidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird
Corvidae	<i>Corvus coronoides</i>	Australian Raven	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian Pipit

Table 5. Amphibians potentially found near the project area

Family	Species	Common Name	Family	Species	Common Name
Hylidae	<i>Cyclorana maini</i>	Sheep Frog		<i>Neobatrachus sudelli</i>	Sudell's Frog
	<i>Cyclorana platycephala</i>	Water-holding Frog		<i>Neobatrachus sutor</i>	Shoemaker Frog
Limnodynastidae	<i>Neobatrachus aquilonius</i>	Northern Burrowing Frog		<i>Neobatrachus wilsmorei</i>	Goldfields Bullfrog
	<i>Neobatrachus kunapalari</i>	Kunapalari Frog		<i>Platyplectrum spenceri</i>	Spencer's Burrowing Frog

Table 6. Mammals potentially found near the project area

Family	Species	Common Name	Family	Species	Common Name
Bovidae	<i>Bos taurus</i>	Cow		<i>Ningui ridei</i>	Wongai Ningui
	<i>Capra hircus</i>	Goat		<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart
	<i>Ovis aries</i>	Sheep		<i>Sminthopsis dolichura</i>	Little Long-tailed Dunnart
Camelidae	<i>Camelus dromedarius</i>	Dromedary		<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart
Canidae	<i>Canis lupus</i>	Dingo/dog		<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart
	<i>Vulpes vulpes</i>	Red Fox		<i>Sminthopsis macroura</i>	Stripe-faced Dunnart
Felidae	<i>Felis catus</i>	House Cat		<i>Sminthopsis ooldea</i>	Ooldea Dunnart
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail Bat	Macropodidae	<i>Osphranter robustus</i>	Euro
Molossidae	<i>Austronomus australis</i>	White-striped Free-tail Bat		<i>Osphranter rufus</i>	Red Kangaroo
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	Leporidae	<i>Oryctolagus cuniculus</i>	European Rabbit
	<i>Chalinolobus morio</i>	Chocolate Wattled Bat	Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna
	<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat		<i>Equus caballus</i>	Domestic Horse
	<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat	Equidae	<i>Mus musculus</i>	House Mouse
	<i>Vespadelus regulus</i>	Southern Forest Bat	Muridae	<i>Notomys alexis</i>	Spinifex Hopping Mouse
Dasyuridae	<i>Antechinomys laniger</i>	Kultarr		<i>Pseudomys desertor</i>	Desert Mouse
	<i>Dasyercus cristicauda/blythi</i>	Mulgara		<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse

Table 7. Reptiles potentially found near the project area

Family	Species	Common Name	Family	Species	Common Name
Agamidae	<i>Ctenophorus caudicinctus</i>	Ring-tailed Dragon		<i>Nephurus wheeleri</i>	Banded Knob-tail
	<i>Ctenophorus fordi</i>	Mallee Dragon		<i>Underwoodisaurus milii</i>	Barking Gecko
	<i>Ctenophorus inermis</i>	Military Dragon	Diplodactylidae	<i>Diplodactylus conspicillatus</i>	Fat-tailed Diplodactylus
	<i>Ctenophorus isolepis</i>	Crested Dragon		<i>Diplodactylus granariensis</i>	Wheat-belt Stone Gecko
	<i>Ctenophorus maculatus</i>	Spotted Dragon		<i>Diplodactylus pulcher</i>	Fine-faced Gecko
	<i>Ctenophorus nuchalis</i>	Central Netted Dragon		<i>Lucasium damaeum</i>	Beaded Gecko
	<i>Ctenophorus reticulatus</i>	Western Netted Dragon		<i>Lucasium squarrosus</i>	Mottled Ground Gecko
	<i>Ctenophorus salinarum</i>	Saltpan Dragon		<i>Strophurus assimilis</i>	Goldfields Spiny-tailed Gecko
	<i>Ctenophorus scutulatus</i>	Lozenge-marked Dragon		<i>Strophurus elderi</i>	Jewelled Gecko
	<i>Diporiphora amphiboluloides</i>	Mulga Dragon		<i>Strophurus strophurus</i>	Western Spiny-tailed Gecko
	<i>Moloch horridus</i>	Thorny Devil		<i>Strophurus wellingtonae</i>	Spiny-tailed Gecko
	<i>Pogona minor</i>	Western Bearded Dragon	Elapidae	<i>Brachyuropsis fasciolata</i>	Narrow-banded Burrowing Snake
	<i>Tympanocryptis pseudopsephos</i>	Pebble Dragon		<i>Brachyuropsis semifasciata</i>	Half-girdled Snake
Boidae	<i>Antaresia stimsoni</i>	Stimson's Python		<i>Furina ornata</i>	Orange-naped Snake
Carphodactylidae	<i>Nephurus levis</i>	Three-lined Knob-tail		<i>Parasuta monachus</i>	Monk Snake
	<i>Nephurus vertebralis</i>	Midline Knob-tail			

Family	Species	Common Name
	<i>Pseudechis australis</i>	Mulga Snake
	<i>Pseudechis butleri</i>	Spotted Mulga Snake
	<i>Pseudonaja mengdeni</i>	Gwardar
	<i>Pseudonaja modesta</i>	Ringed Brown Snake
	<i>Simoselaps bertholdi</i>	Jan's Banded Snake
	<i>Suta fasciata</i>	Rosen's Snake
Gekkonidae	<i>Gehyra purpurascens</i>	Purplish Dtella
	<i>Gehyra variegata</i>	Tree Dtella
	<i>Gehyra xenopus</i>	Crocodile-faced Dtella
	<i>Heteronotia binoei</i>	Bynoe's Prickly Gecko
	<i>Rhynchoedura ornata</i>	Western Beaked Gecko
Pygopodidae	<i>Aprasia picturata</i>	Black-headed Worm-lizard
	<i>Delma butleri</i>	Unbanded Delma
	<i>Delma nasuta</i>	Sharp-snouted Delma
	<i>Lialis burtonis</i>	Burton's Snake-lizard
	<i>Pygopus nigriceps</i>	Western Hooded Scaly-foot
Scincidae	<i>Cryptoblepharus australis</i>	Inland Snake-eyed Skink
	<i>Cryptoblepharus buechananii</i>	Buchanan's Snake-eyed Skink
	<i>Ctenotus ariadnae</i>	Ariadna's Ctenotus
	<i>Ctenotus atlas</i>	Southern Mallee Ctenotus
	<i>Ctenotus dux</i>	Fine Side-lined Ctenotus
	<i>Ctenotus grandis</i>	Grand Ctenotus
	<i>Ctenotus greeri</i>	Spotted-necked Ctenotus
	<i>Ctenotus hanloni</i>	Nimbel Ctenotus
	<i>Ctenotus helenae</i>	Clay-soil Ctenotus
	<i>Ctenotus leonhardii</i>	Leonhardi's Ctenotus
	<i>Ctenotus pantherinus</i>	Leopard Skink
	<i>Ctenotus piankai</i>	Coarse Sands Ctenotus
	<i>Ctenotus quattuordecimlineatus</i>	Fourteen-lined Ctenotus
	<i>Ctenotus schomburgkii</i>	Schomburgk's Ctenotus

Family	Species	Common Name
	<i>Ctenotus severus</i>	Stern Ctenotus
	<i>Ctenotus uber</i>	Spotted Ctenotus
	<i>Egernia depressa</i>	Pygmy Spiny-tailed Skink
	<i>Egernia formosa</i>	Goldfields Crevice-skink
	<i>Eremiascincus richardsonii</i>	Broad-banded Sand Swimmer
	<i>Lerista bipes</i>	North-western Sandslider
	<i>Lerista desertorum</i>	Central Desert Robust Slider
	<i>Lerista distinguenda</i>	South-western Orange-tailed Slider
	<i>Lerista kingi</i>	King's Slider
	<i>Lerista timida</i>	Timid Slider
	<i>Liopholis inornata</i>	Desert Skink
	<i>Liopholis striata</i>	Nocturnal Desert Skink
	<i>Menetia greyii</i>	Common Dwarf Skink
	<i>Morethia butleri</i>	Woodland Morethia Skink
	<i>Tiliqua multifasciata</i>	Centralian Blue-tongued Lizard
	<i>Tiliqua occipitalis</i>	Western Blue-tongued Lizard
Typhlopidae	<i>Anilius australis</i>	Austral Blind Snake
	<i>Anilius bicolor</i>	Dark-spined Blind Snake
	<i>Anilius endoterus</i>	Interior Blind Snake
	<i>Anilius hamatus</i>	Pale-headed Blind Snake
	<i>Anilius waitii</i>	Waite's Blind Snake
Varanidae	<i>Varanus brevicauda</i>	Short-tailed Pygmy Monitor
	<i>Varanus caudolineatus</i>	Stripe-tailed Monitor
	<i>Varanus eremius</i>	Pygmy Desert Monitor
	<i>Varanus giganteus</i>	Perentie
	<i>Varanus gouldii</i>	Gould's Goanna
	<i>Varanus panoptes</i>	Yellow-spotted Monitor
	<i>Varanus tristis</i>	Black-headed Monitor
Cheluidae	<i>Chelodina steindachneri</i>	Steindachner's Snake-necked Turtle

4.4 CONSERVATION SIGNIFICANT FAUNA

Conservation significant fauna 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 WA *BC Act 2016* provides for the publishing of the *Wildlife Conservation (Specially Protected Fauna) Notice* that lists species under multiple categories. In addition, the DBCA maintains a list of fauna that require monitoring under four priorities based on the current knowledge of their distribution, abundance and threatening processes. The *EPBC Act 1999* and *BC Act 2016* imply legislative requirements for the management of anthropogenic impacts to minimise the effects of disturbances on species and their habitats. Priority species have no statutory protection, other than the DBCA wishes to monitor potential impacts on these species. Environmental consultants and proponents of developments are encouraged to avoid and minimise impacts on these species. Definitions of the significant fauna under the *BC Act 2016* are provided in Appendix C.

Wetland and wetland migratory bird species have been excluded from the following list and assessments as there is no suitable habitat for these species in the project area, other than the water in the mining pits. One threatened species of fauna, and one migratory/marine species of birds identified under the *EPBC Act 1999* potentially occur in the project area. There are additional species listed under the *BC Act 2016* that potentially occur in the project area. Following Table 8 is an assessment of the likelihood of each of the species listed in Table 8 being found in the project area.

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

Species	DBC Schedule / Priority	Status under Commonwealth EPBC Act	Comment on the potential presence of the species
Night Parrot <i>Pezoporus occidentalis</i>	Critically Endangered	Endangered	Highly unlikely to be in the project area, due to a lack of suitable habitat.
Sandhill Dunnart <i>Sminthopsis psammophila</i>	Endangered	Endangered	Highly unlikely to be in the project area due to a lack of suitable habitat.
Western Spiny-tailed Skink <i>Egernia stokesii badia</i>	Endangered	Endangered	Highly unlikely to be in the project area, as the project area is well outside its geographic range.
Malleefowl <i>Leipoa ocellata</i>	Vulnerable	Vulnerable	Footprints were recorded in three areas during the field assessment, however, no active or recently active mounds were recorded. It is likely that there are a few isolated Malleefowl in the project or adjacent areas.
Giant Desert Skink <i>Liopholis kintorei</i>	Vulnerable	Vulnerable	Highly unlikely to be in the project area due to a lack of suitable habitat.
Chuditch <i>Dasyurus geoffroii</i>	Vulnerable	Vulnerable	Highly unlikely to occur in the project area, as it has not been recorded in the region for many decades.
Princess Parrot <i>Polytelis alexandrae</i>	Priority 4	Vulnerable	May infrequently be seen in the region, however, unlikely to be a resident species.
Mulgara <i>Dasyercus blythi</i>	Priority 4		Highly unlikely to be in the project area due to a lack of suitable habitat.
Oriental Plover <i>Charadrius veredus</i>	IA	Migratory	Unlikely to be in the project area due to a lack of suitable habitat.
Fork-tailed Swift <i>Apus pacificus</i>	IA	Migratory	May very infrequently be seen in the region, however, unlikely to be a resident species.
Grey Wagtail <i>Motacilla cinerea</i>	IA	Migratory	Highly unlikely to be present in the project area.
Yellow Wagtail <i>Motacilla flava</i>	IA	Migratory	Highly unlikely to be present in the project area.
Peregrine Falcon <i>Falco peregrinus</i>	OS		May infrequently be seen in the region, however, unlikely to be a resident species.
Long-tailed Dunnart <i>Sminthopsis longicaudata</i>	Priority 4		Unlikely to be in the project area due to a lack of its typical breakaway habitat requirements and a high density of feral fauna.

IA – Migratory birds protected under international agreements;

OS – Other Specially protected fauna

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

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

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

Wilson's (1937) summary of observations provided information on the early records of Night Parrots' preferred habitat and breeding sites. Recent information indicates its preferred habitat appears to be in *Triodia* grasslands, chenopod shrublands, shrubby samphire and floristically diverse habitats dominated by large-seeded species (Threatened Species Scientific Committee 2016, McCarthy 2017, Murphy et al. 2017b). At Pullen Pullen Reserve it nests in large, more or less ring-shaped *Triodia*, and the nest consists of a tunnel (25-30cm and 0cm 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°) with the entrance 28cm above the ground (Hamilton et al. 2017). It has clutches of two to four sub-elliptical, white eggs with a lustrous appearance (Murphy et al. 2017a). Breeding followed significant rains in March for the observations in Pullen-Pullen Reserve and in April in the northern Goldfields (Hamilton et al. 2017, Murphy et al. 2017a), but it is thought that breeding generally occurs between April and October (Murphy et al. 2017a).

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

There are no mature spinifex hummocks and there are an abundance of feral predators in the project area. As the preferred roosting and nesting sites for Night Parrots are not present in the project area and there are significant threatening processes for the species in the area (i.e. wild dogs and feral cats), it is Terrestrial Ecosystems' assessment that Night Parrots are not present in the project area and will therefore not be impacted by any proposed development.

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

The Sandhill Dunnart is a small (30-45g) arid adapted dasyurid that is found in the eastern part of the Western Australian section of the Great Victoria Desert and the western and southern parts of South Australia. Recent surveys undertaken for the Great Victoria Desert Trust have increased their geographic range in the Great Victoria Desert.

The habitat in the project area is not suitable for this Dunnart and there are no records of the Sandhill Dunnart near the project area in the Atlas of Living Australia. As the preferred habitat for the Sandhill Dunnart is not present and there is a significant threatening process for the species in the area (i.e. feral cats), it is Terrestrial

Ecosystems' assessment that Sandhill Dunnarts are not present in the project area due to a lack of suitable habitat and will therefore not be impacted by any proposed development.

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

The Western Spiny-tailed Skink is a large stout, live-bearing skink with short dorsal spines and longer tail spines. It has multiple geographically separate populations, and sister subspecies that are found on off-shore islands. It is typically found in York gum woodlands, living in logs with an obvious faecal pellet latrine site nearby (How et al. 2003). But they can also be found in Gimlet and Salmon Gum woodlands. Openings in fallen logs need to be a minimum of 25 cm in diameter, with a preference for overlapping log piles (How et al. 2003). However, they have also been found in abandoned old houses, under a stack of tiles and in rock crevices.

It is highly unlikely that the Western Spiny-tailed Skink is present in the project area, as they have not been recorded nearby.

Malleefowl (*Leipoa ocellata*) - Vulnerable under the *BC Act 2016* and the *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. Prior to vegetation clearing for agriculture, Malleefowl were abundant in the WA Wheatbelt. Vegetation clearing for agriculture also opened adjacent bushland to predators, and in the south-west 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 have been found in mallee regions of southern Australia from approximately the 26th parallel of latitude southwards. Malleefowl are now only found throughout these regions in fragmented patches due to clearing of habitat for agriculture, increased fire frequency, competition with exotic herbivores (sheep, rabbits, cattle, goats) and kangaroos, predation by foxes and cats, inbreeding as a result of fragmentation and possibly hunting for food. DBCA records show the only recorded observation was near Leonora in 1998.

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 they are sparsely distributed, favouring those areas that are more densely vegetated. 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 provides an indication of the presence of Malleefowl in the area.

Malleefowl tracks were present in the project area and some very old mounds that will never be used again were also recorded. No active or recently active nest-mounds were recorded, so it is probable that Malleefowl in the project area are a few isolated birds moving in and through the project and adjacent areas. These birds are likely to move to adjacent areas if disturbed.

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

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

The Giant Desert Skink prefers sandy soils vegetated with spinifex. This habitat is not present in the project area and there is a high density of feral fauna. Terrestrial Ecosystems' assessment is that *Liopholis kintorei* is very unlikely to be found in the project area due to a lack of suitable habitat and presence of a threatening process for this species.

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 south-west WA and other isolated areas. Chuditch are solitary animals for most of their life and den in hollow logs, burrows, culverts, etc. and have also been recorded in tree hollows and rock cavities. Chuditch are opportunistic feeders, and forage primarily on the ground at night. Their diet can include other mammals, birds, lizards, bird and reptile eggs but the majority is a mixture of large invertebrates (e.g. spiders, scorpions and crickets).

How et al. (1988) reported Chuditch being found near the Norseman-Lake King Road and near Mount Holland. DBCA records show that one specimen was recorded in 1974 in Kambalda East. There are multiple records south of Southern Cross and Marvel Loch and there have been other reported sightings east of Kambalda and near Norseman, but Terrestrial Ecosystems can find none north of Kalgoorlie. It is therefore highly unlikely that the Chuditch will be found as far north at Leonora and in atypical habitat. As the project area is a significantly long way north of the species known geographic distribution it is unlikely that the Chuditch would be found in the project area, therefore the clearing of vegetation and mining operations are unlikely to have a significant impact on this species.

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

The species is found mostly in the inland arid areas of Australia, and in Western Australia in the Gibson, Little Sandy and Great Victoria Deserts (Johnstone and Storr 1998, Pavey et al. 2014). However, they occasionally occurred in lightly wooded areas adjacent to the sandy deserts (Moriarty 1972). Dr S. Thompson sighted this parrot in a survey near the Wanjarri Nature Reserve in 2006 and Moriarty (1972) also reported it in the same area, so it may occasionally be seen in the region. If it was present any proposed development is unlikely to significantly impact on this species as it will move away to other areas if it is disturbed.

Very little is known about the Princess Parrot; even the exact extent of its geographical distribution. It is thought to be nomadic within the central desert regions of Australia, occupying arid shrub lands, particularly those dominated by Mulga, Desert Oak and spinifex. Due to the paucity of information on the species, accurate estimates of its conservation significance are difficult to make, however, this species is probably threatened by habitat loss to agricultural practices and changes in fire regimes.

The project area is a long way south and west of its known geographic distribution, so it is Terrestrial Ecosystems' assessment it is highly unlikely to be seen in the project area, unless it is an aviary escapee.

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

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

The reported distribution of Mulgara includes much of the inland spinifex covered sandy desert and spinifex vegetated areas in the Pilbara and northern goldfields. Within these areas their distribution is patchy, and it is most frequently confined to mature spinifex dominated habitat (Gibson and Cole 1992, Masters 1998, Masters et al. 2003, Thompson and Thompson 2008). In some areas, their relative abundance is positively associated with rainfall in the previous 12 to 24 months (Gibson and Cole 1992, Masters 1998, Dickman et al. 2001, Letnic and Dickman 2005) and recent burning of the spinifex does not seem to be sufficient to shift Mulgara out of an area (Thompson and Thompson 2007). Mulgara is generally sedentary in contrast with some other small dasyurids and have high site fidelity and a low propensity for dispersal once a home range has been established (Masters 1998, Dickman et al. 2001).

Fauna habitat in the project area is not suitable for Mulgara. It is therefore Terrestrial Ecosystems' view that they are unlikely to be found in the project area.

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

A migrant species with patchy distribution in Australia, the Oriental Plover is sparsely distributed across arid and semi-arid Australia, but avoids truly desert regions. Its preferred habitat is dry plains. It was not recorded in other fauna surveys undertaken near the project area. The species is under threat because of habitat reduction due to agriculture and changing fire regimes. This plover has not been recorded in the general area in any of the other regional surveys.

Terrestrial Ecosystems' assessment is that the Oriental Plover is unlikely to be seen in the project area and therefore unlikely to be impacted.

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

This species breeds in the 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 an 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 21).

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

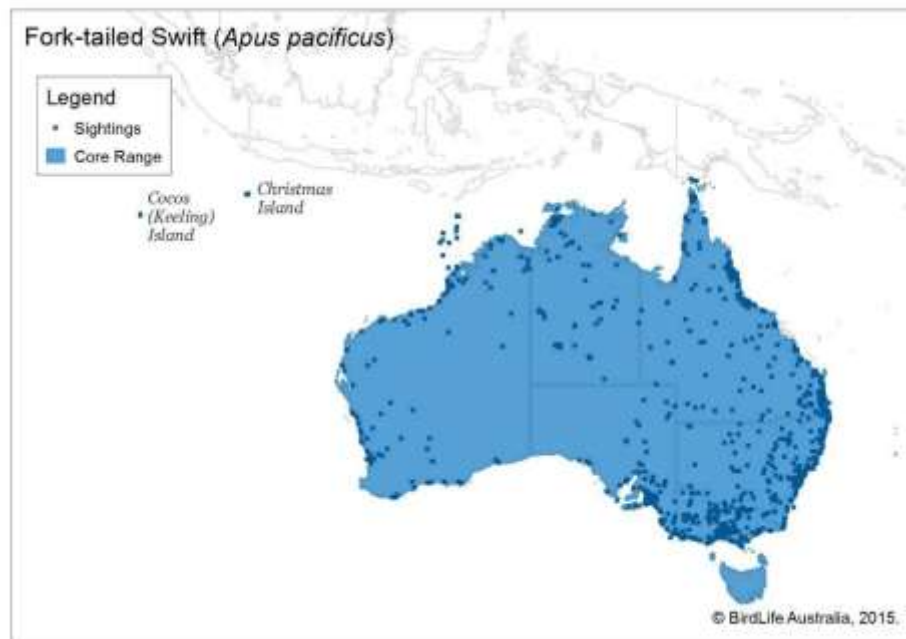


Plate 21. Range and actual reported sightings of the Fork-tailed Swift

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

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

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

The Atlas of Living Australia records two sightings on the south-coast of Western Australia and none around the project area (Plate 22). It is highly unlikely to be seen in the project area due to a lack of records and suitable habitat.

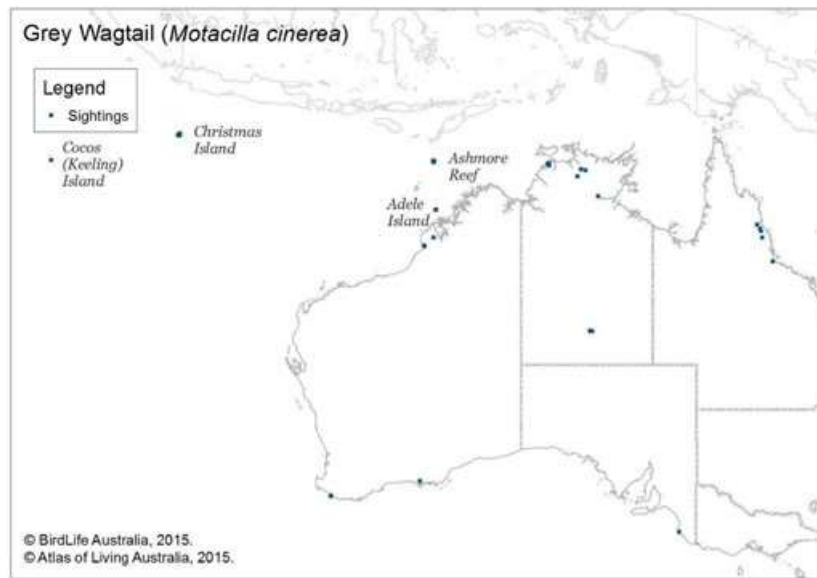


Plate 22. Reported sightings of the Grey Wagtail

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

Yellow Wagtail (*Motacilla flava*) - Migratory under the *EPBC Act 1999* and *BC Act 2016*

The Yellow Wagtail is found in the millions in the northern hemisphere and the Atlas of Living Australia records multiple records of this bird in Australia in the coastal areas. There are no records for this species in inland Western Australia near the project area, therefore it is highly unlikely to be impacted by the proposed development.

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 has been seen in the Wanjarri Nature Reserve (Moriarty 1972, Ninox Wildlife Consulting 1994), at Honeymoon Well (Ninox Wildlife Consulting 1994) and Mileura (Tingay and Tingay 1977), so they could infrequently be seen in the general area.

Terrestrial Ecosystems' assessment is that the Peregrine Falcon may infrequently be seen in the project area, however, development is unlikely to have a significant impact on this species as it will readily move away from disturbance and there are abundant areas of similar habitat in the region.

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

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

Three adult Long-tailed Dunnarts were caught in the Granny Smith Level 2 fauna survey (Terrestrial Ecosystems 2011a) and a single individual was caught in the follow up targeted survey (Terrestrial Ecosystems 2011c). Subsequently, Long-tailed Dunnarts have been caught at Mt Ida and Bottle Creek, which area west of Leonora.

There are no suitable rocky outcrops in the project area, so, it is high improbability that they are present.

5. DISCUSSION

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

The EPA's (2020) *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* indicated that the level of survey effort should be determined after consideration of the following:

- 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
- scale and nature of impact.

Terrestrial Ecosystems' (2020) Detailed and comprehensive terrestrial fauna survey for the King of the Hills project area which is approximately 25km north of the project area and in similar habitat provides a comprehensive appreciation of the vertebrate fauna within the project area. In addition, there are other surveys (How and Dell 1992, McKenzie et al. 1994b, Ninox Wildlife Consulting 1998) for nearby areas that have been undertaken in similar fauna habitats. A Detailed or Targeted fauna survey in the project area is unlikely to yield fauna data that will alter the assessment of potential impacts of the proposed development on the vertebrate fauna and is therefore not recommended.

5.1.1 Amphibians

Frogs are normally only detected immediately after rainfall or around semi-permanent pools. There were pools of water in the drainage channels during the field assessment. *Cyclorana maini*, *C. occidentalis*, *Pseudophryne occidentalis* and *Litoria rubella* were all recorded. It is likely that *Neobatrachus kunapalari* and *Neobatrachus wilsmorei* could also be found in the general area. These species, other than *P. occidentalis* and *L. rubella*, 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, is unlikely to have a significant impact on these species when assessed in a regional context.

5.1.2 Reptiles

Typically, between 25 and 35 species of reptiles are caught in predominantly open mulga woodland (Coffey Environments 2008, Terrestrial Ecosystems 2010, 2011a, 2020). None of the species likely to be in the project area, are of conservation significance. There were no characteristics of the reptile assemblage surveyed in earlier Terrestrial Ecosystems' Level 2/Detailed surveys in adjacent areas that indicated the fauna habitat present in the project area was of conservation significance or different to that in the neighbouring areas, and given that there were large expanses of similar habitat in adjacent areas, development of the project area is unlikely to have significant impact on reptiles when assessed in a regional context.

Terrestrial Ecosystems' view is that the development of the project area is unlikely to significantly impact on the reptile fauna of the bioregion.

5.1.3 Birds

The number of birds and bird species in the northern Goldfields fluctuates based on seasons and recent rainfall (Craig and Chapman 2003). Semi-arid and arid areas of inland Australia support a diverse range of transient and nomadic species that move through large areas in search of available resources. Heavy rain that is followed by flowering and seeding of many plant species is often sufficient to draw a large number of these nomadic species to the general area. These species move on to other areas once the resource is depleted or better resources are available in adjacent areas.

The project area is likely to support a similar assemblage to that present in the adjacent areas. Malleefowl tracks were recorded in three locations within the project area, but there are no active or recently active Malleefowl mounds, so it is likely that there are a few isolated birds moving in the project and adjacent areas. The Princess Parrot is nomadic and moves around the arid interior often in search of water and resources and may very infrequently be seen in the general area. The Peregrine Falcon will normally have a very large home range, and if it was present is unlikely to be significantly impact as it will readily move to other areas if disturbed. The majority of avifauna will readily shift to other areas when there is a disturbance.

5.1.4 Mammals

The diversity of small terrestrial mammals potentially caught in the project area would be low due the sparsely vegetated and degraded habitat and presence of feral and pest fauna.

Terrestrial Ecosystems' view is that the development of the project area is unlikely to significantly impact on the mammal fauna of the bioregion.

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. There are inadequate data to assess the ecological value at the genetic level.

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

5.2.1 Ecological functional value at the ecosystem level

Large sections of the project area have been disturbed by previous mining activity, with the consequence that these area and surrounds will have a depleted vertebrate fauna assemblage. The most significant impact on vertebrate fauna in the project area and surrounds will have been feral cats and wild dogs. Historically, goats would have heavily grazed the region which impacted the vertebrate fauna assemblages, but the recent increase in the wild dog population has reduced the abundance of feral goats.

5.2.2 Maintenance of threatened ecological communities

No threatened ecological communities were identified in the project area.

5.2.3 Condition of fauna habitat

Some of the project area has been highly disturbed due to historical mining and anthropogenic activity. The uncleared fauna habitat present in the project area is similar to many square kilometres of adjacent habitat. The proposed vegetation clearing and wind-turbines are therefore unlikely to have a significant impact on 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 corridors.

5.2.5 Size and scale of the proposed disturbance

The project area (3,581.2ha) is a small proportion of similar fauna habitat found in the adjacent area and region. Given the available fauna survey data for these habitat types, no additional surveys are warranted.

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. It is therefore likely that the fauna assemblage in the project area is similar to the many square kilometres of similar habitat in adjacent areas and the bioregion.

6. POTENTIAL ENVIRONMENTAL IMPACTS

Clearing native vegetation are likely to result in the loss of small vertebrate fauna on site that are unable to move away during the clearing process and aerial species could be hit by the blades of wind-turbines.

6.1.1 Animal deaths during the clearing process and displacement of fauna

Clearing vegetation and activities associated with the development will result in the loss of some small fauna that retreat to burrows, such as reptiles and mammals. Nocturnal species are unlikely to be active when most of the land clearing and construction work is taking place which may result in these individuals being adversely impacted when they attempt to escape. This loss of vegetation is unlikely to have a significant impact when considered in a bioregional context. Larger terrestrial animals and avian species will most often move to adjacent areas. These species will be required to establish new activity areas and home ranges, and this could result in the temporary displacement of resident species.

6.1.2 Impacts of the wind turbines on birds and bats

There are five species of bats potentially in this part of the Goldfields (Table 9), and all are nocturnal, insectivorous, use echolocation to find food and roost in tree hollows. Bats are killed by wind-turbines (Hull and Cawthen 2013, Thompson et al. 2017, Smallwood et al. 2020, Davy et al. 2021), so it can be expected that a number of bats foraging at night in the vicinity of wind-turbines will be killed, and over time many of the local bats would be lost (Bennett et al. 2022).

Table 9. Bat species potentially in the Goldfields

Species	Common name
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat
<i>Chalinolobus morio</i>	Chocolate Wattled Bat
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat
<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat
<i>Vespadelus regulus</i>	Southern Forest Bat

Birds are also killed by wind-turbines (Drewitt and Langston 2006, Perold et al. 2020, Smallwood et al. 2020, Chambert and Besnard 2021), so it can be expected that a small number of birds foraging in the vicinity of wind-turbines will be killed, and overtime some of the local birds would be lost (Chambert and Besnard 2021). In a summary of South African data (Perold et al. 2020), diurnal raptors were killed most often (36% of carcasses, 23 species) followed by passerines (30%, 49 species), waterbirds (11%, 24 species), swifts (9%, six species), large terrestrial birds (5%, 10 species), pigeons (4%, six species) and other near passerines (1%, seven species). So a wide range of species will potentially be negatively impacted by wind-turbines.

Smallwood et al. (2020) indicated that bird and bat mortality increases with increasing wind energy capacity of wind-turbines. Arnett et al. (2010) reported that by increasing the wind-turbines cut-in speed (i.e. the lowest wind speed at which the turbine generates power) it reduced bat mortality 5.5 and 3.6 times compared with the normal operational cut-in speed; demonstrating that active management of wind-turbines could reduce bat, and probably bird mortality.

6.1.3 Reduction or loss of activity areas and closure of burrows

Clearing vegetation and associated development activities are likely to destroy reptile and mammal burrows or foraging habitat that are currently in use or could be used again. Clearing vegetation that forms part of the activity area of individuals has the potential to 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.

6.1.4 Habitat fragmentation

In addition to 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 that partition existing activity areas, isolate sections of established communities and may alter long and medium-term patterns of movement around established home ranges particularly for small mammals and reptiles. A reduction in the population because of this development would be difficult to detect given our current knowledge of the spatial ecology for most of the small mammals known to be in the area. The project area contains sparse vegetation and existing vehicle tracks. The impacts of habitat fragmentation due to additional vehicle tracks would therefore be quite low.

6.1.5 Introduced fauna and weeds

Increased habitat fragmentation and human activity often results in an increase in the abundance of introduced species such as the house mouse (*Mus musculus*), fox (*Vulpes vulpes*), feral cat (*Felis catus*) and wild dogs (*Canis lupus*). This increase may be due to a decline in habitat health, increased road kills, poor disposal of waste 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 have a detrimental impact on native fauna because they predate on and compete with native species, severely disrupting the natural balance. The feral cat is a particularly damaging predator on native fauna and any increase in their numbers could have a detrimental effect on local native fauna (Kinneir 1993, Bamford 1995, Woinarski et al. 2017, Woinarski et al. 2018, Murphy et al. 2019); hence it is important to ensure that populations of the feral predators, such as cats under control.

There are reliable reports that the population of wild dogs has significantly increased in response to the abundance of feral goats that were present in the region. The goat population has now been significantly reduced, so the wild dogs will turn their attention to predating on native animals. Given the proximity to Leonora it is likely that some of the dogs would also be coming from town.

Infrastructure known to support feral species, such as rubbish disposal sites and bins, permanent water, 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. Major changes to the structure of vegetation will alter the fauna habitat and consequently may influence fauna species composition. Preparing and implementing a weed management plan will largely reduce their threat to native fauna species.

6.1.6 Road fauna deaths

An increase in road fauna deaths is likely to occur where new roads / tracks are constructed or upgraded, in particular, 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, the impacts of road fauna deaths is likely to be low.

6.1.7 Fire

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

Large and widespread fires are unlikely to be a significant threat to native fauna species in and adjacent to the project area due to the sparseness of the vegetation.

6.1.8 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 form of disturbance is likely to occur during the initial vegetation clearing and when development activity commences. The overall impact is likely to be confined to a relatively small area and is unlikely to be a significant impact.

6.1.9 Dust

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

6.1.10 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 on a particular area and region. Potential impacts on fauna from the proposed development are identified and briefly described above. Tables 10, 11 and 12 provide a summary of the risk assessment associated with this project.

Any risk assessment is a product of the likelihood of an impact occurring and the consequences of that impact. Likelihood and consequences are categorised and described below. The assessed risk level (likelihood x consequences) is then calculated as the overall risk for the development. This is followed by an assessment of the acceptability of the risk associated with each of the impacts. Disturbances and vegetation clearing have an impact on the fauna at multiple scales – site, local, landscape and regional. Each of these is considered in the risk assessment. This assessment should be considered in the context of the summary in Table 12.

Table 10. Fauna impact risk assessment descriptors

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

Table 11. 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 12. A risk assessment of the impact of ground disturbance activity on fauna

			Before management				With management		
	Potential impacts		Inherent risk			Risk controls	Residual risk		
Factor			Likelihood	Consequence	Significance		Likelihood	Consequence	Significance
Fauna survey data	Inadequate survey data to adequately assess the risks	Unknown loss of fauna, fauna of conservation significance, and fauna assemblages, and an incomplete fauna assessment.	B	2	Low				
	Inadequacy of comparative data	Limits on the availability of comparative data reduced the capacity to assess the uniqueness of the fauna assemblages in the project area.	B	2	Low				
Clearing vegetation	Loss of fauna habitat – local scale	Loss of terrestrial fauna in the project area.	E	2	Mod.				
	Loss of fauna habitat – landscape scale	Loss of some fauna during vegetation clearing.	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 restricted resulting in the death of fauna and a loss of biodiversity.	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		A	2	Low				
	Sandhill Dunnart		A	2	Low				
	Malleefowl		C	3	Mod	Implementing speed controls around the project area will minimise	B	3	Mod

			Before management				With management		
						potentail impacts on Malleefowl			
	Giant Desert Skink		A	2	Low				
	Chuditch		A	2	Low				
	Princess Parrot		A	2	Low				
	Mulgara		A	2	Low				
	Oriental Plover		A	2	Low				
	Fork-tailed Swift		A	2	Low				
	Grey Wagtail		A	2	Low				
	Yellow Wagtail		A	2	Low				
	Peregrine Falcon		A	2	Low				
	Branchinella anophysata		A	2	Low				
	Long-tailed Dunnart		A	2	Low				
Human impacts	Increase or spread of weeds	Changed vegetation and a resulting loss of fauna habitat.	E	2	Mod.	Implementation of a weed management plan.	D	2	Low
	Road kills	Animals being killed by vehicles as they cross roads	E	1	Low	Limiting speeds	E	1	Low
	Increase in feral mammals, specifically the dog and cat	Increased predation on the native fauna	C	2	Low				

6.2 NATIVE VEGETATION CLEARING PRINCIPLES AS THEY PERTAIN TO VERTEBRATE FAUNA

The *Environmental Protection Act* (1986) outlines 10 principles that are to be used in the assessment of native vegetation clearing permit applications which are also applicable for other assessments and approvals (Table 13). Where possible, native vegetation should not be cleared if any of the following principles are comprised.

Table 13. Assessment of impact using the native vegetation clearing principles

Principle	Response
It comprises a high level of biological diversity.	There are a small number of Malleefowl in the project and adjacent areas. These birds are not breeding in the project area and are likely to be moving into adjacent areas. Active management will reduce potential impacts on this species.
It comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	Fauna habitat in the project area is like that in adjacent areas, so other than potential impacts on Malleefowl, clearing the vegetation will not result in the loss of significant habitat for indigenous fauna.
It includes, or is necessary for the continued existence of, rare flora.	N/A
It comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	The area does not contain a threatened ecological fauna community.
It is significant as a remnant of native vegetation in an area that has been extensively cleared.	The area is not a remnant.
It is growing in, or in association with, an environment associated with a watercourse or wetland.	The area does not contain a natural wetland. Some of the mining pits have water in the bottom.
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 of vegetation is unlikely to impact on 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

6.3 REFERRAL UNDER THE EPBC ACT

The proposed project is unlikely to significantly impact on a conservation significant vertebrate fauna species, so a referral under the *EPBC Act 1999* is not required.

7. SUMMARY

There are five broad fauna habitats in the project area:

- Bare salt lakes;
- Ephemeral creek lines;
- Tall shrublands;
- Low shrublands; and
- Open mulga woodlands.

In addition, there are disturbed areas that are largely devoid of vegetation, and if present are mostly weeds with few vertebrate fauna.

The density of trees and shrubs in the relatively undisturbed areas varied across the project area but was mostly sparse. The fauna habitat varied from highly degraded to good; the more degraded areas are due to historical and recent mining activity and grazing. There are numerous access tracks in the project area, but these are narrow and mostly only wheel tracks on a sand-clay substrate. There is extensive evidence of feral fauna in the area.

Tracks of Malleefowl were recorded at three locations in the project area, but there are no active or recently active Malleefowl mounds, so it is probable these are isolated birds that are moving around in the areas of slightly more-dense vegetation, but are not breeding. Clearing native vegetation in the project area is likely to result in the loss of small vertebrate fauna on-site that are unable to move away during the vegetation clearing process, however, this loss is not likely to be significant when viewed in a bioregional context. The few larger animals, such as kangaroos, large goannas and snakes, and most of the birds will move into adjacent areas once vegetation clearing commences, so potential impacts will be low. There may be an on-going loss of small native fauna to vehicle strikes on access tracks, but overall, this impact will be very low. Forced fauna migrants because of vegetation clearing increase competition for resources, which may result in the subsequent loss of migrants or local individuals. Individuals shifted out of their established activity areas are also vulnerable to predation until they have become established in their new areas.

There was evidence of rabbits, cattle, horses and wild dogs in the project area, and probably feral cats. These feral and pest fauna are likely to be doing more environmental damage than the combined impacts of proposed development.

Impacts on vertebrate fauna associated with clearing vegetation in the project area in a landscape or bioregional context are likely to be low as there are vast tracts of similar fauna habitat in adjacent areas.

The proposed project is unlikely to significantly impact on a conservation significant species, so a referral under the *EPBC Act* is not required.

The proposed windfarm will potentially impact on birds and bats in the project area, so a management plan is required, that may include increasing the wind-turbines cut-in speed to minimise the impact on birds and bats.

8. 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. Specific management and mitigation strategies to address potential impacts should be addressed in the recommended Vertebrate Fauna Management Plan and Construction Environmental Management Plan.

8.1 INDUCTION AND AWARENESS

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

Recommendation 1: An induction program that includes a component on managing fauna is mandatory for staff working in the project area.

8.2 FAUNA MANAGEMENT PLAN

The wind-turbines are likely to result in a loss of bats and birds in the project area. This loss can be partially mitigated by altering the cut-in speed for the turbine to operate. The potential impact on aerial fauna will need to be monitored. Details of the mitigation and monitoring should be contained in the fauna management plan for the project.

Recommendation 2: The fauna management plan for the project should specifically address potential impacts on birds and bats and include mitigation strategies to minimise this impact.

8.3 FERAL PREDATORS

The abundance of wild dogs and feral cats often increases around mining and other operations in the Goldfields, particularly due to poor waste management. These increased predator numbers can then impact on the native fauna. The potential impact of feral predators should be addressed in the fauna management plan and wild dog and feral cat management programs regularly implemented.

Recommendation 3: The management of wild dogs and feral cats is specifically addressed in the fauna management plan and management plans are regularly implemented.

9. 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**.
- Arnett, E. B., M. M. P. Huso, M. R. Schirmacher, and J. P. Hayes. 2010. Altering turbine speed reduces bat mortality at wind-energy facilities. *Frontiers in Ecology and the Environment* **9**:209-214.
- Bamford Consulting Ecologists. 2007. Fauna Assessment and Targeted Mulgara Search of the Fish Deposit, Laverton Gold Project. Perth.
- Bamford, M. J. 1995. Predation by feral cats upon lizards. *The Western Australian Naturalist* **20**:191-196.
- Bell, D. T., R. C. Bell, and W. A. Loneragan. 2007. Winter bird assemblages across an arid gradient in south-west Western Australia. *Winter bird assemblages across an arid gradient in south-west Western Australia* **90**:219-227.
- Bennett, E., L. T. Jamieson, S. N. Florent, N. Gill, C. Hauser, and R. H. Cristescu. 2022. Detection dogs provide a powerful method for conservation surveys. *Austral Ecology*.
- 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.
- Biota Environmental Sciences. 2004. Cosmos Nickel Mine Extension Fauna Survey. Perth.
- Biota Environmental Sciences. 2007. Bannockburn Fauna Habitat and Assemblage Survey. Perth.
- Boles, W. E., N. W. Longmore, and M. C. Thompson. 2016. A Recent Specimen of the Night Parrot *Geopsittacus occidentalis*. *Emu* **94**:37-40.
- Burbidge, A. A., N. L. McKenzie, and P. J. Fuller. 2008. Long-tailed Dunnart *Sminthopsis longicaudata*. Pages 148-150 in S. van Dyck and R. Strahan, editors. *The Mammals of Australia*. Reed New Holland, Sydney.
- Chambert, T., and A. Besnard. 2021. Assessing the demographic impact of bird collisions with wind turbines. University of Montpellier, France.
- Charalambous, S. 2016. First night parrot fledgling spotted in 100 years spotted in western Queensland. Australian Geographic **November**.
- Coffey Environments. 2007. Level 1 Fauna Assessment, Leinster Nickel Operations. Perth.
- Coffey Environments. 2008. Level 2 Fauna Assessment for the Duketon Gold Project.
- Cowan, M. 2001. Murchison 1 (MUR1 - East Murchison subregion). Pages 466-479 in N. L. McKenzie, J. E. May, and S. McKenna, editors. *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.
- Davy, C. M., K. Squires, and J. R. Zimmerling. 2021. Estimation of spatiotemporal trends in bat abundance from mortality data collected at wind turbines. *Conserv Biol* **35**:227-238.
- Dell, J., and R. A. How. 1988. Vertebrate Fauna. *Records of the Australian Museum* **Supplement No 31**:38-75.

- Dell, J., R. A. How, and A. V. Milewski. 1992. The biological Survey of the Eastern Goldfields, Part 6, Youanmi - Leonora Study Area. Records of the Western Australian Museum **Supplement 40**:20-32.
- Dickman, C. R., A. S. Haythornthwaite, G. H. McNaught, P. S. Mahon, B. Tamayo, and M. Letnic. 2001. Population dynamics of three species of dasyurid marsupials in arid central Australia: a 10 year study. Wildlife Research **28**:493-506.
- Donato Environmental Services. 2005a. Leinster Nickel Operations Tailing Storage Facility and Water Storage Areas: Wildlife Interactions and Assessment of Risks. Perth.
- Donato Environmental Services. 2005b. Ornithological Survey of the Leinster Nickel Operation Mining Lease: An assessment of Goat Grazing Impact. Perth.
- Drewitt, A. L., and R. H. W. Langston. 2006. Assessing the impacts of wind farms on birds. Ibis **148**:29-42.
- Dunlop, J. N. 1990. The small vertebrate ground fauna of mulga habitats near Wiluna, Western Australia. Mulga Research Centre Journal **10**:19-27.
- ecologia Environment. 2007. Jump Up Dam Fauna Assessment.
- ENV Australia. 2008. Agnew Prospects Fauna Assessment. Perth.
- Environmental Protection Authority. 2020. Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment. Western Australia.
- Garnett, S., G. Crowley, R. Duncan, N. Baker, and P. Doherty. 1993. Notes on live Night Parrot sightings in north-western Queensland. Emu **93**:292-296.
- Garnett, S. T., J. K. Szabo, and G. Dutson. 2011. The Action Plan for Australian Birds 2010. CSIRO, Collingwood, Melbourne.
- Gibson, D. F., and J. R. Cole. 1992. Aspects of the ecology of the Mulgara, *Dasycercus cristicauda*, (Marsupialia: Dasyuridae) in the Northern Territory. Australian Mammalogy **15**:105-112.
- Halpern Glick Maunsell. 1999. Rosemont Gold Project Biological Assessment Survey - Phases 1 & 2. Perth.
- 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.
- Harewood, G. 2011. Terrestrial Fauna Survey (Level 1) of the West Laverton Area (P38/3717, P38/3718, P38/3491, P38/3492, P38/3314, P38/3490, P38/3315, M38/0046, M38/0049, M38/0040, M38/0358, M38/0048, M38/0101, M38/0364, M38/0342, M38/0345, L38/0179, L38/0177, L38/0178, L38/0153, L38/0092, E38/1930, E38/2347, E38/2084 & E38/1966). Bunbury.
- Hart Simpson and Associates. 2000. Anaconda Nickel Ltd, Cawse Expansion Project, Fauna Survey. Perth.
- How, R. A., and J. Dell. 1992. Vertebrate Fauna. Records of the Australian Museum **Supplement No 40**:90-103.
- How, R. A., J. Dell, A. V. Milewski, and G. J. Keighery. 1992. The Biological Survey of the Eastern Goldfields of Western Australia: Part 7, Duketon-Sir Samuel Study Area. Records of the Western Australian Museum **Supplement 40**:69-131.
- How, R. A., J. Dell, and B. G. Muir. 1988. Vertebrate Fauna. Pages 44-94 in R. A. How, K. R. Newbey, J. Dell, B. G. Muir, and R. J. Hnatiuk, editors. The Biological Survey of the Eastern Goldfields of Western Australia; Part 4, Lake Johnston - Hyden Study Area. Records of the Western Australian Museum.
- How, R. A., J. Dell, and D. J. Robinson. 2003. The Western Spiny-Tailed Skink, *Egernia stokesii badia*: Declining distribution in a habitat specialist. The Western Australian Naturalist **24**:138-146.
- Hull, C. L., and L. Cawthen. 2013. Bat fatalities at two wind farms in Tasmania, Australia: bat characteristics, and spatial and temporal patterns. New Zealand Journal of Zoology **40**:5-15.
- 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.

- Keith Lindbeck and Associates. 2011. Snark Project Fauna Assessment. Perth.
- Keith Lindbeck and Associates. 2012. Central Yilgarn Iron Project (CYIP) Fauna Assessment. Perth.
- Keith Lindbeck and Associates. 2013. Mt Mason Project and Proposed Haul Road Targeted EPBC Fauna Survey. Perth.
- Kingfisher Environmental Consulting. 2014. Murrin Murrin – Sunrise Dam Infrastructure Corridor Level 1 Fauna Survey.
- Kingfisher Environmental Consulting. 2020. Northern Goldfields Interconnect Pipeline Fauna Assessment. Perth.
- Kinnear, J. 1993. Masterly marauders: The cat and the fox. *Landscape* **8**:20-28.
- Letnic, M., and C. R. Dickman. 2005. The responses of small mammals to patches regenerating after fire and rainfall in the Simpson Desert, central Australia. *Austral Ecology* **30**:24-39.
- 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*.
- Macarthur Minerals Limited. 2012. Ularring Hematite Project Targeted Survey of Malleefowl. Perth.
- Masters, P. 1998. The Mulgara *Dasyercus cristicauda* (Marsupialia: Dasyuridae) at Uluru National Park, Northern Territory. *Australian Mammalogy* **20**:403-407.
- Masters, P., C. R. Dickman, and M. Crowther. 2003. Effects of cover reduction on Mulgara *Dasyercus cristicauda* (Marsupialia: Dasyuridae), rodent and invertebrate populations in central Australia: Implications for land management. *Austral Ecology* **28**:658-665.
- MBS Environmental. 2004. Vegetation and Habitat Assessment of the Euro, Sickie and Admiral Hill Project Areas, Laverton. Perth.
- McCarthy, M. 2017. Night parrot feather discovery proves Australia's most elusive bird is alive in South Australia. ABC News.
- McKenzie, N. L., J. K. Rolfe, and K. Youngson. 1994a. Vertebrate Fauna: In The Biological Survey of the Eastern Goldfields of Western Australia Part 10. Sandstone-Sir Samuel and Laverton-Leonora Study Areas. Records of the Western Australian Museum **Supplement No. 47**:166.
- 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.
- McKenzie, N. L., J. K. Rolfe, and W. K. Youngson. 1994b. Vertebrate Fauna In: The Biological Survey of the Eastern Goldfields of Western Australia Part 10. Sandstone-Sir Samuel and Laverton-Leonora Study Areas. Records of the Western Australian Museum **Supplement No. 47**:51-85.
- Moriarty, T. K. 1972. Birds of Wanjarri, W.A. (27°25'S, 120°40'E). *Emu* **72**:1-7.
- 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, D. 1994. Vertebrate fauna species of the North-Eastern Goldfields: Report to Western Mining's Leinster Nickel and Mount Keith Operations. High Wycombe, Western Australia.
- 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*.
- Ninox Wildlife Consulting. 1994. A Fauna Assessment of the Honeymoon Well Project Area. April and September 1993. Perth.
- Ninox Wildlife Consulting. 1998. A Vertebrate Fauna Survey of the Murrin Murrin Expansion Project. Perth.
- Ninox Wildlife Consulting. 2005. Vertebrate Fauna Habitat Assessment of the Proposed Expansions to the Cosmos Nickel Mine, near Leinster, Western Australia. Perth.

- Ninox Wildlife Consulting. 2006. A Vertebrate Fauna Assessment of the Tarmoola Area. Perth.
- Ninox Wildlife Consulting. 2012. A Spring Vertebrate Fauna Survey, Ularring Hematite Project, Snark Area, Western Australia. Perth.
- Palaszczuk, A., and S. Miles. 2017. New night parrot community discovered in central west Queensland.
- Pavey, C. R., C. E. M. Nano, J. R. Cole, P. J. McDonald, P. Nunn, A. Silcocks, and R. H. Clarke. 2014. The breeding and foraging ecology and abundance of the Princess Parrot (*Polytelis alexandrae*) during a population irruption. *Emu*:NULL.
- Perold, V., S. Ralston-Paton, and P. Ryan. 2020. On a collision course? The large diversity of birds killed by wind turbines in South Africa. *Ostrich* **91**:228-239.
- Phoenix Environmental Sciences. 2021. Fauna and habitat survey for the Redcliffe Gold Project. Perth.
- 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.
- Rykers, E. 2017. Night parrot call recordings released online for first time. *Australian Geographic* **February**.
- Smallwood, K. S., D. A. Bell, and S. Standish. 2020. Dogs Detect Larger Wind Energy Effects on Bats and Birds. *The Journal of Wildlife Management* **84**:852-864.
- Spectrum Ecology and Spatial. 2022. Leonora Operations Flora and Vegetation Site Visit and Basic Terrestrial Fauna Assessments. Perth.
- Storr, G. M., and R. E. Johnstone. 1983. Part VI Amphibians and Reptiles. Pages 70-74 in N. L. McKenzie, editor. *Wildlife of the Dampier Peninsula, south-west Kimberley, Western Australia*. Western Australian Wildlife Research Centre, Department of Fisheries and Wildlife, Perth.
- 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.
- Terrestrial Ecosystems. 2010. Level 2 Fauna Risk Assessment for the Garden Well Project Area. Perth.
- Terrestrial Ecosystems. 2011a. Level 2 Fauna Risk Assessment for the Granny Deeps Project Area. Perth.
- Terrestrial Ecosystems. 2011b. Malleefowl (*Leipoa ocellata*) survey for the Snark Project. Perth.
- Terrestrial Ecosystems. 2011c. Targeted Survey for Long-tailed Dunnarts for the Granny Deeps Project Area. Perth.
- Terrestrial Ecosystems. 2012a. Level 1 Vertebrate Fauna Risk Assessment for the Proposed Exploration Areas around the Granny Open Pit Project Area. Perth.
- Terrestrial Ecosystems. 2012b. Level 1 Vertebrate Fauna Risk Assessment for the Proposed Mining Areas around the Granny Open Pit Project Area. Perth.
- Terrestrial Ecosystems. 2014. Fauna risk assessment of the proposed power station site. Perth.
- Terrestrial Ecosystems. 2015. Fauna risk assessment of the proposed borrow pit expansion. Perth.
- Terrestrial Ecosystems. 2018. Vertebrate Fauna Risk Assessment for the Granny Smith Solar Power Farm Project. Perth.
- Terrestrial Ecosystems. 2020. Level 2 Vertebrate Fauna Assessment for the King of the Hills Project. Perth.
- Thompson, G. G., and S. A. Thompson. 2007. Shape and spatial distribution of Mulgara (*Dasyercus cristicauda*) burrows, with comments on their presence in a burnt habitat and a translocation protocol. *Journal of the Royal Society of Western Australia* **90**:195-202.
- Thompson, G. G., and S. A. Thompson. 2008. Abundance and spatial distribution of five small mammals at a local scale. *Australian Mammalogy* **30**:65-70.
- Thompson, M., J. A. Beston, M. Etterson, J. E. Diffendorfer, and S. R. Loss. 2017. Factors associated with bat mortality at wind energy facilities in the United States. *Biol Conserv* **215**:241-245.

- Thompson, S. A., and G. G. Thompson. 2006. Reptiles of the Western Australian Goldfields. Goldfields Environmental Management Group, Kalgoorlie, WA.
- Threatened Species Scientific Committee. 2016. Conservation Advice *Pezoporus occidentalis* Night Parrot. Canberra.
- Tingay, A., and S. R. Tingay. 1977. A Vertebrate Fauna Survey of Yeelirrie Station, Western Australia. Perth.
- 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.
- Wilson, H. 1937. Notes on the Night Parrot, with references to recent occurrences. *Emu* **37**:79-87.
- 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.
- Woolley, P. A. 2005. The species of *Dasyercus* Peters, 1875 (Marsupialia: Dasyuridae). *Memoirs of Museum Victoria* **62**:213-221.

Figures

**Basic Vertebrate Fauna Reconnaissance Survey and Risk Assessment
St Barbara Leonora Province Expansion**



Appendix A.

Results of the *EPBC Act* Protected Matters Search

Basic Vertebrate Fauna Reconnaissance Survey and Risk Assessment
St Barbara Leonora Province Expansion





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: 20-Sep-2022

[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:	20
Listed Migratory Species:	9

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

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 <http://www.environment.gov.au/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:	18
Commonwealth Heritage Places:	None
Listed Marine Species:	13
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:	14
Regional Forest Agreements:	None
Nationally Important Wetlands:	4
EPBC Act Referrals:	20
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
BIRD		

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat likely to occur within area
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat known to occur within area

MAMMAL

Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Sminthopsis psammophila Sandhill Dunnart [291]	Endangered	Species or species habitat known to occur within area

PLANT

Scientific Name	Threatened Category	Presence Text
Atriplex yeelirrie [88538]	Endangered	Species or species habitat known to occur within area
Eleocharis papillosa Dwarf Desert Spike-rush [2519]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus articulata Ponton Creek Mallee [56772]	Vulnerable	Species or species habitat likely to occur within area
Gastrolobium graniticum Granite Poison [14872]	Endangered	Species or species habitat may occur within area
Hibbertia crispula Ooldea Guinea-flower [15222]	Vulnerable	Species or species habitat may occur within area
Leucopogon spectabilis Ironstone Beard-heath [83012]	Critically Endangered	Species or species habitat known to occur within area
Myriophyllum lapidicola Chiddarcooping Myriophyllum [55940]	Endangered	Species or species habitat known to occur within area
Ricinocarpos brevis [82879]	Endangered	Species or species habitat known to occur within area
Tecticornia flabelliformis Bead Glasswort [82664]	Vulnerable	Species or species habitat likely to occur within area
Tetratheca aphylla Bungalbin Tetratheca [2915]	Vulnerable	Species or species habitat known to occur within area
Tetratheca paynterae Paynter's Tetratheca [66451]	Endangered	Species or species habitat may occur within area

REPTILE

Scientific Name	Threatened Category	Presence Text
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat may occur within area
Liopholis kintorei Great Desert Skink, Tjakura, Warrarna, Mulyamiji [83160]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species

[Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Migratory Terrestrial Species

Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area

Migratory Wetlands Species

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands

[[Resource Information](#)]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Defence	
Defence - JINDALEE STATION [50257]	WA
Defence - JINDALEE STATION [50256]	WA
Unknown	
Commonwealth Land - [51752]	WA
Commonwealth Land - [51753]	WA
Commonwealth Land - [51754]	WA
Commonwealth Land - [51755]	WA
Commonwealth Land - [51058]	WA
Commonwealth Land - [51750]	WA
Commonwealth Land - [51751]	WA
Commonwealth Land - [51829]	WA
Commonwealth Land - [51828]	WA
Commonwealth Land - [51827]	WA
Commonwealth Land - [52232]	WA
Commonwealth Land - [51756]	WA
Commonwealth Land - [51796]	WA
Commonwealth Land - [52213]	WA

Commonwealth Land Name		State
Commonwealth Land - [51984]		WA
Commonwealth Land - [52197]		WA
Listed Marine Species [Resource Information]		
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Bulga Downs & Cashmere Downs Pastoral leases portions	NRS Addition - Gazettal in Progress	WA
Bullock Holes Timber Reserve	5(1)(g) Reserve	WA
Clear And Muddy Lakes	Nature Reserve	WA
Credo	NRS Addition - Gazettal in Progress	WA
De La Poer Range	Nature Reserve	WA
Goongarrie	National Park	WA
Kaluwiri	NRS Addition - Gazettal in Progress	WA
Lake Mason	NRS Addition - Gazettal in Progress	WA

Protected Area Name	Reserve Type	State
Mount Manning - Helena And Aurora Ranges	Conservation Park	WA
Mount Manning Range	Nature Reserve	WA
Queen Victoria Spring	Nature Reserve	WA
Rowles Lagoon	Conservation Park	WA
Unnamed WA46847	Nature Reserve	WA
Wanjarri	Nature Reserve	WA

Nationally Important Wetlands		[Resource Information]
Wetland Name		State
Lake Ballard		WA
Lake Barlee		WA
Lake Marmion		WA
Rowles Lagoon System		WA

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Extension to Wiluna Uranium Mine (Millipede & Lake Maitland), Wiluna, WA	2014/7138	Controlled Action	Post-Approval
J5 and Bungalbin East Iron Ore Project, Shire of Yilgarn, WA	2015/7494	Controlled Action	Proposed Decision Comment
Lake Maitland Uranium Project	2009/5220	Controlled Action	Completed
Mt Jackson, Windarling & Bungalbin deposits	2001/174	Controlled Action	Post-Approval
Northern Star Resources - Carosue Dam TSF Cell 4	2021/9026	Controlled Action	Assessment Approach
Sandy Ridge Project (kaolin clay mine & complementary waste storage and isolation business) Koolyano	2015/7478	Controlled Action	Post-Approval
Tropicana Gold Project-Develop open cut gold mine, and associated infrastructure	2008/4270	Controlled Action	Post-Approval
Yeelirrie Uranium Mine	2009/4906	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Clearing for Mt Keith Satellite Project, WA	2017/8001	Not Controlled Action	Completed
Construction of a bypass road, haulage contractor workshop & laydown yard	2012/6639	Not Controlled Action	Completed
Develop Carina Iron Ore Project, including open cut mine and associated infrastructure, exploration	2008/4501	Not Controlled Action	Completed
Eastern Goldfields Gas Pipeline Construction, WA	2014/7284	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Murrin Murrin East Nickel and Cobalt Mine Expansion	2008/4140	Not Controlled Action	Completed
Re-establish and Recommencement of Mount Windarra Nickel Mine	2008/4016	Not Controlled Action	Completed
Saracen Gold-Carosue Dam Aerodrome, WA	2017/7925	Not Controlled Action	Completed
Ularring Hematite Project, WA	2012/6426	Not Controlled Action	Completed
Not controlled action (particular manner)			
Mt Mason Hematite DSO Project, 110kms northwest of Menzies, WA	2013/6870	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
Mt Richardson Iron Ore Project and Northern Yilgarn Haul Road	2022/9152	Referral Decision	Referral Publication
Northern Goldfields Interconnect Pipeline	2021/8900	Referral Decision	Referral Publication

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 are 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

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

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

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
- 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.

[© Commonwealth of Australia](#)

Department of Agriculture Water and the Environment

GPO Box 858

Canberra City ACT 2601 Australia

+61 2 6274 1111

Appendix B.

Vertebrate fauna recorded in biological surveys in the region

**Basic Vertebrate Fauna Reconnaissance Survey and Risk Assessment
St Barbara Leonora Province Expansion**



		Surveys	A	B								C								D				E								F					
Family	Species	Common Name		Site 1E	Site LL4	Site LL5	Site LL3	Site LL1	Site LL2	Site 7	Site 8	Site 13	Site 9	Site 9a	Site 12	Site 21	Site 14	Site 21a	Site 19	Site 12a	MME1	MME2	Opportunis	MME3	MME7	MME6	GG27	GG29	GG28	GS28	GS29	GS27	GS30	GG30	Weebo		
Amphibians																																					
Limnodynastidae	Neobatrachus kunapalari	Wheatbelt Frog	X	6	1	2																															
	Neobatrachus sudelli	Sudell's Frog	X																																		
	Neobatrachus sutor	Shoemaker Frog	X									3	5	10							1	1															
	Neobatrachus wilsmorei	Plonking Frog	X									1	11		2	2											3	2									
	Platyplectrum spenceri	Spencer's Burrowing Frog	X																																		
Myobatrachidae	Pseudophryne occidentalis	Western Toadlet	X																																		
Pelodyadidae	Cyclorana maini	Main's Frog	X	4																			1														
	Cyclorana occidentalis	Western Water-holding Frog	X	2																																	
	Litoria cyclorhyncha	Spotted-thighed Frog	X																																		
	Litoria moorei	Motorbike Frog	X																																		
Reptiles																																					
Agamidae	Ctenophorus caudicinctus	Ring-tailed Dragon	X																																		
	Ctenophorus cristatus	Crested Dragon	X																										5	1	1						
	Ctenophorus fordi	Mallee Dragon	X	5								43				2											42	2	15	2	2	9					
	Ctenophorus graafi	Ring-tailed Dragon	X																																		
	Ctenophorus inermis	Military Dragon	X	2			1																														1
	Ctenophorus infans	Ring-tailed Dragon	X																																		
	Ctenophorus isolepis	Central Military Dragon	X	7	4																1																
	Ctenophorus nuchalis	Central Netted Dragon	X																																		
	Ctenophorus ornatus	Ornate Crevice Dragon	X																																		
	Ctenophorus pictus	Painted Dragon	X																																		
	Ctenophorus reticulatus	Western Netted Dragon	X	2									2	1			2	4				1	1	1	3									1	2		
	Ctenophorus salinarum	Saltpan Dragon	X	3				1	5																												
	Ctenophorus scutulatus	Lozenge-marked Dragon	X	1			1																				3	7	3		8		3	1			
	Diporiphora amphiboluroides	Mulga Dragon	X																																		
	Moloch horridus	Thorny Devil	X	3								1		1	2												1					1	2		1		
	Pogona minor	Western Bearded Dragon	X	2	2	1	1					1	2		4	2	1	1	2							1	1	1		3	1			3			
	Tympanocryptis cephalus	Pebble Dragon	X																																		
Carphodactylidae	Nephrurus laevisissimus	Smooth Knob-tail	X									18			1												18		2	1	1	9					
	Nephrurus vertebralis	Midline Knob-tail	X																																		
	Nephrurus wheeleri	Banded Knob-tail	X																																		
	Underwoodisaurus milii	Barking Gecko	X	1																						2								9			
Diplodactylidae	Diplodactylus conspicillatus	Fat-tailed Gecko	X																																		

		Surveys A	B								C								D				E							F					
Family	Species	Common Name		Site 1E	Site LL4	Site LL5	Site LL3	Site LL1	Site LL2	Site 7	Site 8	Site 13	Site 9	Site 9a	Site 12	Site 21	Site 14	Site 21a	Site 19	Site 12a	MME1	MME2	Opportunis	MME3	MME7	MME6	GG27	GG29	GG28	GS28	GS29	GS27	GS30	GG30	Weebo
Elapidae	<i>Brachyuropis fasciolatus</i>	Narrow-banded Burrowing Snake																														1			
	<i>Brachyuropis semifasciata</i>	Half-girdled Snake	X																													1			
	<i>Demansia psammophis</i>	Yellow-faced Whipsnake	X																										2						
	<i>Furina ornata</i>	Orange-naped Snake	X	2																										2					
	<i>Neelaps bimaculatus</i>	Black-naped Burrowing Snake	X																																
	<i>Suta monachus</i>	Hooded Snake	X																			1								1					
	<i>Pseudechis australis</i>	Mulga Snake	X	1																			1												
	<i>Pseudechis butleri</i>	Spotted Mulga Snake	X																				1												
	<i>Pseudonaja mengdeni</i>	Western Brown Snake	X												1																				
	<i>Pseudonaja modesta</i>	Ringed Brown Snake	X										1														1		3						
	<i>Simoselaps bertholdi</i>	Jan's Banded Snake	X	1															1												1				
	<i>Suta fasciata</i>	Rosen's Snake	X																																
Gekkonidae	<i>Christinus marmoratus</i>	Marbled Gecko	X																																
	<i>Gehyra punctata</i>	Spotted Dtella	X																																
	<i>Gehyra purpurascens</i>	Purplish Dtella	X	1		1																								2					
	<i>Gehyra variegata</i>	Variegated Gehyra	X	25		1	1	1				1			2			2	1		3	9	1	3	2	9	1		3	4	6	2	3	1	
	<i>Heteronotia binoei</i>	Bynoe's Gecko	X	5														2				3	1											2	
Pygopodidae	<i>Aprasia picturata</i>	Black-headed Worm-lizard	X																																
	<i>Delma butleri</i>	Unbanded Delma	X		1																									1					
	<i>Delma nasuta</i>	Sharp-snouted Delma	X		1		1																												
	<i>Lialis burtonis</i>	Burton's Legless Lizard	X	1											1																				
	<i>Pygopus nigriceps</i>	Western Hooded Scaly-foot	X												1	1													1						
Pythonidae	<i>Antaresia stimsoni</i>	Stimson's Python	X																																
Scincidae	<i>Cryptoblepharus buchanani</i>	Buchanan's Snake-eyed Skink	X	3				1								1		1				2	1						1	3			1		3
	<i>Ctenotus ariadnae</i>	Ariadna's Ctenotus	X																																
	<i>Ctenotus atlas</i>	Southern Mallee Ctenotus	X									3															3	1	4	3	2	3			
	<i>Ctenotus brooksi</i>	Wedgshout Ctenotus	X																																
	<i>Ctenotus calurus</i>	Blue-tailed Finesnout Ctenotus																	1																
	<i>Ctenotus grandis</i>	Grand Ctenotus	X																																
	<i>Ctenotus greeri</i>	Spotted-necked Ctenotus	X		2														12																
	<i>Ctenotus helenae</i>	Clay-soil Ctenotus	X	3	3														1																

Family	Species	Common Name	Surveys A			B								C								D				E								F
				Site 1E	Site LL4	Site LL5	Site LL3	Site LL1	Site LL2	Site 7	Site 8	Site 13	Site 9	Site 9a	Site 12	Site 21	Site 14	Site 21a	Site 19	Site 12a	MME1	MME2	Opportunis	MME3	MME7	MME6	GG27	GG29	GG28	GS28	GS29	GS27	GS30	GG30
	<i>Ctenotus leae</i>	Orange-tailed Finesnout Ctenotus	X																															
	<i>Ctenotus leonhardii</i>	Leonhardi's Ctenotus	X								5	9		X								1												
	<i>Ctenotus mimetes</i>	Checker-sided Ctenotus																																
	<i>Ctenotus pantherinus</i>	Leopard Ctenotus	X		6		1										4																	
	<i>Ctenotus quattuordecimlineatus</i>	Fourteen-lined Ctenotus															11																	
	<i>Ctenotus schomburgkii</i>	Barred Wedgesnout Ctenotus	X		3						9	1			3			11		1		1				9	3	5	5	1	1			
	<i>Ctenotus severus</i>	Stern Ctenotus	X																															
	<i>Ctenotus uber</i>	Spotted Ctenotus	X												1		1									1						1	6	
	<i>Ctenotus xenopleura</i>	Wide-striped Ctenotus	X																															
	<i>Cyclodomorphus branchialis</i>	Common Slender Bluetongue											1																					
	<i>Cyclodomorphus melanops</i>	Spinifex Slender Blue-tongue	X																							10	2		2		2			
	<i>Egernia depressa</i>	Southern Pygmy Spiny-tailed Skink	X		3										2								1											
	<i>Egernia formosa</i>	Goldfields Crevice Skink	X																														5	2
	<i>Eremiascincus richardsonii</i>	Broad-banded Sand-swimmer	X																															
	<i>Lerista desertorum</i>	Central Desert Robust Slider	X	1		1	1	1									6				1			1										
	<i>Lerista kingi</i>	King's Slider	X																															
	<i>Lerista lineopunctulata</i>	Dotted-line Robust Slider																																
	<i>Lerista macropisthopus</i>	Unpatterned Robust Slider	X																								1							
	<i>Lerista muelleri</i>	Wood Mulch-slider	X																															
	<i>Lerista picturata</i>	Southern Robust Slider	X																															
	<i>Lerista timida</i>	Timid Slider	X																															
	<i>Liopholis inornata</i>	Desert Skink	X								1				1		1									2	1		2		4			
	<i>Menetia greyii</i>	Common Dwarf Skink	X	2			1	1			2	1			1				4		1				2	1	1	1	1	1		1		
	<i>Morethia butleri</i>	Woodland Morethia Skink	X	2												2	2			2	1		1	3								2	1	
	<i>Tiliqua occipitalis</i>	Western Blue-tongued Lizard	X	2							1			1											1					1				
	<i>Tiliqua rugosa</i>	Bobtail	X																															
Typhlopidae	<i>Anilius australis</i>	Austral Blind Snake																											2					
	<i>Anilius bituberculatus</i>	Prong-snouted Blind Snake	X																									1						

		Surveys A	B								C								D				E								F				
Family	Species	Common Name		Site 1E	Site LL4	Site LL5	Site LL3	Site LL1	Site LL2	Site 7	Site 8	Site 13	Site 9	Site 9a	Site 12	Site 21	Site 14	Site 21a	Site 19	Site 12a	MME1	MME2	Opportunis	MME3	MME7	MME6	GG27	GG29	GG28	GS28	GS29	GS27	GS30	GG30	Weebo
Varanidae	<i>Anilius hamatus</i>	Pale-headed Blind Snake					1																								1				
	<i>Varanus brevicauda</i>	Short-tailed Pygmy Monitor	X		1				1																										
	<i>Varanus caudolineatus</i>	Stripe-tailed Monitor	X	1		1							1									1				1									
	<i>Varanus eremius</i>	Pygmy Desert Monitor	X																																
	<i>Varanus giganteus</i>	Perentie	X																																
	<i>Varanus gouldii</i>	Gould's Goanna	X	1										1	1		2		2									2		1					
	<i>Varanus panoptes</i>	Yellow-spotted Monitor	X																																
	<i>Varanus tristis</i>	Black-headed Monitor	X																3				1			1							1		
Birds																																			
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu					2		1			8	1					1	2		1	1	1			1									
Anatidae	<i>Cygnus atratus</i>	Black Swan																					1												
	<i>Tadorna tadornoides</i>	Australian Shelduck		1																			1												
	<i>Chenonetta jubata</i>	Australian Wood Duck		1																															
	<i>Anas superciliosa</i>	Pacific Black Duck		1																				1											
	<i>Anas gracilis</i>	Grey Teal		1																				1											
	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck		1																			1												
Megapodiidae	<i>Leipoa ocellata</i>	Malleefowl																					1												
Podicipedidae	<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		1																															
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing				4												1		1			1												
	<i>Ocyphaps lophotes</i>	Crested Pigeon			5	4		2					6				1				2		1			2									
	<i>Geopelia cuneata</i>	Diamond Dove				8							1																						
Cuculidae	<i>Chrysococcyx basalis</i>	Horsfield's Bronze-Cuckoo				1						6	1					2	3																
	<i>Chrysococcyx osculans</i>	Black-eared Cuckoo										3							1																
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar		1													3																		
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth		1																															
Rallidae	<i>Tribonyx ventralis</i>	Black-tailed Nativehen		1																			1												
	<i>Fulica atra</i>	Eurasian Coot		1																															
Recurvirostridae	<i>Himantopus leucocephalus</i>	Pied Stilt		1																			1												
	<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet																					1												
Charadriidae	<i>Vanellus tricolor</i>	Banded Lapwing		1																															
	<i>Charadrius ruficapillus</i>	Red-capped Plover		1																			1												

		Surveys A	B								C								D				E							F					
Family	Species	Common Name	Site 1E	Site LL4	Site LL5	Site LL3	Site LL1	Site LL2	Site 7	Site 8	Site 13	Site 9	Site 9a	Site 12	Site 21	Site 14	Site 21a	Site 19	Site 12a	MME1	MME2	Opportunis	MME3	MME7	MME6	GG27	GG29	GG28	GS28	GS29	GS27	GS30	GG30	Weebo	
	<i>Elseyornis melanops</i>	Black-fronted Dotterel	1																			1													
Scolopacidae	<i>Actitis hypoleucos</i>	Common Sandpiper	1																																
Turnicidae	<i>Turnix velox</i>	Little Buttonquail									13																								
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron	1																			1													
	<i>Egretta novaehollandiae</i>	White-faced Heron	1																			1													
Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	1																																
Accipitridae	<i>Hieraaetus morphnoides</i>	Little Eagle	1															3			1														
	<i>Aquila audax</i>	Wedge-tailed Eagle				4	8	3								6																			
	<i>Circus assimilis</i>	Spotted Harrier	1												1																				
	<i>Accipiter fasciatus</i>	Brown Goshawk																3																	
Cuculidae	<i>Heteroscenes pallidus</i>	Pallid Cuckoo	1												4	2		1				1													
Alcedinidae	<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher	1																																
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater									3							3																	
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel			1		1	2										3																	
	<i>Falco longipennis</i>	Australian Hobby	1																				1												
	<i>Falco berigora</i>	Brown Falcon				1												5																	
	<i>Falco peregrinus</i>	Peregrine Falcon																			1														
Cacatuidae	<i>Eolophus roseicapilla</i>	Galah		26	4		10									44	62	5				1													
	<i>Nymphicus hollandicus</i>	Cockatiel		15	12		20										4	3																	
Psittaculidae	<i>Neopsephotus bourkii</i>	Bourke's Parrot			6																	1													
	<i>Barnardius zonarius</i>	Australian Ringneck		3	4	3	2					10			3	25		16			1	1			2	3									
	<i>Psephotus varius</i>	Mulga Parrot			9						4	3			2			2				1	1	5	5										
	<i>Melopsittacus undulatus</i>	Budgerigar		6	9	6	5	8			1				38	11		29																	
Ptilonorhynchidae	<i>Chlamydera guttata</i>	Western Bowerbird	X																																
Climacteridae	<i>Climacteris affinis</i>	White-browed Treecreeper	X	1											1		1				1			2											
	<i>Climacteris rufus</i>	Rufous Treecreeper	X																																
Maluridae	<i>Malurus pulcherrimus</i>	Blue-breasted Fairywren									15																								
	<i>Malurus lamberti</i>	Variegated Fairywren			2																														
	<i>Malurus splendens</i>	Splendid Fairywren	X								24											1		9											
	<i>Malurus leucopterus</i>	White-winged Fairywren	X				69		57			17								3															
Meliphagidae	<i>Certhionyx variegatus</i>	Pied Honeyeater	X		2	4					2					2																			
	<i>Purnella albifrons</i>	White-fronted Honeyeater	X		33	17	40	81	99		69	16			7	3	6	4	4	80	100	1	12	10	1										
	<i>Manorina flavigula</i>	Yellow-throated Miner										109			3	10		13		10	5	1	7		10										
	<i>Manorina flaviacula</i>	Yellow-throated Miner	X																																

Family	Species	Common Name	Surveys A										B								C								D						E								F
				Site 1E	Site LL4	Site LL5	Site LL3	Site LL1	Site LL2	Site 7	Site 8	Site 13	Site 9	Site 9a	Site 12	Site 21	Site 14	Site 21a	Site 19	Site 12a	MME1	MME2	Opportunis	MME3	MME7	MME6	GG27	GG29	GG28	GS28	GS29	GS27	GS30	GG30	Weebo								
	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	X		5	32	12						18	7			6	11	4	8		25	20	1		1	2																
	<i>Anthochaera carunculata</i>	Red Wattlebird	X											1						2																							
	<i>Gavicalis virescens</i>	Singing Honeyeater	X			20	1						2	4				11		2			4	1	2	1	1																
	<i>Ptilotula ornata</i>	Yellow-plumed Honeyeater	X																																								
	<i>Ptilotula plumula</i>	Grey-fronted Honeyeater																56		3																							
	<i>Conopophila whitei</i>	Grey Honeyeater											2	1						17																							
	<i>Epthianura tricolor</i>	Crimson Chat	X			11	43	20										154																									
	<i>Epthianura aurifrons</i>	Orange Chat	X																																								
	<i>Epthianura albifrons</i>	White-fronted Chat	X																																								
	<i>Sugomel nigrum</i>	Black Honeyeater	X	1									7																														
	<i>Lichmera indistincta</i>	Brown Honeyeater	X			1																																					
	<i>Nesoptilotis leucotis</i>	White-eared Honeyeater	X										4																														
	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater	X																																								
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote	X					2												2				1																			
Acanthizidae	<i>Pyrrholaemus brunneus</i>	Redthroat	X										16				2		1				1																				
	<i>Acanthiza apicalis</i>	Inland Thornbill	X			8							32				1		2	3	2	2	1		6	2																	
	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	X			3							2	4					4		5	6	1		4	2																	
	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill	X		3	20	3						23	27					10	88	2	8	30	1	2	50	15																
	<i>Acanthiza robustirostris</i>	Slaty-backed Thornbill	X																3				1		2																		
	<i>Smicrornis brevirostris</i>	Weebill	X		8	6							50				2		2	98			1																				
	<i>Gerygone fusca</i>	Western Gerygone	X																																								
	<i>Aphelocephala leucopsis</i>	Southern Whiteface	X			9													12	5			1		20	6																	
	<i>Pomatostomus superciliosus</i>	White-browed Babbler	X			22							1						3				1																				
Cinclosomatidae	<i>Cinclosoma castaneothorax</i>	Chestnut-breasted Quail-thrush	X																																								
Campephagidae	<i>Coracina maxima</i>	Ground Cuckooshrike	X						3																																		
	<i>Coracina novaehollandiae</i>	Black-faced Cuckooshrike	X				1	2	2					3				4		9			2	1																			
	<i>Lalage tricolor</i>	White-winged Triller	X			1	11						2	2					6																								
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella											2							6																							
Psophodidae	<i>Psophodes occidentalis</i>	Chiming Wedgebill	X																																								
Oreoidae	<i>Oreocitta gutturalis</i>	Crested Bellbird	X		2	18	17						11	2				14	2	15	1	1	3	1	1	2	1																
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush	X			1							6						1	5			1		2	1																	
	<i>Pachycephala inornata</i>	Gilbert's Whistler	X																																								

			Surveys A										B										C										D						E						F
Family	Species	Common Name		Site 1E	Site LL4	Site LL5	Site LL3	Site LL1	Site LL2	Site 7	Site 8	Site 13	Site 9	Site 9a	Site 12	Site 21	Site 14	Site 21a	Site 19	Site 12a	MME1	MME2	Opportunis	MME3	MME7	MME6	GG27	GG29	GG28	GS28	GS29	GS27	GS30	GG30	Weebo										
	<i>Pachycephala rufiventris</i>	Rufous Whistler	X		1	18												1	8				1		1	1																			
Artamidae	<i>Artamus personatus</i>	Masked Woodswallow	X			1						1					2		2						1																				
	<i>Artamus superciliosus</i>	White-browed Woodswallow																					1	4		1																			
	<i>Artamus cinereus</i>	Black-faced Woodswallow	X		1	1	23	43	1								55	1																											
	<i>Cracticus torquatus</i>	Grey Butcherbird	X		1							2	1				2		8			1	1	1	1	1	1																		
	<i>Cracticus nigrogularis</i>	Pied Butcherbird	X		1	3	15	5	2			3	14				6	2	4			2	1	1	1																				
	<i>Gymnorhina tibicen</i>	Australian Magpie	X	1									5									3		1																					
	<i>Strepera versicolor</i>	Grey Currawong	X	1									4					1	2						1																				
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail	X		1	7	3	2					1								1		1																						
	<i>Rhipidura albiscapa</i>	Grey Fantail	X																							1																			
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark	X	1																		1	1	2		2																			
Corvidae	<i>Corvus orru</i>	Torresian Crow	X																			1	1	2		1																			
	<i>Corvus bennetti</i>	Little Crow	X						10					149			29		24			2	1		1																				
	<i>Corvus coronoides</i>	Australian Raven	X																																										
Petroicidae	<i>Microeca fascians</i>	Jacky Winter	X			3	1												22																										
	<i>Petroica goodenovii</i>	Red-capped Robin	X			33	12					8	4				1	4	29		1	2	1		6	2																			
	<i>Melanodryas cucullata</i>	Hooded Robin	X			5	3										2	1					1	3																					
	<i>Eopsaltria griseogularis</i>	Western Yellow Robin	X																																										
Locustellidae	<i>Cincloramphus cruralis</i>	Brown Songlark	X	1													3																												
	<i>Cincloramphus mathewsi</i>	Rufous Songlark	X	1														2																											
Hirundinidae	<i>Hirundo rustica</i>	Barn Swallow																									5																		
	<i>Hirundo neoxena</i>	Welcome Swallow	X									2																																	
	<i>Petrochelidon ariel</i>	Fairy Martin	X																																										
	<i>Petrochelidon nigricans</i>	Tree Martin	X	1																																									
	<i>Cheramoeca leucosterna</i>	White-backed Swallow	X	1																			1	2																					
Dicaeidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird	X		4	7						3	4			1			5																										
Estrildidae	<i>Taeniopygia guttata</i>	Zebra Finch	X			22											12		5				1																						
Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian Pipit	X			2	5		4				2										1	4																					
Mammals																																													
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	X	1																		1	1																						
Bovidae	<i>Capra hircus</i>	Goat															1		1				1																						
	<i>Ovis aries</i>	Sheep											1	1		1		1																											
Camelidae	<i>Camelus dromedarius</i>	Dromedary		1				1																																					
Suidae	<i>Sus scrofa</i>	Pig	X																																										
Canidae	<i>Canis lupus</i>	Dingo	X									1											1																						
	<i>Vulpes vulpes</i>	Red Fox		1								1						1	1				1																						
Felidae	<i>Felis catus</i>	Cat		2																																									

Family	Species	Common Name	Surveys		A								B								C								D				E								F							
					Site 1E	Site LL4	Site LL5	Site LL3	Site LL1	Site LL2	Site 7	Site 8	Site 13	Site 9	Site 9a	Site 12	Site 21	Site 14	Site 21a	Site 19	Site 12a	MM1	MM2	Opportunis	MM3	MM7	MM6	GG27	GG29	GG28	GS28	GS29	GS27	GS30	GG30	Weebo												
Molossidae	<i>Austronomus australis</i>	White-striped Freetail Bat	X							1	1																																					
	<i>Mormopterus planiceps</i>	Southern Free-tail Bat	X	2						1																																						
Pteropodidae	<i>Syconycteris australis</i>	Common Blossom-bat		2																																												
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	X	5							1																																			1		
	<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	X	5		4					1																																					
	<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat	X	6							1																																					
	<i>Vespadelus baverstocki</i>	Inland Forest Bat	X																																													
Dasyuridae	<i>Antechinomys laniger</i>	Kultarr	X																																												1	
	<i>Ningai ridei</i>	Wongai Ningai	X		5							1							5																													
	<i>Ningai yvonneae</i>	Mallee Ningai	X																																													
	<i>Pseudantechinus woolleyae</i>	Woolley's False Antechinus	X																																													
	<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart	X				1	4	7						1					1			1																									
	<i>Sminthopsis dolichura</i>	Little Long-tailed Dunnart	X									3					1			1							1	1	1			1	2	12														
	<i>Sminthopsis hirtipes</i>	Hairy-footed Dunnart	X																																													
	<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	X			3	2		1																																							
	<i>Sminthopsis ooldea</i>	Ooldea Dunnart	X		2		1	1																																								
Macropodidae	<i>Osphranter robustus</i>	Euro	X	3											1			1				1																										
	<i>Osphranter rufus</i>	Red Kangaroo	X	38		1	2	4								1						1	5																								1	
Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit		3				1														1																										
Equidae	<i>Equus asinus</i>	Donkey																					1																									
Muridae	<i>Mus musculus</i>	House Mouse	X		2	3	3	3	8				4					3		1	2		2		2																							
	<i>Notomys alexis</i>	Spinifex Hopping Mouse	X									2																																				
	<i>Notomys mitchellii</i>	Mitchell's Hopping Mouse	X													1																																
	<i>Pseudomys albocinereus</i>	Ash-grey Mouse	X																																													
	<i>Pseudomys bolami</i>	Bolam's Mouse	X															3																														
	<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse	X	1	8	1	6	1				2							7						1	2																						

- A Atlas of Living Australia
- B McKenzie N.L., Rolfe, J.K. and Youngson, W.K. (1994b) Vertebrate fauna. In: The Biological Survey of the Eastern Goldfields of Western Australia Part 10, Sandstone-Sir Samuel and Laverton-Leonora Study Areas. *Records of the Western Australian Museum*, Supplement No 47, PP. 51-85.
- C Dell, J and How, R.A. (1988) Vertebrate fauna. In: The biological Survey of the Eastern Goldfields of Western Australia, Part 5, Edjudina - Menzies Study Area. *Records of the Western Australian Museum*, Supplement No 31., pp. 38-77.
- D Ninox Wildlife Consulting (1998) *A Vertebrate Fauna Survey of the Murrin Murrin Expansion Project*. Unpublished report for Anaconda Nickel Ltd, Perth.
- E 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.
- F How R.A. and Dell J. (1992) Vertebrate fauna. In: The Biological Survey of the Eastern Goldfields of Western Australia Part 7. Duketon - Sir Samuel Study Area. *Records of the Western Australian Museum*; Supplement 40, 90-109.

		Surveys	A				B	C	D						E	F						G			H	I	J	K						
Family	Species	Common Name	Site 6	Site 5	Site 7	Opportunistic	Site 7	Site 6	Jump Up Dam	MC06	MC05	MC07	BIF	15	7	18	Mine (Tarmoola Operations)	Pipeline (proposed)	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 9	Site 8	Allan's Pool and Mid Gum	TSF3	Leinster Nickel Operations	Gum Pool	Unknown	Unknown	Unknown	Goongarrie
Reptiles																																		
Agamidae	<i>Ctenophorus reticulatus</i>	Western Netted Dragon	1	3			1		1	1	1						X																	
	<i>Ctenophorus scutulatus</i>	Lozenge-marked Dragon		1	2		15			1	16	3							1	3	5	3	1											
	<i>Diporiphora amphiboluroides</i>	Mulga Dragon		1					1												2													
	<i>Pogona minor</i>	Western Bearded Dragon		1				6		2	1	1								1		1												
Carphodactylidae	<i>Underwoodisaurus milii</i>	Barking Gecko							1																									
Diplodactylidae	<i>Diplodactylus granariensis</i>	Wheatbelt Stone Gecko					1				1																							
	<i>Diplodactylus pulcher</i>	Beautiful Gecko		1			1	4		4	9									1			1											
	<i>Lucasium maini</i>	Main's Ground Gecko					1																											
	<i>Rhynchoedura ornata</i>	Beaked Gecko							1																									
	<i>Strophurus assimilis</i>	Goldfields Spiny-tailed Gecko																1																
Elapidae	<i>Brachyuropsis semifasciata</i>	Half-girdled Snake							1	1		2																						
	<i>Demansia psammophis</i>	Yellow-faced Whipsnake						1																										
	<i>Suta monachus</i>	Hooded Snake									1																							
Gekkonidae	<i>Gehyra variegata</i>	Variegated Gehyra							1		3						X					1												
	<i>Heteronotia binoei</i>	Bynoe's Gecko							1		1												1											
Scincidae	<i>Ctenotus grandis</i>	Grand Ctenotus			1																													
	<i>Ctenotus leonhardii</i>	Leonhardi's Ctenotus						1											1	8	2	1												
	<i>Ctenotus mimetes</i>	Checker-sided Ctenotus		1																														
	<i>Ctenotus schomburgkii</i>	Barred Wedgesnout Ctenotus			2							2								1	1													
	<i>Ctenotus uber</i>	Spotted Ctenotus					2			13	4																							
	<i>Egernia depressa</i>	Southern Pygmy Spiny-tailed Skink							1														3											
	<i>Egernia formosa</i>	Goldfields Crevice Skink							1	1																								
	<i>Lerista kingi</i>	King's Slider									1																							
	<i>Lerista lineopunctulata</i>	Dotted-line Robust Slider						4																										
	<i>Lerista timida</i>	Timid Slider								3	3	3																						
	<i>Liopholis inornata</i>	Desert Skink					2					2																						
	<i>Menettia greyii</i>	Common Dwarf Skink																		1			3											

		Surveys	A				B	C	D				E	F				G			H	I	J	K										
Family	Species	Common Name	Site 6	Site 5	Site 7	Opportunistic	Site 7	Site 6	Jump Up Dam	MC06	MC05	MC07	BIF	15	7	18	Mine (Tarmoola Operations)	Pipeline (proposed)	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 9	Site 8	Allan's Pool and Mid Gum	TSF3	Leinster Nickel Operations	Gum Pool	Unknown	Unknown	Unknown	Goongarie
	<i>Morethia butleri</i>	Woodland Morethia Skink								1																								
Typhlopidae	<i>Anilios bituberculatus</i>	Prong-snouted Blind Snake									3																							
	<i>Anilios hamatus</i>	Pale-headed Blind Snake					1				2																							
Varanidae	<i>Varanus caudolineatus</i>	Stripe-tailed Monitor							1	1								3	2															
	<i>Varanus giganteus</i>	Perentie											2																					
	<i>Varanus gouldii</i>	Gould's Goanna					2			1							X																	
	<i>Varanus panoptes</i>	Yellow-spotted Monitor							1									1		2	1	2												
Birds																																		
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu							1								X																	
Anatidae	<i>Tadorna tadornoides</i>	Australian Shelduck																								1								
	<i>Chenonetta jubata</i>	Australian Wood Duck															X									1								
	<i>Anas superciliosa</i>	Pacific Black Duck																								1								
	<i>Anas gracilis</i>	Grey Teal																								1								
Megapodiidae	<i>Leipoa ocellata</i>	Malleefowl				X			1					X	X	X															X	X	2	
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing							1				1														1							
	<i>Ocyphaps lophotes</i>	Crested Pigeon							1								X	X									1							
	<i>Geopelia cuneata</i>	Diamond Dove								2																								
Cuculidae	<i>Chrysococcyx basalis</i>	Horsfield's Bronze-Cuckoo							1										1	2	2	1												
	<i>Chrysococcyx osculans</i>	Black-eared Cuckoo							1									X	1				1											
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar							1												1													
Caprimulgidae	<i>Eurostopodus argus</i>	Spotted Nightjar							1																									
Apodidae	<i>Apus pacificus</i>	Pacific Swift							1																									
Rallidae	<i>Tribonyx ventralis</i>	Black-tailed Nativehen																									1							
Charadriidae	<i>Charadrius ruficapillus</i>	Red-capped Plover																									1							
	<i>Erythronyis cinctus</i>	Red-kneed Dotterel																									1							
	<i>Elseyonis melanops</i>	Black-fronted Dotterel																									1							
Scolopacidae	<i>Calidris ruficollis</i>	Red-necked Stint																									1							
	<i>Tringa nebularia</i>	Common Greenshank																									1							
	<i>Tringa glareola</i>	Wood Sandpiper																									1							
Turnicidae	<i>Turnix velox</i>	Little Buttonquail							1																									
Otididae	<i>Ardeotis australis</i>	Australian Bustard							1																									

		Surveys	A				B	C	D							E	F							G			H	I	J	K				
Family	Species	Common Name	Site 6	Site 5	Site 7	Opportunistic	Site 7	Site 6	Jump Up Dam	MC06	MC05	MC07	BIF	15	7	18	Mine (Tarmoola Operations)	Pipeline (proposed)	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 9	Site 8	Allan's Pool and Mid Gum	TSF3	Leinster Nickel Operations	Gum Pool	Unknown	Unknown	Unknown	Goongarrie
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron															X									1								
Accipitridae	<i>Hieraetus morphnoides</i>	Little Eagle																								1								
	<i>Aquila audax</i>	Wedge-tailed Eagle															X									1								
	<i>Accipiter fasciatus</i>	Brown Goshawk											1																					
	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk							1																									
	<i>Haliastur sphenurus</i>	Whistling Kite															X									1								
Cuculidae	<i>Heteroscenes pallidus</i>	Pallid Cuckoo								1	1						X			1	2	2	1											
Alcedinidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra																															1	
	<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher											1																					
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater							1		2																					7		
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel															X									1								
	<i>Falco longipennis</i>	Australian Hobby							1								X																	
	<i>Falco berigora</i>	Brown Falcon							1								X	X																
Cacatuidae	<i>Eolophus roseicapilla</i>	Galah							1								X	X		2			2			1								
	<i>Nymphicus hollandicus</i>	Cockatiel							1	1	5						X		13	3		21	3											
Psittaculidae	<i>Neopsephotus bourkii</i>	Bourke's Parrot							1													5												
	<i>Neophema elegans</i>	Elegant Parrot			2																													
	<i>Barnardius zonarius</i>	Australian Ringneck	4	8	2				1								X	X	8	5	8	5	5										1	
	<i>Psephotus varius</i>	Mulga Parrot			2				1								X																	
	<i>Melopsittacus undulatus</i>	Budgerigar							1	10	10	20							10		20	15												
Ptilonorhynchidae	<i>Chlamydera guttata</i>	Western Bowerbird							1											1						1								
	<i>Ptilonorhynchus maculata</i>	Spotted Bowerbird															X																	
Climacteridae	<i>Climacteris affinis</i>	White-browed Treecreeper			1				1									X																
Maluridae	<i>Malurus assimilis</i>	Purple-backed Fairywren	6	3																														
	<i>Malurus splendens</i>	Splendid Fairywren	17	15	7				1	8	4	3					X	X	15	10	20	14	21										1	
	<i>Malurus leucopterus</i>	White-winged Fairywren							1								X																	
Meliphagidae	<i>Certhionyx variegatus</i>	Pied Honeyeater									1																							
	<i>Purnella albifrons</i>	White-fronted Honeyeater							1	2	2	10																						
	<i>Manorina flavigula</i>	Yellow-throated Miner							1								X	X			1	7				1							1	
	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater							1	2	4	10					X	X	1	1	5	5	6										1	
	<i>Anthochaera carunculata</i>	Red Wattlebird							1												2	5											1	

		Surveys	A				B	C	D							E	F							G			H	I	J	K					
Family	Species	Common Name	Site 6	Site 5	Site 7	Opportunistic	Site 7	Site 6	Jump Up Dam	MC06	MC05	MC07	BIF	15	7	18	Mine (Tarmoola Operations)	Pipeline (proposed)	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 9	Site 8	Allan's Pool and Mid Gum	TSF3	Leinster Nickel Operations	Gum Pool	Unknown	Unknown	Unknown	Goongarrie	
	<i>Gavicalis virescens</i>	Singing Honeyeater		2	1				1		2	1					X	X	1	1	1	2	2											1	
	<i>Epthianura tricolor</i>	Crimson Chat							1			1								2	1	2	2												
	<i>Epthianura albifrons</i>	White-fronted Chat															X																		
	<i>Lichmera indistincta</i>	Brown Honeyeater		4					1								X																		
	<i>Nesoptilotis leucotis</i>	White-eared Honeyeater																																1	
	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater									6																								
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote							1		2						X																	1	
Acanthizidae	<i>Pyrholaemus brunneus</i>	Redthroat	2	2					1	4	4	2								1			2											1	
	<i>Acanthiza iredalei</i>	Slender-billed Thornbill																																1	
	<i>Acanthiza apicalis</i>	Inland Thornbill	5	3	2				1	4	2	4						X	19	10	18	11	16											1	
	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill							1								X	X		2															
	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill	5	9	3				1	6	6	6					X	X								1								1	
	<i>Acanthiza robustirostris</i>	Slaty-backed Thornbill																	5	5	14	8	12												
	<i>Smicrornis brevirostris</i>	Weebill	9	11	16				1	2	6	2					X		2		10	5													
	<i>Gerygone fusca</i>	Western Gerygone	1																																
	<i>Aphelocephala leucopsis</i>	Southern Whiteface		2					1								X	X																	
Pomatostomidae	<i>Pomatostomus superciliosus</i>	White-browed Babbler		8	3				1	2	4	2						X		3														1	
Cinclosomatidae	<i>Cinclosoma castaneothorax</i>	Chestnut-breasted Quail-thrush							1																										1
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckooshrike			5				1			2					X	X			2					1								1	
	<i>Lalage tricolor</i>	White-winged Triller							1			2																							
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella									10																								
Oreoicidae	<i>Oreoica gutturalis</i>	Crested Bellbird	3	6	3				1	1	1	1					X	X	6	8	6	5	5											1	
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrikethrush	1	1	1				1	2	1	1					X	X	2	2	2	1	3											1	
	<i>Pachycephala rufiventris</i>	Rufous Whistler		1	1				1								X	X	2		1													1	
Artamidae	<i>Artamus personatus</i>	Masked Woodswallow							1	8	20	500																							
	<i>Artamus cinereus</i>	Black-faced Woodswallow															X	X								1									
	<i>Cracticus torquatus</i>	Grey Butcherbird															X	X								1								1	
	<i>Cracticus nigrogularis</i>	Pied Butcherbird							1								X			1	1	2	1			1								1	
	<i>Gymnorhina tibicen</i>	Australian Magpie							1																										
	<i>Strepera versicolor</i>	Grey Currawong	2	2	1				1										3	1	5	1	4											1	
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail							1								X	X																1	

		Surveys	A				B	C	D						E		F						G			H	I	J	K						
Family	Species	Common Name	Site 6	Site 5	Site 7	Opportunistic	Site 7	Site 6	Jump Up Dam	MC06	MC05	MC07	BIF	15	7	18	Mine (Tarmoola Operations)	Pipeline (proposed)	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 9	Site 8	Allan's Pool and Mid Gum	TSF3	Leinster Nickel Operations	Gum Pool	Unknown	Unknown	Unknown	Goongarie	
	<i>Rhipidura albiscapa</i>	Grey Fantail	1	1						1									1														1		
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark								1							X									1									
Corvidae	<i>Corvus orru</i>	Torresian Crow															X	X	3	2	4														
	<i>Corvus bennetti</i>	Little Crow						1											1		1	1											1		
Petroicidae	<i>Petroica goodenovii</i>	Red-capped Robin	1		2			1	2	3	2						X	X		4	4	5	3											1	
	<i>Melanodryas cucullata</i>	Hooded Robin	2																															1	
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow															X									1									
	<i>Petrochelidon nigricans</i>	Tree Martin															X									1									
	<i>Cheramoeca leucosterna</i>	White-backed Swallow															X									1									
Dicaeidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird						1		2																								1	
Estrildidae	<i>Taeniopygia guttata</i>	Zebra Finch						1		6	2						X	X																	
Motacillidae	<i>Motacilla alba</i>	White Wagtail																								1									
	<i>Anthus novaeseelandiae</i>	Australasian Pipit						1									X									1									
Mammal																																			
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna					1		1								X																		
Bovidae	<i>Bos taurus</i>	Cow							1								X																		
	<i>Capra hircus</i>	Goat							1								X																		
	<i>Ovis aries</i>	Sheep															X																		
Camelidae	<i>Camelus dromedarius</i>	Dromedary									X																								
Canidae	<i>Canis lupus</i>	Dingo															X																		
	<i>Vulpes vulpes</i>	Red Fox						1																											
Felidae	<i>Felis catus</i>	Cat						1																											
Molossidae	<i>Austronomus australis</i>	White-striped Freetail Bat	X	X	X					X			X						1	1	1	1	1												
	<i>Mormopterus</i> sp. 4	South-western Free-tail Bat						1																											
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	X	X				1	X			X							1	1	1	1	1				1	1	1						
	<i>Chalinolobus morio</i>	Chocolate Wattled Bat	X	X	X			1				X																							
	<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat						1											1	1	1	1					1	1							
	<i>Vespadelus baverstocki</i>	Inland Forest Bat		X	X					X																		1	1	1					
	<i>Vespadelus finlaysoni</i>	Finlayson's Cave Bat								X			X						1	1	1	1	1												
Dasyuridae	<i>Pseudantechinus woolleyae</i>	Woolley's False Antechinus											9												1										
	<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart					1																												

		Surveys	A				B	C	D								E	F								G			H	I	J	K		
Family	Species	Common Name	Site 6	Site 5	Site 7	Opportunistic	Site 7	Site 6	Jump Up Dam	MC06	MC05	MC07	BIF	15	7	18	Mine (Tarmoola Operations)	Pipeline (proposed)	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 9	Site 8	Allan's Pool and Mid Gum	TSF3	Leinster Nickel Operations	Gum Pool	Unknown	Unknown	Unknown	Goongarrie
	<i>Sminthopsis dolichura</i>	Little Long-tailed Dunnart																	1	2	3	4	3											
	<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart																			2													
Macropodidae	<i>Osphranter robustus</i>	Euro							1								X																	
	<i>Osphranter rufus</i>	Red Kangaroo							1								X																	
Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit							1								X																	
Muridae	<i>Leporillus apicalis</i>	Lesser Stick-nest Rat											X																					
	<i>Mus musculus</i>	House Mouse								10	4	5							4	2	2	23	10		1	2								
	<i>Notomys alexis</i>	Spinifex Hopping Mouse									1								5															
	<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse									1								3		1	2	1											

- A Keith Lindbeck and Associates (2011) *Snark Project Fauna Assessment*, Unpublished report for Macarthur Minerals Ltd, Perth.
- B Hart, Simpson and Associates (2000) *Anaconda Nickel Ltd, Cawse Expansion Project, Fauna Survey*. Unpublished report for Anaconda Nickel Ltd, Perth.
- C Ecologia Environment (2007) *Jump Up Dam Fauna Assessment*. Unpublished report for Heron Resources, Perth.
- D Ninox Wildlife Consulting (2012) *A Spring Vertebrate Fauna Survey, Ularring Hematite Project, Snark Area, WA*, Unpublished report for Macarthur Minerals, Perth.
- E Ninox Wildlife Consulting (2006) *A vertebrate fauna assessment of the Tarmoola area*. Unpublished report for St Barbara Limited, Lower King WA.
- F Keith Lindbeck and Associates (2012) *Central Yilgarn Iron Project (CYIP) Fauna Assessment Mt Mason*, Unpublished report for Jupiter Mines Ltd, Perth.
- G Donato Environmental Services (2005b) *Ornithological Survey of the Leinster Nickel Operation Mining Lease: An assessment of Goat Grazing Impact*, Unpublished report for Leinster Nickel Operations, Perth.
- H Macarthur Minerals Ltd (2012) *Ularring Hematite Project Targeted Survey of Malleefowl*, Unpublished report for Macarthur Minerals, Perth.
- I Terrestrial Ecosystems (2011b) *Malleefowl (Leipoa ocellata) survey for the Snark Project*, Unpublished report for Macarthur Minerals, Perth.
- J Keith Lindbeck and Associates (2013) *Mt Mason Project and Proposed Haul Rd Targeted EPBC Fauna Survey*, unpublished report for Jupiter Mines Ltd, Perth.
- K 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.

		Survey	A																
Family	Species	Common name	9	8	15	7	10	4	2	1	12	11	14	3	13	5	6	Opportunistic	
Amphibians																			
Limnodynastidae	<i>Neobatrachus sutor</i>	Shoemaker Frog	16	11	5	1	14	6										1	
Myobatrachidae	<i>Pseudophryne occidentalis</i>	Western Toadlet	4															1	
Pelodryadidae	<i>Cyclorana occidentalis</i>	Western Water-holding Frog																1	
	<i>Litoria rubella</i>	Desert Tree Frog	1				1											1	
Birds																			
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar																1	
	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk																1	
	<i>Accipiter fasciatus</i>	Brown Goshawk																1	
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle																1	
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon																1	
	<i>Phaps chalcoptera</i>	Common Bronzewing																1	
Alcedinidae	<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher																1	
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater																1	
Cuculidae	<i>Chrysococcyx basalis</i>	Horsfield's Bronze-Cuckoo																1	
Falconidae	<i>Falco berigora</i>	Brown Falcon																1	
	<i>Falco cenchroides</i>	Nankeen Kestrel																1	
Acanthizidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill																1	
	<i>Acanthiza robustirostris</i>	Slaty-backed Thornbill																1	
	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill																1	
	<i>Aphelocephala leucopsis</i>	Southern Whiteface																1	
	<i>Gerygone fusca</i>	Western Gerygone																1	
	<i>Pyrrholaemus brunneus</i>	Redthroat																1	
	<i>Smicrornis brevirostris</i>	Weebill																1	
Artamidae	<i>Artamus cinereus</i>	Black-faced Woodswallow																1	
	<i>Cracticus nigrogularis</i>	Pied Butcherbird																1	
	<i>Gymnorhina tibicen</i>	Australian Magpie																1	
	<i>Strepera versicolor</i>	Grey Currawong																1	
Campephagidae	<i>Coracina maxima</i>	Ground Cuckooshrike																1	
	<i>Coracina novaehollandiae</i>	Black-faced Cuckooshrike																1	
Climacteridae	<i>Climacteris affinis</i>	White-browed Treecreeper																1	

		Survey	A																
Family	Species	Common name	9	8	15	7	10	4	2	1	12	11	14	3	13	5	6	Opportunistic	
Corvidae	<i>Corvus bennetti</i>	Little Crow																1	
	<i>Corvus orru</i>	Torresian Crow																1	
Estrildidae	<i>Taeniopygia guttata</i>	Zebra Finch																1	
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow																1	
Maluridae	<i>Malurus leucopterus</i>	White-winged Fairywren																1	
	<i>Malurus splendens</i>	Splendid Fairywren																1	
Meliphagidae	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater																1	
	<i>Epthianura tricolor</i>	Crimson Chat																1	
	<i>Lichenostomus virescens</i>	Singing Honeyeater																1	
	<i>Manorina flavigula</i>	Yellow-throated Miner																1	
	<i>Purnella albifrons</i>	White-fronted Honeyeater																1	
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark																1	
Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian Pipit																1	
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella																1	
Oreoicidae	<i>Oreoica gutturalis</i>	Crested Bellbird																1	
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrikethrush																1	
	<i>Pachycephala rufiventris</i>	Rufous Whistler																1	
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote																1	
Petroicidae	<i>Melanodryas cucullata</i>	Hooded Robin																1	
	<i>Petroica goodenovii</i>	Red-capped Robin																1	
Pomatostomidae	<i>Pomatostomus superciliosus</i>	White-browed Babbler																1	
Ptilinorhynchidae	<i>Ptilinorhynchus guttatus</i>	Western Bowerbird																1	
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail																1	
	<i>Rhipidura leucophrys</i>	Willie Wagtail																1	
Cacatuidae	<i>Eolophus roseicapilla</i>	Galah																1	
Psittaculidae	<i>Barnardius zonarius</i>	Australian Ringneck																1	
	<i>Neopsephotus bourkii</i>	Bourke's Parrot																1	
Mammals																			
Canidae	<i>Canis lupus</i>	Dingo			1													1	
Dasyuridae	<i>Ningauai ridei</i>	Wongai Ningau													1			1	
	<i>Sminthopsis dolichura</i>	Little Long-tailed Dunnart			1				1	2		3	2	1	2	2	2	1	
	<i>Sminthopsis macroura</i>	Stripe-faced Dunnart			3				1									1	
Macropodidae	<i>Osphranter robustus</i>	Euro																1	

		Survey	A																
Family	Species	Common name	9	8	15	7	10	4	2	1	12	11	14	3	13	5	6	Opportunistic	
	<i>Osphranter rufus</i>	Red Kangaroo																1	
Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit																1	
Muridae	<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse													1		9	1	
Reptiles																			
Agamidae	<i>Ctenophorus reticulatus</i>	Western Netted Dragon			1				6	1	1	2	1	1				1	
	<i>Ctenophorus scutulatus</i>	Lozenge-marked Dragon										3			1			1	
	<i>Diporiphora amphiboluiroides</i>	Mulga Dragon							2		1							1	
	<i>Pogona minor</i>	Western Bearded Dragon	1				1	1										1	
Carphodactylidae	<i>Nephrurus vertebralis</i>	Midline Knob-tail										5						1	
	<i>Underwoodisaurus milii</i>	Barking Gecko	11	9		7	20	5						2				1	
Diplodactylidae	<i>Diplodactylus granariensis</i>	Wheatbelt Stone Gecko	2	2	6	4	9	10	14	18	7	5	2	12	10	12	12	1	
	<i>Diplodactylus pulcher</i>	Beautiful Gecko			33				8	17	10	11	4	3	16	11	12	1	
	<i>Rhynchoedura ornata</i>	Beaked Gecko			1				2		1		7			8	1	1	
	<i>Strophurus wellingtonae</i>	Western Shield Spiny-tailed Gecko							3	2	2	1	4	2		3	1	1	
Elapidae	<i>Brachyurophis semifasciata</i>	Half-girdled Snake	1			1	4			1								1	
	<i>Pseudechis butleri</i>	Spotted Mulga Snake								1				1				1	
	<i>Pseudonaja modesta</i>	Ringed Brown Snake							1									1	
	<i>Simoselaps bertholdi</i>	Jan's Banded Snake	1	1		2		1						1				1	
	<i>Suta fasciata</i>	Rosen's Snake																1	
	<i>Suta monachus</i>	Hooded Snake	1								2		1		1			1	
	<i>Suta punctata</i>	Spotted-headed Snake	1															1	
Gekkonidae	<i>Gehyra variegata</i>	Variegated Gehyra	10	5	5	4	9	16	5	5	3	6	3	1	15	11	5	1	
	<i>Heteronotia binoei</i>	Bynoe's Gecko	20	31		27	26	32			4	8	4	3	12	2	1	1	
Pygopodidae	<i>Lialis burtonis</i>	Burton's Legless Lizard					1	1										1	
	<i>Pygopus nigriceps</i>	Western Hooded Scaly-foot											1		1		2	1	
Pythonidae	<i>Antaresia stimsoni</i>	Stimson's Python				1												1	
Scincidae	<i>Cryptoblepharus buehananii</i>	Buchanan's Snake-eyed Skink	5	2		3	5											1	
	<i>Ctenotus schomburgkii</i>	Barred Wedgesnout Ctenotus							11	1		6	9					1	
	<i>Ctenotus severus</i>	Stern Ctenotus	4	16		16	11	11										1	
	<i>Ctenotus uber</i>	Spotted Ctenotus	2	13	9	5	1	9	35	14	1	12	19	13	9	4	2	1	
	<i>Egernia depressa</i>	Southern Pygmy Spiny-tailed Skink							5	6	6	3		1	4	2	5	1	

		Survey	A																
Family	Species	Common name	9	8	15	7	10	4	2	1	12	11	14	3	13	5	6	Opportunistic	
	<i>Eremiascincus richardsonii</i>	Broad-banded Sand-swimmer	2		1	2	13	2				3				1	2	1	
	<i>Lerista desertorum</i>	Central Desert Robust Slider	20	23	1	15	40	24	1	4				3			5	1	
	<i>Lerista muelleri</i>	Wood Mulch-slider	3	1		5	4	2	2	3	1	1	3			1		1	
	<i>Menetia greyii</i>	Common Dwarf Skink			2		4				2	3	3		1	2		1	
	<i>Morethia butleri</i>	Woodland Morethia Skink	20	12		14	15	20	5	3	3	1	2	3	2	1	3	1	
Typhlopidae	<i>Anilius hamatus</i>	Pale-headed Blind Snake										1						1	
Varanidae	<i>Varanus caudolineatus</i>	Stripe-tailed Monitor			3		2		3	2	2		1				5	1	
	<i>Varanus panotes</i>	Ye3llow-spotted Monitor					1				1	1	1		1	2	1	1	

A Terrestrial Ecosystems (2020) Level 2 Vertebrate Fauna Assessment for the King of the Hills Project, Unpublished report for Red 5, Perth.

Appendix C.

Definitions of Significant Fauna under the WA *Biodiversity Conservation Act 2016* and Priority Species

**Basic Vertebrate Fauna Reconnaissance Survey and Risk Assessment
St Barbara Leonora Province Expansion**



ATTACHMENT C

DEFINITIONS OF SIGNIFICANT FAUNA UNDER THE WA BIODIVERSITY CONSERVATION ACT 2016

Threatened, Extinct and Specially Protected fauna or flora¹ are species² 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.

Rapid habitat assessments

Basic Vertebrate Fauna Reconnaissance Survey and Risk Assessment
St Barbara Leonora Province Expansion



Date: 12-Sep-22

Habitat Assessment #: 0

Observer: Joel Wilson

Zone: 51

Easting: 335551 mE

Northing: 6805836 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 1

Observer: Joel Wilson

Zone: 51

Easting: 335783 mE

Northing: 6806018 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 12-Sep-22

Habitat Assessment #: 2

Observer: Joel Wilson

Zone: 51

Easting: 335536 mE

Northing: 6806084 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 3

Observer: Joel Wilson

Zone: 51

Easting: 335428 mE

Northing: 6806349 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 4

Observer: Joel Wilson

Zone: 51

Easting: 335393 mE

Northing: 6806007 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 12-Sep-22

Habitat Assessment #: 5

Observer: Joel Wilson

Zone: 51

Easting: 335187 mE

Northing: 6806054 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: Disturbed

Surface: Few stones



Date: 12-Sep-22

Habitat Assessment #: 6

Observer: Joel Wilson

Zone: 51

Easting: 333987 mE

Northing: 6805603 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 12-Sep-22

Habitat Assessment #: 7

Observer: Joel Wilson

Zone: 51

Easting: 334087 mE

Northing: 6805211 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 8

Observer: Joel Wilson

Zone: 51

Easting: 334200 mE

Northing: 6805482 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 9

Observer: Joel Wilson

Zone: 51

Easting: 334254 mE

Northing: 6805874 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 10

Observer: Joel Wilson

Zone: 51

Easting: 334407 mE

Northing: 6805669 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 11

Observer: Joel Wilson

Zone: 51

Easting: 334382 mE

Northing: 6805179 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 12

Observer: Joel Wilson

Zone: 51

Easting: 334390 mE

Northing: 6804834 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 12-Sep-22

Habitat Assessment #: 13

Observer: Joel Wilson

Zone: 51

Easting: 334610 mE

Northing: 6805084 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 14

Observer: Joel Wilson

Zone: 51

Easting: 334613 mE

Northing: 6805471 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 15

Observer: Joel Wilson

Zone: 51

Easting: 334796 mE

Northing: 6804960 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 16

Observer: Joel Wilson

Zone: 51

Easting: 334594 mE

Northing: 6804663 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 12-Sep-22

Habitat Assessment #: 17

Observer: Joel Wilson

Zone: 51

Easting: 334356 mE

Northing: 6804494 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 18

Observer: Joel Wilson

Zone: 51

Easting: 334983 mE

Northing: 6805142 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 12-Sep-22

Habitat Assessment #: 19

Observer: Joel Wilson

Zone: 51

Easting: 335720 mE

Northing: 6805720 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 20

Observer: Joel Wilson

Zone: 51

Easting: 335975 mE

Northing: 6805545 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 21

Observer: Joel Wilson

Zone: 51

Easting: 336298 mE

Northing: 6805644 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 22

Observer: Joel Wilson

Zone: 51

Easting: 336502 mE

Northing: 6805388 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 23

Observer: Joel Wilson

Zone: 51

Easting: 336664 mE

Northing: 6805191 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 24

Observer: Joel Wilson

Zone: 51

Easting: 336869 mE

Northing: 6804765 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 25

Observer: Joel Wilson

Zone: 51

Easting: 336944 mE

Northing: 6804548 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 26

Observer: Joel Wilson

Zone: 51

Easting: 336950 mE

Northing: 6804333 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 27

Observer: Joel Wilson

Zone: 51

Easting: 336586 mE

Northing: 6804126 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 28

Observer: Joel Wilson

Zone: 51

Easting: 338859 mE

Northing: 6799644 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 29

Observer: Joel Wilson

Zone: 51

Easting: 338965 mE

Northing: 6799811 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 30

Observer: Joel Wilson

Zone: 51

Easting: 339054 mE

Northing: 6800158 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 31

Observer: Joel Wilson

Zone: 51

Easting: 339209 mE

Northing: 6800147 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 32

Observer: Joel Wilson

Zone: 51

Easting: 339200 mE

Northing: 6799862 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 33

Observer: Joel Wilson

Zone: 51

Easting: 339178 mE

Northing: 6799588 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: Disturbed

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 34

Observer: Joel Wilson

Zone: 51

Easting: 339394 mE

Northing: 6799693 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 35

Observer: Joel Wilson

Zone: 51

Easting: 339403 mE

Northing: 6799964 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 36

Observer: Joel Wilson

Zone: 51

Easting: 339412 mE

Northing: 6800413 mN

Fire History: > 5 years

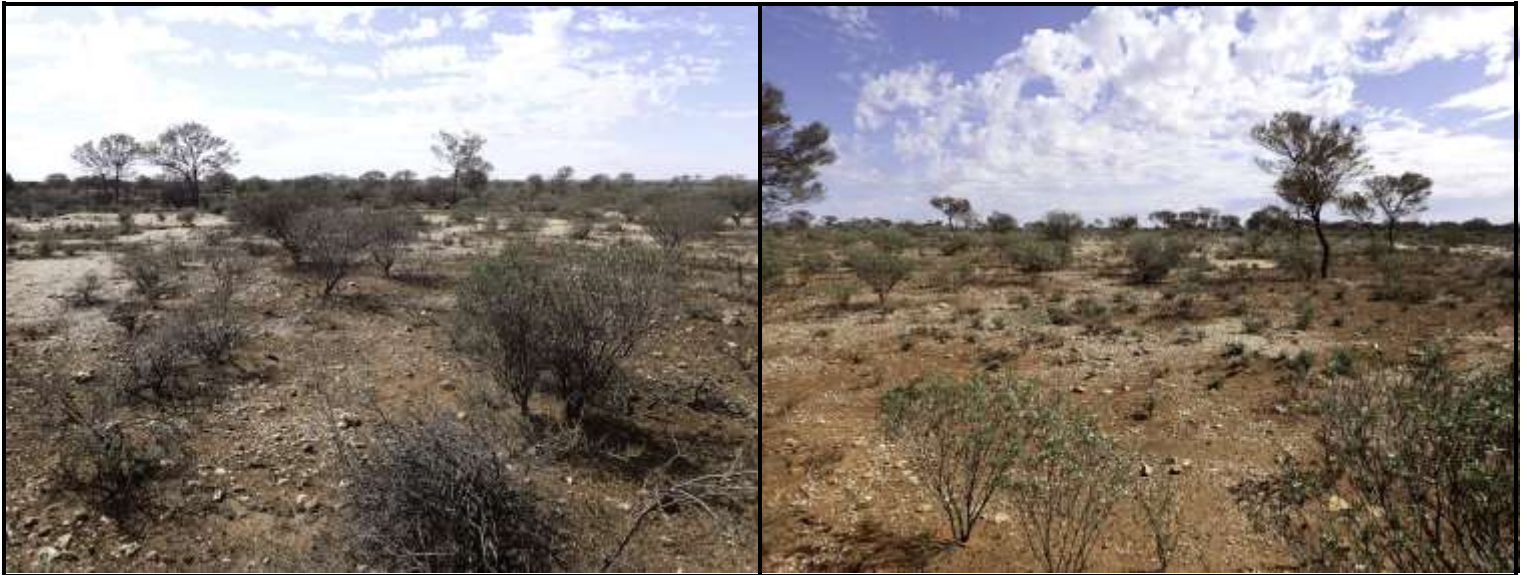
Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 37

Observer: Joel Wilson

Zone: 51

Easting: 339400 mE

Northing: 6800808 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 38

Observer: Joel Wilson

Zone: 51

Easting: 339423 mE

Northing: 6801202 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 39

Observer: Joel Wilson

Zone: 51

Easting: 339540 mE

Northing: 6801818 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 40

Observer: Joel Wilson

Zone: 51

Easting: 339597 mE

Northing: 6801418 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 41

Observer: Joel Wilson

Zone: 51

Easting: 339593 mE

Northing: 6800989 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 42

Observer: Joel Wilson

Zone: 51

Easting: 339589 mE

Northing: 6800635 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 43

Observer: Joel Wilson

Zone: 51

Easting: 339592 mE

Northing: 6800275 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 44

Observer: Joel Wilson

Zone: 51

Easting: 339584 mE

Northing: 6799952 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 45

Observer: Joel Wilson

Zone: 51

Easting: 339574 mE

Northing: 6799691 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 46

Observer: Joel Wilson

Zone: 51

Easting: 339800 mE

Northing: 6799886 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 47

Observer: Joel Wilson

Zone: 51

Easting: 339797 mE

Northing: 6800144 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 48

Observer: Joel Wilson

Zone: 51

Easting: 339800 mE

Northing: 6800527 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 49

Observer: Joel Wilson

Zone: 51

Easting: 339796 mE

Northing: 6800845 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 50

Observer: Joel Wilson

Zone: 51

Easting: 339789 mE

Northing: 6801320 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 51

Observer: Joel Wilson

Zone: 51

Easting: 339815 mE

Northing: 6801855 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 52

Observer: Joel Wilson

Zone: 51

Easting: 340010 mE

Northing: 6802167 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 53

Observer: Joel Wilson

Zone: 51

Easting: 339999 mE

Northing: 6801672 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 54

Observer: Joel Wilson

Zone: 51

Easting: 339995 mE

Northing: 6801180 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 55

Observer: Joel Wilson

Zone: 51

Easting: 340001 mE

Northing: 6800646 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 56

Observer: Joel Wilson

Zone: 51

Easting: 340004 mE

Northing: 6800297 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 57

Observer: Joel Wilson

Zone: 51

Easting: 339986 mE

Northing: 6799783 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 58

Observer: Joel Wilson

Zone: 51

Easting: 340202 mE

Northing: 6799720 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 59

Observer: Joel Wilson

Zone: 51

Easting: 340217 mE

Northing: 6800226 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 60

Observer: Joel Wilson

Zone: 51

Easting: 340212 mE

Northing: 6800667 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 61

Observer: Joel Wilson

Zone: 51

Easting: 340226 mE

Northing: 6801168 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 62

Observer: Joel Wilson

Zone: 51

Easting: 340178 mE

Northing: 6801972 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 63

Observer: Joel Wilson

Zone: 51

Easting: 341543 mE

Northing: 6799042 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 64

Observer: Joel Wilson

Zone: 51

Easting: 341570 mE

Northing: 6798823 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 65

Observer: Joel Wilson

Zone: 51

Easting: 341576 mE

Northing: 6798548 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 66

Observer: Joel Wilson

Zone: 51

Easting: 341580 mE

Northing: 6798147 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 67

Observer: Joel Wilson

Zone: 51

Easting: 341578 mE

Northing: 6797616 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 68

Observer: Joel Wilson

Zone: 51

Easting: 341588 mE

Northing: 6797120 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 69

Observer: Joel Wilson

Zone: 51

Easting: 341590 mE

Northing: 6796658 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 70

Observer: Joel Wilson

Zone: 51

Easting: 341588 mE

Northing: 6796164 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 71

Observer: Joel Wilson

Zone: 51

Easting: 341599 mE

Northing: 6795707 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 72

Observer: Joel Wilson

Zone: 51

Easting: 341604 mE

Northing: 6795306 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 73

Observer: Joel Wilson

Zone: 51

Easting: 341407 mE

Northing: 6795616 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 74

Observer: Joel Wilson

Zone: 51

Easting: 341357 mE

Northing: 6796149 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 75

Observer: Joel Wilson

Zone: 51

Easting: 341386 mE

Northing: 6796515 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 76

Observer: Joel Wilson

Zone: 51

Easting: 341377 mE

Northing: 6797074 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 77

Observer: Joel Wilson

Zone: 51

Easting: 341390 mE

Northing: 6797459 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 78

Observer: Joel Wilson

Zone: 51

Easting: 341416 mE

Northing: 6798204 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 79

Observer: Joel Wilson

Zone: 51

Easting: 341389 mE

Northing: 6798730 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 80

Observer: Joel Wilson

Zone: 51

Easting: 341387 mE

Northing: 6799162 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: Disturbed

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 81

Observer: Joel Wilson

Zone: 51

Easting: 341205 mE

Northing: 6799357 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 82

Observer: Joel Wilson

Zone: 51

Easting: 341196 mE

Northing: 6798742 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 83

Observer: Joel Wilson

Zone: 51

Easting: 341210 mE

Northing: 6798185 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 84

Observer: Joel Wilson

Zone: 51

Easting: 341234 mE

Northing: 6797437 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 85

Observer: Joel Wilson

Zone: 51

Easting: 341204 mE

Northing: 6796956 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 13-Sep-22

Habitat Assessment #: 86

Observer: Joel Wilson

Zone: 51

Easting: 341184 mE

Northing: 6796536 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 13-Sep-22

Habitat Assessment #: 87

Observer: Joel Wilson

Zone: 51

Easting: 341166 mE

Northing: 6796208 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 88

Observer: Joel Wilson

Zone: 51

Easting: 340998 mE

Northing: 6799177 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 89

Observer: Joel Wilson

Zone: 51

Easting: 341009 mE

Northing: 6798845 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 90

Observer: Joel Wilson

Zone: 51

Easting: 340987 mE

Northing: 6798536 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 91

Observer: Joel Wilson

Zone: 51

Easting: 340992 mE

Northing: 6798049 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 92

Observer: Joel Wilson

Zone: 51

Easting: 340995 mE

Northing: 6797408 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 93

Observer: Joel Wilson

Zone: 51

Easting: 340998 mE

Northing: 6796951 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 94

Observer: Joel Wilson

Zone: 51

Easting: 341005 mE

Northing: 6796527 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 95

Observer: Joel Wilson

Zone: 51

Easting: 341011 mE

Northing: 6796292 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 96

Observer: Joel Wilson

Zone: 51

Easting: 340803 mE

Northing: 6795985 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 97

Observer: Joel Wilson

Zone: 51

Easting: 340816 mE

Northing: 6796626 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 98

Observer: Joel Wilson

Zone: 51

Easting: 340778 mE

Northing: 6797153 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 99

Observer: Joel Wilson

Zone: 51

Easting: 340779 mE

Northing: 6798028 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 100

Observer: Joel Wilson

Zone: 51

Easting: 340788 mE

Northing: 6798483 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 101

Observer: Joel Wilson

Zone: 51

Easting: 340805 mE

Northing: 6798894 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 102

Observer: Joel Wilson

Zone: 51

Easting: 340776 mE

Northing: 6799219 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 103

Observer: Joel Wilson

Zone: 51

Easting: 340592 mE

Northing: 6799105 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 104

Observer: Joel Wilson

Zone: 51

Easting: 340583 mE

Northing: 6798888 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 105

Observer: Joel Wilson

Zone: 51

Easting: 340604 mE

Northing: 6798499 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 106

Observer: Joel Wilson

Zone: 51

Easting: 340590 mE

Northing: 6798066 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 107

Observer: Joel Wilson

Zone: 51

Easting: 340593 mE

Northing: 6797658 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 108

Observer: Joel Wilson

Zone: 51

Easting: 340599 mE

Northing: 6797325 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 109

Observer: Joel Wilson

Zone: 51

Easting: 340588 mE

Northing: 6796978 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Tall shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 110

Observer: Joel Wilson

Zone: 51

Easting: 340585 mE

Northing: 6796537 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 111

Observer: Joel Wilson

Zone: 51

Easting: 340597 mE

Northing: 6796200 mN

Fire History: > 5 years

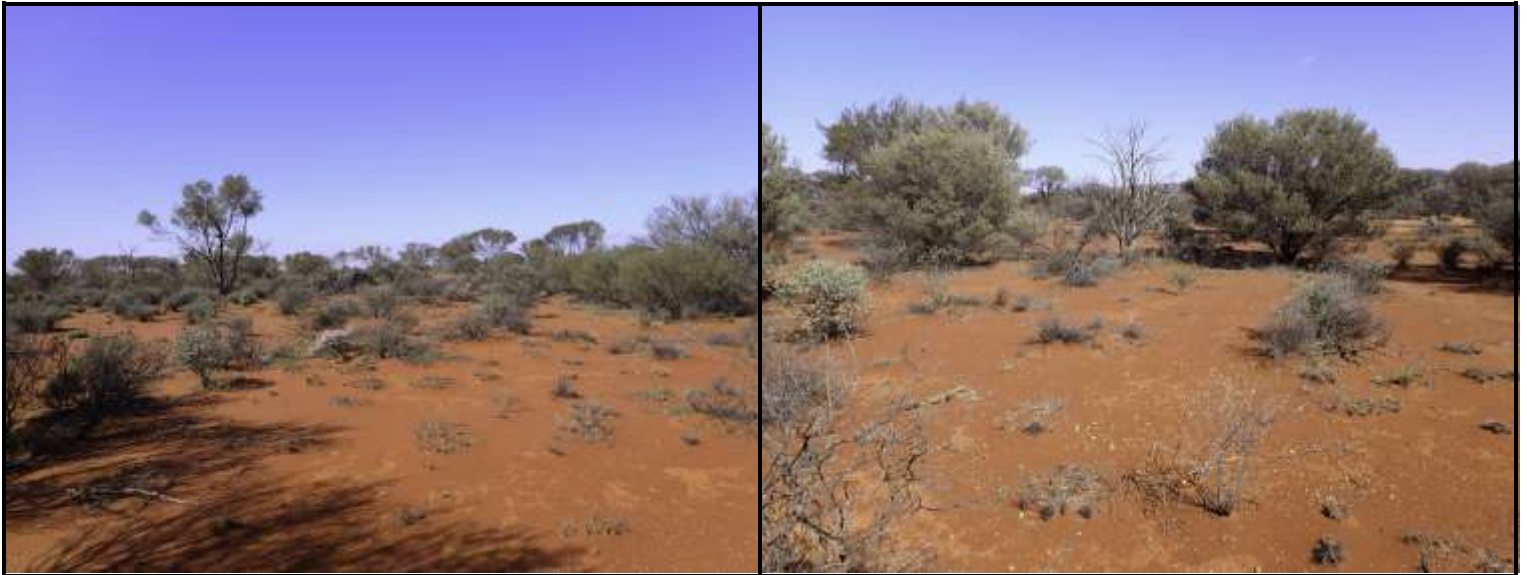
Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 112

Observer: Joel Wilson

Zone: 51

Easting: 340572 mE

Northing: 6795994 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 113

Observer: Joel Wilson

Zone: 51

Easting: 340396 mE

Northing: 6796010 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 114

Observer: Joel Wilson

Zone: 51

Easting: 340400 mE

Northing: 6796298 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 115

Observer: Joel Wilson

Zone: 51

Easting: 340359 mE

Northing: 6796636 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Tall shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 116

Observer: Joel Wilson

Zone: 51

Easting: 340407 mE

Northing: 6797446 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 117

Observer: Joel Wilson

Zone: 51

Easting: 340400 mE

Northing: 6797904 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 118

Observer: Joel Wilson

Zone: 51

Easting: 340395 mE

Northing: 6798416 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 119

Observer: Joel Wilson

Zone: 51

Easting: 340375 mE

Northing: 6799089 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 120

Observer: Joel Wilson

Zone: 51

Easting: 340388 mE

Northing: 6799288 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 121

Observer: Joel Wilson

Zone: 51

Easting: 340207 mE

Northing: 6799405 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: Disturbed

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 122

Observer: Joel Wilson

Zone: 51

Easting: 340197 mE

Northing: 6798946 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 123

Observer: Joel Wilson

Zone: 51

Easting: 340208 mE

Northing: 6798594 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 124

Observer: Joel Wilson

Zone: 51

Easting: 340206 mE

Northing: 6797793 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 125

Observer: Joel Wilson

Zone: 51

Easting: 340191 mE

Northing: 6797497 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 126

Observer: Joel Wilson

Zone: 51

Easting: 340213 mE

Northing: 6797207 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 127

Observer: Joel Wilson

Zone: 51

Easting: 340195 mE

Northing: 6796735 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 128

Observer: Joel Wilson

Zone: 51

Easting: 340208 mE

Northing: 6796462 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 129

Observer: Joel Wilson

Zone: 51

Easting: 340208 mE

Northing: 6796161 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 130

Observer: Joel Wilson

Zone: 51

Easting: 339979 mE

Northing: 6796217 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 131

Observer: Joel Wilson

Zone: 51

Easting: 340006 mE

Northing: 6796566 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 132

Observer: Joel Wilson

Zone: 51

Easting: 340016 mE

Northing: 6796916 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 133

Observer: Joel Wilson

Zone: 51

Easting: 339986 mE

Northing: 6797525 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 134

Observer: Joel Wilson

Zone: 51

Easting: 340009 mE

Northing: 6797844 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 135

Observer: Joel Wilson

Zone: 51

Easting: 340013 mE

Northing: 6798423 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 136

Observer: Joel Wilson

Zone: 51

Easting: 340009 mE

Northing: 6798908 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 137

Observer: Joel Wilson

Zone: 51

Easting: 339787 mE

Northing: 6799272 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 138

Observer: Joel Wilson

Zone: 51

Easting: 339786 mE

Northing: 6798822 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 139

Observer: Joel Wilson

Zone: 51

Easting: 339808 mE

Northing: 6798284 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 140

Observer: Joel Wilson

Zone: 51

Easting: 339812 mE

Northing: 6797856 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 141

Observer: Joel Wilson

Zone: 51

Easting: 339820 mE

Northing: 6797294 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 142

Observer: Joel Wilson

Zone: 51

Easting: 339814 mE

Northing: 6796790 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 143

Observer: Joel Wilson

Zone: 51

Easting: 339795 mE

Northing: 6796392 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 144

Observer: Joel Wilson

Zone: 51

Easting: 339793 mE

Northing: 6796177 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 145

Observer: Joel Wilson

Zone: 51

Easting: 339630 mE

Northing: 6796349 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 146

Observer: Joel Wilson

Zone: 51

Easting: 339593 mE

Northing: 6796697 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 147

Observer: Joel Wilson

Zone: 51

Easting: 339629 mE

Northing: 6797093 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 148

Observer: Joel Wilson

Zone: 51

Easting: 339609 mE

Northing: 6797702 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 149

Observer: Joel Wilson

Zone: 51

Easting: 339621 mE

Northing: 6798039 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 150

Observer: Joel Wilson

Zone: 51

Easting: 339610 mE

Northing: 6798546 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 151

Observer: Joel Wilson

Zone: 51

Easting: 339597 mE

Northing: 6799093 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 152

Observer: Joel Wilson

Zone: 51

Easting: 339418 mE

Northing: 6799434 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 153

Observer: Joel Wilson

Zone: 51

Easting: 339408 mE

Northing: 6798831 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 154

Observer: Joel Wilson

Zone: 51

Easting: 339401 mE

Northing: 6798405 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 155

Observer: Joel Wilson

Zone: 51

Easting: 339399 mE

Northing: 6797575 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 156

Observer: Joel Wilson

Zone: 51

Easting: 339431 mE

Northing: 6797087 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 157

Observer: Joel Wilson

Zone: 51

Easting: 339423 mE

Northing: 6796442 mN

Fire History: > 5 years

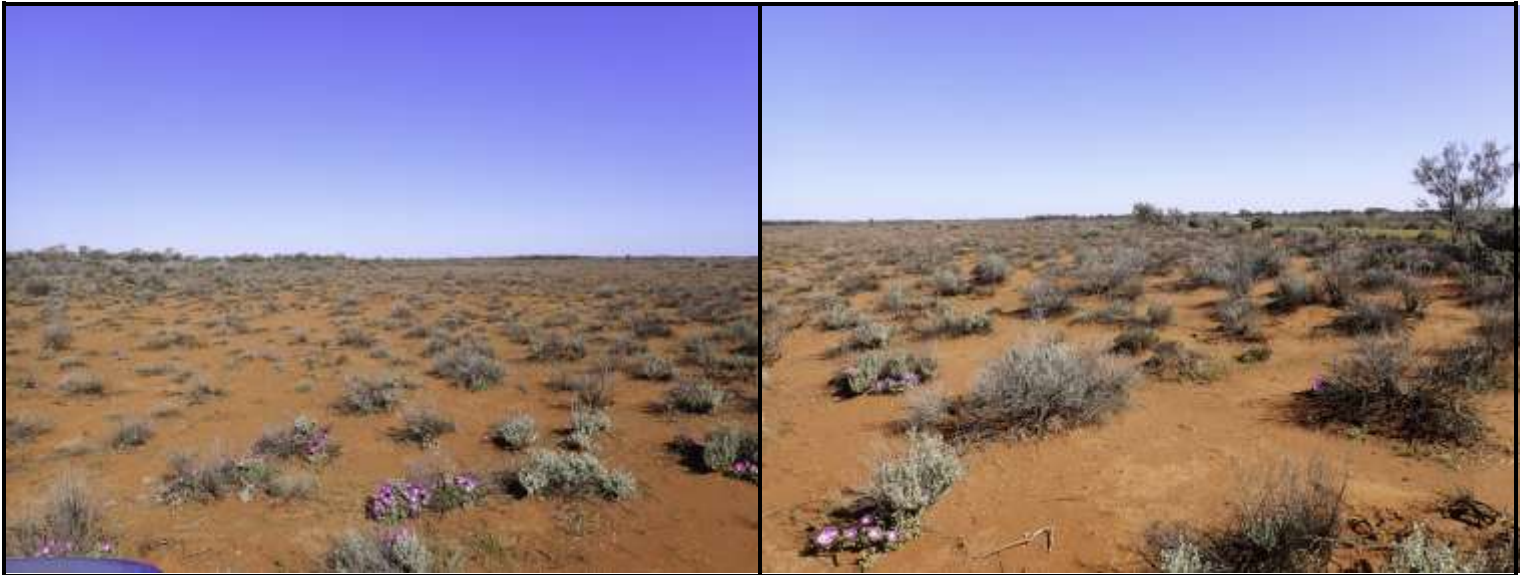
Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 158

Observer: Joel Wilson

Zone: 51

Easting: 339448 mE

Northing: 6796220 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 159

Observer: Joel Wilson

Zone: 51

Easting: 339212 mE

Northing: 6796228 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 160

Observer: Joel Wilson

Zone: 51

Easting: 339209 mE

Northing: 6796358 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 161

Observer: Joel Wilson

Zone: 51

Easting: 339216 mE

Northing: 6796777 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 162

Observer: Joel Wilson

Zone: 51

Easting: 339228 mE

Northing: 6797258 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 163

Observer: Joel Wilson

Zone: 51

Easting: 339207 mE

Northing: 6797805 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 164

Observer: Joel Wilson

Zone: 51

Easting: 339210 mE

Northing: 6798232 mN

Fire History: > 5 years

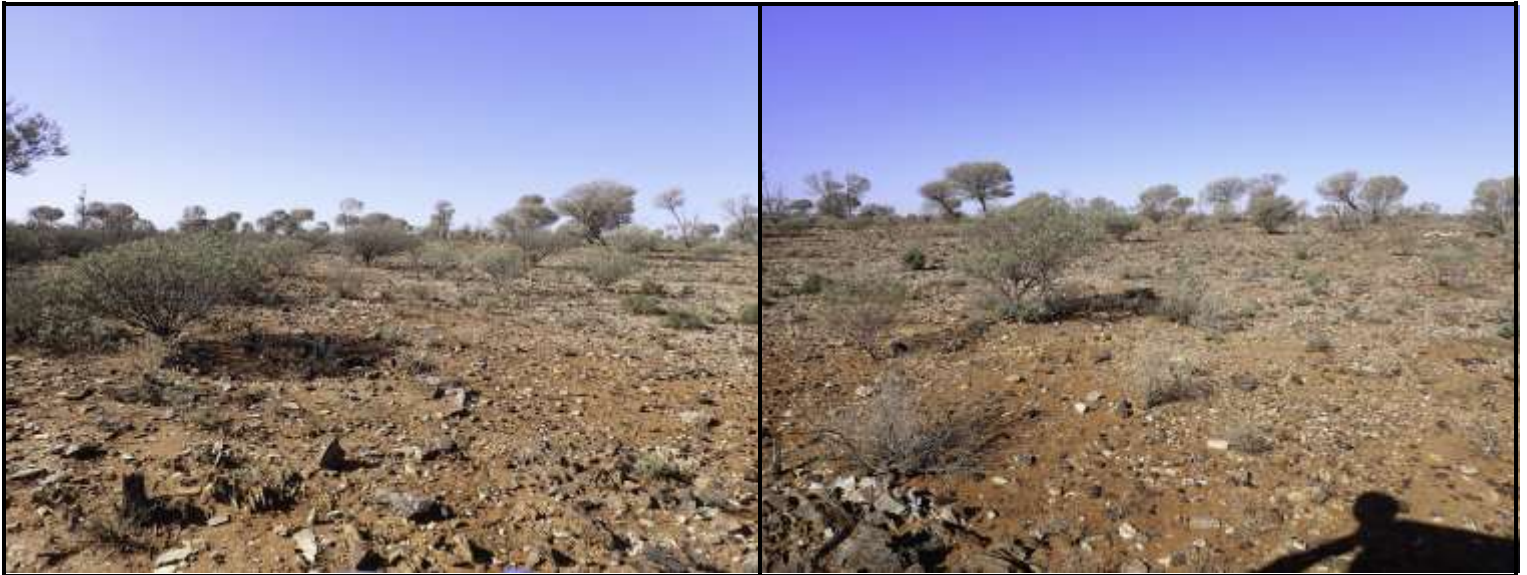
Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 165

Observer: Joel Wilson

Zone: 51

Easting: 339230 mE

Northing: 6798707 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 166

Observer: Joel Wilson

Zone: 51

Easting: 339230 mE

Northing: 6799227 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 167

Observer: Joel Wilson

Zone: 51

Easting: 338997 mE

Northing: 6799046 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 168

Observer: Joel Wilson

Zone: 51

Easting: 338979 mE

Northing: 6798467 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 169

Observer: Joel Wilson

Zone: 51

Easting: 338985 mE

Northing: 6797960 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 170

Observer: Joel Wilson

Zone: 51

Easting: 338953 mE

Northing: 6797444 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 171

Observer: Joel Wilson

Zone: 51

Easting: 338986 mE

Northing: 6797041 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 172

Observer: Joel Wilson

Zone: 51

Easting: 339017 mE

Northing: 6796586 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 173

Observer: Joel Wilson

Zone: 51

Easting: 339014 mE

Northing: 6796265 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 174

Observer: Joel Wilson

Zone: 51

Easting: 338779 mE

Northing: 6797369 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 175

Observer: Joel Wilson

Zone: 51

Easting: 338793 mE

Northing: 6797872 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 176

Observer: Joel Wilson

Zone: 51

Easting: 338796 mE

Northing: 6798401 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 177

Observer: Joel Wilson

Zone: 51

Easting: 338802 mE

Northing: 6799368 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 178

Observer: Joel Wilson

Zone: 51

Easting: 338600 mE

Northing: 6799430 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 179

Observer: Joel Wilson

Zone: 51

Easting: 338611 mE

Northing: 6798969 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 180

Observer: Joel Wilson

Zone: 51

Easting: 338572 mE

Northing: 6798495 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 181

Observer: Joel Wilson

Zone: 51

Easting: 338571 mE

Northing: 6798102 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 182

Observer: Joel Wilson

Zone: 51

Easting: 338535 mE

Northing: 6797534 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 183

Observer: Joel Wilson

Zone: 51

Easting: 338403 mE

Northing: 6797151 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 14-Sep-22

Habitat Assessment #: 184

Observer: Joel Wilson

Zone: 51

Easting: 338398 mE

Northing: 6797450 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 185

Observer: Joel Wilson

Zone: 51

Easting: 338429 mE

Northing: 6798064 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 14-Sep-22

Habitat Assessment #: 186

Observer: Joel Wilson

Zone: 51

Easting: 338398 mE

Northing: 6798531 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 15-Sep-22

Habitat Assessment #: 187

Observer: Joel Wilson

Zone: 51

Easting: 338189 mE

Northing: 6798549 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 15-Sep-22

Habitat Assessment #: 188

Observer: Joel Wilson

Zone: 51

Easting: 338183 mE

Northing: 6798117 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 15-Sep-22

Habitat Assessment #: 189

Observer: Joel Wilson

Zone: 51

Easting: 338160 mE

Northing: 6797698 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 15-Sep-22

Habitat Assessment #: 190

Observer: Joel Wilson

Zone: 51

Easting: 338186 mE

Northing: 6797369 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 191

Observer: Joel Wilson

Zone: 51

Easting: 338216 mE

Northing: 6797122 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 192

Observer: Joel Wilson

Zone: 51

Easting: 338015 mE

Northing: 6797152 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 193

Observer: Joel Wilson

Zone: 51

Easting: 338057 mE

Northing: 6797515 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 194

Observer: Joel Wilson

Zone: 51

Easting: 337974 mE

Northing: 6797955 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 15-Sep-22

Habitat Assessment #: 195

Observer: Joel Wilson

Zone: 51

Easting: 337958 mE

Northing: 6798520 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 15-Sep-22

Habitat Assessment #: 196

Observer: Joel Wilson

Zone: 51

Easting: 337790 mE

Northing: 6798204 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 15-Sep-22

Habitat Assessment #: 197

Observer: Joel Wilson

Zone: 51

Easting: 337822 mE

Northing: 6797803 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 15-Sep-22

Habitat Assessment #: 198

Observer: Joel Wilson

Zone: 51

Easting: 337800 mE

Northing: 6797515 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 199

Observer: Joel Wilson

Zone: 51

Easting: 337812 mE

Northing: 6797144 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 200

Observer: Joel Wilson

Zone: 51

Easting: 337604 mE

Northing: 6797065 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Tall shrubland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 201

Observer: Joel Wilson

Zone: 51

Easting: 337597 mE

Northing: 6797533 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 202

Observer: Joel Wilson

Zone: 51

Easting: 337614 mE

Northing: 6797785 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 203

Observer: Joel Wilson

Zone: 51

Easting: 337578 mE

Northing: 6798108 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Sandy clay



Date: 15-Sep-22

Habitat Assessment #: 204

Observer: Joel Wilson

Zone: 51

Easting: 337398 mE

Northing: 6798301 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Sandy clay



Date: 15-Sep-22

Habitat Assessment #: 205

Observer: Joel Wilson

Zone: 51

Easting: 337425 mE

Northing: 6797864 mN

Fire History: > 5 years

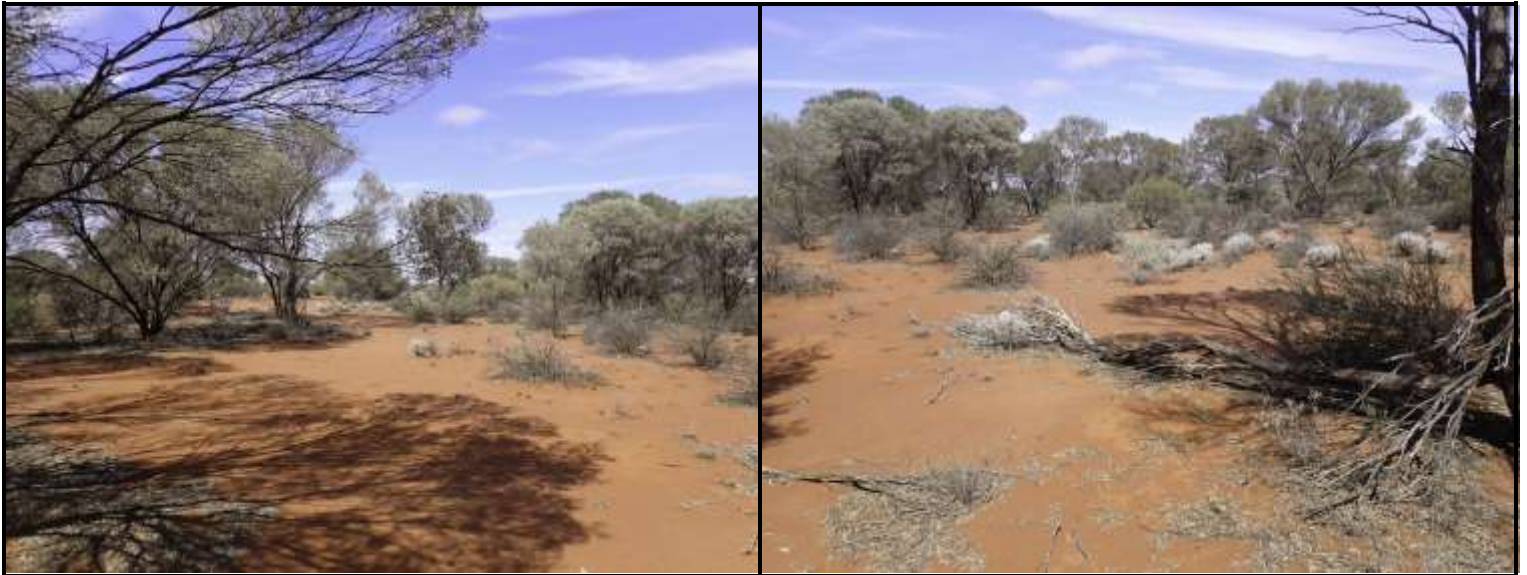
Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 206

Observer: Joel Wilson

Zone: 51

Easting: 337380 mE

Northing: 6797569 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 207

Observer: Joel Wilson

Zone: 51

Easting: 337366 mE

Northing: 6797249 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Tall shrubland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 208

Observer: Joel Wilson

Zone: 51

Easting: 337207 mE

Northing: 6797317 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 209

Observer: Joel Wilson

Zone: 51

Easting: 337195 mE

Northing: 6797734 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 210

Observer: Joel Wilson

Zone: 51

Easting: 337168 mE

Northing: 6798012 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: Disturbed

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 211

Observer: Joel Wilson

Zone: 51

Easting: 336997 mE

Northing: 6797880 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Sandy clay



Date: 15-Sep-22

Habitat Assessment #: 212

Observer: Joel Wilson

Zone: 51

Easting: 337095 mE

Northing: 6797382 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: Disturbed

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 213

Observer: Joel Wilson

Zone: 51

Easting: 336798 mE

Northing: 6797869 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 15-Sep-22

Habitat Assessment #: 214

Observer: Joel Wilson

Zone: 51

Easting: 336629 mE

Northing: 6798053 mN

Fire History: > 5 years

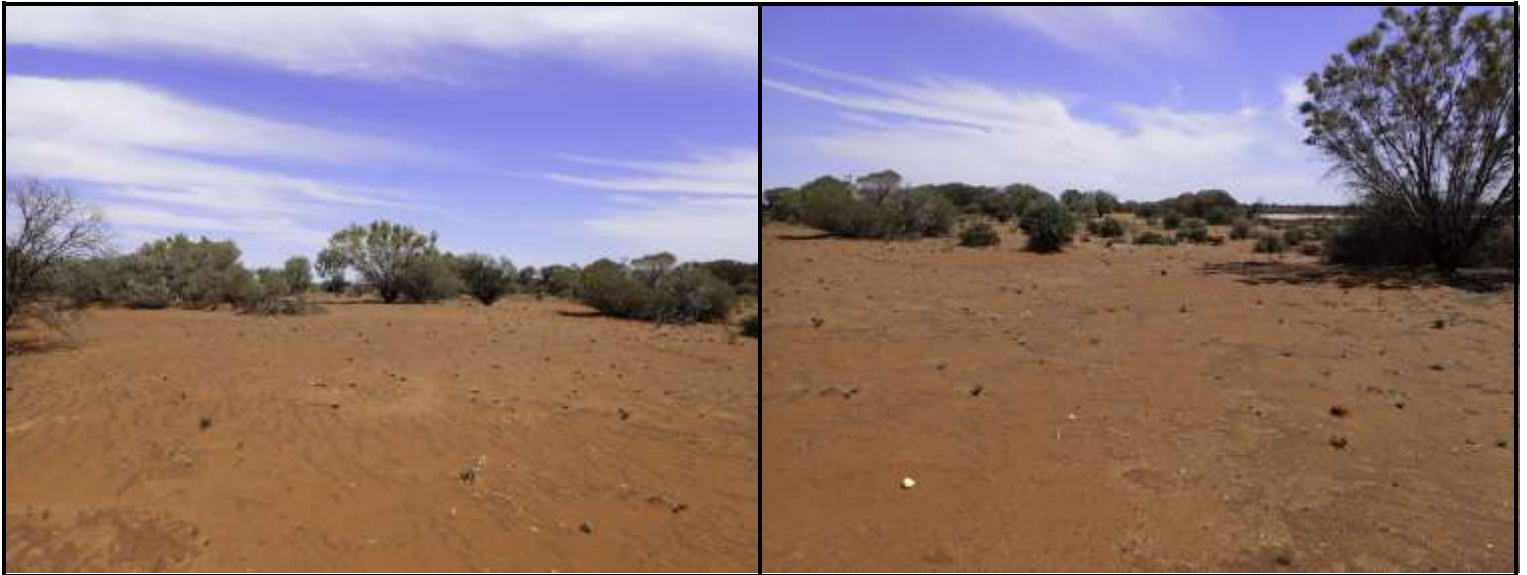
Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: Disturbed

Surface: Stoney



Date: 15-Sep-22

Habitat Assessment #: 215

Observer: Joel Wilson

Zone: 51

Easting: 336582 mE

Northing: 6797779 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 15-Sep-22

Habitat Assessment #: 216

Observer: Joel Wilson

Zone: 51

Easting: 336406 mE

Northing: 6797865 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 217

Observer: Joel Wilson

Zone: 51

Easting: 336219 mE

Northing: 6798051 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 218

Observer: Joel Wilson

Zone: 51

Easting: 336190 mE

Northing: 6797913 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 219

Observer: Joel Wilson

Zone: 51

Easting: 335191 mE

Northing: 6798717 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 220

Observer: Joel Wilson

Zone: 51

Easting: 335402 mE

Northing: 6798226 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 221

Observer: Joel Wilson

Zone: 51

Easting: 335397 mE

Northing: 6798440 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Tall shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 222

Observer: Joel Wilson

Zone: 51

Easting: 335389 mE

Northing: 6798593 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Tall shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 223

Observer: Joel Wilson

Zone: 51

Easting: 335550 mE

Northing: 6798496 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 224

Observer: Joel Wilson

Zone: 51

Easting: 335635 mE

Northing: 6798113 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 225

Observer: Joel Wilson

Zone: 51

Easting: 335824 mE

Northing: 6798210 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 226

Observer: Joel Wilson

Zone: 51

Easting: 336023 mE

Northing: 6798308 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 227

Observer: Joel Wilson

Zone: 51

Easting: 335133 mE

Northing: 6799023 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 228

Observer: Joel Wilson

Zone: 51

Easting: 335226 mE

Northing: 6799144 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: d

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 229

Observer: Joel Wilson

Zone: 51

Easting: 335595 mE

Northing: 6799292 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 230

Observer: Joel Wilson

Zone: 51

Easting: 335582 mE

Northing: 6799068 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 231

Observer: Joel Wilson

Zone: 51

Easting: 335514 mE

Northing: 6798978 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 15-Sep-22

Habitat Assessment #: 232

Observer: Joel Wilson

Zone: 51

Easting: 335587 mE

Northing: 6798714 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 233

Observer: Joel Wilson

Zone: 51

Easting: 335869 mE

Northing: 6798533 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 15-Sep-22

Habitat Assessment #: 234

Observer: Joel Wilson

Zone: 51

Easting: 335797 mE

Northing: 6798732 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 235

Observer: Joel Wilson

Zone: 51

Easting: 337395 mE

Northing: 6801214 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 236

Observer: Joel Wilson

Zone: 51

Easting: 337392 mE

Northing: 6801658 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 237

Observer: Joel Wilson

Zone: 51

Easting: 337358 mE

Northing: 6801981 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 238

Observer: Joel Wilson

Zone: 51

Easting: 337367 mE

Northing: 6802408 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 239

Observer: Joel Wilson

Zone: 51

Easting: 337374 mE

Northing: 6802805 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 240

Observer: Joel Wilson

Zone: 51

Easting: 337214 mE

Northing: 6802855 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Tall shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 241

Observer: Joel Wilson

Zone: 51

Easting: 337170 mE

Northing: 6802507 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 242

Observer: Joel Wilson

Zone: 51

Easting: 337199 mE

Northing: 6802034 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 243

Observer: Joel Wilson

Zone: 51

Easting: 337199 mE

Northing: 6801732 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 244

Observer: Joel Wilson

Zone: 51

Easting: 337208 mE

Northing: 6801411 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 245

Observer: Joel Wilson

Zone: 51

Easting: 337033 mE

Northing: 6801202 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: d

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 246

Observer: Joel Wilson

Zone: 51

Easting: 337013 mE

Northing: 6801600 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: d

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 247

Observer: Joel Wilson

Zone: 51

Easting: 337037 mE

Northing: 6801944 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 248

Observer: Joel Wilson

Zone: 51

Easting: 337009 mE

Northing: 6802329 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 249

Observer: Joel Wilson

Zone: 51

Easting: 337002 mE

Northing: 6802703 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 250

Observer: Joel Wilson

Zone: 51

Easting: 336705 mE

Northing: 6803666 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 251

Observer: Joel Wilson

Zone: 51

Easting: 336686 mE

Northing: 6803899 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 252

Observer: Joel Wilson

Zone: 51

Easting: 336484 mE

Northing: 6803801 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 253

Observer: Joel Wilson

Zone: 51

Easting: 334788 mE

Northing: 6803329 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 254

Observer: Joel Wilson

Zone: 51

Easting: 334472 mE

Northing: 6803207 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 255

Observer: Joel Wilson

Zone: 51

Easting: 333914 mE

Northing: 6802370 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 256

Observer: Joel Wilson

Zone: 51

Easting: 333929 mE

Northing: 6802011 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 257

Observer: Joel Wilson

Zone: 51

Easting: 333942 mE

Northing: 6801638 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 258

Observer: Joel Wilson

Zone: 51

Easting: 333979 mE

Northing: 6801283 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 259

Observer: Joel Wilson

Zone: 51

Easting: 333973 mE

Northing: 6800931 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 260

Observer: Joel Wilson

Zone: 51

Easting: 333988 mE

Northing: 6800573 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 261

Observer: Joel Wilson

Zone: 51

Easting: 333997 mE

Northing: 6800271 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 262

Observer: Joel Wilson

Zone: 51

Easting: 334013 mE

Northing: 6799946 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 263

Observer: Joel Wilson

Zone: 51

Easting: 334180 mE

Northing: 6799857 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 264

Observer: Joel Wilson

Zone: 51

Easting: 334172 mE

Northing: 6800169 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 265

Observer: Joel Wilson

Zone: 51

Easting: 334176 mE

Northing: 6800525 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 266

Observer: Joel Wilson

Zone: 51

Easting: 334216 mE

Northing: 6800910 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 267

Observer: Joel Wilson

Zone: 51

Easting: 334194 mE

Northing: 6801202 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 268

Observer: Joel Wilson

Zone: 51

Easting: 334194 mE

Northing: 6801644 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 269

Observer: Joel Wilson

Zone: 51

Easting: 334091 mE

Northing: 6801997 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 270

Observer: Joel Wilson

Zone: 51

Easting: 334230 mE

Northing: 6802339 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 271

Observer: Joel Wilson

Zone: 51

Easting: 334417 mE

Northing: 6802321 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 272

Observer: Joel Wilson

Zone: 51

Easting: 334415 mE

Northing: 6802036 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 273

Observer: Joel Wilson

Zone: 51

Easting: 334412 mE

Northing: 6801644 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 274

Observer: Joel Wilson

Zone: 51

Easting: 334364 mE

Northing: 6801173 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 275

Observer: Joel Wilson

Zone: 51

Easting: 334386 mE

Northing: 6800880 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 276

Observer: Joel Wilson

Zone: 51

Easting: 334399 mE

Northing: 6800506 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 277

Observer: Joel Wilson

Zone: 51

Easting: 334393 mE

Northing: 6800241 mN

Fire History: > 5 years

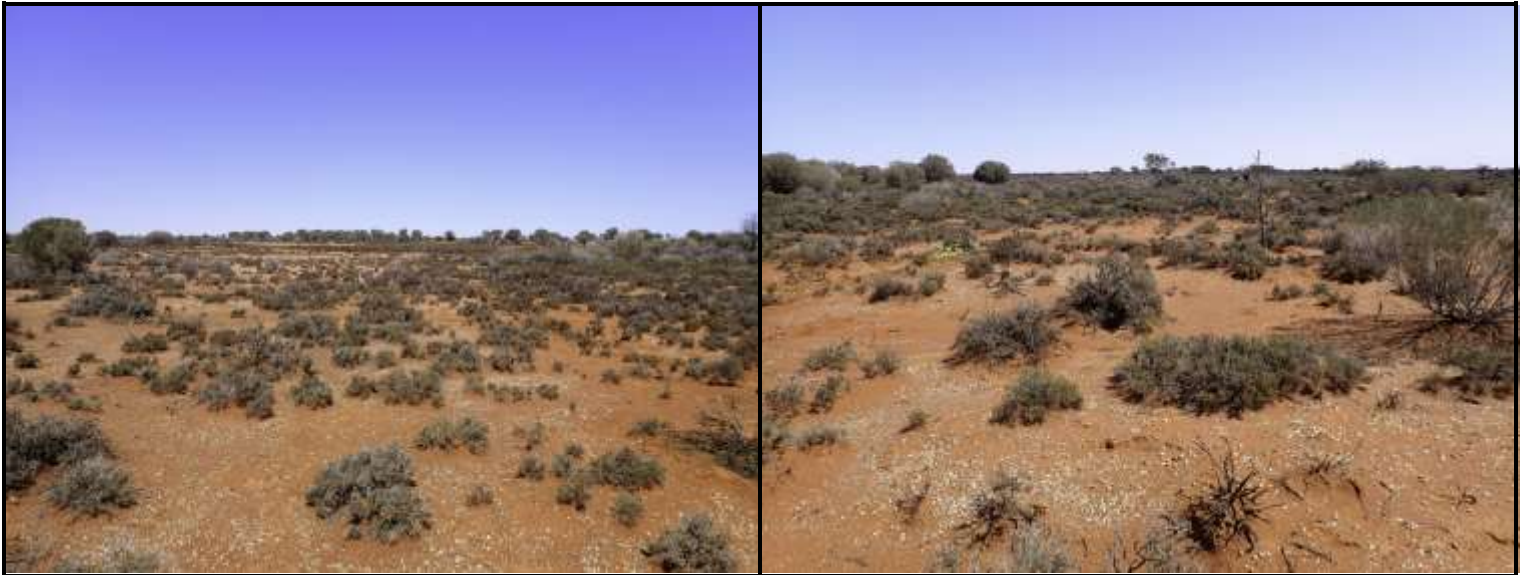
Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 278

Observer: Joel Wilson

Zone: 51

Easting: 334392 mE

Northing: 6799849 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 279

Observer: Joel Wilson

Zone: 51

Easting: 334581 mE

Northing: 6799842 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 280

Observer: Joel Wilson

Zone: 51

Easting: 334596 mE

Northing: 6800178 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 281

Observer: Joel Wilson

Zone: 51

Easting: 334579 mE

Northing: 6800507 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 282

Observer: Joel Wilson

Zone: 51

Easting: 334594 mE

Northing: 6800906 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 283

Observer: Joel Wilson

Zone: 51

Easting: 334586 mE

Northing: 6801204 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 284

Observer: Joel Wilson

Zone: 51

Easting: 334595 mE

Northing: 6802006 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 285

Observer: Joel Wilson

Zone: 51

Easting: 334595 mE

Northing: 6802259 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 286

Observer: Joel Wilson

Zone: 51

Easting: 334392 mE

Northing: 6802738 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 287

Observer: Joel Wilson

Zone: 51

Easting: 335122 mE

Northing: 6799315 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: d

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 288

Observer: Joel Wilson

Zone: 51

Easting: 335100 mE

Northing: 6799629 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: d

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 289

Observer: Joel Wilson

Zone: 51

Easting: 334951 mE

Northing: 6800151 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 290

Observer: Joel Wilson

Zone: 51

Easting: 334789 mE

Northing: 6799869 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 291

Observer: Joel Wilson

Zone: 51

Easting: 334811 mE

Northing: 6800174 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 292

Observer: Joel Wilson

Zone: 51

Easting: 334815 mE

Northing: 6800521 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 293

Observer: Joel Wilson

Zone: 51

Easting: 334819 mE

Northing: 6800912 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 294

Observer: Joel Wilson

Zone: 51

Easting: 334785 mE

Northing: 6801189 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 295

Observer: Joel Wilson

Zone: 51

Easting: 334794 mE

Northing: 6802061 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 296

Observer: Joel Wilson

Zone: 51

Easting: 334787 mE

Northing: 6802356 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 297

Observer: Joel Wilson

Zone: 51

Easting: 334837 mE

Northing: 6802605 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 298

Observer: Joel Wilson

Zone: 51

Easting: 335025 mE

Northing: 6802871 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 299

Observer: Joel Wilson

Zone: 51

Easting: 335014 mE

Northing: 6802513 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 300

Observer: Joel Wilson

Zone: 51

Easting: 334967 mE

Northing: 6802263 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 301

Observer: Joel Wilson

Zone: 51

Easting: 334986 mE

Northing: 6801165 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 302

Observer: Joel Wilson

Zone: 51

Easting: 334960 mE

Northing: 6800878 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 303

Observer: Joel Wilson

Zone: 51

Easting: 335007 mE

Northing: 6800533 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 304

Observer: Joel Wilson

Zone: 51

Easting: 334982 mE

Northing: 6799942 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Tall shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 305

Observer: Joel Wilson

Zone: 51

Easting: 335194 mE

Northing: 6800489 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Tall shrubland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 306

Observer: Joel Wilson

Zone: 51

Easting: 335188 mE

Northing: 6800891 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 307

Observer: Joel Wilson

Zone: 51

Easting: 335186 mE

Northing: 6801229 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 308

Observer: Joel Wilson

Zone: 51

Easting: 335206 mE

Northing: 6801665 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 309

Observer: Joel Wilson

Zone: 51

Easting: 335196 mE

Northing: 6802116 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 310

Observer: Joel Wilson

Zone: 51

Easting: 335226 mE

Northing: 6802448 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 311

Observer: Joel Wilson

Zone: 51

Easting: 335206 mE

Northing: 6802819 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 312

Observer: Joel Wilson

Zone: 51

Easting: 335427 mE

Northing: 6802861 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 313

Observer: Joel Wilson

Zone: 51

Easting: 335406 mE

Northing: 6802165 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 314

Observer: Joel Wilson

Zone: 51

Easting: 335390 mE

Northing: 6801750 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 315

Observer: Joel Wilson

Zone: 51

Easting: 335408 mE

Northing: 6801304 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 316

Observer: Joel Wilson

Zone: 51

Easting: 335384 mE

Northing: 6800986 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 317

Observer: Joel Wilson

Zone: 51

Easting: 335409 mE

Northing: 6800519 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 318

Observer: Joel Wilson

Zone: 51

Easting: 335591 mE

Northing: 6800509 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 319

Observer: Joel Wilson

Zone: 51

Easting: 335596 mE

Northing: 6800922 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 320

Observer: Joel Wilson

Zone: 51

Easting: 335595 mE

Northing: 6801248 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 321

Observer: Joel Wilson

Zone: 51

Easting: 335585 mE

Northing: 6801621 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: Disturbed

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 322

Observer: Joel Wilson

Zone: 51

Easting: 335695 mE

Northing: 6801981 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 323

Observer: Joel Wilson

Zone: 51

Easting: 335649 mE

Northing: 6802352 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 324

Observer: Joel Wilson

Zone: 51

Easting: 335596 mE

Northing: 6802850 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 325

Observer: Joel Wilson

Zone: 51

Easting: 335982 mE

Northing: 6803000 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 326

Observer: Joel Wilson

Zone: 51

Easting: 335968 mE

Northing: 6802685 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 327

Observer: Joel Wilson

Zone: 51

Easting: 335803 mE

Northing: 6802644 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Ephemeral creekline

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 328

Observer: Joel Wilson

Zone: 51

Easting: 335819 mE

Northing: 6803028 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 329

Observer: Joel Wilson

Zone: 51

Easting: 336186 mE

Northing: 6803055 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 330

Observer: Joel Wilson

Zone: 51

Easting: 336208 mE

Northing: 6802761 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 331

Observer: Joel Wilson

Zone: 51

Easting: 336584 mE

Northing: 6802786 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 332

Observer: Joel Wilson

Zone: 51

Easting: 335805 mE

Northing: 6801283 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 333

Observer: Joel Wilson

Zone: 51

Easting: 335836 mE

Northing: 6800956 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 334

Observer: Joel Wilson

Zone: 51

Easting: 335793 mE

Northing: 6800501 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 335

Observer: Joel Wilson

Zone: 51

Easting: 335999 mE

Northing: 6800447 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 336

Observer: Joel Wilson

Zone: 51

Easting: 335990 mE

Northing: 6800927 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 337

Observer: Joel Wilson

Zone: 51

Easting: 336005 mE

Northing: 6801245 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 338

Observer: Joel Wilson

Zone: 51

Easting: 336228 mE

Northing: 6801273 mN

Fire History: > 5 years

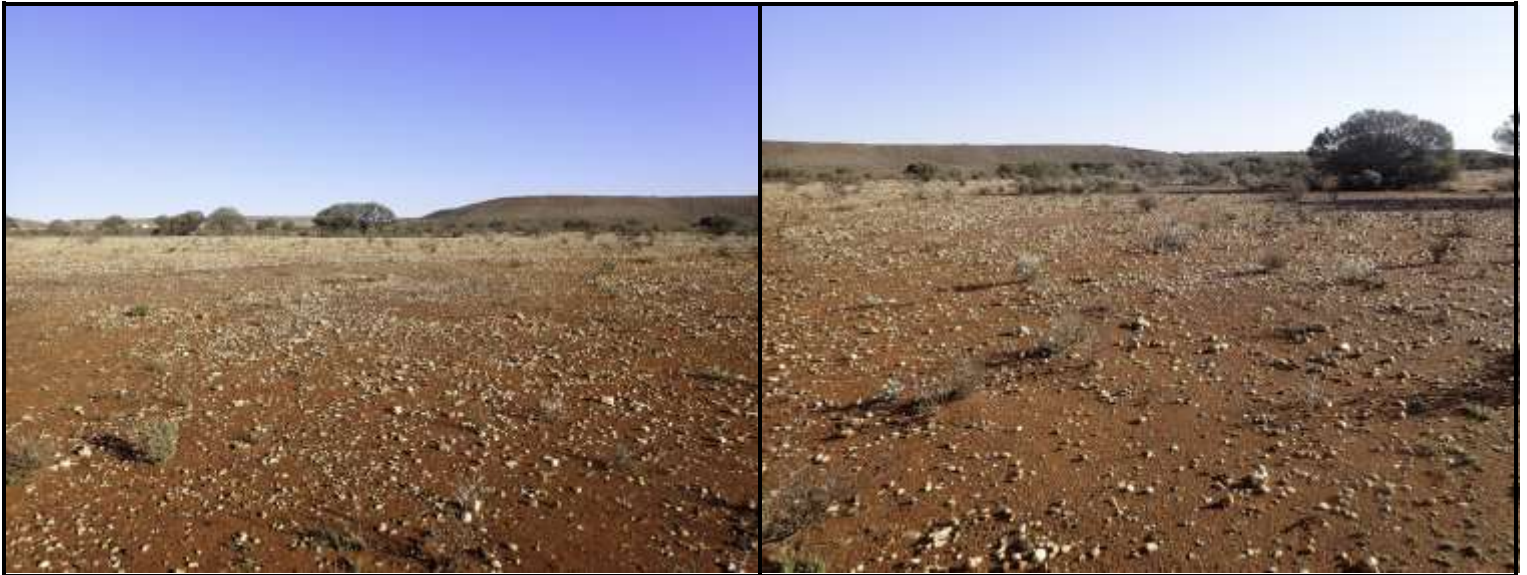
Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 339

Observer: Joel Wilson

Zone: 51

Easting: 336201 mE

Northing: 6800838 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 340

Observer: Joel Wilson

Zone: 51

Easting: 336155 mE

Northing: 6800494 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 341

Observer: Joel Wilson

Zone: 51

Easting: 336389 mE

Northing: 6800385 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: No stones



Date: 16-Sep-22

Habitat Assessment #: 342

Observer: Joel Wilson

Zone: 51

Easting: 336435 mE

Northing: 6800937 mN

Fire History: > 5 years

Landform: Stoney rise

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 343

Observer: Joel Wilson

Zone: 51

Easting: 336427 mE

Northing: 6801256 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 344

Observer: Joel Wilson

Zone: 51

Easting: 336590 mE

Northing: 6801144 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 345

Observer: Joel Wilson

Zone: 51

Easting: 336573 mE

Northing: 6800852 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Open mulga woodland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 346

Observer: Joel Wilson

Zone: 51

Easting: 336580 mE

Northing: 6800251 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 347

Observer: Joel Wilson

Zone: 51

Easting: 336548 mE

Northing: 6799995 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Disturbed

Habitat Quality: Disturbed

Surface: Few stones



Date: 16-Sep-22

Habitat Assessment #: 348

Observer: Joel Wilson

Zone: 51

Easting: 336830 mE

Northing: 6800003 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 349

Observer: Joel Wilson

Zone: 51

Easting: 336793 mE

Northing: 6800322 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



Date: 16-Sep-22

Habitat Assessment #: 350

Observer: Joel Wilson

Zone: 51

Easting: 336806 mE

Northing: 6800943 mN

Fire History: > 5 years

Landform: Plain

Soil Type: Sandy clay

Habitat Structure: Low shrubland

Habitat Quality: Very good

Surface: Stoney



