

Level 1 Vertebrate Fauna Risk Assessment for the Eundynie Project



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Front Cover: Fauna habitats in the project area



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EXECUTIVE SUMMARY

RNC Minerals Limited (RNC) is planning to expand exploration activities at Endynie South which is near existing mining operations in the southern Goldfields (i.e. project area). The project area is approximately 10km north south-east of the Higginsville mining operations (Figure 1).

The total assessed area was approximately 135ha but only a portion of this will be disturbed. There are three broad fauna habitats in the project area:

- open Salmon Gum woodland over sparse chenopods;
- eucalypt woodland over mixed shrubland and chenopod over scattered grasses of varying densities on a sandy-clay substrate; and
- mixed sclerophyll shrubland.

There are also areas devoid of vegetation from earlier exploration activity and these areas are of little value as fauna habitat.

The density of trees and shrubs in the relatively undisturbed areas varied across the project area. The fauna habitat quality varies from highly degraded to very good, with the more degraded areas due to recent exploration activity. There is one east-west haul road and a series of access tracks and exploration grid lines in the area. Apart from the haul road the tracks are narrow and do not overly impact on fauna habitat.

The area has been lightly grazed by cattle and there was extensive evidence of rabbits and other feral fauna in the area.

Potential 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 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 recommended.

It is recommended that:

- an induction program that includes a component on managing fauna is a mandatory component of working on the Eundynie project;
- the impact of dust on adjacent vegetation and fauna habitat is managed and monitored against appropriate KPIs;
- pets are not permitted on site;
- all waste and rubbish is contained in bins and regularly removed from site or buried so it is unavailable to pest and feral species;
- feeding of native fauna should be actively discouraged;
- a log of all on-site drill holes be maintained detailing when they were capped, how and by whom;
- speed limits are implemented and enforced on-site. These should be determined based on the quality and condition of the roads, but be a maximum of 80km/h;
- signage is erected to indicate the maximum travelling speeds and the possible presence of wildlife crossing roads; and
- a feral and pest animal management program is implemented to reduce the predation risk on native fauna including Malleefowl in and near the project area. This program should concentrate on reducing the impacts of cats, foxes, wild dogs and rabbits.



1 INTRODUCTION

1.1 Background

RNC Minerals Limited (RNC) is planning to undertake additional exploration activities at the Eundynie project which is near the existing Higginsville mining operations in the southern Goldfields (i.e. project area). The project area is approximately 10km south-east of Higginsville east of the Goldfields Highway (Figure 1). The total assessed area was approximately 135ha but only a portion of this will be disturbed.

1.2 Project objectives and scope of works

Terrestrial Ecosystems was commissioned by Native Vegetation Solutions on behalf of RNC to undertake a Level 1 vertebrate fauna risk assessment and search of the project area for Malleefowl and their mounds. The purpose of this Level 1 fauna risk assessment was to provide information to the Department of Mines, Industry Regulation and Safety (DMIRS) and/or the Environmental Protection Authority (EPA) 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 (EPA) and the *Technical Guidance Terrestrial Fauna Surveys* (Environmental Protection Authority 2016) and the *Technical Guidance - Sampling methods for terrestrial vertebrate fauna* (Environmental Protection Authority 2016).

A Level 1 fauna risk assessment involves undertaking a desktop review and reconnaissance site visit. The objectives of this fauna risk assessment were to:

- provide an indication of the vertebrate fauna assemblage (reptiles, amphibians, mammals and birds) on and near the project area, so that potential impacts on the fauna and fauna assemblage might be adequately assessed;
- identify the presence and/or potential risk of impacts on species of conservation significance that are present or likely to be present in the project area;
- assess the impact and environmental risks associated with the proposed development on the fauna assemblage;
- determine if any additional surveys are required to assess the potential impact on fauna assemblages 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 Department of Biodiversity, Conservation and Attractions (DBCA) records in NatureMap] to identify potential vertebrate fauna within the area;
- searched the DBCA's NatureMap for Threatened and Priority Species;
- 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 and searched the area for active Malleefowl mounds;
- 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;
- discussed the likelihood of *EPBC Act 1999* and *Biodiversity Conservation Act 2016 (BC Act 2016)* 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 within the Coolgardie (COO3-Eastern Goldfield) Interim Biogeographic Regionalisation of Australia (IBRA) subregion. This subregion is a gently undulating plain on the Yilgarn Craton with calcareous soil being dominant (Cowan 2002). The subregion supports a diverse eucalypt woodland around the salt lakes, on the low ranges and in the broad valleys and mallee and Acacia thickets and shrub heaths on the plains (Cowan 2002). The sub-region is rich in endemic Acacias (Cowan 2002).

2.2 Land use history

The dominant land uses in this bioregion are pastoralism, crown reserves and mining. Mining is evident in many areas around Kambalda, Higginsville, Widgiemooltha and Norseman, with numerous small abandoned and operational mines scattered throughout the landscape.

Many of the larger trees in the bioregion were removed decades ago to support the mining and power generation industries and these trees have often not been replaced by replanting programs.

2.3 Climate

The project area is characterised as semi-arid. Chart 1 shows the average mean monthly maximum and minimum temperatures and rainfall for Norseman, the closest weather station (~45km south). Temperatures are highest in December–February and most rain comes in winter. Winter rain is the result of low pressure cells that move in an easterly direction from the south-west of the state, whereas, summer rain is often from thunderstorms that move in from either the west or the north-west.

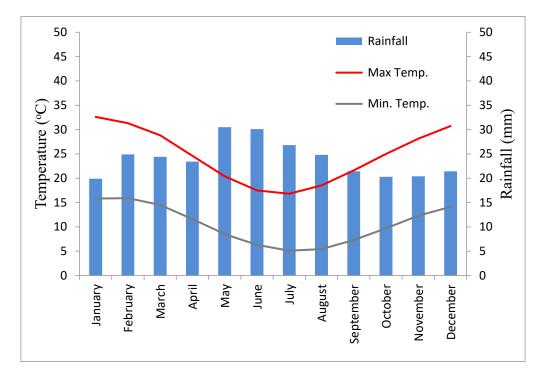


Chart 1. Mean monthly maximum and minimum temperatures and rainfall for Norseman (http://www.bom.gov.au/climate/averages/tables/cw_012065.shtml, downloaded January 2018)



2.4 Great Western Woodlands

The Eundynie project area is part of the Great Western Woodlands (Watson et al. 2008, pp. vi) in unallocated crown land. The Great Western Woodlands represents the largest and most intact eucalypt woodland remaining in southern Australia and one of the best examples of its type in the world. It is home to an impressive 3,000 flowering plant species, 20 per cent of Australia's known flora, as well as a diverse range of animals dependent on its varied habitats (Department of Environment and Conservation 2010).

The Wilderness Society argued the fauna and flora diversity in the area has evolved with the landscape during an unbroken biological lineage stretching back 250 million years.

2.5 Regional biological fauna context of project area

The frogs, reptiles, mammals and birds in the goldfields have been surveyed on many occasions for a variety of purposes and are therefore well known. Fauna surveys and assessments undertaken near the project area or with similar habitats that have been reviewed for this assessment include:

- ATA Environmental (2006a) Fauna Assessment St Ives Cave Rocks Satellite Pit, Waste Dump and Haul Road. Unpublished report for Jim's Seeds, Weeds and Trees, Ltd, Perth.
- ATA Environmental (2006b) Vertebrate Fauna Assessment St Ives Gold Mine. Unpublished report for Jim's Seeds, Weeds and Trees, Ltd, Perth.
- Bamford Consulting Ecologists (2010) Gold Fields St Ives Gold Mine, Kambalda. Fauna Assessment: impacts of water discharge and general mining activity on vertebrate fauna. Unpublished report to Gold Fields St Ives Gold Mine, Perth.
- Blythman, M., and G. Harewood. (2009) Targeted Fauna Survey for Slender-billed Thornbill and Rainbow Beeeater, Neptune Pistol Club Areas, Kambalda. Unpublished report for Botanica Consulting.
- Botanica Consulting (2011) 66KW extension power line fauna assessment. Unpublished report for Goldfields St Ives. Boulder.
- Chapman, A., Kealley, I., McMillan, D., McMillan, P. and Rolland, G. (1991b) Biological surveys of four Goldfields Reserves, *Landnote*, 1/91, 1-26
- Dames and Moore (1999) Public Environmental Review Gold Mine Development on Lake Lefroy. Unpublished report for St Ives Gold Mine; Kalgoorlie.
- Dell, J and How, R. (1984) Vertebrate fauna. In: The Biological Survey of the Eastern Goldfields of Western Australia, *Records of the Western Australian Museum*, Supplement No 18, 57-89.
- GHD (2010a) Report for Chalice Project Area Desktop Biological Assessment and Broad Scale Vegetation Mapping. Unpublished report for Avoca Resources Ltd, Perth.
- GHD (2010b) Report for Higginsville Project Area Desktop Biological Assessment and Broad Scale Vegetation Mapping. Unpublished report for Avoca Resources Ltd, Perth.
- GHD (2014) Lake Cowan Project Area Desktop Assessment and Broadscale Mapping. Unpublished report for Metals X Ltd, Perth.
- GHD (2015a) *Musket Project Area Desktop Assessment and Broad Scale Mapping*. Unpublished report for Metals X Ltd, Perth.
- GHD (2015b) *Wills Project Area Desktop Assessment and Broad Scale Mapping*. Unpublished report for Metals X Ltd, Perth.
- Halpern Glick Maunsell (1998) Lake Lefroy Environmental Assessment. Report ES4490C. Unpublished Report commissioned by WMC Resources Ltd.
- Harewood, G. (2010b) *Terrestrial Fauna Survey (Level 1) of the proposed Diana Mine Area St Ives Kambalda*. Unpublished report for Botanica Consulting. Bunbury.
- Harewood, G. (2010d) Terrestrial Fauna Survey (Level 1) of the proposed West Idough Mine Area St Ives -Kambalda. Unpublished report for Botanica Consulting. Bunbury.
- Harewood, G. (2011a) Terrestrial Fauna Survey (Level 1) of Thunderer Mine Area St Ives Kambalda. Unpublished report for Botanica Consulting. Bunbury.
- Harewood, G. (2011b) Terrestrial Fauna Survey (Level 1) of Workshop Project Area St Ives Kambalda. Unpublished report for Botanica Consulting. Bunbury.
- Harewood, G. (2013a) Fauna Assessment of Idough Mine Area St Ives Kambalda. Unpublished report for Botanica Consulting. Bunbury
- Harewood, G. (2013b) Fauna Assessment of Neptune Mine Area and Invincible Road St Ives Kambalda. Unpublished report for Botanica Consulting. Bunbury.



Harewood, G. (2010c) *Terrestrial Fauna Survey (Level 1) of the proposed Pistol Club Mine Area - Kambalda*. Unpublished report for Botanica Consulting. Bunbury

- Harewood, G. (2010a) Terrestrial Fauna Survey (Level 1) of the proposed Bellerophon Mine Area St Ives -Kambalda. Unpublished report for Botanica Consulting. Bunbury
- Harewood, G. (2011c) Wildlife sweep of Tailings Storage Facility (TSF) 4 -area to be cleared. Bunbury.
- Harewood, G. (2010a) Terrestrial Fauna Survey (Level 1) of the proposed Bellerophon Mine Area St Ives -Kambalda. Unpublished report for Botanica Consulting. Bunbury
- Keith Lindbeck and Associates (2007) St. Ives Gold Mining Company Tailings Storage Facility (No. 4) Spring Fauna Survey. Unpublished report for St. Ives Gold Mining Company.
- McKenzie, N.L. and Hall, N.J. (1992) The biological survey of the eastern goldfields of Western Australia. Part 8: Kurnalpi - Kalgoorlie study area, *Records of the Western Australian Museum*, Supplement 41.
- McKenzie, N.L., Rolfe, J.K. and Youngson, W.K. (1992) IV Vertebrate fauna, *Records of the Western Australian Museum*, Supplement, No 41, 37-64.
- McKenzie, N.L., Rolfe, J.K., Hall, N.J. and Youngson, W.K. (1993) Vertebrate Fauna. In Hall, N.J. and McKenzie N.L. The Biological Survey of the Eastern Goldfields of Western Australia Part 9. Norseman -Balladonia. *Records of the Western Australian Museum*, Supplement No 42, 33-55.
- Newby, K.R., Dell, J., How, R.A. and Hnatiuk, R.J. (1984) The Biological Survey of the Eastern Goldfields of Western Australia - Part 2: Widgiemooltha – Zanthus Study Area. *Records of the Western Australian Museum, Supplement* 18, 21–158.
- Ninox Wildlife Consulting (1995) Vertebrate Fauna Studies Kambalda Area (1993) Widgiemooltha Area (1994). Perth.
- Ninox Wildlife Consulting (1998) A Vertebrate Fauna Survey of the Randell Timber Reserve (1997 & 1998). Unpublished report for Mt Monger Gold Project Pty Ltd, Perth.
- Ninox Wildlife Consulting (2004a) St Ives Gold Delta Island Vertebrate Fauna Assessment. Unpublished Report Commissioned by St Ives Gold Mining Company Pty. Ltd.
- Ninox Wildlife Consulting (2004b) St Ives Gold Mine Vertebrate Fauna Assessment 2004. Unpublished report for St Ives Gold Mining Co Pty Ltd, Kalgoorlie.
- Phoenix Environmental Sciences (2018) Terrestrial fauna survey for the St Ives Gold Mine Beyond 2018 Project. Unpublished report for St Ives Gold Mining Company Pty Ltd. Perth.
- Terratree (2016) Desktop Assessment of Environmental Constraints and Opportunities within Delta Island South and Incredible Project Areas. Unpublished report for St Ives Gold Mine. Perth
- Terrestrial Ecosystems (2015a) Level 1 Vertebrate Fauna Risk Assessment for the Baloo Project Area. Unpublished report for Polar Metals Pty Ltd. Perth.
- Terrestrial Ecosystems (2015b) Level 1 Vertebrate Fauna Risk Assessment for the Fairplay Pit and Waste Landform Expansion and Development. Unpublished report for Native Vegetation Solutions, Perth.
- Terrestrial Ecosystems (2015c) Level 1 Vertebrate Fauna Risk Assessment for the Musket Project. Unpublished report for Native Vegetation Solutions, Perth.
- Terrestrial Ecosystems (2015d) Level 1 Vertebrate Fauna Risk Assessment for the Wills Project. Unpublished report for Native Vegetation Solutions, Perth.
- Terrestrial Ecosystems (2017a) Level 1 Vertebrate Fauna Risk Assessment for the proposed Higginsville infrastructure corridor development. Unpublished report for Native Vegetation Solutions, Perth.
- Terrestrial Ecosystems (2017b) Level 1 Vertebrate Fauna Risk Assessment for the proposed Higginsville powerline. Unpublished report for Native Vegetation Solutions, Perth.
- Terrestrial Ecosystems (2017c) Level 1 Vertebrate Fauna Risk Assessment for the proposed Mitchell project area. Unpublished report for Native Vegetation Solutions, Perth.
- Terrestrial Ecosystems (2018) Level 1 Vertebrate Fauna Risk Assessment for the Proposed Musket Pipeline Project. Unpublished report for Native Vegetation Solutions, Perth.
- Thompson, S. (2004) *Mine site rehabilitation index using reptile assemblage as a bio-indicator*, PhD thesis and additional surveys.
- Western Wildlife (2006) St Ives Gold Fauna Survey; Spring 2005. Perth.
- Western Wildlife (2013) *Mt Henry Study Area Baseline Fauna Survey: Level 2 Fauna Survey 2012 & 2013 Final Report.* Unpublished report for Panoramic Resources Limited, Perth.

The most relevant fauna survey data come from the Western Australian Museum (WAM)/Department of Environment Conservation (DEC) eastern Goldfields survey of the Widgiemooltha-Zanthus survey area, the ATA Environmental (2006b), Bamford Consulting Ecologists (2010), Dames and Moore (1999), Keith Lindbeck and Associates (2007), Ninox Wildlife Consulting (2004b) and Western Wildlife (2006, 2013). The McKenzie *et al.* (1993) report is part of the WAM/DEC's Eastern Goldfields survey undertaken in the mid 1980's and the Chapman et al. (1991a) report is the results of fauna surveys of four timber reserves that are all nearby. All the GHD reports (2010b, a, 2014, 2015b, a) and Terrestrial Ecosystems reports (2015a, d, b, c, 2017b, c, a, 2018) are



desktop assessments of the vertebrate fauna. In addition, Terrestrial Ecosystems has included in the Thompson (2004) fauna survey data, data collected after Thompson's (2004) PhD was completed. Much of this work has been published or been presented at various workshops and conferences (Thompson 2001, Thompson and Thompson 2002, Thompson 2002, Thompson *et al.* 2003a, Thompson *et al.* 2003b, Thompson *et al.* 2003c, Thompson and Thompson 2003a, Thompson 2003c, a, b, Thompson and Thompson 2003b, Thompson and Thompson 2004a, Thompson 2004, Thompson and Thompson 2004b, Thompson and Thompson 2005c, b, Thompson *et al.* 2005a, b, Thompson and Thompson 2006c, b, Thompson and Thompson 2006e, d, Thompson and Thompson 2007a, b, Thompson and Thompson 2008).

Data in the Atlas of Living Australia and Western Australian Museum records has also been added to the information contained in Appendix B, and the compilation of the species lists for the project area.

The trapping effort employed during many of these surveys is now considered inadequate to assess species richness or assemblage structure, however, they provide useful contextual information concerning the project area and compiling a species list.



3 METHODOLOGY

3.1 Database searches

A review of the *EPBC* list of protected species was undertaken to identify species of conservation interest to the Commonwealth Government. The search circle had a radius of 50km around a centre point coordinate of - 31.7804°S and 121.81512°E (Appendix A). In addition, a desktop search of the Terrestrial Ecosystems' fauna survey database was used to develop an appreciation of the vertebrate fauna assemblages in relevant sections of the bioregion near the project area. The DBCA threatened and priority species database was searched via the records in NatureMap.

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 (2006e) for reptiles; Johnstone and Storr (1998b, 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 (e.g. water and shore birds). Vagrants can be recorded almost anywhere. Many of the records are historical and the species is no longer present in the area (e.g. Malleefowl, 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 Reconnaissance survey

A site visit was undertaken on 27 June 2019 to assess fauna habitat types and condition in the project area. This fauna habitat assessment methodology required the assessor to stop at multiple locations within the project area and to assess 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.

3.3 Fauna habitat assessment

The fauna habitat assessment was undertaken for the majority of the 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.

Dr Scott Thompson, 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. The following data were assessed at each location as part of the 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	Lake / lake edge
Clay plain	Lower slope
Cliff	Mid slope
Creek line	Ridge
Dam	River
Drainage line	Rocky outcrop / breakaway
Dune crest	Salt lake
Dune slope	Sand dune
Dune swale	Sand plain
Escarpment	Stony plain
Flat	Swamp
Gorge	Undulating
Gully	Upper slope
Intertidal / mangrove	Wetland
5	Water hole

Habitat quality – options

- High quality fauna habitat These areas closely approximate the vegetation mix and quality that would have been in the area prior to any disturbance. The habitat has connectivity with other habitats and is likely to contain the most natural vertebrate fauna assemblage.
- Very good fauna habitat These areas show minimal signs of disturbance (e.g. grazing, clearing, 0 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.
- Good fauna habitat These areas showed signs of disturbance (e.g. grazing, clearing, 0 fragmentation, weeds) but generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by disturbance.
- Disturbed fauna habitat- These areas showed signs of significant disturbance. Many of the trees, 0 shrubs and undergrowth are cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, containing weeds or have been damaged by vehicle or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.
- Highly degraded fauna habitat These areas often have a significant loss of vegetation, an 0 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.

Habitat structure - combined into habitat description

Upper stratum		
	Tall open woodland	Scattered tall trees
	Tall woodland	Scattered trees
	Open woodland	Scattered low trees
	Woodland	Low closed forest
	Open forest	Low open forest
	Closed forest	Low woodland
	Tall closed forest	Low open woodlar
	Tall open forest	-
Middle stratum	-	
	Shrubland	Open heath
	Tall shrubland	Low closed heath
	Tall open shrubland	Low open heath
	Low shrubland	Tall closed scrub
	Scattered low shrubs	Tall open scrub
	Low open shrubland	Scattered tall shrub

Scattered low trees Low closed forest Low open forest Low woodland Low open woodland Open heath Low closed heath Low open heath Tall closed scrub Tall open scrub Scattered tall shrubs Scattered tall shrubs Open shrubland Closed heath Scattered shrubs Lower stratum Closed hummock grassland Closed tussock grassland / sedgeland / herbland Tussock grass land / sedgeland / herbland Mid-dense hummock grassland Hummock grassland Open tussock grassland / sedgeland / herbland



	Open hummock grassland	Scattered tussock / grasses / sedges / herbs
	Scattered hummock grassland	Very open tussock grassland / herbland
Soil Type – option	18	
	Sand	Clay loam
	Loamy sand	Silty clay loam
	Clayey sand	Clay
	Sandy loam	Rock
	Loam	Peat / organic
	Silty loam	Stony
	Sandy clay loam	
Soil Colour -opti	ons	
-	Black	Red
	Brown	White
	Grey	Yellow
	Orange	
Surface stones - o	options	
v	None	Boulders (>250mm)
	Pebbles (0-50mm)	Rocks
	Cobbles (51-250mm)	

3.4 Survey and reporting staff

Dr Scott Thompson undertook the site investigation and fauna habitat assessment. The field work was completed with the assistance of Eren Reid from Native Vegetation Solutions. Dr Scott Thompson prepared this report and Dr Graham 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 surveys and assessments within 50km of the project area and are familiar with the habitat in the project area.

3.5 Taxonomy and nomenclature

Taxonomy and nomenclature for fauna species used in this report are generally based on the WA Museum species list except for bats, which follow Churchill (2008) and birds which follow Christidis and Boles (2008). Terrestrial Ecosystems' has presumed that the identifications referred to in the appendices or in reports used to provide local and regional comparative data are correct and we have only corrected obvious records where the nomenclature was known to be incorrect.

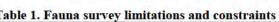
3.6 Limitations

This Level 1 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's (2016) *Technical Guidance Terrestrial Fauna Surveys* suggested that fauna surveys may be limited by many variables. Limitations associated with each of these variables are assessed in Table 1.



Possible limitations	Constraint (yes/no); significant, moderate or negligible	Fauna survey limitations and constraints Comment
Competency and experience of the consultant carrying out this assessment	No	The environmental scientists that undertook the site assessment, drafted and reviewed this report are familiar with the vertebrate fauna of this bioregion.
Scope	No	All aspects of the scope of works have been addressed.
Proportion of fauna identified, recorded and/or collected	No	Not applicable.
Accuracy of previous survey work	Yes, negligible	Terrestrial Ecosystems has reported fauna survey data recorded by various authors but is not able to vouch for the accuracy of much of this information. It is acknowledged that the taxonomy of Western Australian vertebrates is continually being revised and the nomenclature of some of the species listed in the appendices may have changed since publication by the authors.
Sources of information	Yes, negligible	Vertebrate fauna information was available from an on-line database and unpublished and published reports of surveys conducted in the bioregion in a variety of habitat types. Many of these surveys employed a low level of trapping effort which significantly impacts on the capacity of these data to represent the fauna assemblages in the areas surveyed.
Proportion of the task achieved	No	All tasks completed.
Timing/weather/ season/ cycle	N/A	Weather was fine during the site visit.
Disturbances which affected results of the survey	No	Disturbances in the project area have been factored into this assessment.
Intensity of survey effort	N/A	
Completeness	No	All aspects of this assessment have been completed.
Resources	No	Adequate resources were available.
Remoteness and/or access problems	Yes, negligible	There were no access issues.
Availability of contextual information on the region	No	Fauna survey data are available for the general area and specifically fauna habitats accessed in the project area.





RESULTS 4

Fauna habitat 4.1

There are three broad fauna habitats in the project area:

- open Salmon Gum woodland over sparse chenopods (Plates 1 and 2);
- eucalypt woodland over mixed shrubland and chenopod over scattered grasses of varying densities on a sandy-clay substrate (Plate 3 and 4); and
- mixed sclerophyll shrubland (Plate 5).

There are also areas devoid of vegetation from earlier exploration activity and these areas are of little value as fauna habitat (Plate 6).

The density of trees and shrubs in the relatively undisturbed areas varied across the project area. The fauna habitat quality varies from degraded to good with the more degraded areas due to historical and recent exploration activity. There are a few access tracks and old exploration grid lines in the area, but these are narrow and mostly only wheel tracks.

The area has been grazed by cattle with some areas showing signs of degradation (i.e. cattle tracks, chewed bushes and shrubs, etc). There was extensive evidence of rabbits and other feral fauna in the area.



Plate 1. Open Salmon Gum woodland over sparse



Plate 3. Eucalypt woodland over mixed shrubland and chenopod over scattered grasses of varying densities on a sandy-clay substrate



Plate 2. Open Salmon Gum woodland over sparse chenopods



Plate 4. Eucalypt woodland over mixed shrubland and chenopod over scattered grasses of varying densities on a sandy-clay substrate





Plate 5. Mixed sclerophyll shrubland

Plate 6. Highly disturbed

4.2 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 2-5 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.

Family	Species	Common Name	Family	Species	Common Name
Accipitridae	Lophoictinia isura	Square-tailed Kite	Rallidae	Fulica atra	Eurasian Coot
1.20 OC 14	Haliastur sphemurus	Whistling Kite	Acanthizidae	Sericomis frontalis	White-browed Scrubwren
	Accipiter fasciatus	Brown Goshawk	1	Hylacola cauta	Shy Heathwren
	Accipiter cirrocephalus	Collared Sparrowhawk	11	Calamanthus campestris	Rufous Fieldwren
	Aquila audax	Wedge-tailed Eagle	f	Pyrrholaemus brunneus	Redthroat
100 A	Hieraaetus morphnoides	Little Eagle	4	Smicromis brevirostris	Weebill
Anatidae	Cygnus atratus	Black Swan	2	Gerygone fusca	Western Gerygone
· · · · · · · · · · · ·	Tadorna tadornoides	Australian Shelduck		Acanthiza robustirostris	Slaty-backed Thornbill
a 2000 - 10 a	Chenonetta jubata	Australian Wood Duck	A	Acanthiza chrysorrhoa	Yellow-rumped Thornbill
	Anas gracilis	Grey Teal		Acanthiza apicalis	Inland Thornbill
	Anas superciliosa	Pacific Black Duck	Y	Aphelocephala leucopsis	Southern Whiteface
5 Factor - 11	Aythya australis	Hardhead	A	Acanthiza uropygialis	Chestnut-rumped Thornbill
Aegothelidae	Aegotheles cristatus	Australian Owlet-nightjar	Artamidae	Artamus personatus	Masked Woodswallow
Podargidae	Podargus strigoides	Tawny Frogmouth	Y - Charles - La	Artamus cinereus	Black-faced Woodswallow
Casuariidae	Dromaius novaehollandiae	Emu		Artamus cyanopterus	Dusky Woodswallow
Charadriidae	Charadrius ruficapillus	Red-capped Plover		Cracticus torquatus	Grey Butcherbird
	Charadrius australis	Inland Dotterel		Cracticus nigrogularis	Pied Butcherbird
	Elsevornis melanops	Black-fronted Dotterel		Cracticus tibicen	Australian Magpie
	Erythrogonys cinctus	Red-kneed Dotterel		Strepera versicolor	Grey Currawong
	Vanellus tricolor	Banded Lapwing	Campephagidae	Coracina maxima	Ground Cuckoo-Shrike
Laridae	Chroicocephalus novaehollandiae	Silver Gull		Coracina novaehollandiae	Black-faced Cuckoo- Shrike
Recurvirostridae	Recurvirostra novaehollandiae	Red-necked Avocet		Lalage tricolor	White-winged Triller
Contraction of the second	Cladorhynchus leucocephalus	Banded Stilt	Climacteridae	Climacteris rufa	Rufous Treecreeper
Scolopacidae	Tringa nebularia	Common Greenshank	Corvidae	Corvus coronoides	Australian Raven
Columbidae	Streptopelia senegalensis	Laughing Dove		Corvus bennetti	Little Crow
	Phaps chalcoptera	Common Bronzewing	1	Corvus orru	Torresian Crow
	Phaps elegans	Brush Bronzewing	Estrildidae	Taeniopygia guttata	Zebra Finch
C	Ocyphaps lophotes	Crested Pigeon	Hirundinidae	Cheramoeca leucosterna	White-backed Swallow
Alcedinidae	Todiramphus pyrrhopygius	Red-backed Kingfisher	1 A	Hirundo neoxena	Welcome Swallow
· · · · · · · · · · · · · · · · · · ·	Todiramphus sanctus	Sacred Kingfisher	1	Petrochelidon nigricans	Tree Martin
Meropidae	Merops ornatus	Rainbow Bee-eater		Petrochelidon ariel	Fairy Martin
Cuculidae	Chalcites basalis	Horsfield's Bronze-Cuckoo	Mahuridae	Malurus splendens	Splendid Fairy-wren
A 1 A	Chalcites osculans	Black-eared Cuckoo		Malurus leucopterus	White-winged Fairy-wren
	Chalcites lucidus	Shining Bronze-Cuckoo	1	Mahurus lamberti	Variegated Fairy-wren
	Cacomantis pallidus	Pallid Cuckoo		Malurus pulcherrimus	Blue-breasted Fairy-wren
	Cacomantis flabelliformis	Fan-tailed Cuckoo	Meliphagidae	Lichenostomus virescens	Singing Honeyeater
Caprimulgidae	Eurostopodus argus	Spotted Nightjar		Lichenostomus leucotis	White-eared Honeyeater
Falconidae	Falco cenchroides	Nankeen Kestrel	1	Lichenostomus flavicollis	Yellow-throated
	Falco berigora	Brown Falcon		Junio	Honeyeater
A	Falco peregrinus	Peregrine Falcon		Lichenostomus cratitius	Purple-gaped Honeyeater
Megapodiidae	Leipoa ocellata	Malleefowl	-		

Table 2. Birds potentially found near the project area



Family	Species	Common Name	Family	Species	Common Name
	Lichenostomus ornatus	Yellow-plumed	Petroicidae	Microeca fascinans	Jacky Winter
the second second second	A set of the second second second	Honeyeater		Petroica goodenovii	Red-capped Robin
	Purnella albifrons	White-fronted Honeyeater	1 1 1 1 1 1 1 1 1 1	Melanodryas cucullata	Hooded Robin
· · · · · · · · · · · · · · · · · · ·	Manorina flavigula	Yellow-throated Miner	-	Eopsaltria australis	Eastern Yellow Robin
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater	1	Eopsaltria griseogularis	Western Yellow Robin
	Anthochaera carunculata	Red Wattlebird	5	Drymodes superciliaris	Northern Scrub-robin
	Epthianura tricolor	Crimson Chat	A COLUMN TWO IS NOT	Drymodes brunneopygia	Southern Scrub-robin
	Epthianura albifrons	White-fronted Chat	Pomatostomidae	Pomatostomus superciliosus	White-browed Babbler
	Sugomel niger	Black Honeyeater	Psophodidae	Cinclosoma castanotus	Chestnut Quail-thrush
	Gliciphila melanops	Tawny-crowned	Rhipiduridae	Rhipidura fuliginosa	Grey Fantail
		Honeyeater	the second se	Rhipidura leucophrys	Willie Wagtail
	Lichmera indistincta	Brown Honeyeater	Timaliidae	Zosterops lateralis	Silvereve
	Melithreptus brevirostris	Brown-headed Honeyeater	Phalacrocoracidae	Microcarbo melanoleucos	Little Pied Cormorant
-	Myiagra inquieta	Restless Flycatcher	Podicipedidae	Poliocephalus poliocephalus	Hoary-headed Grebe
	Grallina cyanoleuca	Magpie-Lark	Cacatuidae	Eolophus roseicapillus	Galah
Motacillidae	Anthus novaeseelandiae	Australasian Pipit	1	Nymphicus hollandicus	Cockatiel
Nectariniidae	Dicaeum hirundinaceum	Mistletoebird	Psittacidae	Glossopsitta porphyrocephala	Purple-crowned Lorikeet
Neosittidae	Daphoenositta chrysoptera	Varied Sittella	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Polytelis anthopeplus	Regent Parrot
Pachycephalidae	Pachycephala inornata	Gilbert's Whistler	1	Platycercus icterotis	Western Rosella
	Pachycephala pectoralis	Golden Whistler		Barnardius zonarius	Australian Ringneck
S	Pachycephala rufiventris	Rufous Whistler		Psephotus varius	Mulga Parrot
	Colluricincla harmonica	Grey Shrike-thrush		Melopsittacus undulatus	Budgerigar
1	Oreoica gutturalis	Crested Bellbird		Neophema splendida	Scarlet-chested Parrot
Pardalotidae	Pardalotus punctatus	Spotted Pardalote	Strigidae	Ninox novaeseelandiae	Southern Boobook
	Pardalotus striatus	Striated Pardalote			-

Table 3. Amphibians potentially found near the project area

Family	Species	Common Name	Family	S
Limnodynastidae	Limnodynastes dorsalis	Western Banjo Frog	-	N
	Neobatrachus albipes	White-footed Trilling Frog	Myobatrachidae	0
	Neobatrachus centralis		1	P
	Neobatrachus kunapalari	Kunapalari Frog		P
	Neobatrachus pelobatoides	Humming Frog		

Family Species Common Name Neobatrachus sutor Shoemaker Frog Myobatrachidae Crinia pseudinsignifera Bleating Froglet Pseudophryne guentheri Crawling Toadlet Pseudophryne occidentalis Western Toadlet

Table 4. Mammals potentially found near the project area

Family	Species	Common Name	
Bovidae	Capra hircus	Goat	
	Ovis aries	Sheep	
Canidae	Canis lupus familiaris	Dog	
for the second se	Vulpes vulpes	Red Fox	
Felidae	Felis catus	House Cat	
Molossidae	Austronomus australis	White-striped Free-tail Bat	
	Mormopterus planiceps	Southern Free-tail Bat	
Vespertilionidae	Chalinolobus gouldii	Gould's Wattled Bat	
2	Chalinolobus morio	Chocolate Wattled Bat	
	Nyctophilus geoffroyi	Lesser Long-eared Bat	
	Nyctophilus major	Greater Long-eared Bat	
	Scotorepens balstoni	Inland Broad-nosed Bat	
	Vespadelus regulus	Southern Forest Bat	
Dasyuridae	Ningaui ridei	Wongai Ningaui	
	Ningaui yvonneae	Mallee Ningaui	
	Sminthopsis crassicaudata	Fat-tailed Dunnart	
-	Sminthopsis dolichura	Little Long-tailed Dunnart	
	Sminthopsis gilberti	Gilbert's Dunnart	

Family	Species	Common Name	
	Sminthopsis hirtipes	Hairy-footed Dunnart	
S	Sminthopsis ooldea	Ooldea Dunnart	
Burramyidae	Cercartetus concinnus	Southwestern Pygmy Possum	
Macropodidae	Macropus fuliginosus	Western Grey Kangaroo	
	Macropus irma	Western Brush Wallaby	
	Macropus robustus	Wallaroo or Euro	
	Macropus rufus	Red Kangaroo	
Leponidae	Oryctolagus cuniculus	European Rabbit	
Tachyglossidae	Tachyglossus aculeatus	Short-beaked Echidna	
Equidae	Equus caballus	Domestic Horse	
Muridae	Mus musculus	House Mouse	
	Notomys alexis	Spinifex Hopping Mouse	
-	Notomys mitchellii	Mitchell's Hopping Mouse	
	Pseudomys albocinereus	Ash-grey Mouse	
	Pseudomys bolami	Bolam's Mouse	
	Pseudomys hermannsburgensis	Sandy Inland Mouse	
	Rattus fuscipes	Bush Rat	
	Rattus rattus	Black Rat	

Table 5. Reptiles potentially found near the project area

Family	Species	Common Name	Family	Species	Common Name
Agamidae	Ctenophorus adelaidensis	Southern Heath	Boidae	Morelia spilota imbricata	Carpet Python
Agamidae	Clenophorus adeiaidensis	Dragon	Carphodactylidae	Nephrurus laevissimus	
	Ctenophorus caudicinctus	Ring-tailed Dragon		Nephrurus vertebralis	
	Ctenophorus cristatus	Bicycle Dragon	S /	Underwoodisaurus milii	Barking Gecko
	Ctenophorus fordi	Mallee Sand Dragon	Diplodactylidae	Crenadactylus ocellatus	Clawless Gecko
	Ctenophorus isolepis	Crested Dragon	-	Diplodactylus granariensis	1
	Ctenophorus maculatus	Spotted Military Dragon		Diplodactylus pulcher	
	Ctenophorus ornatus	Ornate Crevice Dragon		Lucasium maini	
	Ctenophorus reticulatus	Western Netted Dragon	41	Oedura reticulata	
	Ctenophorus salinarum	Salt Pan Dragon		Strophurus assimilis	Goldfields Spiny-tailed Gecko
	Ctenophorus scutulatus	0		Strophurus elderi	
	Moloch horridus	Thorny Devil	1	Strophurus intermedius	
	Pogona minor	Bearded Dragon		Strophurus strophurus	1
	Tympanocryptis cephalus	Pebble Dragon	Elapidae	Brachyurophis fasciolata	



Family	Species	Common Name
	Brachyurophis semifasciata	and the second second second
0	Demansia psammophis	Yellow-faced Whipsnake
	Furina ornata	Moon Snake
	Neelaps bimaculatus	Black-naped Snake
	Parasuta gouldii	
	Parasuta monachus	
	Parasuta nigriceps	
	Pseudechis australis	Mulga Snake
	Pseudonaja affinis	Dugite
	Pseudonaja mengdeni	Gwardar Direct Deres Sector
	Pseudonaja modesta	Ringed Brown Snake Jan's Banded Snake
	Simoselaps bertholdi Simoselaps semifasciata	Jan's Danued Shake
	Suta fasciata	Rosen's Snake
Gekkonidae	Christinus marmoratus	Marbled Gecko
Generollitate	Gehyra purpurascens	Matolet Geene
	Gehyra variegata	0
	Heteronotia binoei	Bynoe's Gecko
	Rhynchoedura ornata	Beaked Gecko
Pygopodidae	Delma australis	111
	Delma butleri	
	Delma fraseri	1
	Delma nasuta	A
	Lialis burtonis	
1.0.2	Pygopus lepidopodus	Common Scaly Foot
Scincidae	Cryptoblepharus buchananii	
-	Ctenotus atlas	1
	Ctenotus leonhardii	0
	Ctenotus mimetes	
	Ctenotus schomburgkii	
	Ctenotus severus	
	Ctenotus uber	
	Cyclodomorphus branchialis	
	Cyclodomorphus melanops	Slender Blue-tongue
	Egernia carinata	
	Egernia depressa	Southern Pygmy Spiny-tailed Skink
	Egernia formosa	JAIIIA
	Egernia multiscutata	
	Egernia richardi	The second second second
	Eremiascincus richardsonii	Broad-banded Sand Swimme
	Hemiergis initialis	
	Hemiergis millewae	
	Hemiergis peronii	in the second se
	Lerista distinguenda	
	Lerista dorsalis	
	Lerista kingi	
	Lerista picturata	
	Lerista taeniata	
	Lerista terdigitata	
	Lerista tridactyla	12°
	Liopholis inornata	
	Menetia greyii	
-	Morethia adelaidensis	
	Morethia butleri	
-	Morethia obscura	
	Tiliqua occipitalis	Western Bluetongue
	Tiliqua rugosa	Bobtail
Typhlopidae	Anilios australis	
1.	Anilios bicolor	
E	Anilios bituberculatus	
	Anilios hamatus	0
Varanidae	Varanus caudolineatus	1
	Varanus gouldii	Bungarra or Sand Monitor
	Varanus rosenbergi	Heath Monitor



4.3 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, 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.

The fauna species that have special status in either State or Commonwealth government legislation or are on the DBCA Priority species list and are potentially present in the vicinity of the project area are listed in Table 6. Although they were recorded in the search of the MNES online database, migratory species that typically would be found around the edges of salt lakes, clay pans, estuaries and marshes have been excluded from Table 6 as there is no suitable habitat nearby.

Four threatened species of fauna and three migratory species of birds were identified under the *EPBC Act 1999* as potentially occurring in the project area or surrounds. There is one Schedule 7 species as listed under the *BC Act 2016* and three species listed on the DBCA's Threatened and Priority Fauna List that potentially occur in the project area or surrounds. The following is an assessment of the likelihood of each of the species listed in Table 6 being found in the project area and their potential to be impacted by clearing of vegetation.

Listed marine and shorebird species have been excluded from this list as there is no suitable habitat in the project area.

Table 6. Assessment of the potential pre	nce of a conservation significant	at fauna species in the
	project area	
DDGI		

Species	DBCA Schedule / Priority	Status under Commonwealth EPBC Act	Comment on the potential presence of a species
Arid Bronze Azure Butterfly Ogyris subterrestris petrina	Critically Endangered	Critically Endangered	Unlikely to be in the project area due to a lack of recent records and unsuitable habitat.
Night Parrot (Pezoporus occidentalis)	Critically Endangered	Endangered	Highly unlikely to occur in the project area.
Malleefowl (Leipoa ocellata)	Vulnerable	Vulnerable	No mounds recorded in the project area.
Chuditch (Dasyurus geoffroii)	Vulnerable	Vulnerable	Highly unlikely to occur in the project area.
Jalmenus aridus (butterfly)	Priority 1		Unlikely to be in the project area due to a lack of recent records and unsuitable habitat.
Westem Rosella Platycercus icterotis xanthogenys (Mallee)	Priority 4		Potentially in the region.
Central Long-eared Bat Nyctophilus major tor	Priority 4		Potentially in the project area.
Oriental Plover (Charadrius veredus)	Migratory	Migratory	May infrequently be seen in the region.
Fork-tailed Swift (Apus pacificus)	Migratory	Migratory	May infrequently be seen in the region.
Grey Wagtail (Motacilla cinerea)	Migratory	Migratory	Highly unlikely to be seen in the project area.
Peregrine Falcon (Falco peregrinus)	Schedule 7		May infrequently be seen in the area.

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



Arid Bronze Azure Butterfly (Ogyris subterrestris petrina) – Critically endangered under the BC Act 2016 and EPBC Act 1999

This butterfly is associated with colonies of the ant *Camponotus terebrans* in mallee vegetation on sandy soil, often near flood plains, and typically digs its nest at the base of eucalypts. Larvae hatching from eggs laid near ant nest entrances (often near the bases of various mallee eucalypts) are carried by the ants into their nest. Details of its biology and of any form of herbivory by the larvae are unknown; however, it is likely that the larvae are myrmecophagous (*Camponotus terebrans*). These butterflies fly close to the ground, and have been observed flying over agricultural lands near presumed breeding colonies. It is known from Lake Douglas, about 12kms south-west of Kalgoorlie (Field 1999) and in the Barbalin Nature Reserve (approximately 11km west of Mukinbudin) in the Avon Wheatbelt (Threatened Species Scientific Committee 2014).

It is unlikely that this butterfly is in the project area as there are no records of it nearby. Terrestrial Ecosystems' assessment is that vegetation clearing in the project area is unlikely to have a significant impact on this species.

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 1998a, 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. 2011, Threatened Species Scientific Committee 2016). Recordings in north-west and western Queensland in the early 1990-2000s were in a broad cross section of 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, Palaszzuk 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 (25-30° and 0° 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. 2017a). 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 recent Night Parrot records near the project area, and there are no old large spinifex hummocks in the project area. As the preferred roosting and nesting sites for Night Parrots are not present in the project area, it is Terrestrial Ecosystems' assessment that Night Parrots are not present in the project area.



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

Malleefowl are large, ground-dwelling birds that rarely fly unless alarmed or are perching for the night. Historically, Malleefowl have been found in mallee regions of southern Australia from approximately the 26th parallel of latitude southwards. 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 and their eggs are vulnerable to predation by foxes, and newly hatched chicks are vulnerable to foxes, cats and raptors (Priddel and Wheeler 1990, 1997, 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 have been observed in the bioregion, however, there are no recent records of active breeding mounds in the vicinity of the project area. Open fauna habitat and presence of feral and pest species significantly reduce the probability of Malleefowl utilising the project area. As a consequence, Terrestrial Ecosystems' assessment is that vegetation clearing in the project area is unlikely to have any significant impact on 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 records south of Southern Cross and Marvel Loch and there have been other reported sightings east of Kambalda and near Norseman. It is therefore possible that this species is in the bioregion, and this could only be verified with an extensive trapping or camera trapping program. As the project area is north-east of the species known distribution it is unlikely that the Chuditch would be found in the project area. As a consequence, Terrestrial Ecosystems' assessment is that vegetation clearing in the project area is unlikely to have any significant impact on this species.

Jalmenus aridus - Priority 1 with the DBCA

Caterpillars of this butterfly are green with some red and white lines along the body, and it has a black head and tail. This species is known to feed on the foliage of *Senna* sp. and *Acacia tetragonophylla*. DBCA reported sightings of this species in the vicinity of Lake Douglas, west of Kalgoorlie. *Jalmenus aridus* is known from only a single colony, on a single *Acacia* tree. Subsequent searches have failed to reveal additional colonies.

It is Terrestrial Ecosystems' assessment that vegetation clearing of the project area is unlikely to have a significant impact on this species as it is highly unlikely to be in the project area.

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

The mallee form of the Western Rosella is found mostly in eucalypt and *Casuarina* woodland and shrub lands, especially Wandoo, Flooded Gums and Salmon Gums. This species was sighted by Dames and Moore (1999) around Lake Lefroy, Outback Ecology Services (2009) at Randalls and it was reported by Dell and How (1984) in the



biological survey of Widgiemooltha. A search of NatureMap indicated that they have been recorded in the vicinity of Kalgoorlie.

It is possible that this species could be infrequently seen in the project area. However, given that the project area represents a very small fraction of similar habitat in adjacent areas, it is Terrestrial Ecosystems' assessment that vegetation clearing in the project area is unlikely to have a significant impact on this species.

Central Long-eared Bat (Nyctophilus major tor) - Priority 4 with the DBCA

This species is probably the species referred to by Churchill (2008) as the Central Long-eared Bat (*Nyctophilus* major tor.). Records in the Atlas of Living Australia indicated this species has been found west of Kalgoorlie and in other areas in the Goldfields and the Wheatbelt. It roosts in tree cavities, foliage and under loose bark.

Given that project area represents a very small fraction of similar habitat in the general area, it is Terrestrial Ecosystems' assessment that vegetation clearing in the project area is unlikely to have a significant impact on this species.

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. The species is under threat because of habitat reduction due to agriculture and changing fire regimes. The Oriental Plover has not been recorded in the general area during any of the other regional surveys.

Terrestrial Ecosystems' assessment is that the Oriental Plover is unlikely to be seen in the project area, due to a lack of previous records in the general area.

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 aerial species, foraging and sleeping on the wing. It rarely comes to ground, usually only for breeding. It is common in the Kimberley, uncommon to moderately common near northwest, west and southeast coasts and rare to scarce elsewhere. It is rarely seen in the Goldfields.

Terrestrial Ecosystems' assessment is that the Fork-tailed Swift may infrequently be seen in the project area. However, the proposed vegetation clearing is unlikely to significantly impact on this species as it will move away to other areas if it is disturbed.

Grey Wagtail (Motacilla cinerea) - Migratory species 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.

It is highly unlikely to be seen in the project area due to a lack of records and suitable habitat.

Peregrine Falcon (Falco peregrinus) - Other specially protected fauna 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 favours hilly or mountainous country and open woodlands and may be an occasional visitor to the project area. 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. A Peregrine Falcon was seen at the Randalls Timber Reserve (Ninox Wildlife Consulting 1998) and around St Ives mine (Dames and Moore 1999, Ninox Wildlife Consulting 2004b) and during the Widgiemooltha biological survey (Dell and How 1984), so they are in the region. It could therefore infrequently be seen in the project area.

It is Terrestrial Ecosystems' assessment that vegetation clearing in the project area is unlikely to have a significant impact on this species as the bird will readily move away from disturbance and there are abundant areas of similar habitat in the region.



5 DISCUSSION

5.1 Adequacy of the fauna survey data for fauna habitats represented in the project area

The EPA's (2016) *Technical Guidance on Terrestrial Fauna* indicated that a Level 2 fauna assessment is required for a disturbance area of in excess of 75ha in this bioregion. The project area is greater than 75ha, so the disturbance exceeds one of the criterion to require a Level 2 survey in the Coolgardie IBRA bioregion, however, fauna survey data provided by the Western Australian Museum (WAM)/Department of Environment Conservation (DEC) eastern Goldfields survey of the Widgiemooltha-Zanthus survey area, ATA Environmental (2006b), Bamford Consulting Ecologists (2010), Dames and Moore (1999), Keith Lindbeck and Associates (2007), Ninox Wildlife Consulting (2004b) and Western Wildlife (2006, 2013) provide a good indication of the vertebrate fauna assemblage in the project area. The McKenzie *et al.* (1993) report is part of the WAM/DEC's Eastern Goldfields survey undertaken in the mid 1980's and the Chapman et al. (1991a) report is the results of fauna surveys of four timber reserves that are all nearby. In addition, Thompson (2004b) has provided in excess of 120,000 pit/funnel trap-nights of data in fauna habitats that are present in the project area, so the results of this survey alone are much more comprehensive than is typically undertaken for a Level 2 fauna assessment.

Although the project area is larger than 75ha, given the fauna survey data that are available nearby and the level of existing disturbance in the project area, there is sufficient information on the fauna assemblages to enable potential impacts to be assessed and additional on-the-ground surveys are not required. It is unlikely that a Level 2 vertebrate fauna survey in the project area will provide new species not previously identified for this area that would alter the assessment of potential impacts. However, as with all surveys, until it is completed the outcome is unknown.

5.1.1 Amphibians

Amphibians typically found in eucalypt woodlands in the Goldfields are listed in Table 3. Frogs are normally only detected immediately after rainfall or around semi-permanent pools. It is likely that *Cyclorana maini, Pseudophryne occidentalis, Neobatrachus kunapalari* and *Neobatrachus wilsmorei* would be found in the general area. These species, other than *P. occidentalis,* burrow into the ground and aestivate between rainfall events. *Pseudophryne occidentalis* find shelter under rocks and in crevices during the dry periods and enter temporary ponds to breed after major rainfall events. All four species have a wide-spread distribution and are abundant. Clearing vegetation 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. There are no conservation significant amphibians in the Goldfields.

5.1.2 Reptiles

Reptile species richness in the project area will be comparable with similar eucalypt woodlands elsewhere in the bioregion. The list provided in Appendix B represents species likely to be found over a large area of diverse habitat types. Eucalypt woodlands would typically support up to 40 species of reptiles, but many of these would be in low abundance (see Table 5). Fauna habitats in the project area are likely to be similar to that in the adjacent areas, so the loss of reptiles during vegetation clearing is unlikely to be significant in a bioregional context.

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

5.1.3 Birds

Avian species richness in the Goldfields is influenced by rainfall and is generally higher in woodlands compared with chenopod shrublands and more sparsely vegetated areas. The list provided in Table 2 represents species likely to be found over a large area of diverse habitat types. Eucalypt woodlands would typically support up to 50-70 species of birds, but many of these would be in very low numbers (see Appendix B) and are only present after significant rainfall. Birds typically move from an area once vegetation clearing commences, so the impact is relatively low if the area is small. However, eggs and chicks in nests are often lost during the clearing process.



Predation by feral cats, foxes and wild dogs has significantly reduced the abundance of Malleefowl in the Goldfields and there are a few remaining small populations, mostly in areas of dense shrubland, as the dense vegetation provides the adult birds with some protection from predators. There are no active Malleefowl mounds in the project area.

The Peregrine Falcon will normally have a very large home range in the Goldfields and clearing a small section of the project area, particularly when similar habitat exists in the adjacent areas, is unlikely to significantly impact on this species.

Terrestrial Ecosystems' view is that the proposed clearing is unlikely to significantly impact on the avian fauna of the bioregion.

5.1.4 Mammals

The diversity of small terrestrial mammals potentially caught in the project area would be low due the sparsely vegetated habitat. Although, records of Numbats (*Myrmecobius fasciatus*), Burrowing Bettongs (*Bettongia lesueur*) and Bilbies (*Macrotis lagotis*) are shown in the Atlas of Living Australia and Western Australian Museum records (Appendix B), they are no longer present in this region, having been predated on by foxes, cats and dogs many years ago. None of the mammals potentially found in the project area are of conservation significance and the loss of small mammals during vegetation clearing is unlikely to be significant in a bioregional context.

It was noted during the site visit that there was evidence of rabbits, feral cats, foxes and dogs in the project area and surrounds.

5.2 Biodiversity value of the project area

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

Much of the project area has been highly disturbed by previous mining or exploration activity, with the consequence that the project area 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, foxes and wild dogs. Goats have heavily grazed some areas, and this would have 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 fauna communities were identified in the project area.

5.2.3 Condition of fauna habitat

Some of the project area has been disturbed due to historical development activity (i.e. tracks, exploration and fences). There is also extensive evidence of disturbance by cattle and the presence of rabbits and cats. There is a large area of recent exploration which has degraded the habitat. The uncleared fauna habitat present in the project area is similar to many square kilometres of adjacent habitat; the clearing of vegetation is 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 corridor.

5.2.5 Size and scale of the proposed disturbance

The project area is a small proportion of similar 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.

5.2.7 Potential impacts on ecosystem function

Clearing native vegetation is likely to result in the loss of small vertebrate fauna on-site that are unable to move away during the clearing process. The few larger animals, such as kangaroos and large goannas, and most of the birds will move into adjacent areas once clearing commences. Shifting animals into adjacent areas will increase the pressure on resources in those areas and it is likely that there will be some disruption to the ecosystems in these areas for a period until a balance is restored.

Impacts associated with clearing vegetation in the project area in a landscape or bioregional context on the vertebrate fauna are likely to be low as the proposed disturbance area is small relative to the quantity of similar habitat in the bioregion.



6 POTENTIAL ENVIRONMENTAL IMPACTS

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

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

6.1 Direct impacts

Clearing vegetation and activities associated with the development will result in the loss of 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.

Clearing linear corridors and other large areas increases fauna habitat edges. Small mammals can respond both positively and negatively to edges depending on their ecological traits (Laurance 1991, 1994, Goosem and Marsh 1997, Goosem 2000). Edge and disturbance effects can lead to altered and most often higher levels of predation, restricting or increasing fauna movements and altering assemblage structure (Oxley et al. 1974, Paton 1994, Baker et al. 1998, Temple 1998, Luck et al. 1999, Goosem et al. 2001). Goldingay and Whelan (1997) and Clarke and Oldland (2007) reported that edge effects can extend up to 150-200m from the edge for some species, meaning the impact area on vertebrate fauna is likely to be larger than the cleared footprint.

Edge effects can lead to the disruption of ecological processes such as predation and dispersal, animal movements and can change assemblage structure. The consequence is that the impact area will always be much larger than the cleared area.

6.1.1 Animal deaths during the clearing process and displacement of fauna

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

6.1.2 Reduction or loss of activity areas and closure of burrows

Clearing vegetation and associated construction 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.

6.2 Indirect impacts

In addition to the obvious impact of vegetation clearing there can be an equally significant or greater impact in the adjacent areas because of 'edge effects'. Edge effects can lead to the disruption of ecological processes such as predation and dispersal, animal movements and can change assemblage structure. The consequence is that the impact area will always be much larger than the cleared area. Vehicle tracks also have the propensity to develop weed infestations which can impact on natural fauna habitats. Cleared corridors can also provide improved predator access to areas, enhance the invasion of pest species into areas and may act as inhibitors or disrupt fauna migration and movement patterns.



There are numerous potential threats associated with vegetation clearing and the construction of infrastructure that could have an impact on the vertebrate fauna in the project area. Some of these are discussed below.

6.2.1 Habitat fragmentation

In addition to 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.

6.2.2 Introduced fauna and weeds

An increase in habitat fragmentation and human activity is often associated with an increase in the abundance of introduced species such as the house mouse (*Mus musculus*), foxes (*Vulpes vulpes*), cat (*Felis catus*) and wild dogs (*Canis lupus*) (Raiter *et al.* 2018). 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 cat is a particularly damaging predator on native fauna and any increase in their numbers could have a detrimental effect of local native fauna (Kinnear 1993, Bamford 1995, Woinarski *et al.* 2017, Woinarski *et al.* 2018, Murphy *et al.* 2019); hence it is important to ensure that 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 on numerous mining tenements. The goat population has now been significantly reduced, so the wild dogs will turn their attention to predating of station cattle calves and sheep, and native animals.

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

Introduced plant species can successfully and rapidly invade areas of cleared native vegetation or otherwise disturbed by humans. Introduced plant species may replace native species that provide shelter or foraging areas for native fauna. 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.

6.2.3 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.

6.2.4 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 a number of 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 near the project area due to the sparseness of the vegetation and existing fragmentation.



6.2.5 Anthropogenic activity

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

6.2.6 Dust

Dust generated from shifting top soil and spoil and 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.

6.2.7 Uncapped drill holes

An ongoing potential risk to terrestrial fauna is the presence of uncapped drill holes within the project area. Small animals, particularly lizards and mammals, can become trapped in the drill holes and eventually die. Therefore drill holes that are open for periods of months or years can be particularly detrimental to small animal populations (Malnic 1997).

6.2.8 Rehabilitation of cleared areas

To minimise the long-term potential impacts, rehabilitation programs should be progressively implemented and evaluated. An emphasis should be placed on the establishment of near-natural, self-sustaining, functional ecosystems in rehabilitation planning, and this should be one of the focal criteria for assessing the success of rehabilitation programs.



7 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 7, 8 and 9 provide a summary of the risk assessment associated with this project.

Table 7. Fauna impact risk assessment descriptors

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 9.

Likelih					
Level	Description		Criteria		
A	Rare		The environmental event may occur, or one or more conservation significant species may be present in exceptional circumstances.		
В	Unlikely		The environmental event could occur, or one or more conservation significant species could be present at some time.		
С	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 c	ertain	The environmental event is expected to occur, or one or more conservation significant species is expected be present in most circumstances.		
Conseq	uences				
Level	Descripti	on	Criteria		
1	Insignificant		Insignificant Insignificant impact on fauna of conservation significance or regional biodiver and the loss of individuals will be insignificant in the context of the availabilit 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 <i>EPBC Act (1999)</i> at a regional scale.		
Accept	ability of R	lisk			
Level of risk Management Action Required		Manag	gement Action Required		
Low	w No ac		action required.		
		Avoid annua	l if possible, routine management with internal audit and review of monitoring results lly.		
extern		extern	nally approved management plan to reduce risks, monitor major risks annually with al audit and review of management plan outcomes annually. May a referral to the monwealth under the <i>EPBC Act 1999</i> .		
Extrem	e	Unacc	eptable, project should be redesigned or not proceed.		



Table 8. Levels of acceptable risk

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

Table 9. A risk assessment of the impact of ground disturbance activity on fauna

			Befor	Manag	gement	1	With	Mana	gement
Factor	Potential Impact		Inherent Risk			Risk Controls / Management	Residual Risk		
			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.	В	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.	В	2	Low				
Clearing vegetation	Loss of fauna habitat – local scale	Loss of terrestrial fauna in the project area.	E	2	Mod.	1			
	Loss of fauna habitat – landscape scale	Loss of some fauna during vegetation clearing.	В	1	Low				
	Loss of fauna habitat – regional scale	Small loss of some fauna from the region.	В	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				1
	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				
Death or loss of	Malleefowl	Death or the reduced viability of Malleefowl.	Α	3	Low		-110	1	
conservation	Peregrine Falcon	Death or the reduced viability of the Peregrine Falcon.	A	2	Low		100		
significant fauna	Western Rosella	Death or the reduced viability of the Western Rosella.	Α	2	Low		1.00		
	Central Long-eared Bat	Death or the reduced viability of the Central Long- eared Bat.	A	2	Low		Ξđ		j
	Oriental Plover	Death or the reduced viability of the Oriental Plover.	Α	2	Low	· · · · · · · · · · · · · · · · · · ·	1.441	-	1
	Fork-tailed Swift	Death or the reduced viability of Fork-tailed Swift.	Α	2	Low	2 B	12.9		
Human impacts	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	Е	1	Low
	Increase in feral fauna, specifically the wild dog and feral cat	Increased predation on the native fauna	с	2	Low	Management of waste, implementing a feral animal control program and not-feeding feral animals.	в	2	Low



7.1 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 10). Where possible, native vegetation should not be cleared if any of the following principles are comprised.

Table 10. Assessmen	t of impact using	the native vegetation	clearing principles
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Principle	Response		
It comprises a high level of biological diversity.	Clearing vegetation will not comprise a high level of biodiversity.		
It comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	Clearing the vegetation will not result in the loss of significant habitat for indigenous fauna.		
It includes, or is necessary for the continued existence or, rare flora.	N/A		
It comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	The area does not contain a threatened ecological fauna community.		
It is significant as a remnant of native vegetation in an area that has been extensively cleared.	The area is not a remnant.		
It is growing in, or in association with, an environment associated with a watercourses or wetland.	The area does not contain a wetland.		
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		

7.2 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* is not recommended.



8 SUMMARY

The total assessed area is 135ha, but the development area is likely to be significant less. There are three broad fauna habitats in the project area:

- open Salmon Gum woodland over sparse chenopods;
- eucalypt woodland over mixed shrubland and chenopod over scattered grasses of varying densities on a sandy-clay substrate; and
- mixed sclerophyll shrubland.

There are also areas devoid of vegetation from earlier exploration activity and these areas are of little value as fauna habitat.

The density of trees and shrubs in the relatively undisturbed areas varied across the project area but was mostly sparse. The fauna habitat quality varies from degraded to good and the more degraded areas due to historical and recent exploration activity and cattle grazing. There are a few access tracks and exploration grid lines in the area, but these are narrow and mostly only wheel tracks of a stony red sand-clay substrate.

The area has been grazed by cattle with many areas showing degradation (i.e. cattle tracks, chewed bushes and shrubs, etc). There was extensive evidence of rabbits and other feral fauna (i.e. feral cats and dogs) in the area.

Clearing native vegetation is likely to result in the loss of small vertebrate fauna on-site that are unable to move away during the clearing process. The few larger animals, such as kangaroos and large goannas and snakes, and most of the birds will move into adjacent areas once clearing commences.

Development and vegetation clearing will have a minimal impact on the fauna in areas adjacent to those that will be cleared. There will be a small loss of native fauna to vehicle strikes on access tracks, but this will be low. Migrants 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.

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



9 MANAGEMENT STRATEGIES

9.1 Induction and awareness

All contractors and people involved in vegetation clearing and development 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 a mandatory component of working on the Eundynie project.

9.2 Dust

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

Recommendation 2: The impact of dust on adjacent vegetation and fauna habitat is managed and monitored against appropriate KPIs.

9.3 Minimising secondary impacts to the habitat

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

Recommendation 3:	Pets are not permitted on site.
Recommendation 4:	All waste and rubbish be contained in bins and regularly removed from site or buried so it is unavailable to pest species.
Recommendation 5:	Feeding of native fauna should be actively discouraged.

9.4 Uncapped drill holes

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

Recommendation 6: A log of all on-site drill holes be maintained detailing when they were capped, how and by whom.

9.5 Road fauna deaths

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

Recommendation 7: Speed limits are implemented and enforced on-site. These should be determined based on the quality and condition of the roads, but be a maximum of 80km/h.

Recommendation 8: Signage is erected to indicate the maximum travelling speeds and the possible presence of wildlife crossing roads.



9.6 Feral fauna

Based on feral cat tracks and scats recorded in the project area it is highly probable that the project area currently supports a significant population of feral cats. Rabbits were also present in the project area. Reducing the impacts of feral cats and rabbits will reduce the stress on fauna and fauna assemblages in the area.

Recommendation 9: A feral and pest animal management program is implemented to reduce the predation risk on Malleefowl (and other fauna) in the project area. This program should concentrate on reducing the impacts of cats, foxes, wild dogs and rabbits.



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Figures Vertebrate Fauna Assessment – Eundynie Project Area

Appendix A Results of the EPBC Act Protected Matters Search Vertebrate Fauna Assessment – Eundynie Project Area

Appendix B Vertebrate Fauna Recorded in Biological Surveys in the Region Vertebrate Fauna Assessment – Eundynie Project Area

Note: Each column of data represents a different habitat type or survey site

Descriptions of the vegetation for each habitat surveyed are contained below

X indicates a presences in the area, V = Vulnerable, E = Endangered, M = Migratory, TH = Threatened

2nd indicates observations of secondary evidence (tracks, scats, diggings etc.)

Numbers denote numbers captured during systematic trapping efforts; X = presence noted.

Appendix B(1). Vertebrate fauna recorded in biological surveys in the region

1		Survey		-		-			-	-				-	-	-	-	A		-	-	-	-		-				-	-		-
Family	Species	Common Name	Camp 1	Camp 1/1	Camp 1/10	Camp 1/11	Camp 1/12	Camp 1/13	Camp 1/2	Camp 1/4	Camp 1/5	Camp 1/6	Camp 1/7	Camp 1/8	Camp 1/9	Camp 2/15	Camp 2/16	Camp 2/18	Camp 2/19	Camp 2/20	62/2 dum	Camp 2/25	Camp 2/26	Camp 2/27	Camp 2/28	Camp 4	Camp 4/12	Camp 4/14	Camp 4/15	Camp 4/4	Camp 4/5	Opportunistic
Birds	1			-	-	Ĭ	-	-					Ť	-				-	-					Ĭ		-	1			-		1
Accipitridae	Lophoictinia isura	Square-tailed Kite	X	121	11				11						X	3.72	1.11			X		1	1.11	\square			200			7215		1 27
	Haliastur sphenurus	Whistling Kite	X				001					1.1				100				110		111		\square		C IT	1111	111		111		200
	Aquila audax	Wedge-tailed Eagle	X		X			11	1.1		1.00	X	1.00	11	1	1	i = i	201				1.00	1-1			11			11-1			
	Hieraaetus morphnoides	Little Eagle	X		5.5	E H	111	E (1	3114		1.11	12.21		E-01	X	2	1H (31	(111	E F	3	181	\square	(-1)	est eff	-11-			-		18 18
Aegothelidae	Aegotheles cristatus	Australian Owlet-nightjar	X	X	1		101	2	<	1 22		1122			X	1	1.5		X	X		010	1.5	\square	3	X	10	X		221	211	1 12
Podargidae	Podargus strigoides	Tawny Frogmouth	X	X							X	12.72			X		12.1	111				2	17.1		7	X	100	X		22.0		
Casuariidae	Dromaius novaehollandiae	Emu		1			x			100		х	1.3	X	X	3 32	X	1.1				6 11	1			X		12		1017	-10	
Charadriidae	Vanellus tricolor	Banded Lapwing	X		X	X						1.1.1					1.5	1.1								X			1.5	2.2		1
Ardeidae	Ardea pacifica	White-necked Heron		1											- 11	1	1.1.1					110								1510	11	1
Columbidae	Columba livia	Rock Dove		1				1		1.1		1.11		11		1,111	122					0120		\square		. (I.	10		1.00	200	11	1
	Streptopelia senegalensis	Laughing Dove	251	1-1	-			EEE	10		11		=	E-613	÷1).1		(H) (16.6		117	(E (- (E	-EE	0-3				1
	Phaps chalcoptera	Common Bronzewing	х									X		11	X	2 12 1	1.1	X		X		61.9		\square						3.3	217	1
Alcedinidae	Todiramphus pyrrhopygius	Red-backed Kingfisher	Х	1					2111		1.27	х	100		X	1	111		X	X		312	11.1	\square			1.13			22 0	11	
	Todiramphus sanctus	Sacred Kingfisher	X	177.			1.11	111	12	0.00	1.17	11.11	1.3		X	3 27	1.11	11	1.11	111	11.1	017	1	\square		11	111	1.11		22.0	20	1.27
Meropidae	Merops ornatus	Rainbow Bee-eater	X	Х	11		111		11	11	х	11.11			X	3.011	1.5.1	11	111	11			1.5.1]]]	X	117	Х		2210	-11	1 177
Cuculidae	Chalcites basalis	Horsfield's Bronze-Cuckoo						6.6	11		1.1			11	X		10.4		X		11	115	1.1.1	\square	1	- () - E	10	1.1				
	Chalcites osculans	Black-eared Cuckoo		254	21		1.3	0.71		1		1		1.11	X	1.	1.00		X			X	х			- 1 L	11	1	1.1	2.2	11	1
	Cacomantis pallidus	Pallid Cuckoo	х	120	-1)+{}/	6.64	3403				t = 0	F (11	X	1	1 ± 1		X	H f	- F	111	(He (\square	(-1)	d f f	-6.13			1	-101	18
	Cacomantis flabelliformis	Fan-tailed Cuckoo		h L			120			1				121		1 12	1.50	1.1	23	10		0 120	1.2.	\square		11	10			22.5	211	1
Caprimulgidae	Eurostopodus argus	Spotted Nightjar	X		X									<u></u>	X	1	111					112	17.1	\square	1	X	1.1	Х		111	-11:	1.2
Falconidae	Falco cenchroides	Nankeen Kestrel	X	1.	1	1	1.11		11.3		12		1	X	X	3 00	1.00			11						1111	1.5	122		20 A.		1.
	Falco berigora	Brown Falcon	Х	1		X	101	111	X			1		11	1	0	00	12.2	11			Q III	1.1.1				1.1				-10	12
	Falco longipennis	Australian Hobby	X	X	1.1		111		-	1					- 1	1	1.4						1.0.1			23.1				10.0		4
Megapodiidae	Leipoa ocellata	Malleefowl	X		X		2.3	C 1 1								1								\Box]	X	10			2717	11	
Otididae	Ardeotis australis	Australian Bustard					121	0.0	3.13			19		611	X							114				(1) E	L D					1
Acanthizidae	Calamanthus cautus	Shy Heathwren	X	11.4							X			X	X		1.1						X								-1.1	
	Pyrrholaemus brunneus	Redthroat	Х	X			1.1		12	X			X	ХХ	X	100	121	1.1	111		11		Х			13.11	1	12.		22.0	11	1.1
	Smicrornis brevirostris	Weebill	X	X		Х	111	2	XΧ	X	Х		Х	Х	X	X	х		X	X	X	X	Х]]	X	X	Х		12,0		
	Gervgone fusca	Western Gerygone	х				2	X	312	100	1.745	12.20	1 = 1	X	X	X	100	1.54		110		1	1.00			X	100	X		1510	1111	

-	-	Surv	vey				-	-			_	_	-	-		_		A			-	_	-	_		-	_	_		-		_	
Family	Species	Common Name	Camp 1	Camp 1/1	Camp 1/10	Camp 1/11	Camp 1/12	Camp 1/13	Camp 1/2 Camp 1/3	Camp 1/4	Camp 1/5	Camp 1/6	Camp 1/7	Camp 1/8	Camp 1/9	Camp 2	Camp 2/15 Camp 2/16	Camp 2/18	Camp 2/19	Camp 2/20	Camp 2/23	Camp 2/24	Camp 2/25	Camp 2/26	Camp 2/28	Camp 4	Camp 4/1	Camp 4/12 Camp 4/14	Camp 4/15	Camp 4/4	Camp 4/5	Camp 4/6	Onnortunistic
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill						21			12	1.1		11	1	X		10.	5.3	1		1	1	2.0					1115	1.2.2	1.1	11	
	Acanthiza apicalis	Inland Thornbill	X	X		X	X		1.12	X	х	Х	Х	1	1	XX	(X	Х	111	Х	X	X	X	11.	х			11	122	1.77		
Acrocephalidae	Cincloramphus mathewsi	Rufous Songlark	1				(n) z	11	1971	120	100	1		1	1.5		11	111	11	111				10	1	111		1	100			111	1
	Cincloramphus cruralis	Brown Songlark	X					11	1		00			1			12		177		1		12		1				a line	124		171	
Artamidae	Artamus cinereus	Black-faced Woodswallow	X					11	1		Х	1.1		11	1	1.4			1.1			1.1		11	111	1.1				1123			
	Artamus cyanopterus	Dusky Woodswallow	X			X			X	1.000	х	1.23		(\Box)	1	XX	()	1.1	3.2	124	Х	112	11		112	х		$\leq 1^{\circ}$		12.2			1
	Cracticus torquatus	Grey Butcherbird	23,44	X		X			-	1	11.1	1		1		XX	X	1.22	х		X	1.7		X	112	X	X	X					-
	Cracticus nigrogularis	Pied Butcherbird	X			X		11	1	100	111	х				X	10		1.11	0	1	10	11	N.	1	111		2.2	21.123	1.20			1.00
Artamidae	Cracticus tibicen	Australian Magpie	11/2	T.	11	2			1	100	8 8	1		1		7.1	1.5		127			11	11		11			17	51	12			2
	Strepera versicolor	Grey Currawong	X	X		X				Х	Х	1.1				XX	X	-	х					X	1	Х		X					Ċ,
Campephagidae	Coracina novaehollandiae	Black-faced Cuckoo-Shrike	X	111		X		The T	X	100	$j \in \mathbb{T}$	х	X		X	XX	XX	2.2	X		10	X		10	1.1.1	х				127		11	17
	Lalage sueurii	White-winged Triller	11		-1	1	11	-1.1	1.1		$l \ge 1$		F -	i, i	100		1	1-1	r I	ΗI	if i	Εz	Ξų.	3 (F	1,17	1.3	H-C	-		: ::	1		1
Climacteridae	Climacteris rufa	Rufous Treecreeper	X		2	X	-	11	X	1.11	Х	-	l = 1		2	XX	2	2.2	X			1.00		X	2.20	х		X	X	123		111	1
Corvidae	Corvus coronoides	Australian Raven	X		1						111			100		X	1		1			12	11			1.1				122			
	Corvus bennetti	Little Crow	X	_	11		14	11	13.3		1.1.1	1.1	1	1	_	X	321	X	$\zeta \rightarrow$	1	1	1	10	2, 0	11	1.1.1			1, 11,	12.5	-	1.1.1	1
Eupetidae	Cinclosoma castanotum	Chestnut Quail-thrush	X	1				11	X		200	1	12	1		XX	X		х	(\Box)		10	73	100	1	173		10	1.			111	-
Hirundinidae	Cheramoeca leucosterna	White-backed Swallow	11						11	1.77	1.2.3	1		1	2		1		155		1	1.1		11	11					11.7	=	111	-
Concerning and the second	Petrochelidon nigricans	Tree Martin	X		Х				1		1.50	1.4	$\tilde{r} \rightarrow 0$		-	X		111		1.1		1.1		10	1	х		X	S				15
Maluridae	Malurus pulcherrimus	Blue-breasted Fairy-wren	X		13		THE C	E (1	301		H-1(3-1		Х		X	1	(13-1) (13-1)	$) \rightarrow $	H	P.C	1-8	13	X	10) - I	1.7	1.01	$\pm b^2$	1	6 22	-	111	17
Meliphagidae	Lichenostomus virescens	Singing Honeyeater	X		2.2			111	4.23	1,122	UC;	1.23		120	143	1.1	12. L.	1.2	1	1		1.0	1.1	11, 22	11.0	X		_	1.175	2.2	-	111	-
	Lichenostomus leucotis	White-eared Honeyeater	X	X		X		Х		1	Х	X			X	X	1.1.1	1	Х	11		Х	2	X	X	X	X	X	6	12.2		111	
	Lichenostomus flavicollis	Yellow-throated Honeyeater	11	121	2.1			11	2.2	100	12	1.11			1.1	_	X	х	_	1.1		2.5	11	21		1.1	\square	1	21 12	122			1.1
	Lichenostomus ornatus	Yellow-plumed Honeyeater	X	X		X	X	XX	X	X	Х	X	1.77	Х	1	XX	X		х	11	X	X	X	XX	2100	х		X	X	122	\subseteq		1
	Lichenostomus plumulus	Grey-fronted Honeyeater	11			-			1					2.1	1-1							1.0		11		2.1			110	1.7		1.1.1	-
	Purnella albifrons	White-fronted Honeyeater		X	-11			- 111	-	12-0	1-1	·		Х	2	X	X	-	X	-	X	-	1	X	11		\square		1.1	-	1	11	
	Manorina flavigula	Yellow-throated Miner		Х	11			11	111	1.11	11.1	1.1		11	L.1.	["L]	1		111	1.1			14		111-	1.1		_		111			
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater		X	1.1	-					1.55	1		111	2	-	11		1	11	X			10.0	1	Х	\vdash	_	1	100		111	-
	Anthochaera carunculata	Red Wattlebird	X	Х		X	XX	XX	X		Х	X			2	XX	X		X		X	X	X	XX	X	Х		X			9	111	
	Epthianura tricolor	Crimson Chat						1.1		-	-			111	2	X	11		1.1	11	111	-	X	1.1	1	1.1	\vdash	+	2	12.			
	Epthianura albifrons	White-fronted Chat	X		X	X	_		_		_			1	-				-			_		_	-		\vdash	_	_	-			-
	Lichmera indistincta	Brown Honeyeater	X		Х				1.0										land.		1					-	\vdash	_			100		
-	Melithreptus brevirostris	Brown-headed Honeyeater	Х	1	X	X	-	Х	e	X	Х	1		X	_	X	X	-	х		X	-	_	X	-	Х	\vdash	X	5	123	1		-
Monarchidae	Myiagra inquieta	Restless Flycatcher	X			-			1		111			1.1	1	X			100	1.1	11	2.3	- 1	X	1		\vdash	_	-	-	1		1
	Grallina cyanoleuca	Magpie-Lark	-		2.2	-		-12	4		1.	2.23		111	1.				1.21		11.1	-		1	11		\vdash	_	1.1.1	-		111	-
Motacilidae	Anthus novaeseelandiae	Australasian Pipit	X		X	X	_	-						-	2	_		X				-	_	-	-	Х	\vdash	+					L
Nectariniidae	Dicaeum hirundinaceum	Mistletoebird	-			-					-			-	_	XX	(11				-		-	\vdash	+					F
Neosittidae	Daphoenositta chrysoptera	Varied Sittella	X			_	_	X		-	X				X	-	-		X				2	X		X	\vdash	+	_	-			L
Pachycephalidae	Falcunculus frontatus	Crested Shrike-tit	X	-							X	1.0			-	XX						_		1			\vdash	4	1				L
	Pachycephala inornata	Gilbert's Whistler	X		Х						х				-	X	1					_					\vdash	4	-				1
	Pachycephala pectoralis	Golden Whistler	X	X		-	1.1	X		X	1.00		1.000		X	XD			X	1.1	X			X	1.1			- 1.1		-	1	2	100

		Survey	t,			-							0		-	-		A	/							-		_		_	-	-	
Family	Species	Common Name	Camp 1	Camp 1/1	Camp 1/10	Camp 1/11	Camp 1/12	Camp 1/13	Camp 1/2 Camp 1/3	Camp 1/5 Camp 1/4	Camp 1/5	Camp 1/6	Camp 1/7	Camp 1/8	Camp 1/9	Camp 2	Camp 2/15 Camp 2/16	Camp 2/18	Camp 2/19	Camp 2/20	Camp 2/23	Camp 2/24	Camp 2/25	Camp 2/26	Camp 2/27	Camp 2/28	Camp 4 Camp 4/1	Camp 4/12	Camp 4/14	Camp 4/15	Camp 4/4	Camp 4/5	Camp 4/6
	Pachycephala rufiventris	Rufous Whistler	-	-	-	Ŭ	-	Ŭ .				1		-		x			-	-	-	~		x	T				-	-	-	-	-
	Colluricincla harmonica	Grey Shrike-thrush	X	X		X			X	X	х			х	X	X	x x		X	1.1	1111		_	x	X	X		115	X	11.1	2.2		11
	Oreoica gutturalis	Crested Bellbird	X	X				X	XX	X	х	X		17.1		X	X		X		111		X	X		X		112	X		1.1		
Pardalotidae	Pardalotus punctatus	Spotted Pardalote	х			1.0	2	X	112	0.20	100	1		111	1	10	20	6	1.23	1000	111	20	22		1			115	1.00	1.5	22.		
	Pardalotus striatus	Striated Pardalote	X	Х	X	X		XX	XX	X	Х		X	2.1		X	XX	1	X		Х	X	X	X		X	811	X	X	х	111	1	11
Petroicidae	Microeca fascinans	Jacky Winter	X	12.	Х					1	1		1.1		12	X	K	1.00	Х	2.4		X		X	1.1	X		112	111	121	5.3		
	Petroica goodenovii	Red-capped Robin	Х	Х		X			- 11		11	177		1	X	х	11	1			х	1.1	11			-15	3.1	111			11		11
	Melanodryas cucullata	Hooded Robin	1.1		100		1	11		3 (2)		1				X	X					10	11		3.0	-15	311	12.2	1000		22	1	13
	Eopsaltria griseogularis	Western Yellow Robin	X	Х	Х					1.00	111	1		1	12	Х	11 12	100	Х	1	Х	1	1	20	1	X		115	Х	1 m - 1			
	Drymodes brunneopygia	Southern Scrub-robin	Х							1	Х			1		X			100		100	1.1		14		22	11	11.1	1.21				
Pomatostomidae	Pomatostomus superciliosus	White-browed Babbler	X	X		X			X	1	х	X		E^{+}		X	X			12	X	X		X	11	X	2	111		X	2.2		11
Rhipiduridae	Rhipidura leucophrys	Willie Wagtail	Х	iE.C	X	X	X	X	ζ.	Х	Х	X		£-1(1 -	X	X	(17)		111	122		X	X	e Li Je	X		(EE	Х	1.4	19.	11	
Stumidae	Sturnus vulgaris	Common Starling			-	1		-21	-	1.0	1	1		1	2.2			111			1211	1-1		1	12	11	10	182				1	
Timaliidae	Zosterops lateralis	Silvereye	Х		X						111				1.1	X	X	1 = 1			100	12	11					1.1.1			1.1		11
Cacatuidae	Eolophus roseicapillus	Galah	5	ij					11	1 11					10	11	<u>11</u>					1	1.1	1	11	<u></u> 1'	11	112	111		1		11
Psittacidae	Glossopsitta porphyrocephala	Purple-crowned Lorikeet	Х	Х	1.1			X	X	X	Х				1	X	X	1				10		X	3303	X		111	Х	1			11
	Polytelis anthopeplus	Regent Parrot	X	1					1							1.11		1			1				111	11		115		-			
	Platycercus icterotis	Western Rosella	Х	IJ,	1.1			14		1		11.11			1.0	10.1	20	0.01		1	1				1.4	X	5	115	X				
	Barnardius zonarius	Australian Ringneck	X	X	X) = (-01	X		Х	1.1		÷ξ	1 ± 1	X	X		Х		Х	1		X	EE E	X	21 E	(E)	X	1-4			E
	Psephotus varius	Mulga Parrot	X		11	1.11			X	010	0.0	1.1.1	1.1		10	X	ζ.	121			1.11				23	X		111.	. 31				
Strigidae	Ninox novaeseelandiae	Southern Boobook	X	X	11	1			1.1	1.1	111	X		1		X	1111			150	X	-		X	110	X	1	111	X		12		11
Mammals			1.21						23.24	1 23		1		111	1.1	121	11 12			1	12.5	1	10	12.0	11		11	1.1.2	121		100		11
Camelidae	Camelus dromedarius	Dromedary		i la la	11				12	X	12.		17	2.1	X	T.	X	122			111	12			11			111	14			_	
Canidae	Canis lupus dingo	Dingo		1		1		X	_			-		1	1.	1.1.1		X										115				- 1	
	Vulpes vulpes	Red Fox	18	174	-1	(-+)		X	_	1,280	1-1	-		6.3	[1 - 1]	-1	÷()1-	100			(-+)	-	-				$\leq E$	11-)E	-	Ξ	-	$\{\cdot\}$
Felidae	Felis catus	House Cat	1.1		11	100		X	_	11,111	11.1	11		Х	12.	111	11 11	1,00			11	1.1			0.1	_	4 L	111			11		
Molossidae	Austronomus australis	White-striped Freetail Bat		Х		X	1	X	_		123	X		X	1.4		12,00	1	-	х	111	-							X				11
	Mormopterus planiceps	Southern Freetail-bat	12	1.000	11	1		X			11	Х		X	1.1	11	11,11			Х	111	1	X	1.1	11		11	112	X		1.1	1	11
Vespertilionidae		Gould's Wattled Bat	X	Х	11			X	2	1	124	Х		Х	1.	100				111	111				1	-11	11	100	Χ	1.	2.5		
	Chalinolobus morio	Chocolate Wattled Bat	1.1							2.27	100	Х		100				1	-	1.73	1.1	_			4	_	4	10					
	Nyctophilus geoffroyi	Lesser Long-eared Bat		1	1.1	1				X	Х	Х		1		1.01	11	1.0		X	1.1			1	\perp	_	44				-	- 1	
	Nyctophilus major	Western Long-eared Bat	1	121	-1	-			- 2	0	Х		X	Х	1	10	210			21	1.1	Х		-	+	_	4		-		-		
	Vespadelus regulus	Southern Forest Bat		Х				X	X			Х		X	1.5	111		X	1	1.1	111	_	X	-	+	_	_	-	Х			-1	1
Dasyuridae	Ningaui yvonneae	Mallee Ningaui	a de la	de la		_			1	1.22	1	1.7		1	1.5		X	1	-		1.1	_	Х		Х		4	-			-		1
	Sminthopsis crassicaudata	Fat-tailed Dunnart	1			_								X		_		-	-	Х	-	-		_	X	-	_	-				-	
	Sminthopsis dolichura	Little Long-tailed Dunnart	12.1	Х		2	X		-	-	-				X	_						X		_		-	-	1	1.1		-	-	
Burramyidae	Cercartetus concinnus	Southwestern Pygmy Possum					_	-		X	х	-				_	XX	2	X	Х	X	X	X	XX	X	4	X	+			X	-	
Macropodidae	Macropus fuliginosus	Western Grey Kangaroo		1		_	_	X	_			Х	-	X			-		-	-			_	-	+	+	+	4			_		_
Leporidae	Oryctolagus cuniculus	European Rabbit				-	-	-	X		х		X			_	X		-	X		-	X	X	+	+	+	+			_	_	_
Muridae	Mus musculus	House Mouse	100	X		1.51		X		1.000	12.	1.1		X	X	, 11	1.1	1	X	100	1000	1.2	1.	1.	X	4	2.1				1.1	2	X

-		Survey	7										-		-		A	1				-		-			-				-	
Family	Species	Common Name	Camp 1	Camp 1/1	Camp 1/10 Camp 1/11	Camp 1/12	Camp 1/13	Camp 1/2	Camp 1/3	Camp 1/4	Camp 1/5	Camp 1/6 Camp 1/7	Camp 1/8	Camp 1/9	Camp 2	Camp 2/15	Camp 2/18	Camp 2/19	Camp 2/20	Camp 2/23	Camp 2/24	Camp 2/25	Camp 2/26	Camp 2/2/ Camp 2/28	Camp 4	Camp 4/1	Camp 4/12	Camp 4/14	Camp 4/15 Camp 4/4	Camp 4/5	Camp 4/6	Onnortunistic
	Notomys mitchellii	Mitchell's Hopping Mouse		x			1		1	X			X	X	1.1	X						1	X	1						X		Г
· · · · · · · · · · · · · · · · · · ·	Pseudomys bolami	Bolam's Mouse	1		X	3	1		122						121	23			X	Х	Х	02.1	20	11	11.1			110				F
Amphibians				15	11.0	1	100	124						11.1	1.1	1011			10.1	1.11		10	10	1	1 1 1		1.1				111	Γ
Limnodynastidae	Neobatrachus sp.		X	17	X						2	X	1	1.1	Х					177	10			10					11			Γ
Myobatrachidae	Pseudophryne occidentalis	Western Toadlet	X		X	11.	111		123		2	X	100	111	х	1.1	X	11.1	11.1	1	1.1		X	T	T L I	11	1.1	t ift	21 3			E
Reptiles			1211	121	11,11		(L.	1.1			1.1	11	1	1.2	122	100			1	12.2	1			137	1	100	1.1			1		
Agamidae	Ctenophorus adelaidensis	Southern Heath Dragon	X	X	1.1.10		1.11	12	1.22			e. (**		1.1.1	Х	100	1 -			200	1		1.1				11			1 5		
· · · · · · · · · · · · · · · · · · ·	Ctenophorus cristatus	Bicycle Dragon	X	X	XX	1	X		X	2	X J	K		X	х	XX	5			X	Х		22	111	X		14	71.				
	Ctenophorus salinarum	Salt Pan Dragon	X	11	211	11.	111	Х	271			1	X	1000	Х	X	X		X	122	1		X	X	X		1	111		1		
	Moloch horridus	Thorny Devil	X	1		Х		7.4	144				X	1.1	X	X	1		X	Х		1	X		X		Х					
	Pogona minor	Bearded Dragon	X	X	71.17	1		151			2	X	Х	Х	Х	X		1		107			1	11	Х	16.	1.1		11			
Diplodactylidae	Crenadactylus ocellatus	Clawless Gecko	Х	EK)	- 1) la	111	i = i	1-1		X	:0	11	10	1.17 *	1 - 1		117		1	Đ.	大王	1.55	÷1)3	1.17	1,1,4	HE(12					
	Diplodactylus granariensis		Х	11	11	1.5	1	2.0	÷-1		2	K	j.		3	1.1	100		1.00	12.2	10			11	1111					N	121	
	Lucasium maini		X	X	X		1	1	111	2	X			X	Х	11			X	12.2	12		X	1.17	X	11.1	X					
	Oedura reticulata		X	X	X	1	100	10	10.0					11.					1.1		1		1	11	11.1		1.1	111	1	1		
	Strophurus intermedius		10.00	1				1.1			10			111	Х	242			Х	1	10			110		1.1.1						
Elapidae	Acanthophis antarcticus	Southern Death Adder	100				1	1 I	111		11			1.1	101				100		1.1		11	11			1.1				11	1
	Neelaps bimaculatus	Black-naped Snake	X	14	111			14				3.1		115						1000	10			1	1	1.6.7	1.5					
	Parasuta gouldii		X	X	X	111	(E)	1 ± 1) - 13	X	10	$\exists F$	1	() = C	Х		0.1		111	PE	()- =	146	÷ () 3			1-1-1	1-	080	36 3		111	
	Pseudonaja affinis	Dugite	X	1	1111		1 12 1	111	12.1		2	X	1	1.4	Х	UL L	-			1	1		X	111			1.1	210.0				
Gekkonidae	Christinus marmoratus	Marbled Gecko	X		X	X	1		X						х	X			111	1	-	111		10	11.1	1.1	1.1					
	Gehyra variegata		X		71.0	1.1	1		171		2	K I		124	Х	X		Х	X	Х	1		X	1	11.1		14	, at 1	17	5		
	Heteronotia binoei	Bynoe's Gecko	X	X			100	X	X		2	X		111	X	X	X		X		10	3	X	112			1.1					1
Pygopodidae	Delma australis		X		X			1.1	11.1				1	123	X	X	() = .	1		1			2412	1								
	Delma butleri		(-)	Ξ(2033	+	(\pm)	1-1	1-10	1	- 1		3	811-8	X					任王	X		1	111		1 E.L	1-		-			÷
	Lialis burtonis		X		X		i Jul	11	111		11			111	Х	Х				1 ·····	31	111	11.0	d It.	1			1, 11, 1,		1		
Scincidae	Cryptoblepharus buchananii		X		121		X	11.5	201		1.1		1	1.4	Х	X	X			Х	-	12.1		1144	X			X				
	Cryptoblepharus pulcher clarus		1.1		7.11	1	1	14	111		T.C	11		15	х				101		14	(24)		11	1111	11.1						
	Ctenotus atlas	1	X	11	X	100	Х	12	31			11		Х	X	X	10.5			1			X	1	X		Х	111	1.1			
	Ctenotus schomburgkii		X		1.1				X		X	X		1.1	Х	X			1	Х		3	X	1.13			1.1					
	Ctenotus uber		X		111	1.1	121	3.5	2	X	11	1.5	1	11-1	(1, 2)	132	110			101	10	0.0	141		1.44	i lei			-1			
	Cyclodomorphus branchialis		X	~ 1	-12		Х	$\mathbb{I} = \mathbb{I}$	1		- 1		Х	114	Х	X	1.00			行用	Х	Х	1	10	1)-1	HE.	$\{-$		33+		11	
	Egernia multiscutata	1	X		22.3	1.71	121	121	1.51		11	11		1.1	1.2		1.2	1	1	1 1	A 11	122	111	11	115				-1			
	Egernia richardi		X		ХХ		121		Х	2	X			1.4	Х	122.0				1	in the	12.2	X		X		1.1			1		
	Hemiergis initialis brookeri		-	12	713	1	1.1.1		71		10.0			1.5	х	X	1.1		1126	X	100	121	12	1	101		1					
	Hemiergis initialis initialis		X	\square			100	14	2	X		41.		121	Х	122.1				1				1.11			1.1					
	Lerista dorsalis		X								2	X			Х	X								1.1			1.1					
	Lerista picturata	1	X		1.1		[1-1	${\rm d} = 1$	181		1		1	11.4	X	XX	2	1.		Х	1.1		110	1	1				21 2			
	Lerista sp.		X	X				1.1		1				Х	Х	X	X			Х	Х			12								ſ
	Liopholis inornata		X		X						T		1		Х				1			1	X	X	X	1	1.00					

		Survey		_	-	-	_		-	-	_		-	-	_	_	-	1	4	-		-	_	-	-	-	-	-	-	_		_	_		
Family	Species	Common Name	Camp 1	1/1	Camp 1/10	1/1	Camp 1/12	1/1	Camp 1/2 Camp 1/3	Camp 1/4	Camp 1/5	Camp 1/6	1	Camp 1/8	1	amp	amp	Camp 2/16	amp	amp	amp	amp	duna	dune	Camp 2/27	4 6	1 4	Camp 4/1	Camp 4/12	4	Camp 4/15	Camp 4/4	Camp 4/5	Camp 4/6	Opportunistic
-	Menetia greyii		Х			Х				3.57	ĊĨ.				X							XX		X							11	2.1	1.1		
	Morethia butleri		Х	X	-	Х	111		X	111	13	1.1				X	X	XX	(1	X	()		11	X	210	X	100	115	Х	1121	221			
	Morethia obscura		X	X	0.1	1	124		1.1	1	11]	X	X			11	X	(1	1		X	100	122	Х		121			121
5	Tiliqua occipitalis	Western Bluetongue	Х	1117	17.1	1.23	101			X	(3)	12.23	1.3	100		X		1.1	11		1 11	X		6	17	11	1 22	1 1 1 1	12.5	2241		2.2.1			
-	Tiliqua rugosa		X	х	11	1.1	1371	0.01	11		х			11		X		3113	11	11	11	11			1	X		1111			1.71	100		01	Ξ.
Typhlopidae	Ramphotyphlops australis		201	121	121	1.0	1.0	6.3	11	1 22			1.1	1.1		X		11	1B	2.2	11			e u	11	13.	1	(inter	1.0	11	121	2.21			111
Varanidae	Varanus gouldii	Bungarra or Sand Monitor	Х		11	1			11	X	х		1	122	1	X	2	X								1						22			
	Varanus rosenbergi	Heath Monitor	Х		Х		111		16.0	100			1	111	1.1	22		20	11	1	11		21	11.0	1	100		1111	111		1	7.1		1	

A McKenzie, N.L., Rolfe, J.K., Hall, N.J. and Youngson, W.K. (1993) Vertebrate Fauna. In Hall, N.J. and McKenzie N.L. The Biological Survey of the Eastern Goldfields of Western Australia Part 9. Norseman - Balladonia. *Records of the Western Australian Museum*, Supplement No 42, 33-55.

X Presence Only

Appendix B(2). Vertebrate fauna recorded in biological surveys in the	the region
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	1	orded in biological surveys in Survey			-						A	2								-	_			B		
		Juny				Ι	1									T				00	sturbance	harge	prence	3		and the second se
Family	Species	Common Name	ake Finn Rd	Opportunitic	Site 1	Site 3	Site 4	Site 5	site 7	Site 8	Site 9	Site 10	Site 12	Site 13	Site 14	Site 15 Site 16	Site 17	Site 18	Site 19	Site 20 A rate Discharge	argo usedarge 3eta Hunt Disturbance	Junction Discharge	Unition Reference	Veptune Reference	Opportunistic	the second s
Birds				×	~ ~			-						-												Î
Accipitridae	Accipiter fasciatus	Brown Goshawk	177				1	1.5			1		17.1							1		1		100	1.1	ĺ
	Aquila audax	Wedge-tailed Eagle	(1, 2)				(1 - 1)	2 ())) - () i i)—i	1111	1	00 ±1		24 (12	- 11-		12 - 21			X	i
Aegothelidae	Aegotheles cristatus	Australian Owlet-nightjar			1				1 1.1			12	- 2.1	1			-		1	5		1.1		11		ļ
Columbidae	Phaps chalcoptera	Common Bronzewing						-1	1.53			121				11		1	111			111	10	100	X	
Columbidae	Ocyphaps lophotes	Crested Pigeon					1						1.1.1	-			9			- 12	3		2	X	1-1	
Meropidae	Merops ornatus	Rainbow Bee-eater			1	1	1	121	11.1					1 - 1	1.12	1		1.1.1		X	X			X	1	
Cuculidae	Chalcites basalis	Horsfield's Bronze-Cuckoo				-								-						117			1	1	-	
Falconidae	Falco berigora	Brown Falcon				1.1	1.5	2.1	124		1.1	124			1.11	11			141	2		1	11	110		Į
Acanthizidae	Calamanthus cautus	Shy Heathwren	(-1)	10	=03	8	9 E (-13	31011	(=)	1.51) #1 (FP)) i () i	-611-	ED #1		H (D	10		15 11	1		X	Ī
	Pyrrholaemus brunneus	Redthroat	(115		111	1		1.1	101 13	101	1		11	1111	1.1.1	1.00	X			X	1 144	X	ľ
	Smicrornis brevirostris	Weebill				11	1.111	111	111.1	1	1.1	111	111	1.11	1.11	11	121	111		14	1		14 4	3	1.2	Ī
	Acanthiza apicalis	Inland Thornbill				1			11 1 1			111		1	111			111	127	1			10	112.	x	İ
	Acanthiza uropygialis	Chestnut-rumped Thornbill				0.04			1.011								172		10	X			2	1	X	Ì
Artamidae	Artamus personatus	Masked Woodswallow							1 10			TIT C						100	111	1		1.00	1.1	1 10	-	ľ
	Artamus cvanopterus	Dusky Woodswallow			-	0		-11	+0-+				1.1		1-1-1-	-0.0	100		(-) -	-			2	10.1	X	İ
	Cracticus torquatus	Grey Butcherbird										1.1	1.11	1			1.07	1.1						4	1.1	Ì
	Cracticus tibicen	Australian Magpie			10	1 1.3		111	1		1.1	131	101					122	60.0	610	1	1	1.1	12.	1.1	ľ
C	Strepera versicolor	Grey Currawong							111.1			111			1.1				111		10.1		X	1.1		ľ
Campephagidae	Coracina novaehollandiae	Black-faced Cuckoo-Shrike				1		111	1111			111		1	111		1	1	1111	2	7	_	7	1	1	t
Climacteridae	Climacteris rufa	Rufous Treecreeper				1	100		1			1	111		111	11	-	1.1	111						x	ľ
Corvidae	Corvus coronoides	Australian Raven			-	-											122		123	2	X		X	X		ľ
Hirundinidae	Cheramoeca leucosterna	White-backed Swallow				2.0		- 1 1	10-1)-)-C				11	(in)	0	0.01	4	X		1 3	102	-1	ľ
	Petrochelidon nigricans	Tree Martin						- 1	110			1.67 1.5					1.11	h = d	19.1				4	1.21	1.1	ľ
Maluridae	Malurus leucopterus	White-winged Fairy-wren											1.1						1.00	40)		4	1.0		ľ
Meliphagidae	Lichenostomus virescens	Singing Honeyeater						11	11.1			111			1.1		111	1.1	111		2 10		1 1	3 141		t
	Lichenostomus ornatus	Yellow-plumed Honeyeater				1													1.0				X	1.1	X	
	Purnella albifrons	White-fronted Honeyeater							1				10.1				1 230	1.1.1	111	3	3		51 2	1		t
200	Manorina flavigula	Yellow-throated Miner						11	1111			1.1			1.1.1		1111		111	7	2	_	4 18	8 7		t
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater			- 1			- 3 3				1.2	1.00						0.00	9	X		20			t
	Anthochaera carunculata	Red Wattlebird								1							1.01			2	_		7	x		t
	Lichmera indistincta	Brown Honeyeater															1 11 1			Ē			1			t
	Melithreptus brevirostris	Brown-headed Honeyeater															1 221						X		x	t
Nectariniidae	Dicaeum hirundinaceum	Mistletoebird				1		-																		t
Neosittidae	Daphoenositta chrysoptera	Varied Sittella														-							>		1	t

		Surv	ey	-	-		-		-	-	-	-	A			-		-			-							B	-	-	-
Family	Species	Common Name	.ake Finn Rd	Opportunitic	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site II	olte 12 Site 13	5110 1.5 514-1.1	Nite 14 Site 15	site 16	Site 17	Site 18	Site 19	Site 20	Argo Discharge	Beta Hunt Disturbance	Iunction Discharge	Junction Reference	Veptune Disturbance	Veptune Reference	Upportunistic Thunderer Disturbance	Thunderer Reference
Pachycephalidae	Colluricincla harmonica	Grey Shrike-thrush	-			-		-				-						-		-				-	1	1	1	-	X		
	Oreoica gutturalis	Crested Bellbird		1								- 1										1			X	-	X	1 1			X
Pardalotidae	Pardalotus striatus	Striated Pardalote																				1		1			1	2 2			4
Petroicidae	Petroica goodenovii	Red-capped Robin	100			1													11	100					1	1	11		X	1	1
Rhipiduridae	Rhipidura leucophrys	Willie Wagtail	10-1					- (-			÷-f		-					11-	1 -		12.0			1	14	141	XX	K		1
Timaliidae	Zosterops lateralis	Silvereve	1	1																			1			1.1			X		Ē
Psittacidae	Glossopsitta porphyrocephala	Purple-crowned Lorikeet	1.11			111												110	1					1		1.1			X		1
	Polytelis anthopeplus	Regent Parrot				1	1					1				1			1		1			X		1.1					1
	Barnardius zonarius	Australian Ringneck	1			1													1						1		2	1	9		5
	Psephotus varius	Mulga Parrot										-										1.1.1									X
	Neophema splendida	Scarlet-chested Parrot	187			13		G				- (D C					11		0			1		1.1	3			1 - 3	T
Mammals			110	100		1.5	1.1		- 1	E.									111	11		18.1			21	1 -	1.57				
Canidae	Canis lupus familiaris	Dog	111						1.1	i		1				11.			11.			1.00			1	1.1				1	1
Felidae	Felis catus	House Cat	1 (1)		1			161	1.1	1	1.1	1						11.	1.	177			TT.	1	$\subset 1$	1.1		2		1	
Dasyuridae	Ningaui sp.		1		3	2		1.00				11	2 2	2					1	1.00		1				1	-				
	Ningaui yvonneae	Mallee Ningaui	110					1	1	1		1							100		1.		172	2		1	2	1		1	1
	Sminthopsis crassicaudata	Fat-tailed Dunnart				1.11		1.1						11		3			1	1.1		1.2.1					10		11	1	-
	Sminthopsis dolichura	Little Long-tailed Dunnart	183		10	(30)		C,	1	1.1		1	10)	0				1 E	2			Œ,) = (18)	0			
2	Sminthopsis gilberti	Gilbert's Dunnart	11		2	1.0					1				1					1			1						2.1		
Burramyidae	Cercartetus concinnus	Southwestern Pygmy Possum	21				4	1	1	1.1	1	1	3	1					1	3		1				3	1				
Macropodidae	Macropus fuliginosus	Western Grey Kangaroo	1.1						1.1	1.11		1.1						1							1	17.			1		
Leporidae	Oryctolagus cuniculus	European Rabbit	112						1.1			1.1							1						1	12				1	
Muridae	Mus musculus	House Mouse	1							2			1				1		1			1.1		2	1	1	3	4		10	7
	Notomys alexis	Spinifex Hopping Mouse	3120					18.1				11						1	11	11			16		- 1	1.6				1	
	Notomys mitchellii	Mitchell's Hopping Mouse	18.0		•	1		Œ,	31	1.1		£28	2	2		1		1	11	1		θE.			= (1			1	
-	Pseudomys bolami	Bolam's Mouse	100																	1				2	1	1	2			1	
· · · · · · · · · · · ·	Pseudomys hermannsburgensis	Sandy Inland Mouse	11			1.1		1		3		1					1	1.11	1						1					1	
Amphibians			1.1			17.				1.11		111					11	11	10	1.7		1					24				
Limnodynastidae	Neobatrachus kunapalari	Kunapalari Frog	1.0																					1	1	1	1	1			
	Neobatrachus sutor	Shoemaker Frog	100			1	1				1	T (1							0	0					
Myobatrachidae	Pseudophryne occidentalis	Western Toadlet					13.1	5	2			1						1	111						- [2				
Reptiles			3.6			10	15	110	\cdot I	1.1		124	1:12	Ð		10-	1	÷	(i I-	1.00		Gel.			1	14	123			11-11	
Agamidae	Ctenophorus cristatus	Bicycle Dragon	8	1		1.01	2	1	1	1		4	2	7			1		12	1	2	7			~ 1	1	1		1.1		
P	Ctenophorus fordi	Mallee Sand Dragon	1			1.1			1.4	1			1 3	5			1	1	1	12		1		1	1	2	11			1	
	Ctenophorus salinarum	Salt Pan Dragon	1							11	1.1	1					11	117	1					4	1	1		111		9	
	Ctenophorus scutulatus	1																1.	3	13		1				1.1	131		2	511	

		Survey			3	-			-	-	-	-	A		-		-				-		-				B		_	
Family	Species	Common Name	.ake Finn Rd	Opportunitic	Site 1	Site 2	Site 3	site 4	Site 5 Star 6	511C U	Site /	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 16	Site 17	Site 18	Site 19	Site 20	Argo Discharge	Seta Hunt Disturbance	unction Discharge	unction Reference	Veptune Disturbance	Opportunistic	Fhunderer Disturbance	Thunderer Reference
	Moloch horridus	Thorny Devil	-	-					3/10		14	1					-		19	2			~		-	316	-	1		-
	Pogona minor	Bearded Dragon	1		2			1			1		1			1 3		2			-	1		1	1		1	1.1		1
	Tympanocryptis cephalus	Pebble Dragon	1			1.01			1.1		1.0	1 1.10	1.11	1.000	-	-	-1	1		1 1 1	1.0	1.0.1	1			1717	1			-
Carphodactylidae	Nephrurus laevissimus			1		1			10	101		1.00	1	1	1			11		1.000		111	1	5	5 3	\$ 2			2	
	Nephrurus vertebralis	1	1.01	1	-	14.0		- 1	- 1 -		1	6.1 -	0.83		1-1	1-1	111	1.1	0.			-	1-1-1	- ()		1.1	1 1-1	- 1		
second a secol	Underwoodisaurus milii	Barking Gecko	1			1.1			3			12.4	1	-	1		1	10.			2	4		- 11			3 2.7		4	
Diplodactylidae	Diplodactylus granariensis			101		1		2	2		1 11	1 1 1	122				.10	1			1	1				110	100			
	Diplodactvlus pulcher		111	1.1	1		1					1.1		1	1			10												
	Lucasium damaeum		1				- 1				1	1		-						100					-	100	107	1.1	-	
	Lucasium maini				-	1							111	-		2														
	Strophurus assimilis	Goldfields Spiny-tailed Gecko	1								1	111	100		11			1		100	0.00		3	- 1	1	1	112		1	
	Strophurus elderi	Condicios opiny unica occas					-				12		1.01							1			1		Ť	-			Î.	1
Elapidae	Brachyurophis semifasciata																			1			-							1
Lingione	Parasuta monachus		1.1	111	-									1				1			1									-
	Pseudechis australis	Mulga Snake									-			-				-	1		-	1					-			
	Pseudonaja mengdeni	Gwardar	1			-						1		-		-			1	1						1				
Gekkonidae	Gehyra purpurascens	Gwaddar	-								-			-						1			-			-				1
Cellitonidae	Gehyra variegata		1.1		2	11	11		112		1	111	1.0	1		2	1.1	1	1	1		1.		2		1	2			1
	Heteronotia binoei	Bynoe's Gecko	1		-	2	,		2	1			1	2		Ē		-	1	-	1			1 1		2	_			-
Pygopodidae	Delma australis	Bynoe's beens				-	-		-	-		1	-	-					-	-	-			2		-				
Jeponnet	Lialis burtonis		1	111		1								1										T	-					1
	Pygopus lepidopodus	Common Scaly Foot	1			-	-				-	1	-	-			-		1	1				-	-	-	-			-
	Cryptoblepharus sp.	Common Senty Poor				-			1	-		1		-					1	1				-			-			-
ochicidate	Ctenotus atlas	V III	1.1			4			-		1	4	13		12.2		11	1		4			5	6	1	1 1	1			10
	Ctenotus leonhardii							-					1.5	-				-		1	-	1.1	-	4		-	1			-
	Ctenotus schomburgkii		11				2		-		1	-					1			2	1	1.00	4	<u> </u>	-	-	-			-
	Ctenotus uber				1	1	-	1	4	1	Ť	1		1			+		1	-	6			+	+	+	+			+
	Egernia depressa	Southern Pygmy Spiny-tailed Skink	1			-		1	1	1	1	-		-	-				1		1	-			+	-		-		
	Egernia formosa	section i jenij opnij milot okim							1	+	1									1	1	1		+	+	-	1			+
	Hemiergis initialis	×						+	1	1	-			-	1		-		-	1	1	-		+	+	+	+			-
	Lerista distinguenda									Ť		1			-					1				1	+	+	1			1 3
	Liopholis inornata		1									11-		_		1	1	1	+				2	1	1					-
	Menetia greyii	1				2	1									ť				2		1	-	1 [†]	ť		2		3	2
-	Morethia adelaidensis					-	1				1			-		4				4		1			+		4			-
	Morethia butleri				-	1				+	1			1	-	1 3	1		1	1	1	1		+	+	+	+		-	+
	Morethia obscura				-	-	-	-	-	-	-	-	1	-	-		- 1	-	-	-	-	-		-+-	-	+	+-		-	+

-		Survey			-		-			10-1	-		A	-			~ ~		-		-			-		_		B	K		-	-
Family	Species	Common Name	Lake Finn Rd	Opportunitic	Site 1	Site 2	Site 3	Site 4	Site 5	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 20	Argo Discharge	Beta Hunt Disturbance	Junction Discharge	Junction Reference	Neptune Disturbance	Veptune Reference	Opportunistic	Thunderer Disturbance Thunderer Reference	Dunes Refer
	Tiliqua rugosa	1.10		1			-	-	1				1	1			2		~		1		1	-				-	-	-		
Typhlopidae	Ramphotyphlops australis	1. Ann 1.								1.1	-	1.1		-								1	1		-	1		1.3			-112	1
	Ramphotyphlops bicolor									1					_				-									1	100			2
Varanidae	Varanus gouldii	Bungarra or Sand Monitor				2			1	1	1		Tel.	200		11		1	14	163	1.1	65	15	1	2	11		N. A	11		-11	1
	Varanus tristis	Racehorse Monitor	13	111		1		-1				-	131		1	19	141	1÷.1	-	1) - (1-1	1-1		1-1	-10	-1.14	283

A B ATA Environmental (2006c) Vertebrate Fauna Assessment St Ives Gold Mine. Unpublished report for Jim's Seeds, Weeds and Trees, Ltd, Kalgoorlie. Bamford Consulting Ecologists (2010) Gold Fields St Ives Gold Mine, Kambalda. Fauna Assessment: impacts of water discharge and general mining activity on vertebrate fauna. Unpublished report to Gold Fields St Ives Gold Mine, Perth.

х Presence only

		Survey	v	A		B				_	С					1									D									
Family	Species	Common Name	LF	LS LS	OM/T	St Ives	tunistic	Site Ia	Site 1b	Site Ic	Site 1d	Site 2a	Site 2b	Site 2c	Site 2d	Site 1	Site 2	Site 20	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	5116 1 /	Site 18
Birds		A REAL PROPERTY OF									1	0.0			-	-			1	-			-	-			-						T	
Accipitridae	Haliastur sphenurus	Whistling Kite	124	1.51	Х	Х		115	1.00	1		71				10.1	E-S		77				$[\cdot, \cdot]$		X			12	711		1112	-17		2.57
	Accipiter fasciatus	Brown Goshawk	1.1		1.	Х	1	1	1.0	1			1.3		É.	1.1	1	11	1	1.1		É.I.		Х	2	Х	101	100	<u>(1</u>)		12.1			X
	Accipiter cirrocephalus	Collared Sparrowhawk	1	1.1.		Х		12	2.13	1		~ 2				1	1						1	112	111	1.1	1.1	100	1.15		241	20		21.7
	Aquila audax	Wedge-tailed Eagle	1 []	110		Х	C 1	1	1.01	1.1		2	1.17	121	112	122	111		12	111	101		1.1		[]		31.7	101	110		111	21.27		11
	Hieraaetus morphnoides	Little Eagle	1			Х	-	1.	1.00			11			1	111	1					1	1							1	144	11		1.17
Anatidae	Tadorna tadornoides	Australian Shelduck	1.1			Х			100	1			1	\square	11		1.1		12		123		1	100	1	1.1	100	0	20			10		110
	Anas superciliosa	Pacific Black Duck		1.1.1			1			1	1			-	11				- 1												111			
Aegothelidae	Aegotheles cristatus	Australian Owlet-nightjar	1281	1=1	3	х	1	1				31) II+		£01)	10			1	1.31			18				<u></u>	124	e (†		(EI)	11		133
Podargidae	Podargus strigoides	Tawny Frogmouth		111	0	Х	=	1.0	1.57		1	21	100	PT1		2-1		11	1	100	111		E		120		jec.	m	201		191.1	-11	T	1111
Casuariidae	Dromaius novaehollandiae	Emu	X	Х	1	Х	1	1	5.5				100	1.52	dent.	240					126			5.3			1.00	101	100		1.5			
Charadriidae	Charadrius ruficapillus	Red-capped Plover	1	104	11.	Х	<u>()</u>	14		1.1.1	111		三	101	127	1.1	1.1						12		1.1		11.1	121	EE1 17		121	11.14		117
Recurvirostridae	Recurvirostra novaehollandiae	Red-necked Avocet	100			Х		13	1	171			Ξ		E.	$i \rightarrow i$	1			11		E.			111		1.1		EU		1.1	11.1		10
Recurvirostridae	Cladorhynchus leucocephalus	Banded Stilt	1	00		х		1.5				1	121	1.1	17		100		1.5				1			11	11.1		0.117		73	10		1111
Columbidae	Phaps chalcoptera	Common Bronzewing	100	11.1	10	Х		12.1	1	1	2	11	1.01		2	х		X	54	1-11		12.1	1.0	1.11		Х	1.11	111	3	X	X	11		1.11
· · · · · · · · · · · · · · · · · · ·	Ocyphaps lophotes	Crested Pigeon	1251	120	3.2	Х	1	11-	100	(* st)		-1)-=+		14 ($1 \rightarrow$		X	-1) = 1		-	1.0	1		1.1			E () /		(2) E	310		107
Alcedinidae	Todiramphus pyrrhopygius	Red-backed Kingfisher	11-1	101	0	Х		12 12	1	1 - 1	10.1	22	in the			2-1	1-1	1.1	11				X		7	X	111		200		1.51 1	11.11	T	1 11
	Todiramphus sanctus	Sacred Kingfisher	1			х	1	1.5			1.1.1	1.1	1.1	1	1.1	11	1.3			1.11			1		1.1.1	1.1	1.1	1.1	11. U		1.1.1	12 13		-
S	Merops ornatus	Rainbow Bee-eater	1000	1.11		Х	1	1.5	121			14	2			\mathbb{D}	Х		11				1.1		X	X		X	221		2	X	X	X
Cuculidae	Chalcites basalis	Horsfield's Bronze-Cuckoo	: 20	11.		Х		11.5			1L	11	111		1	1.1	1.1		11	1	1.1		1.1		111		111	1.1	110		111	10		10
	Chalcites osculans	Black-eared Cuckoo	1	0.7	2.2	Х		1.			100	7.5	1.11			1.1	-		12	121			14											110
	Cacomantis pallidus	Pallid Cuckoo	X	11		Х	-		0.5		99	23	1-1	111	Ð (1 -1		H (± 1	1-1	111	66	1				1-31	110	EU		180	-		
Falconidae	Falco cenchroides	Nankeen Kestrel	12.1	1.01	2.1	Х			120		Ш.,	\mathbb{Z}^{2}	121			1.1	100		1		12		10	20	1.11		11.1		217		393		T	1 17
· · · · · · · · · · · · · · · · · · ·	Falco berigora	Brown Falcon				х						11	1.1		1 1	1	11.1		1.1	1110	Х												T	
	Falco peregrinus	Peregrine Falcon	100	1.1	Х	Х	<u> </u>	1.1		1.00			1	10			111		1.1				1.1	2.2	0.01			0			111	21.12		1.1
Acanthizidae	Calamanthus cautus	Shy Heathwren	1	1	1	Х	C .:	125						1000	1	1.1	1		71	111	111		17.					100			111			
	Calamanthus campestris	Rufous Fieldwren	100	1.1.1				1.00	1.00	1	11.		-			÷				Х	11		1.1	11	1			111	1111			517		117
	Pyrrholaemus brunneus	Redthroat	11.5	145		X		1.4	1.00	1.55	lu í			1.4	Feb.	1.1				X	X	1	X	100	1		X	111	2	X	X	<	X	X
	Smicrornis brevirostris	Weebill	X	Х	100	Х	1	13	15	16	6	9	32	8	8	11-1	X	X	Х	X	Χ	FF (X	X	X	X	X	Х	3	X	XX	X	X	X
	Gerygone fusca	Western Gerygone	112	12.	20	Х		11.5		1	E.	11	5.25			1	11		2.2	5.0	1.1		11		200	111	10	2-1	0.1		111	112	T	11.1
	Acanthiza robustirostris	Slaty-backed Thornbill	1	121		11.1		1 1	1.77		11.1		12		12	100	-	1.1	22				12				111	2.8.2			121	212		2111
1	Acanthiza chrysorrhoa	Yellow-rumped Thornbill	1.77	12	12	Х		12.2	22		100 million (1997) 100 million (1997)	11	Anna an Anna Anna Anna Anna Anna Anna A	123	25	2.1		X	22		10			111	111			х	2.17		221	12.23	1.	X
	Acanthiza apicalis	Inland Thornbill	X	X		Х		1.1		1			1.2	4	11	Х	1		2	Х	Х		11	1			Х		3	X	X	(X
	Aphelocephala leucopsis	Southern Whiteface	1.01											1									-							1.5	111			
	Acanthiza uropygialis	Chestnut-rumped Thornbill	Х	Х		Х	1	9	3	2			3	14		111		X	1.3				Π.				X		3	X	Х	2		X
Artamidae	Artamus personatus	Masked Woodswallow	Х	Х	13-1.			1.1	(1+i)		Η.		(-1)		t-t	1 -1			81	1-1	111	1-1	13	用		ΡŦ)# 4	111			1 11		- (13	
	Artamus cinereus	Black-faced Woodswallow		Х	3	Х	-						177		3	Х	11					X	X	Х									T	1
	Artamus cyanopterus	Dusky Woodswallow				х		-		1	1.			177		1.7					10		X	X	X		·	Х					T	

Appendix B(3). Vertebrate fauna recorded in biological surveys in the region

		Survey	1	A	B				-	C	-	-	-	-		-				-			Γ)								
Family	Species	Common Name	LF	LS	St Ives	Opportunistic	Site Ia	Site 1b	Site Ic	Site 1d	Site 2a	Site 2b	Site 2c	Site 2d	Site 1	Site 2	Site 20 Site 2	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13 Site 14	Site 15	Site 16	Site 17	Site 18	Site 19
	Cracticus torquatus	Grey Butcherbird	X	X		1000	1		1.1				1	1			X			х			Х		X	XX	X	X		X		
	Cracticus nigrogularis	Pied Butcherbird			X	1	110	121		4			r nin	-	1.1	110	1	1.1		1.771	17		1.7	117			1		104	X		1
	Cracticus tibicen	Australian Magpie	1-1	115	X	1	1.1	1	2	2	1.1	$\frac{1}{2} = \frac{1}{2}$			1-1	X		111-1		1.1	2.5	1.51		1.1			-12-	11	i leni	X	X	1
-	Strepera versicolor	Grey Currawong	1411	10	X	1	3	1		61	1	1 1	1	- (1	1-3-3	X	X	S. 13	1	х	Х	131	X	X	10		2) I		X		$-\mathbb{Z}$	33
Campephagidae	Coracina maxima	Ground Cuckoo-Shrike		X	Х	1	11	1		111	1	1-1			111		11	11	1 11	100		1.01		210		121	212	1.5	12.1			10
the second second	Coracina novaehollandiae	Black-faced Cuckoo-Shrike	X	X	X	1	1.1	121	1	1	1	2	1		1	X	X	21	1.1.1	Х	X	X	10	Х	Х	had 1	_11	X	1.1.1	X	X	Х
	Lalage sueurii	White-winged Triller		11		100	14		121	17.					11	10	G 11	11-			1		1.1	10	11	1	111	-		11	X	1-00
Climacteridae	Climacteris affinis	White-browed Treecreeper	111		1.1		1	1.71	111	12.1	21	. =1			1-11	1.1		1		100	1	-	171		inti	HI.		- 17	111		1.1	
	Climacteris rufa	Rufous Treecreeper	X	X	X	1	1.5				1.1	1.11]	1				11	X	177	Х	X	X		1.12	X				5	X	177
Corvidae	Corvus coronoides	Australian Raven	Х	110	X	1	1.0	1	2	i in i	1	3 1	2		1-1	X	2		Х		17			1.1	Х		-12	X	Х	X	X	-
	Corvus bennetti	Little Crow	Х	10	X	1-1	1 -	2-3		(E.)	11)-#E			100			11	1.0	100	15			C I				1	1:17		- 1	13
	Corvus orru	Torresian Crow		- 1	X	1	1.1	1.11		111								1.		1000		1-10-1 -		s (b)	F		10-1 (+)	-	1.00	1.00		1-4-1
Eupetidae	Cinclosoma castanotum	Chestnut Quail-thrush			X		1.1	12.1	111		1.1				1.1.1			X	1.5	Х	X	11.1			_	121		X	X	1		17
Hirundinidae	Cheramoeca leucosterna	White-backed Swallow	Х		X		1.1											1.20		1		171	Н	X	1		111	11	10.1			
	Hirundo neoxena	Welcome Swallow	01	1.1			11.1			1.1.1	11	1							1.1		1.1	111		11		111		371	100	1.1.1	X	
	Petrochelidon nigricans	Tree Martin		1	X		1.1			125	2											111		1.1	10			500	1000			
Maluridae	Malurus leucopterus	White-winged Fairy-wren		115	X	_	-	123		Æ (21	=			1 -1]		1.1	14	111	100	11	开		i-i) – i	2	X	11		$l \neq 0$	- 1	
	Malurus pulcherrimus	Blue-breasted Fairy-wren	1.2.3	1	Х						2.2				1.1.3	10		X		1	1.1				201		21.2	212	1 100	1.22	22	
Meliphagidae	Lichenostomus virescens	Singing Honeyeater	X	X	X	1		1.11		111	11				2	X		11		X	11	1.71		22		1	X		X	11.1		1
	Lichenostomus leucotis	White-eared Honeyeater	27.2	X	X		1.1	120			11	1						111		Х	1.1	100.00		Х	111		X	5.2	X	11	[]	
	Lichenostomus flavicollis	Yellow-throated Honeyeater	100	211		$1 \subseteq 1$	1.1	12.1	[11]	110	1.3	1					X	X		1	X	121	511		11	1111		33	1 2.1	1.5.1	11	1
	Lichenostomus ornatus	Yellow-plumed Honeyeater	21		X		1	141	1	4	12		11 2	25	_	XX		X	Х	Х	Х	X	X	X	X	X	X		X	Х	X	Х
	Purnella albifrons	White-fronted Honeyeater	X	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	_		1	3	2		100	1.1			2	X		111		X	X	111		111	11		X	8	X		-	X
	Manorina flavigula	Yellow-throated Miner	X		Х	_	1.5	$\{\cdot\}$	2	9	2] _ [1 -1]	X		11)-1			12	111		\vdash L	_	X	20	X	_	X		Х
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater	X	X		1	11		111	4					1.1	Х		1111	X	1	1.0		_	X	X	X	X	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				Х
	Anthochaera carunculata	Red Wattlebird	Х	X	-	1	15	4	2	8	1		1 1	1	2	XX	X	X	X	Х	X	Х	Х	Х	X	X		X	X	X	X	Х
	Epthianura tricolor	Crimson Chat		X			1.1	12.1	21	12.	11								1.1		1.1	100	14		1.1	111	112	1	116	1		1
	Epthianura albifrons	White-fronted Chat		22	Х		1.5	122	1000 - 100 1000 - 100	1	0.1				11		1.1	2100		1		1.1		11.5		_		12				
	Lichmera indistincta	Brown Honeyeater			X		-	1.1.1	12.1			-	-	2	XX	X					Х	Х		X	X	X	X	X	X	X	X	Х
	Melithreptus brevirostris	Brown-headed Honeyeater		X				3		11	11	1			1.1		-			Х	1			10	17	_		1				
Monarchidae	Grallina cyanoleuca	Magpie-Lark		11	Х						11	1		-	1-1		1	1.1				1 - 1		1-1		_	_	-	-		Х	
Motacilidae	Anthus novaeseelandiae	Australasian Pipit	2.5		X			121		1.1	22			_	1.1	1	-	1		1	1			1	11	_	_	+	-		$ \rightarrow $	
Nectariniidae	Dicaeum hirundinaceum	Mistletoebird		11 1	X		1.1	1.71	1.1.1	111	11	1			1.1			1.17	-		12	1.71	1	11	1	_		-	1	Х		
Neosittidae	Daphoenositta chrysoptera	Varied Sittella			X				-					-					-	-		-	_			_	-	X	100	\square		
Pachycephalidae		Rufous Whistler			X	_	-	123	-					-		_		-	-						_	_	_	+	-			-
	Colluricincla harmonica	Grey Shrike-thrush	X	X	_	_	-			1	2	1	2 3	3	2	XX	_	X	Х		X		X	_	_	X		X			X	-
	Oreoica gutturalis	Crested Bellbird	X	X	_	_	-					-		_	_	X		-	-	-			X		Х	_	X		X			
Pardalotidae	Pardalotus striatus	Striated Pardalote	X	XX	_	1	4	1	8	4	2	7	1 1	1		X	X	X	X	X	X		_	X	X	X	X		X		_	X
Petroicidae	Microeca fascinans	Jacky Winter	1	X	X	1		Sec.		1. Sec.	1.1.1	1	- L .	_	1.1	1.1	1	- 1 -	1.4		1	2.11	х	X	11.2	1111	X	3112	4.5	in the	X	

		Survey	Ċ.	A		B					C		-	-			-		-	50	-	-	_	D	-	-		-					
Family	Species	Common Name	LF	LS	OM/T	St Ives	Opportunistic	Site Ia	Site 1b	Site Ic	Site 1d	Site 2a	Site 2b Sha 7a	She ze She 7d	Site 1	Site 2	Site 20	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13 Site 14	Site 15	Site 16	Site 17	Site 18	Site 19
	Petroica goodenovii	Red-capped Robin	Х	17.		X	1	1	321		7, 0		11	1	1	3 20	X	2.1		111	11	121	11	11			11 1	X	1.33	Х	110		Х
	Eopsaltria griseogularis	Western Yellow Robin		100		X	-			1			7.0			7.01	17.5		-	(\neg)	1	1				10	~ 1	101		22			
Pomatostomidae	Pomatostomus superciliosus	White-browed Babbler			4	X	-		1	1	1	- 11	1	1			1141		1		1	120		< 1				1	х	Х			
Rhipiduridae	Rhipidura leucophrys	Willie Wagtail	Х	01	X	X		1-00	121			HI:			313	3 (85	1100	[-1]	131		(E)	IS)		X	13	£.7- 7	14	1911	1020	125	10	X	
Sturnidae	Sturnus vulgaris	Common Starling		12.1		E.		$1 \le 1$			1	221	1.1		1.11	1.20	1111	21		111		2 ± 12			11	1	14	1.11	11:1		18.5		
Timaliidae	Zosterops lateralis	Silvereye		1.4.7	1	X		1				- 21			12.	21					12.1	1	11		12		4.1	18.	1.18.1	1	1.1	X	
Psittacidae	Glossopsitta porphyrocephala	Purple-crowned Lorikeet	[]		X	X		1-1	1		÷	-11			1	X	1	Х	Х	X	X	XZ	X	XJ	()	()	C Y	XX	X	X	х	X	X
	Polytelis anthopeplus	Regent Parrot				X	1	-		1			-		1		1	1.1		714			-							101			
	Barnardius zonarius	Australian Ringneck		X	X	X	1 1	2	3	3 3	3 4	1 5	4	4		X	X	Х	Х	X		X	X	XD		()	ζ		Х				
Mammals					-											11	12.1											114					
Canidae	Vulpes vulpes	Red Fox		1-1	Х		- 8		EI:						11	10	112	31	104		-C 1	131		11	Τ.	. + +				1	HE.		
Felidae	Felis catus	House Cat		1.11		1 1		1	1							1			1		1000								1		1.1		
Dasyuridae	Ningaui ridei	Wongai Ningaui			1.1			111								4	1.1.1	2.1	1	1.11	1	141		1		-11	41		8,22.7	100	1.5		
	Ningaui sp.		5		1	1			121					1.5		112	111	11		1.1	1		21	11		2.2.7	11		127	1			
	Ningaui yvonneae	Mallee Ningaui	Х	17.4	Х	X	1.1	3	3	3		1		2	5.15		111					1					14				11.		
	Sminthopsis crassicaudata	Fat-tailed Dunnart				X		-								1			1	2						11	3		1207	1000			
	Sminthopsis dolichura	Little Long-tailed Dunnart	Х	计正		X	=0	(\pm)			10	÷i.p	1	4 E	£11 :	111	2	11	(-1)	121	1-1	130			10	1		- (H	40+7	1	法主	- 1	
Burramyidae	Cercartetus concinnus	Southwestern Pygmy Possum	X	1	3.8	X		1.11	1	1		1			12.	1	1.01	2	1		2	3 1	1	3	4	1 3	1		2	1	1.51	2	
Macropodidae	Macropus fuliginosus	Western Grey Kangaroo		12.1		X		:=			11	-11			1		1.11		1			1.1						1.1	1.37	4 1.23	111	1721	
	Macropus robustus	Wallaroo or Euro		1		X		11	30							1.12	1		3	1.11	Anna A	241				1	21.2		3.2.2		111		
	Macropus rufus	Red Kangaroo			1	X			2.1					10		1.1.	115			171			24			1.1.1	111		3 22		1.00	1	
Leporidae	Oryctolagus cuniculus	European Rabbit	Х	124	Х	1		1.3			1.1					1	1111		2.000			121	11			11	24 1		111	111	110		
Tachyglossidae	Tachyglossus aculeatus	Short-beaked Echidna		1	1	X	1		12				11		1.1	1	1	7.5				111	21		1			11	120	1.00	111		
Muridae	Mus musculus	House Mouse	Х	X	X		4	4 1	1		÷ (1)	81) I	11	il b	612	1	1.11	21) - F	111	10 (E-D			1.)	11	4	16 14	10.8		注意	± 1	
	Notomys mitchellii	Mitchell's Hopping Mouse		10 mil	.1				111			. 11			1	12	2				111	1.1		1	i i	. 1		1		111			
	Pseudomys bolami	Bolam's Mouse		. I.,		X										2.0	1.1.				1				1							171	
	Pseudomys hermannsburgensis	Sandy Inland Mouse		111	1.1	X	1	111	21			11	1		11	11.	1.	11		121	121	12			11		11	11.1	1.1		01.		
Amphibians			101	1.00	1	1	-	1.1			1.	21.1	11.11	1.1	1.1	1.17	1	21		1.1	121	14.	21	1.	1	11	11		1.1		121		
Limnodynastidae	Neobatrachus kunapalari	Kunapalari Frog	X	1.000	X	X									11							1.1						11	1.27		1.71		
A	Neobatrachus pelobatoides	Humming Frog	Х	100		X		11	E.			11			I.	1E	1.5	21	1	125	ii	151		11/		53		1		122			
	Neobatrachus sutor	Shoemaker Frog		100	X		-0	13			- (-1.)	\rightarrow		£.1-	1.1-	(E)	-1	$) \rightarrow $	14	$\in \{$	E.	3		1)		± 0.6	- (B	DB		ÆC		=
Myobatrachidae	Pseudophryne occidentalis	Western Toadlet	1	Х	3.2	X										1E	1			1	1									123			
Reptiles					11	1.1											110											11			112		
Agamidae	Ctenophorus cristatus	Bicycle Dragon			_	X	1	11	1	1		1		4		1	1	21	1	1.1		_	X			1		X		120	1	X	1
	Ctenophorus fordi	Mallee Sand Dragon	Х			X									1	1	11.	12	1	111	1	2	2	1 3				111	1.0	12.2	12.1	X	
	Ctenophorus isolepis	Crested Dragon				100]	1							3							11										
	Ctenophorus ornatus	Ornate Crevice Dragon			21		1	1	1 1	1						11	1.5		13	14	Ξí					60							
	Ctenophorus reticulatus	Western Netted Dragon		11	_	X			1		- 1				11	11-					100	13						-(1-	DE		1 ± 1		
	Ctenophorus salinarum	Salt Pan Dragon	X	X	1	X	1				- H.		1				1.1.1				2.1					1.11	2	6 L L	1	100		(

		Survey		A	B					C	-	-	-	-		-		-	-	-	-	-	D			_		-	-		-
Family	Species	Common Name	LF	LS	St Ives	Opportunistic	Site Ia	Site 1h	Site Ic	Site 1d	Site 2a	Site 2b	Site 2c	Site 20	Site 2	Site 20	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8 Sina 0	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 10 Site 17	Site 18	Site 19
	Ctenophorus scutulatus		10	1, 17			2.1	1	111		11		1111	11	3 23		1.1	122		1		110	127	3 23	111	100	1.1	X		4 13	1
	Moloch horridus	Thorny Devil			X		1.5					10					1		\sim							20	-			111	
20 A		Bearded Dragon	X	1	Х		(r - 1)	1 ± 1	$ \cdot $	19.1	- 61		1	X	5), IF	(-1)	1	1	1.1	1	-	- 1 -	1	1.1	1	1	1			$\{ i \in j \}$	140
	Tympanocryptis cephalus	Pebble Dragon	42.0	51,080	X		1.0	121	200		-13		01.4		3.63	1010	-1	303		12-1	$1 \le 1$	0	1	0.00	1	0.0	1.5	11	11	(121	() = 1
Carphodactylidae	Nephrurus laevissimus		Х	$r1 \le$	Х		12 - 1	1.21		19.1	22	~ 1		1	5	111	21		1.1	1	3		2	9.00	2.1	1.1	2 ± 1			121	100
The second second	Underwoodisaurus milii	Barking Gecko		14	X		1.4	2						12	1	8		2	62					23.040	1	(-1)	2	2	1	1 1	1
Diplodactylidae	Crenadactylus ocellatus	Clawless Gecko	[]]]		х	-			[]			1		1	11-	1	-	3		E1		1	1	125		<u>1-1</u>	1	1	111	1 -1	121
	Diplodactylus granariensis		111		X	1-1	1-	1				-			1	1	1	3	2		2	1	1		100		2 3	3	10	1	1
	Diplodactylus pulcher			1	X		1.1	1		4	1.1				310		171	1.112	3	7	1			4			11	1	2	1	4
	Lucasium damaeum	·		11	10		1	1.14	1.0	18.1	14	1	1		12	144			1.1	111	1 = 1	15				11	100	11	10.01	121	111
- C	Lucasium maini	22		X	X		2	9	3	3 1	1	1	1	1.1	3.60	101	9	100	2	1	1	11	16	I) (943		100	1-1	-17	111	100	4
	Oedura reticulata			-	X			-	1	1.1				1		1 - 1 - 1	-	1		1	1.1	1	1		1000	40000	1			1	
	Strophurus assimilis	Goldfields Spiny-tailed Gecko		1			11	111	10			1		1	11.00	1,000	1.1	1		121	1	11	1.1	1	1.01	1		3	11	100	
	Strophurus elderi	· · · · · · · · · · · · · · · · · · ·	5.00		1		1.1				21	11	11	11	3		11		111	1	1	82	1		1.1	1	12			1011	1
Elapidae	Brachyurophis fasciolata	N			Х		11.1	111				11	24.2		7.57	111			1.14			11	12		10.4	1	1.1	11	111	111	
	Brachyurophis semifasciata						1.5			0.1					2	100						90					1	1 1	DI C	111	
F	Demansia psammophis	Yellow-faced Whipsnake		115	X		$(1 \in]$)+i		H ()	21) 3		11.1	-802-	11-	1	21) = I	111	10 L	(E)	1.	i La	1))	121	$i \rightarrow i$	l = 1	1 11		(1÷ 1	100
	Parasuta gouldii	A REAL PROPERTY AND A REAL PROPERTY.	25.1	1.	х		1.1	13.1			11				1.12	12.	. 1	1				11	1	1 22	1	127		11		123	
	Parasuta monachus			11 1	X		12.21	121		111	- 11			11	1	1 12.1			1.1							1	=		1	1.72	
	Pseudechis australis	Mulga Snake			1.1	1	12.2	33					31		1.12	X		1	101	1		11				1 mar 1	1.1		1	100	
	Pseudonaja mengdeni	Gwardar		1	Х			1211	111				71 I.		1	100			101			11	1	102	171		1.1	1.1		101	
	Pseudonaja modesta	Ringed Brown Snake				1	1.1	11.							1	1		1	1.1	-			i L		1	1	1		111	10.1	
	Simoselaps bertholdi	Jan's Banded Snake			X	1		1.1		0.0	1.5	11		100	1	10.5		1			100	9.2	10	1.	1	12.5		10.1	0.0	17.1	
Gekkonidae	Christinus marmoratus	Marbled Gecko		-11-		1	1	1+1		H (11		H F	1	110	(H)	11	1.33	111	E-1)	18D)	1	Х	28-3	1.2.1	ter(111	1 11 1		(EEE	
1	Gehyra purpurascens		111		Х			111					1		10	1111				12.1	1.1	111	11			121	1.1	111	111	111	
	Gehyra variegata		X	X	Х		1.					1		3	1	1	1			1					1		1	1		2	1.1
	Heteronotia binoei	Bynoe's Gecko	X	< l	X	1	1.1	23				11		2	3.0	12.	2		1	1	11	11.77		1	1.5	2	1		1		6
Pygopodidae	Delma australis		5.11				1	12.4					1		1	1	1			1		1			1	1.00-1 1.00-1	1.1		11	1.011	
	Delma butleri		X		X		15	17.3	1.1						2												1	2		- 1	-
	Delma fraseri				X		1.1		5					11	3	100	77	1		17.1			15					10	10	111	
	Lialis burtonis	Y	-	115	X		1 -	1.54		E.C	÷1.)	-33	£1, 1		2	181	1.1		111	E-C	E=10	1	18	1.0-1	111	(-1)	1	1		3	
	Pygopus lepidopodus	Common Scaly Foot		1.	X		1.1	124	1		11				1.12	12.	1.1		101		1.1	1		1	124	12.	11	111	11	1	1.11
Scincidae	Cryptoblepharus buchananii	1	121	11			15	121			-1			11	1 =	111	4	1		Si.	2			1	2	24	X 2	2		1.1.1	
	Cryptoblepharus carnabyi	3 T			1.4	i = :	1.1	$\frac{1}{2} = \frac{1}{2}$				1		12	-		1.2	1						1	1.1	1.1	2.1			12.1	
	Cryptoblepharus plagiocephalus		X		Х		1.1	20	212	0.1			210		15			1.000	\square						100	1	1		100	100	
	Ctenotus atlas		X	K	X				1	1	2		2	5	6						3		11							1 - 1	
	Ctenotus leonhardii	1		2010	X										$\zeta \to \gamma$	100	1.1													1111	1.1
	Ctenotus schomburgkii	1		X	X		1-	1 ± 1		£ (11	-1	11	1	1		111				1	1)1-1	111	1.1	3 1	1		Х	5
i	Ctenotus severus						1	1.2.2		1	1		2			1.3.1		1.11	1	1								1.1		1.1	

		Survey		A		B	-	-		(2	-	-	-	-	-		-		-	-	-	-	D	50	-						
Family	Species	Common Name	LF	LS	OM/T	St Ives	Opportunistic	Site Ia	Site 1b	Site Ic Site Id	dite 2a	site 2b	Site 2c	site 2d	Site 1	site 2	Site 20	site 3	Site 4	site 5	site 6	site 7	alle 8	Site 9	Sife IU	Site 11	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18
	Ctenotus uber		-	-	-	X	-						5.				41				2	1				10				1	1	1 1
1	Cyclodomorphus melanops	Slender Blue-tongue		111				TT	1						1		111										1		111			1.1
1	Egernia formosa		171	111	12.1	X		1.1						1		1.1	10.1	11		2	1	-	11	1	1			112	1.44	1-1		11
y	Egernia multiscutata	1	14.1	1-1	- 1	X		1-1		0					11-1	10	(H)	-11				- 1	0	3	T			- 11-1	130		CEC 1	- 1
1	Eremiascincus richardsonii	Broad-banded Sand Swimmer	1.1	101	11				1.1.1						1.1	1-1	1.000			4	1	1		1					1.11	121		
	Hemiergis initialis	And the second second	12.2	11.	1	Х		12.1	1.1						12.1	100	X		1						1			12	1.0.1	1.1.1		120
[Lerista distinguenda		1.1	121	111	1.01		24	11	-11		1 -		1	1	4	120	1.5				1	11	1	1	-1	1	1	1	1		-19
	Lerista muelleri		111	121	Х	X	1			1					1.73	171		11				-							1	171		
() () () () () () () () () ()	Lerista picturata		222	nci.	11	X	3	211	21				100	1.1	1	-	2	1			5	1	3	1	1	2		1	1111	211	3	3 1
	Lerista sp.	Y		81	10	1.	1	1.1	111	1				111	101	100		4	4 2	2	4	1	11		2	2	5	1	3	5	3	2 4
	Liopholis inornata	2	0.1	ĊE.	11	131	1	E - 1			1				1	1	(-1)	FI	-			1		9 C	1				(E)	1	100	- 1
	Menetia greyii		Х	181	Х	X		11 = 1	2						111		11.1	1.1				1			1			1	1	1	4	3 2
	Morethia adelaidensis	j	111		X	11.11			111	11				1	1.1	11		1.1	1			1			1		1		122	1.5	100	111
	Morethia butleri	-	22		25	Х	\square	-		1				1	1.1	100		2	2	2	1	1	31		2			1.000	17.1		1	2
	Morethia obscura		11	11.				11		11	1		101		173	11		11							2	2	1	12.1	1	0	1	
	Tiliqua occipitalis	Western Bluetongue		00	2.2	X		1.1						1	1.7	1.1	010	7.5					n r			1			127		0.1	
	Tiliqua rugosa		Х	144		X	1	1		1				1	1-1	(1=1)	X	εi.			-11	$\equiv 1$		-	-10	111		1.1 =	2		1 - 1	F 1 F
Typhlopidae	Ramphotyphlops australis		1	12	3.9	X		1	11						1	1	1	1	1 2	2	1	1	1	1	13		10	1.1	111	1.4		. 1 1
	Ramphotyphlops bituberculatus		1	11.1	2.2	X	0	1.1		1	1					5	1.2.1	1.1				- 11	11	1				1 2 2	1.71		111	
Varanidae	Varanus gouldii	Bungarra or Sand Monitor			17	Х	1	1.1	23 1	12	1	1		1		2											1	122	30	111		

A B Dames and Moore (1999) Public Environmental Review Gold Mine Development on Lake Lefroy. Unpublished report for St Ives Gold Mine; Kalgoorlie.

Ninox Wildlife Consulting (2004b) St Ives Gold Mine Vertebrate Fauna Assessment 2004. Unpublished report for St Ives Gold Mining Co Pty Ltd, Kalgoorlie.

С Keith Lindbeck and Associates (2007) St. Ives Gold Mining Company Tailings Storage Facility (No. 4) Spring Fauna Survey. Unpublished report for St. Ives Gold Mining Company.

D Western Wildlife (2006) St Ives Gold Fauna Survey; Spring 2005. Unpublished report for Jim's Seeds, Weeds and Trees, Kalgoorlie.

		Survey		_	_	-			_	_	1	Dell	and	Hov	v (1	984)	-	_		_	_	_			_
Family	Species	Common Name	WZ13	WZ16	WZ16a	WZ18	WZ18a	WZ2	WZ22	WZ23	WZ24a	WZ25	WZ25a	WZ26	WZ27	WZ3	WZ32a	WZ33	WZ34	WZ34a	WZ37a	WZ40	WZ6	WZ7	
Birds	1 m											27.4	12.			201				C.,			12.		Г
Accipitridae	Lophoictinia isura	Square-tailed Kite	1	11.1	121		100	1.1	1	2		1.11						1.00			22	1	and the second		12
	Accipiter cirrocephalus	Collared Sparrowhawk		1		1	3		111	1.1	3	1					1	122			1		1.	2	
6	Aquila audax	Wedge-tailed Eagle		L. i	4	1.1	124	1.00			2	1.1	2	1			1			1				11	
	Hieraaetus morphnoides	Little Eagle	1.1	100	0 +		2	12.0) B	(H (2) - SI	16 (1	11	50	2.3	18		1	4	1	1.E 1		Г
Aegothelidae	Aegotheles cristatus	Australian Owlet-nightjar		1.1		122	1	12.1			2	22	4		1			1	-	1.1.		1	11		
Podargidae	Podargus strigoides	Tawny Frogmouth	100	100	1	1.00	1		1.21	1.2.2	1	t	1.11					1.51		11.1	22	1	0.01		T
Casuariidae	Dromaius novaehollandiae	Emu	1	111	1		1	1.1	111			11	1.44	(1	1.00			100 - 100 100 - 100		1.00	2	9	
	Charadrius australis	Inland Dotterel	1	1.1	2		1		12	111	111	1.11	124					122	1	100		1			T
	Vanellus tricolor	Banded Lapwing		12.2	121	1.00	1	1	111	121	111	11.11	1111					111		12.	18		12.7		T
Columbidae	Phaps chalcoptera	Common Bronzewing		171	100	1.1	1	1.1	11	100		3.4	1.20		1	17	17-1	100	125	140	12.1		1.00	36	
Meropidae	Merops ornatus	Rainbow Bee-eater		1 11				1.00	2	2	1	1	ndr.	1	11	10.1	111	15		120	1.1		1775		T
Cuculidae	Chalcites basalis	Horsfield's Bronze-Cuckoo		1			3	2.4		2	3	1	1			1.1	1	1	8	2		3	1	1	T
	Chalcites osculans	Black-eared Cuckoo				100	1		12.1	2		21	1		100	2			1.1	10	1.1	2	3	1	
	Cacomantis pallidus	Pallid Cuckoo		100			1	100	3	1.2	1		2	2	100	2	4	1		1			10.2		t
Caprimulgidae	Eurostopodus argus	Spotted Nightjar		-	-		1				1	1.00			1	-				-		1	1.2.1		T
Falconidae	Falco cenchroides	Nankeen Kestrel		11.1	4				1.1.1	1.1	1.1	1				1	1	-	1		1	1			
[Falco berigora	Brown Falcon			1		2	1	-		3		1	11		111	1	1	1	6	1	1	1.5		t
	Falco peregrinus	Peregrine Falcon					-		1.5	14		1.01	1			1-1	Ĩ.	1.11		1			1-1-1	1	
Megapodiidae	Leipoa ocellata	Malleefowl									1.1	1.1	1			121									t
Acanthizidae	Calamanthus fuliginosus	Striated Fieldwren			1	1.1	1									1		111	1.1	1		0.1			
	Pyrrholaemus brunneus	Redthroat		-	Ê		3	1.1	5	9	1	3				1				1		10	21	18	
	Smicrornis brevirostris	Weebill		-	-		38	-	72			131	116	13	11	3	6	81	36	52	-	73		-	t
	Acanthiza chrysorrhoa	Yellow-rumped Thombill		1.1	1	1		1.0	-		2					1	3		1	13				12.2	t
e	Acanthiza apicalis	Inland Thornbill	14-1	1.1			4	12.2	10	21	2	15	11.21	-1	3713	1		- 53		1	1.1	33	25	19	
	Aphelocephala leucopsis	Southern Whiteface		1.1	1.0	1.1					-		1.1	- P		1	1.5	1.1	1-1	6				-	t
	Acanthiza uropygialis	Chestnut-rumped Thornbill					6		5		24	13	1			1	6	26	3	35				7	t
Artamidae	Artamus personatus	Masked Woodswallow		1	4		12	-		1211	200	1	1.0	1	-	11	-		1.22	1	1.1	1	1		
	Artamus cinereus	Black-faced Woodswallow			5				1				-		-	1		-	13		15		1		
	Artamus cyanopterus	Dusky Woodswallow			-	1	6		2	13	7	1	12		2	-						1	-		t
	Cracticus torquatus	Grey Butcherbird		1.1	2		7		3	15	22	5	16		-	1111	3	4	8	12	1.1	2	2		
	Cracticus nigrogularis	Pied Butcherbird		12.1	2	1	23		-	1	22			-1		171	1	1.1	3			~	1	2	t
	Cracticus tibicen	Australian Magpie		1	7	1	2.5	1.0			1	1.00	1			1.0	2	8	-	3			-	-	t
	Strepera versicolor	Grey Currawong			ť		5		2	3	8	15	7				-	1	1	-					t
Campephagidae	Coracina novaehollandiae	Black-faced Cuckoo-Shrike		-		1000	3		1	1	13	1	1	10.0		-		1	7	8	2	1	1	2	t
Cumpopulagidad	Lalage sueurii	White-winged Triller		1.00			1		-	-	1	-						-		0	-	1	-	-	t
Climacteridae	Climacteris affinis	White-browed Treecreeper				+					11	-				-		-	1.1	-			-	\vdash	+
Ciminactoriuae	Climacteris rufa	Rufous Treecreeper	1		-	-	7	-	1	2	11	2	1.11	3										\vdash	t

Appendix B(4). Vertebrate fauna recorded in biological surveys in the region

-	1	Survey	-	-	-	-			-	1	Dell :	and I	Iow	; (19	84)	-	-	-				-	
Family	Species	Common Name	WZ13	WZ16	WZ16a	WZ18a	CL/N	WZ22	WZ23	WZ24a	WZ25	WZ25a	WZ26	WZ27	WZ3	WZ32a	WZ33	WZ34	WZ34a	WZ.37a WZ.40	WZ6	LZW	WZ7a
Corvidae	Corvus coronoides	Australian Raven								1		1.1											
1	Corvus bennetti	Little Crow		1111	23		1 11	1.11	12.1	20	25	10	22			1	1	27	4 1	17		1 - 1	1
Eupetidae	Cinclosoma castanotum	Chestnut Quail-thrush			111	110	10	5	1	201		111				1.1	11		2.0	12,000	2	-	1
Hirundinidae	Petrochelidon nigricans	Tree Martin			10.1	14		3 22	1		111	34				6		142					1
Maluridae	Malurus leucopterus	White-winged Fairy-wren		1	20		1		111	1				-		1	11		121		1.1.1	-	
Maluridae	Malurus pulcherrimus	Blue-breasted Fairy-wren		1	1.00	1.0	10	120	3		1.00	1.11	11					201			22	1.1	1
Meliphagidae	Lichenostomus virescens	Singing Honeyeater		E = E	1 61 (6	1	6.13	E () #1	1	i fii	k = l	i = i	11	10	6	1=1		6	$(-1)^{2}$	1	06.3	1-1	
	Lichenostomus leucotis	White-eared Honeyeater	1.1		1211	3	10	8		6	8	3	3	2	1	14	2		1. H	3	11	1	1.5
	Lichenostomus ornatus	Yellow-plumed Honeyeater		100		25	6			12	4	1			7	1	. 71		12.1	47	186		1
	Purnella albifrons	White-fronted Honeyeater			100	112		1	3	4	1	TD.			122		1	123	2		8		1
	Manorina flavigula	Yellow-throated Miner			10	4			6	117	6	73	1			6	23	17 1	23	2			1
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater	E T	1	14	1			1-1	2		1	1			5	3	12	15	4 1	16.57		
	Anthochaera carunculata	Red Wattlebird	5		=1	82	1	28	24	4	5	16	3	4	2	2	3		2	4	i here	26	1.
	Epthianura albifrons	White-fronted Chat				1	1	1.22	1.10	1.0.0.0		1.2	11			17.1		70	· · ·	30		2	1.1
	Lichmera indistincta	Brown Honeyeater		10.1	1.1	21		4	1.11	111	1.43	1.10			23	1.4	1.1	<u></u> .	1	1211-0	46	23	-
	Melithreptus brevirostris	Brown-headed Honeyeater	1.1	1	71 L	2		0.11	4	1.1	9		6	121	11.7			\square	11.0	2	8	1	
Motacilidae	Anthus novaeseelandiae	Australasian Pipit		9	32		1			1.1.1			14			2		2	4	47	122	1	
Nectariniidae	Dicaeum hirundinaceum	Mistletoebird		11.5		6	17		1	2		1			1	-				1	1.5		
Neosittidae	Daphoenositta chrysoptera	Varied Sittella		1-5	(-1)		1.11	8	$[n_{i}, i]$	8	9	1.1	51		in.	1	8		$= \frac{1}{2}$	- 1. H.	1.1	-	
Pachycephalidae	Pachycephala inornata	Gilbert's Whistler	-	£33	101		11	1		1-1		主	1		1		1	134	1-1	-I)-		- T	17
an eilen fin eine ein	Pachycephala pectoralis	Golden Whistler		1.1	1.41		1.1	3	1	121	4	11.	21	121	1	1.1	11		(#1)	2	19	12.1	
	Pachycephala rufiventris	Rufous Whistler		1			1	1.00	-	4		1.41	1.2			1	2.1			1.1	-	1.1	
	Colluricincla harmonica	Grey Shrike-thrush		1.1	212	3	_		1	6	6	4	71	11			2	-	1	3	_	11	1
	Oreoica gutturalis	Crested Bellbird	1.1	1	211	4			-	11	5	3	1		11	3		-	5	4		2	
Pardalotidae	Pardalotus striatus	Striated Pardalote	1.7	1	111	25	_	14	30	32	23	29	4	7	1		_		5	29	-		
Petroicidae	Microeca fascinans	Jacky Winter		1	11	2	_	100	10	8	8	121	1	2	\mathbb{Z}	5	7	19	111	1	1.		
	Petroica goodenovii	Red-capped Robin		$ \rightarrow $	4	1	(1)	1	(z=1)	5	1	100	1		± 3		(-)	121	1	2		4	
	Melanodryas cucullata	Hooded Robin		100	2	1	1.11	1.1	122	111	11	1.0					11	-	8				
	Eopsaltria australis	Eastern Yellow Robin					1.2	4	1			130	-	-		1.1	1	_				-	-
	Pomatostomus superciliosus	White-browed Babbler			2.1		1	1.1	5	8	111	125	7	1		11	1	7				1.1	
Rhipiduridae	Rhipidura leucophrys	Willie Wagtail			3	1	1.	12.	1	2			1	1	1.1	1			1			1	
Timaliidae	Zosterops lateralis	Silvereye			101			3				17.5				1	10					3	
Cacatuidae	Eolophus roseicapillus	Galah			55					3	ΕĐ	1910				13	1	2	1 4				
Psittacidae	Glossopsitta porphyrocephala	Purple-crowned Lorikeet		1.1	11	78	_	54	41	2	9	1.5	2		7	1.1	_	-		13	_	13	
	Polytelis anthopeplus	Regent Parrot			1.71	26	5	1.11	2	1.1.2	111		12			121	11	-	111	_	2	17.2	
	Platycercus icterotis	Western Rosella			2.2	1.1		1.1		1.1	20		-1			11			_	2			
	Barnardius zonarius	Australian Ringneck		-	1	27		1	3	35	5	7	1			10	_	_	_	8 2	1	15	
	Psephotus varius	Mulga Parrot			- 1				1.1	17		1.1.1	-	=		4		4	4				
Strigidae	Ninox novaeseelandiae	Southern Boobook				9										1			_		-		
Mammals				10.1		1			1.5			1.11	1.1	1.15	1.1	13.0	1.11	121					

		Survey	7	-	-	-	_			-	De	ll and	Ho	w (19	984)	-	-	-	_	_	-	
Family	Species	Common Name	WZ13	WZ16	WZ16a	WZ18	WZ18a	WZ2	WZ22	WZ23	WZ24a	WZ25a	WZ26	WZ27	WZ3	WZ32a	FELM	WZ34a	WZ37a	WZ40	WZ6	1111
Camelidae	Camelus dromedarius	Dromedary	1	-	X	-	-	-	-	-			-	-	-	X		-	-	-		Г
Canidae	Vulpes vulpes	Red Fox				h - 4														1	1.2	
Felidae	Felis catus	House Cat		1000	12.1	221	1.2.2	1.1			11					1.1					1	
Molossidae	Austronomus australis	White-striped Freetail Bat		-	1	1	1.21			-	1	2	2	1					4			
	Mormopterus planiceps	Southern Freetail-bat				1	1				-	Ĩ	-	-					3		1	
Vespertilionidae	Chalinolobus gouldii	Gould's Wattled Bat		1.1	122	3	12.5				11		4	1	10.1	1		1	16	1	1.50	
- op of an onitod of	Chalinolobus morio	Chocolate Wattled Bat			1	1					11	117		1		1-1			1		I F I	t
	Nyctophilus geoffroyi	Lesser Long-eared Bat	1			1	1.000				1								2			t
	Nyctophilus major	Western Long-eared Bat									-								Ē			t
	Nyctophilus sp.												1									t
	Scotorepens balstoni	Inland Broad-nosed Bat	1		-	-	1		-		3	-	-			-		-				
	Vespadelus regulus	Southern Forest Bat	-	1		1					-		5		-			-	1		1	
Dasyuridae	Ningaui ridei	Wongai Ningaui	1	-	1.0							100	1	1.1				-	-	-	1	
Dasyundac	Ningaui vvonneae	Mallee Ningaui	-	-					-	-	-	-			-		2					-
	Sminthopsis crassicaudata	Fat-tailed Dunnart	1	1	1				-		1		1				3	_			1	
	Sminthopsis dolichura	Little Long-tailed Dunnart	-	-	1		1		-			-	+	-		1	1		-			t
1	Sminthopsis ooldea	Ooldea Dunnart		-	-	-			-	-	-		-			1.1	-	1				
Macropodidae	Macropus fuliginosus	Western Grey Kangaroo	x	x		х			x	x		-	X		x	XX	7	x	x		-	
Macropoditat	Macropus robustus	Wallaroo or Euro	1	A		X	121		~	~		X			A	A 1	x		~	1	1.21	x
	Macropus rufogriseus	Red-necked Wallaby			1.00		123		-	-			1	-		1		X		-	1	-
	Macropus rufus	Red Kangaroo		1.0		-			-	-			1			1				1		
Leporidae	Oryctolagus cuniculus	European Rabbit	1	1	X	x			-		1.0		X		-	3	7	1		1		1
Tachyglossidae	Tachyglossus aculeatus	Short-beaked Echidna	-	1			1.000		X	x	111					-	-	1	- 1			1
Equidae	Equus caballus	Domestic Horse	1	-														-			1.00	
Muridae	Mus musculus	House Mouse	1		2	1	100									1			1		1.00	
in an	Notomys mitchellii	Mitchell's Hopping Mouse		1		-	100		1.81	- 1	1.1	111				1.0		1111	-	THE	151	
	Pseudomys bolami	Bolam's Mouse		1	5				- 1	1	1		1	1		1			- 1	-		
	Pseudomys bermannsburgensis	Sandy Inland Mouse						H									1	1				t
	Rattus rattus	Black Rat															1	1			t br	
Amphibians		Le Aller A MIT																			1	
Hylidae	Litoria cyclorhyncha	Spotted-thighed Frog																				
	Limnodynastes dorsalis	Western Banjo Frog		1																	120	t
	Neobatrachus centralis		1		1	1						1	1-1			1					1	
2	Neobatrachus kunapalari	Kunapalari Frog	1		Ê	Ê						100				î.					-	
	Neobatrachus pelobatoides	Humming Frog	1																			t
	Neobatrachus sutor	Shoemaker Frog										111									1	
Myobatrachidae	Crinia pseudinsignifera	Bleating Froglet	1				1.000					115				1						
	Pseudophryne occidentalis	Western Toadlet				3		t t					1		4						1	2
Reptiles			1			É							11				1				-	f
Agamidae	Ctenophorus adelaidensis	Southern Heath Dragon					19			1					1			1			111	

		Surve	y	-	_	-		-	_	-	1	Dell :	and	How	(198	4)	-	-	_	_		-		
Family	Species	Common Name	WZ13	WZ16	WZ16a	WZ18	WZ18a	WZ2	WZ22	WZ23	WZ24a	WZ25	WZ25a	WZ26	WZ27	WZ37a	WZ33	WZ34	WZ34a	WZ37a	WZ40	WZ6	VZ7	(a)rem
¥	Ctenophorus caudicinctus	Ring-tailed Dragon											1.1							11		1.12		Ē
	Ctenophorus cristatus	Bicycle Dragon	1.113	1	121	1	1	12	3	2	111	6	5	1	1		1	1	1		1	1	1	Ē
	Ctenophorus fordi	Mallee Sand Dragon			1.0	1201	1	1			1.1.4	122				1	121	1.1	111				1	Ē
-	Ctenophorus isolepis gularis	Central Military Dragon				1	1	1		1.5		171	1.44			1		10	21	5		194		Ē
	Ctenophorus maculatus	Spotted Military Dragon		-	1.1		1	1.1	123	1.00		· · · · ·	-				1.1.1	1.6.1	121				11	Ē
5-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	Ctenophorus mckenziei	Dwarf Bicycle Dragon	111	1.1		1201	1.57	100			111	1111	1	1		1			100			100	-	
	Ctenophorus nuchalis	Central Netted Dragon		1 - E	0.1		100	14	0.5	135	355	并同	1±1	- 1	-08	0.84	0.8		121	5	3	$i \equiv i$	3-1	1
	Ctenophorus ornatus	Ornate Crevice Dragon		1.1	1.1	1	1.003	1		1.2	111	2.1	12.	11	16	1 E.			1	1	1.1	1		Γ
Y	Ctenophorus pictus	Painted Dragon			1.1		:=:	1	1.2.1	1.22	1.1.2	111		111			1.5		111					Γ
	Ctenophorus reticulatus	Western Netted Dragon	1		1.1	1	12.5	1	1	1	10	2.54		1	1	1	1.	-				1	1	Γ
	Ctenophorus salinarum	Salt Pan Dragon		4	12		122	127	1	1.57	1.1	121	100			10)	1	1.1.1		1	: 20		Γ
	Ctenophorus scutulatus			1			1	1	1.1.1		3	17.73	141				1.2		1		1	1.11		Ē
P	Diporiphora reginae		111-	100	1	1.1	7-27	75	1-1	100	111	10	194	-1	14	1	1.0	6	11	3	100	1.11	-1	Ē
	Moloch horridus	Thorny Devil	1111	1.1	1.11	1	100.1	1.1		111	11.	1	111	: 1		1	1.1	1.1.1		1.1	1.1	1		Ē
	Pogona minor	Bearded Dragon	1111			1.1	1	1.1		1.00	3	2	11.11	3		1	100	1	2	- 1		1	1.2	Ē
	Tympanocryptis houstoni	Nullabor Earless Dragon		1	171	1.1.1	110	1	111	1		113	-		11			1	10	1	1	100	11	1
Boidae	Aspidites ramsayi	Woma (southwest pop)			127		1.5	11.	1.1	1.10		111	122		11	111	1.1		1.00			112		
	Morelia spilota imbricata	Carpet Python		1.1.1			1.5	175	111	1	111	1.1										1		
Carphodactylidae	Nephrurus laevissimus			100	1.00	(inc)	1000	47	1.6.	14	1.1.1	$\{ i_1, \dots, i_r \}$	1.16	6.6		111	1.00	100	i ini	÷1,	1-1	1.41		Ē
	Underwoodisaurus milii	Barking Gecko	++	÷.,	2	5	$\zeta \in I$	1-		2	1.5		2	3	-(E	1	100	1.1.1	()	-1	(=)	1	1	
Diplodactylidae	Crenadactylus ocellatus ocellatus		11-	1.00	1.81		182	22	1.11	2.27	2.2.*	분인	104			1.1.1	122	1.1	19.1	2.1		124		Ū
	Diplodactylus granariensis		1		121	5	1	12.5		1.00	1	3	2		11		1	1	1.57	2.1			2.2	
	Diplodactylus granariensis granariensis		111		111	1	1	1.	21	110		1.11		11	11	1 1.1	1	1.5		11		122	74	
	Diplodactylus pulcher		1.1.1		11	1	12.1	1.1	1		7		2		2	1	1	4	1.1.1	2		12	1	È.
	Lucasium damaeum			11.1	1		1.21	14			1.1	11	1.25	1.0								120	1	
	Lucasium maini	14	1	10.1	1	26	101	16	1	11.1	1		8	34.	3	2	<u>, 1</u> 10	100	16.1	14		111		1
	Oedura reticulata		H E	1000			< ÷ (1-	18.1	1.1		21	10	()-E)	-0 f	12			1-1	-1			21	
· · · · · · · · · · · · · · · · · · ·	Strophurus assimilis	Goldfields Spiny-tailed Gecko			1.7		1 = 1	17	121	122	111	1.1	1.1	11		1	1.27	122	111	71	1			
	Strophurus elderi		113	111	1.1	1	12.1	2.5	1	1.5	111	1000		11		1	3.73	3	12.	1	1	100		1
	Strophurus intermedius		1111		111	1	1	1.5	12.5	1.1.1		111	1	21	11	1	$2 \ge 1$	1	12	2.1	\square	17.5	1	6
	Strophurus strophurus							111		1	111	11	124			12.		10		1	1	110	11	È
Elapidae	Brachyurophis fasciolata fasciolata			1.1			1.1	1			111		1,245	1.1			1.0			2.5		125	11	Ĺ
1.1	Brachyurophis semifasciata	1			0.0			11	0.5	200	111	<u>)</u> ; -(円(≥ 1	-16	11	0.6		1 - 1	11	$\left \cdot \right $	EE(-3	
č	Demansia psammophis psammophis			100	13.1		1.001	12		1		2.3		11		1	121		101	2.1	(m)	1.2.1	11	
	Demansia reticulata			-	1.2		1 - 1	-		1		11		21			123	1	1	11	1			
	Echiopsis curta	Bardick					1.1	1.1		1.5	111	111	A shared at	21	11		1	122	1.7.4	2.2	1	125	11	
	Elapognathus coronatus	Crowned Snake	1111		12.		121	17,			1	111	1.7	11	11	11			12	04		1.77	1	
	Furina ornata	Moon Snake		1	1.1			1									1.1			2.1				
	Neelaps bimaculatus	Black-naped Snake					fin 1						Eř.			11		1.1						2
17 E 1	Parasuta gouldii	1. A.		1.1	0.5			11	1	3		1	1		1	1.1		1	121	122	1	1		

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Family	Species	Common Name	WZ13	WZ16	WZ16a	WZ18	WZ18a	WZ2	WZ22	WZ23	WZ24a	WZ25	WZ25a	WZ26	WZ27	WZ3	WZ32a	WZ33	WZ34	WZ34a	WZ37a	WZK	WZ7	WZ7a
9	Parasuta monachus												1							1	1			
	Parasuta nigriceps				111	-		-	1 22	1	1111	111	1.000	12.2			=	1.11	1 - 1					
	Parasuta spectabilis						12.1	1.1		111		111	1	1			1.1							
-	Pseudechis australis	Mulga Snake					121				1												1	
	Pseudonaja affinis affinis	Dugite			1111		1.22		1111	1.1.1		1.1.1				-	1.1		100		21 13		1	
5-C	Pseudonaja mengdeni	Gwardar					: 23	T.		1.22	111	1.21	1327	11	1	177	10						011	
	Pseudonaja modesta	Ringed Brown Snake	$ \cdot = 0$		1		181	14		24.1	233	$ \cdot \cdot \cdot $	131	-		£-1	1-1				8 C) F	111	1 - 1	
	Simoselaps bertholdi	Jan's Banded Snake	11-11				1.01	11		1.000	111	1	2			10.3			1		110			1
	Simoselaps semifasciata						-			1.000				- 1	-	1	-		2		-1 -			Ê
	Suta fasciata	Rosen's Snake	1				121	1.1		1.1.1		1111	1			1	1.1		1.11		1.1		1 1.1	
Gekkonidae	Christinus alexanderi				722		î ci		100	1		1.12	101			1			1		110	111	100	
	Christinus marmoratus	Marbled Gecko		1	1.1.1							10.00	1.5.1			-			-		111		1	
	Gehyra purpurascens		1-1		100		611	11	1.1	111	111	1.1	12.2		1	17.1	1.1			100		1.1	21.1	
	Gehyra variegata		1	1.1	1	25		3	3	111	1.1	10	12	3		7	4	1	1	1	1	1	1.73	
	Heteronotia binoei	Bynoe's Gecko			1211	4		1	4	19	121	1212.6	2	6	100	2	1	2.1			1	2	1	1
Pygopodidae	Aprasia striolata							11		10.		125	12.5			10.1	1.1		[1]			10	1.74	
	Delma australis	1	3		111			1.1		111		1.11	1	1		1	1.1		2		1		1	
1	Delma butleri	1.	177		-		121	TC	111		111	111	177	11	171	-	-					7.00		
	Delma fraseri			1.0				1.7	14.	1	144	1.00	1 ml	1.1	1	1	1.1		$1 \le 1$		1.1		1.51	
	Delma nasuta		[]		1		111	1 -	(-)	1.10	2.2.2	1-1	1.35	3		(E)	15	4	17	1			1.1	
	Lialis burtonis			1.1	1.01		121	1-		111		1.1	110	1		11	12	2	1	_	1		1.1	
	Pygopus lepidopodus	Common Scaly Foot	(i and					1.1		1.00		1.1	1			121	1.1				21	1	1.1.1	
-	Pygopus nigriceps		1111	1111				1.		150		1.11	1	1.1			1	1.00			22			100
Scincidae	Cryptoblepharus buchananii		1				121	11	1	1	4	1	1.2	2			11		100		11	2		
	Cryptoblepharus carnabyi			12.7	111		171	14		1.11		1.1	110				\mathbb{R}^{n}					100	-	100
· · · · · · · · · · · · · · · · · · ·	Cryptoblepharus plagiocephalus		1111				10	10		10.1		1	111				100				34.0	100	134	
	Cryptoblepharus pulcher clarus		[금 ㅋ]	(-+)	1			1-	(-1)	1=1		1.0	123	-1		-26	13		1.1		1		1 - 1	
	Ctenotus atlas					5		17	1.71	1.22	1.1.1	6	1.1				15	4	5		71.57		1	
	Ctenotus leonhardii	1	113		4			2.1	111	111	111	101	135			1 - 1 - 1 2 - 1 - 1			1.11		1		6.0.3	1
	Ctenotus orientalis		1	11.1	10.0			1.		121		111	1.11			111			21		731	11	1.71	
	Ctenotus pantherinus	Leopard Skink						1.1		11.		1.0	11/1			1		2	1		110		011	
	Ctenotus pantherinus ocellifer	Leopard Skink	101	11.1	1.01		rt i	1.5	10	11	1.11	1.21	1.11		121						1.1		1	
	Ctenotus schomburgkii		2	$I = \{i\}$	1 + 1		188	1-	$1 \pm i$	4	4	4	1	1		÷.	14	1		- 1	E D F	1	1	
2	Ctenotus severus							12		282		3.22	124			1	1	10.	2.85		11		1.	1.31
	Ctenotus uber uber							1				1			\equiv			1.21		24	72.27			
	Cyclodomorphus branchialis			111	22				22	111		11	110	1		11	1	4	4	2	16	2		1
	Cyclodomorphus melanops elongatus	Slender Blue-tongue				2.1	100	1	125			111			111	· · · · · ·	1.1						1111	
	Egernia carinata					1			1								-					3	1	
	Egernia depressa	Southern Pygmy Spiny-tailed Skink					1	T.		1 il		T. d	the l	1	1		1.1		1.11			d II	1.1	
	Egernia formosa				1.1		12.1	1	1.21	121		1.00	1.11		1.1	1.1	· · ·			1		1 1 1		1

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Family	Species	Common Name	WZ13	WZ16	WZ16a	WZ18	WZ18a	WZ2	WZ22	WZ23	WZ24a	WZ25	WZ25a	WZ26	WZ27	WZ3	WZ32a	WZ33	WZ34	WZ34a	WZ37a	WZ40	WZ6	VZ7	WZ7a
-	Egernia multiscutata					1			1			1	1.11				1.				11		1		11
	Egernia richardi				101		1	1	1.21	1.001				- 1		122	12	1.21		12.1	11	1	1.22		
	Eremiascincus richardsonii	Broad-banded Sand Swimmer			4		1	1.1	1.1	-		1.000				1	1	14		100 - 100 100 - 100 100 - 100			1.1		
1	Hemiergis initialis		100		1		1.71		3		12	5	6	1		-		1					2		
	Hemiergis millewae		8	1		1	1	-	107	1.00	0.5	1110	1.01	2	1	127	6	2	14	11	14	-			
1	Hemiergis peronii peronii			177	100	100	1.57	15	1		111	1111	1,000	1		177		11	114	(11) (11)	21	173	127		100
	Lerista dorsalis			1-11) =i		100	1.4) R.	1	1	1.11	121	- 1		F = 1	1-1)书		$l \in I$	1	1-1	111		
	Lerista muelleri			12.2			101	1.1	2.1	· · · · · ·	1.1		152	1.1	1.1	12.5		121	1	1	11	12			1.34
N	Lerista picturata				1.71	111	-	1.1	3	1.11	1	1	3	11	1	100		101	1	11.1	11	1	1.11		1
	Lerista sp.		1	1		7	15.1	1.1	5	1	6	2	6	3	1	1	1	2	2	1	2	\square	3	1	
1	Lerista taeniata				-		1.2.1		122		17.1	1.11				100 m (* 100 100 m (* 100		22		11			15		
	Lerista terdigitata				1		1	1	1.1.1			1	1111	1				111	2	201	-		14		1
P	Lerista tridactyla			100	1	17	247	74	(-1)	100	1.2	5.5	1245		15.	2ef	14	161	12	797	~ 7	1-1	123		T = f
	Liopholis inornata			1.1	1.82		11.1	1.1	111		4	1.1	1.11			111	12	111			2	1.11			10
	Liopholis striata	Night Skink		100	12.1		1	1.1	11.1	1.00	12.2	12.23	12.1		121	12.1		121				1.22			1.1
	Menetia greyii	12			1	1	111		111		011	111	177	3	1	3	1	2	7	2	5	111	1	1	1.1
	Morethia adelaidensis				121		1.00	10	111	1.11		101				177	12	177	111	121		111	111		
	Morethia butleri			1	111	4	1	1	11	2	111	1111	2	1	111	1	11	1	-		11	111	1,7	1	177
	Morethia obscura			li-ii	100		in i	1.0	i î î	1	1.5	1	1.4	1	111	1	1.0	1.1	111	1944	11	$l \sim l$			
	Tiliqua occipitalis	Western Bluetongue		E :	1.0	Ε.	$i \in I$	Ξ-	(\mathbb{H})		1	(-1)	5.5	1		£θ	1.	030		É.	-1) =	H.		1
1.2	Tiliqua rugosa			3) H		1.001	1.	1.11	1	2	1	1	1		iet.		111	1	2	11	jeg	17.		je
Typhlopidae	Ramphotyphlops australis			Ê. 1	21		1		111	1.00	122		12.2					111		1.0	. 1	122			107
	Ramphotyphlops bicolor				12.1				21	111			170	11		122		21				1			
	Ramphotyphlops bituberculatus	1			1		120		11			11	1. Sec. 1.			1	T.	11		111	0.1	1	12		
	Ramphotyphlops hamatus									110		100	120			11					11				
Varanidae	Varanus gouldii	Bungarra or Sand Monitor		11	14		10	14	L.R.	14		1.1	111	1	1	141	1	1.ii		16.1	11	1=1	111		
	Varanus rosenbergi	Heath Monitor	13	163	1	ler!	1.22	1.	11	141	1.11	기막	主義	1	1.54	£2)	1	1=1		1-1	≥ 1		i El		2.53
COL ST	Varanus tristis tristis				121	1	ling!	1.3	111	101		2 23	1.24				15	111		101	11	122	121		1

Dell, J and How, R. (1984) Vertebrate fauna. In The Biological Survey of the Eastern Goldfields of Western Australia, Records of the Western Australian Museum, Supplement No 18, 57-89.

Appendix B(5). Vertebrate fauna recorded in biological surveys in the region	n

		Survey		-	-	_	B	_	_		_
Family	Species	Common Name	Dordie Rock NR #1	Dordie Rock NR #2	Dordie Rock NR #3	Dordie Rock NR #4	Kurrawang NR #3	Kurrawang NR #4	Kurrawang NR #5	Kurrawang NR #6	Kurrawang NR #7
Birds					1						1
Accipitridae	Lophoictinia isura	Square-tailed Kite		11	1	121	11			X	_
	Accipiter fasciatus	Brown Goshawk	1.4	1.1							-
and some first sectors in	Aquila audax	Wedge-tailed Eagle	14				1.1	1			24
Aegothelidae	Aegotheles cristatus	Australian Owlet-nightjar	X	100	111	10.0		1.001	1.11	Х	-
Podargidae	Podargus strigoides	Tawny Frogmouth	1		P = 4		2.3	1	114	Х	- 1
Casuariidae	Dromaius novaehollandiae	Emu	Х	}#I	1-1	HE L		j =i	HI	12	Х
Columbidae	Phaps chalcoptera	Common Bronzewing		11			22	1.23			242
	Ocyphaps lophotes	Crested Pigeon				111	24				Х
Meropidae	Merops ornatus	Rainbow Bee-eater			Х		Х	Х	Х		1
Cuculidae	Chalcites basalis	Horsfield's Bronze-Cuckoo	ĨT.	111	1						
Caprimulgidae	Eurostopodus argus	Spotted Nightjar	T.	111	111	111					1.1
Falconidae	Falco cenchroides	Nankeen Kestrel	E-1	E)		E.	-1			1	X
The second second second second second second second second second second second second second second second se	Falco berigora	Brown Falcon	1	19	1.51	111	- 1	E	1.1	1	111
· · · · · · · · · · · · · · · · · · ·	Falco longipennis	Australian Hobby		123			1.1		1.1	1	
Megapodiidae	Leipoa ocellata	Malleefowl	х	11	111	10	11		1,1		11
Otididae	Ardeotis australis	Australian Bustard		11	1.1.1				111		1
Acanthizidae	Pyrrholaemus brunneus	Redthroat	1.1	Х	111	171	2.5	i Th	10	1	-
1	Smicrornis brevirostris	Weebill	X	Х	per la	164	X	X	X	1	1.1
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill		-11	1.3	6.1		Х	X	1	1.1
	Acanthiza apicalis	Inland Thornbill	1.0	X	111	1.01		100		X	100
	Aphelocephala leucopsis	Southern Whiteface				11.1	1.1				1
	Acanthiza uropygialis	Chestnut-rumped Thornbill	X	X	1		11	X	X		1
Artamidae	Artamus personatus	Masked Woodswallow				i Ti			11		11
	Artamus cinereus	Black-faced Woodswallow		1			-		X		1.5
	Artamus cvanopterus	Dusky Woodswallow	11 -	141	X	111	1	1.1		1	1.1
	Cracticus torquatus	Grey Butcherbird	Х	11		111	Х	х	1.1	12	X
	Cracticus nigrogularis	Pied Butcherbird		111	X	à.:	X	X			X
-	Cracticus tibicen	Australian Magpie		11		D.				1	X
	Strepera versicolor	Grey Currawong	х	х	00		11		111	х	X
Campephagidae	Coracina maxima	Ground Cuckoo-Shrike			123	-		-			X
	Coracina novaehollandiae	Black-faced Cuckoo-Shrike	1.4	X	X	57	i = 1	1-1	1.14	1	X
Climacteridae	Climacteris rufa	Rufous Treecreeper	1 - 1	1.1	x	(Ff	1.7	1-1	111		1.11
Corvidae	Corvus coronoides	Australian Raven	X					1			1.1
	Corvus bennetti	Little Crow	X			-		-	1	-	x
Eupetidae	Cinclosoma castanotum	Chestnut Quail-thrush			X	110		111	x	x	
Hirundinidae	Cheramoeca leucosterna	White-backed Swallow					11				-
	Hirundo neoxena	Welcome Swallow									-
	Petrochelidon nigricans	Tree Martin		1		1				-	1
Maluridae	Malurus splendens	Splendid Fairy-wren				121					x
	Malurus leucopterus	White-winged Fairy-wren			-		-	1			-1

		Survey					B				
Family	Species	Common Name	Dordie Rock NR #1	Dordie Rock NR #2	Dordie Rock NR #3	Dordie Rock NR #4	Kurrawang NR #3	Kurrawang NR #4	Kurrawang NR #5	Kurrawang NR #6	Kurrawang NR #7
Meliphagidae	Lichenostomus virescens	Singing Honeyeater		_		-	-	-		-	
and a second second	Lichenostomus leucotis	White-eared Honeyeater	Х	10			21	1.1	Х	Ē.,	
	Lichenostomus ornatus	Yellow-plumed Honeyeater	Х	Х	Х		2.2	Х	Х	1	Х
	Purnella albifrons	White-fronted Honeyeater	Х		[]	11					
	Manorina flavigula	Yellow-throated Miner	1	34			1			Х	X
1	Acanthagenys rufogularis	Spiny-cheeked Honeyeater	Х		Х	22	Х		20	-	
1	Anthochaera carunculata	Red Wattlebird	Х	X	Х	111	Х	1	Х		Х
	Sugomel niger	Black Honeyeater	12	10		eč.) ==	1	100	141
1	Lichmera indistincta	Brown Honeyeater	12	1.22		11.1	2.1	jeni	Х		21
1	Melithreptus brevirostris	Brown-headed Honeyeater	Х								22
Monarchidae	Grallina cyanoleuca	Magpie-Lark			1.1					=	х
Motacilidae	Anthus novaeseelandiae	Australasian Pipit	17	1			11	1.1		i. 1	X
Nectariniidae	Dicaeum hirundinaceum	Mistletoebird	1.5	1		1.00	11	1	1.00		
Neosittidae	Daphoenositta chrysoptera	Varied Sittella	11	181		111		141	111	1.1	1-1
Pachycephalidae	Pachycephala rufiventris	Rufous Whistler	1	1.0	13	(H)	-1) =	1.1	12	107
and the second second	Colluricincla harmonica	Grey Shrike-thrush	X	$\left[\cdot \cdot \right]$	Х	121	12		X	1-2	Х
	Oreoica gutturalis	Crested Bellbird	х	Х	X		Х	Х	Х	1	х
Pardalotidae	Pardalotus striatus	Striated Pardalote	Х	171		121	Х	X X	211		
Petroicidae	Microeca fascinans	Jacky Winter	Х					11/	Х		
	Petroica goodenovii	Red-capped Robin	25	Х		151	21	13			Х
11	Melanodryas cucullata	Hooded Robin	1 -	017		Ξť	11	H	H	11	-9
Pomatostomidae	Pomatostomus superciliosus	White-browed Babbler	21			62	11				1
Rhipiduridae	Rhipidura leucophrys	Willie Wagtail	Х	111					1.11	1	243
Cacatuidae	Eolophus roseicapillus	Galah		31	111			1	15		Х
Psittacidae	Glossopsitta porphyrocephala	Purple-crowned Lorikeet	Х	32	1.1	150	11	111	111		
	Polytelis anthopeplus	Regent Parrot	17				Х	1.1		1.00	X
	Barnardius zonarius	Australian Ringneck	х	Х	Х	[n]		1.11			11
	Psephotus varius	Mulga Parrot	1.2	E.		e (- 1	H	H		Х
	Melopsittacus undulatus	Budgerigar	1				1				1.1
Strigidae	Ninox novaeseelandiae	Southern Boobook	1	1.11	9						5
Mammals	and the second sec			73	111	14		1			1
Canidae	Canis lupus	Dingo	1.1	12.1			21	111			
Felidae	Felis catus	House Cat									
Molossidae	Austronomus australis	White-striped Freetail Bat	15			E					
	Mormopterus species 4	Southern Freetail Bat	F	D 🗄		E (H	0	1
Vespertilionidae	Chalinolobus gouldii	Gould's Wattled Bat	1								Ð
1.2	Nyctophilus sp.	A 19 A 19 A 19		12	1.1.4					<u>1</u>	1
	Vespadelus baverstocki	Inland Forest Bat	1.1	11	(-1)	11		1	1.11	1	
Dasyuridae	Sminthopsis crassicaudata	Fat-tailed Dunnart	÷ċ.	24	121	10	2	111	111	1.1	21
	Sminthopsis gilberti	Gilbert's Dunnart	1	111	1	171			1		
Burramyidae	Cercartetus concinnus	Southwestern Pygmy Possum	10.0						123	1	
Macropodidae	Macropus fuliginosus	Western Grey Kangaroo	1	1.57		Na f		1-1	111	Y	х

-		Survey				_	B	-	10	-	
Family	Species	Common Name	Dordie Rock NR #1	Dordie Rock NR #2	Dordie Rock NR #3	Dordie Rock NR #4	Kurrawang NR #3	Kurrawang NR #4	Kurrawang NR #5	Kurrawang NR #6	Kurrawang NR #7
· · · · · · · · · · · · · · · · · · ·	Macropus robustus V Oryctolagus cuniculus E Tachyglossus aculeatus S Mus musculus F Notomys mitchellii N Pseudomys hermannsburgensis S Ctenophorus cristatus E Ctenophorus cristatus T Pogona minor E Tympanocryptis cephalus T Diplodactylus granariensis D Diplodactylus granariensis D Diplodactylus pulcher Lucasium maini Cedura reticulata P Pseudechis australis N Gehyra variegata Heteronotia binoei Pygopus lepidopodus C Cryptoblepharus buchananii C Ctenotus atlas C Ctenotus uber E Egernia formosa E Eremiascincus richardsonii E Lerista muelleri T Liopholis inornata Menetia greyii	Wallaroo or Euro							10.0		X
Leporidae	Macropus robustus Walla Oryctolagus cuniculus Europ Tachyglossus aculeatus Short Mus musculus Hous Notomys mitchellii Mitcl Pseudomys hermannsburgensis Sandy Ctenophorus cristatus Bicyo Ctenophorus cristatus Wests Moloch horridus Thom Pogona minor Beard Pogona minor Beard Diplodactylus granariensis Diplodactylus granariensis Diplodactylus granariensis Mulg Gehyra variegata Heteronotia binoei Pseudechis australis Mulg Gehyra variegata Heteronotia binoei Pygopus lepidopodus Comu Cryptoblepharus buchananii Ctenotus atlas Ctenotus uber Egernia formosa Eremiascincus richardsonii Broad Lerista muelleri Lerista picturata Liopholis inornata Lerista	European Rabbit		11.			21	E	1.1	1	
Tachyglossidae	Oryctolagus cuniculus European Tachyglossus aculeatus Short-bea Mus musculus House Ma Notomys mitchellii Mitchell's Pseudomys hermannsburgensis Sandy Inl Ctenophorus cristatus Bicycle E Ctenophorus fordi Mallee Sa Ctenophorus reticulatus Western I Moloch horridus Thorny D Pogona minor Bearded I Tympanocryptis cephalus Pebble Dn ae Underwoodisaurus milii Barking C Diplodactylus granariensis Diplodactylus granariensis Diplodactylus granariensis Eucasium damaeum Lucasium maini Pasuta monachus Pasudechis australis Mulga Sn Gehyra variegata Heteronotia binoei Pygopus lepidopodus Common Cryptoblepharus buchananii Ctenotus atlas Ctenotus schomburgkii Italas	Short-beaked Echidna	1.1	123	1	UC.	1	1		L	
Muridae	Oryctolagus cuniculus European Rai Tachyglossus aculeatus Short-beaked Mus musculus House Mouse Notomys mitchellii Mitchell's Ho Pseudomys hermannsburgensis Sandy Inland Ctenophorus cristatus Bicycle Drag Ctenophorus fordi Mallee Sand Ctenophorus reticulatus Western Nett Moloch horridus Thorny Devil Pogona minor Bearded Drag Tympanocryptis cephalus Pebble Drago ae Underwoodisaurus milii Barking Geck Diplodactylus granariensis Diplodactylus pulcher Lucasium maini Qedura reticulata Parasuta monachus Pseudechis australis Mulga Snake Gehyra variegata Heteronotia binoei Pygopus lepidopodus Common Sca	House Mouse		1		ΪĽ.	11	1		1	
	Macropus robustus Wallaroo or Oryctolagus cuniculus European R Tachyglossus aculeatus Short-beaks Mus musculus House Mou Notomys mitchellii Mitchell's H Pseudomys hermannsburgensis Sandy Inlat Ctenophorus cristatus Bicycle Dra Ctenophorus cristatus Western Ne Moloch horridus Thomy Det Pogona minor Bearded Dra Pogona minor Bearded Dra Underwoodisaurus milii Barking Ge Diplodactylus granariensis Diplodactylus granariensis Diplodactylus granariensis Mulga Snal Gehyra variegata Heteronotia binoei Heteronotia binoei Bynoe's Ge Delma australis Mulga Snal Ctenotus atlas Common S Cryptoblepharus buchananii Ctenotus atlas Ctenotus schomburgkii Ctenotus atlas Ctenotus uber Egernia formosa Eremiascincus richardsonii Broad-band Lerista muelleri Lerista picturata Liopholis inornata Norde-band	Mitchell's Hopping Mouse	12	1	1			1	1		
	Macropus robustus Wallaroo of Oryctolagus cuniculus European I Tachyglossus aculeatus Short-beak Mus musculus House Mo Notomys mitchellii Mitchell's Pseudomys hermannsburgensis Sandy Inla Ctenophorus cristatus Bicycle Dr Ctenophorus cristatus Bicycle Dr Ctenophorus cristatus Western N Moloch horridus Thorny De Pogona minor Bearded D Tympanocryptis cephalus Pebble Dra Underwoodisaurus milii Barking Gr Diplodactylus granariensis Diplodactylus granariensis Diplodactylus pulcher Lucasium maini Lucasium maini Oedura reticulata Parasuta monachus Pseudechis australis Mulga Sna Gehyra variegata Heteronotia binoei Bynoe's Gr Delma australis Common S Cryptoblepharus buchananii Ctenotus schomburgkii Ctenotus schomburgkii Ctenotus uber Egernia formosa Eremiascincus richardsonii Erseta muelleri Lerista muelleri	Sandy Inland Mouse		1.71			1.1	,	10	\square	
Reptiles	And the second second			1				1.000		-	
Agamidae	Ctenophorus cristatus	Bicycle Dragon	X)-1	х		-1) =		X	13
12		Mallee Sand Dragon	2.2	1.91	1	18.1	2.1	х		12.1	
		Western Netted Dragon	2.0	213			2.2	1.22		1.15	2
		Thorny Devil	1-		[_]		1		12		X
	Pogona minor	Bearded Dragon	1 -							í	
 A. A. li>		Pebble Dragon	15	111	111	1.111	11	1	1.00	-	
Carphodactylidae		Barking Gecko		18	1.11	Х	51	1-1	1.1	1	
Diplodactylidae	Diplodactylus granariensis		1	(0)		$\{-\}$	31		1.3	10.	
and a second second second second second second second second second second second second second second second			Х	100	1.1	10.1	11	1-11	1.2	100	X
1			\equiv		1	l. L.	11	1	1.1		2
			х	25		1	11		1.1	-	_
			1.	11	1.1	11.			1.1	1	<u> </u>
Elapidae			1	123							
e		Mulga Snake	-	3.61		124	21) III	111		-
Gekkonidae				12	1	Х	22	1	2.4	1	2
		Bynoe's Gecko	-	121			11		1.1	1	X
Pygopodidae			-	1	_		-				-
		Common Scaly Foot	1.5	-							-
Scincidae		A		1.11	-	104	-	-		-	
Access and a second second	THE CASE OF CASES OF CASES			11		1.00	-	X	1		-
			1	1.11	-	12.1	2.1	X			
			_			-	1			-	2
			-	-	-			-	-		
		Broad-banded Sand Swimmer	-	-	-	-	-	1	1		-
-			-	-		-	-		-	-	-
			-	1.115	v	14.1	1.1	1.05	5.3		
				1	X	100	-		1	-	x
	Morethia butleri		-		-			-	-		Λ
	Morethia obscura		-		x		-	A			-
	Tiliqua occipitalis	Western Bluetongue	-	1.1	Λ	1 (1) (1) (1)	-	1	1.11	-	X
	Tiliqua rugosa	western Directongue		1.1	-	1.00	-	1	1.1.1	-	X
Typhlopidae	Ramphotyphlops australis		-		-	-		1			Λ
Thuopidae	Ramphotyphlops hamatus			1	1.11	100	-	-		-	-
Varanidae	Kampnotypniops namatus Varanus gouldii	Bungarra or Sand Monitor			x	1.1			-	-	
	I WIND EVANAL					1000			100 C	A	

		Survey					B	_	-		
Family	Species	Common Name	Dordie Rock NR #1	Dordie Rock NR #2	Dordie Rock NR #3	Dordie Rock NR #4	Kurrawang NR#3	Kurrawang NR #4	Kurrawang NR #5	Kurrawang NR #6	Kurrawang NR #7
	Varanus tristis	Racehorse Monitor	he.	1.00	6.1		12	5	6.1	0.1	1

Chapman A; Kealley I; McMillan D; McMillan and Rolland; G (1991b) Biological Surveys of Four Goldfields Reserves. Landnote 1/91; 1-238

Appendix B(6). Vertebrate fauna recorded in biological surveys in the region

Family	Species	Common name	W.	.A. M	useui	m Sur	rveys (1992		enzie	e and	Hall			Th	omp	son u	nput	olishe	d dat	a set				Cha	ртаг	n et al	. (199	91b)	
			Qpv	Qqs	Qas	16	Agb	Qqz	Qps	ls.	rg.	Crossroads	Davyhurst	Poodplains	Gimlet	Golden	alace	tose	salmon Gums	security	spinifex	Vendy Gully	CNR #1	KNR #2	CNR #3	KNR #4	KNR #5	CNR #6	KNB #7
Casuariidae	Dromaius novaehollandiae	Emu	- V	11	14		-	-			23	Ĭ	-		-	×		-		1	1	-		-				1	X
Megapodiidae	Leipoa ocellata	Malleefowl	10.00	1000			11.1		X	X	X		12.2	1.2.0		0.000	1.1.1	1	1			00.20		2.30		1 1		107	1
Anatidae	Anas gracilis	Grev Teal	1.1	10			1		1.20		10.3	1	17.22	1	1.22	122.1	1.1		1			12.7		11 11	1	1	1	100	1
	Hamirostra isura	Square-tailed Kite		part of	1.000	-	1		1.000	1					1	t age of	1.1		1	1	1	1.000		10.00	1		1	X	1
	Haliastur sphemaus	Whistling Kite	1.1			1	2				11		11.1	-		2.00		-	1			1.02		24.3					T
	Aquila audax	Wedge-tailed Eagle	-13100		12.1	2	100	100		0	11.0			0.00	1201	Cont.		2	1		110	1		200	2 20	1		1	
	Circus assimilis	Spotted Harrier		1.1	1.000	-		1	1.000				1	B		1	1			1.000	h ment			1	-		100 mg	-	1
Falconidae	Falco berigora	Brown Falcon		1	1.000		1	2	2	1	10.00				1.2.4		1.1.1						-				-	-	+
	Falco cenchroides	Australian Kestrel		1		1	1	-	1 m	1			1							1	1	1			-	1	1	1	X
Columbidae	Phaps chalcoptera	Common Bronzewing		4		3	1	2			1			100		0.00											\mathbf{T}	-	1
Conditional	Ocyphaps lophotes	Crested Pigeon		2		1Ť	-	-			1				1				1			-	-			1		1	X
Psittacidae	Cacatua roseicapilla	Galah		10		-	24	1	-	1	-	1	-	-	-	-		-			-	-	x						X
1 SINGCIGAC	Cacatua leadbeateri	Major Mitchell's Cockatoo		10		-		-		-		-	-		-				-	-	1		-	1			-	1	- 1
	Nymphicus hollandicus	Cockatiel	-	15		1-	1	-	1	1		-	1	1	1		10.00	-	-	-	-	-	-	1	-	-	-	-	+
	Glossopsitta porphyrocephala	Purple-crowned Lorikeet	-	3		6	7	7	-	-		-	10			-	-	-	-	-	-	-	+	-		+	-	+	+
	Polytelis anthopeplus	Regent Parrot	-	-	-	-	-	1	-	-			-	-	1.0	100	-	-	-	-	-	-	-	v	x	-	-	-	X
	Barnardius zonarius semitorquatus	Australian Ringneck		67	11	16	6	7	-	-	3	-	-	-	-			-	-	-	-	-	+-	A	A.	-	-	+	10
1	Platycercus icterotis xanthogenys	Western Rosella	-	05	11	10	0	1	-	-	2	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	+	+
	Platycercus icterous xaninogenys Platycercus varius	Mulga Parrot		1	7	1	16	-	1	4	4	1	0.1			100	1.00	-	-	-	-	-	+	-	-	+	-	-	x
			-	1	/	-	10	-	1	2	4	-	1	-	-	-		-	-	-	-	-	-	-	-	+	-	-	-
0	Melopsittacus undulatus	Budgerigar Pallid Cuckoo	-	4	1	1	1	100	4	4	4	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	+	+-
Cuculidae	Cuculus pallidus			4	1	-1	1	1	2	-		-	-	-	-		-	-	-	-	-	-	+	-	-		-	+	+
	Chrysococcyx osculans	Black-eared Cuckoo		2	1	<u> </u>	2	2	1	1	5	-			-	1.21	-	-	-	-	-	-	+-	-			<u> </u>	+	+
0.111	Chrysococcyx basalis	Horsfield's Bronze Cuckoo		2	1	1	3	4	4	1	5	-	-	-	1.00	-		_	-	-	-	-	+		-		-	+	+
Strigidae	Ninox novaeseelandiae	Boobook Owl	-	-		1	-	-	-	-		-	-	-	-	-		-	-	-	-	-	-		-	-	-	+ ++	+
Podargidae	Podargus strigoides	Tawny Frogmouth		-	1	-	3	-	-				-		-	-		-	-	-	-	-	-	-	-		-	X	_
Aegothelidae	Aegotheles cristatus	Australian Owlet-nightjar		_	-	-	-	1	-		1.1	-	-	1.23	1.5		1.1.1	-	-	-	-	-	-	1.00	-	-	-	X	-
Halcyonidae	Todiramphus pyrrhopygia	Red-backed Kingfisher	-	-	-	2		1	-	-	1.1		-		h		1 - 1		-	-		-			-	-	1 mar 1	-	-
	Todiramphus sanctus	Sacred Kingfisher			-	-	1	1	-		-	-	1		-	0.41	2	1	1 - 1	-		C - 24	-	200	-	-	-	-	-
Meropidae	Merops ornatus	Rainbow Bee-eater		19	-	10	1	6	-	12	6		-		-	-	-	-	-	-	-	-	-	-	X	X	х	-	+
Neosittidae	Daphoenositta chrysoptera	Varied Sittella		15	1.0	-	1000		6		1.1	1.00	1.0	1	1	1-1	0.0			-		1000	_	10.00	-	-	-		+-
Climacteridae	Climacteris rufa	Rufous Treecreeper		4		-		-	1	-	-		1					-	_	-		-	-		-	-	-	-	-
	Climacteris affinis superciliosa	White-browed Treecreeper		-	-	-		1	-				5.2		1	1		-	-	-	-			5 -	_	_		-	+
Maluridae	Malurus lamberti	Variegated Fairy-wren			1.000	_	45		-	1	20			1	1.5	_			-	-	1000		-	1.00	_	_	-	-	+
	Malurus leucopterus	White-winged Fairy-wren		10	1	_				-	-	-	12.0	i	1	1		· · · · · · ·	_	-		_	-	24.3	-	-	1.00	-	-
	Mahurus splendens	Splendid Fairy-wren			-	-	1				1.5			1.0	-	C		1	1.00	-		()		28.0	_	_	1.1	-	X
	Amytornis textilis	Thick-billed Grasswren			-	-		-	-	-		-	1	-	-	-	-	-	-	-	-	_					_	-	+
Pardalotidae	Pardalotus striatus	Striated Pardalote		56	1000	9	1	5	1	7			-		1.00	1	1.1	_	-				Х	X	X	X	1.000		4-
Acanthizidae	Acanthiza apicalis	Inland Thornbill		-		14	22	14	9	4	14		1	· · · ·	1.		-	-	-	-				1	-	1.00	-	X	
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill	1000	-		4	47	-			1.00	-	12.2	2.0	-	00.1			1	-	1	1		100	-	X	X	-	+
	Acanthiza robustirostris	Slaty-backed Thornbill					2	-	1				-		1.00	1	2.2	1	-		-		1	1.1	_		-	-	+
	Acanthiza uropygialis	Chestnut-rumped Thornbill		2	33	25	67	42	2	3	12	-	1				1.00	_				-	1			Х	Х	-	+
	Aphelocephala leucopsis	Southern Whiteface		-	100	1	18	1.7.6	$\{ i_1, \dots, i_n \}$		2		1		-	1	1.1		_			1		<u> </u>				_	1
	Pyrrholaemus brunneus	Redthroat	10	1	2		14	6	2	1	7	100	125	(i - i)	11.4	1.01	2-2	1	-	100	100	1000	1	29	1000	100	24	-	12
	Smicrornis brevirostris	Weebill	1.1	155	12		15	137	42	55	40	1.00	10.00	1.000	112	1.				1.000	1.000	1.000	X	X	Х	X	Х		
Meliphagidae	Lichmera indistincta	Brown Honeyeater	1.1			30	2		1		2		1.1			122.5	1.1.1	1	1			1	12 1	1.11			Х	1	
	Lichenostomus virescens	Singing Honeyeater	1,0000		9	15	10			1	11.4		11.1			0 1	111					12.2		12.20		1.0			
	Lichenostomus plumulus	Grey-fronted Honeyeater		-		1	1	1.20	1 =	2	11 12	1	12.2	11	11.7		1.1	1				11.1	1.1	1.2	1	1		1.5	

Family	Species	Common name	W.	A. M	useun		veys (1992	McK)	enzie	and I	Hall	_	-	Th	omp	son u	mpub I	lishe	d data	a set	-	-		Cha	pman	1 et al	l. (199	1b)	
			Qpv	sb0 30	Qas	SA	Agb	Qqz	Qps	Ts	Tg	Crossroads	Davyhurst	Floodplains	Gimlet	Golden	Palace	Rose	Salmon Gums	Security	Spinifex	Wendy Gully	KNR#1	KNR #2	KNR #3	KNR #4	KNR #5	KNR #6	KNR #7
	Lichenostomus ornatus	Yellow-plumed Honeyeater	-	30	-	8			-	-	1	_	-			-	-		-	-		-	X	X	-	X	1 m 1 m 1 m 1 m 1 m		X
	Lichenostomus leucotis	White-eared Honeyeater		3				7	2	1	1		I.,		1 - 1	-		· · · · · ·					-	-	-		X		È.
	Melithreptus brevirostris	Brown-headed Honeyeater		_		5		17	9	_			21.20	1.0	-			-		-		-	-	-	-				-
	Phylidonyris nigra	White-cheeked Honeyeater						7			1		1			-			-	-		-	-	-	-	-	-		-
	Phylidonyris albifrons	White-fronted Honeyeater		11	17		4	15	6	15			10.004	-	1.	1	127	1	1 1	1	1.000	1.000	-	-		1	-		-
	Manorina flavigula	Yellow-throated Miner		86	52			2	10	1	1	-	1	-	-	1				-	h hard	-	-	X		-	1	X	X
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater	0.0	10	20	14	21	13	13	12	22		. 0	-		-				-	-		+	X			-		
	Anthochaera carunculata	Red Wattlebird	-	31	-									-					-		-		X	X	X		X		X
Pomatostomidae	Pomatostomus superciliosus	White-browed Babbler		5	1	28	23	1.1.1	1.21	3	18	1.2.2	274	1.7.1				-	-			1	1	1	-	1	1		
Petroicidae	Eopsaltria griseogularis	Western Yellow Robin	0.0			0	1.	-	1 70	1.1	17.2	122	11 10	1.0				1	1					1		1			
And a second sec	Microeca fascinans	Jacky Winter		11	1	6	1	8	1.27	1.1	17.1	12.5	パゴ	1.1		120)	1			-	X	-			X		
	Petroica cucullata	Hooded Robin		1	1.000	1000	1	1.00	1-10-1	1.00	$\{0, \dots, 0\}$	1.00	10.004	10	121	100	1.1		1	-	1.00	1.00	10 mil			1	1.00		-
	Petroica goodenovii	Red-capped Robin		5	5	6	187	14	1.01	5	7		14.3	1	1.1	1	1.1.1		1		1.00	1					1	_	X
Cinclosomatidae	Cinclosoma castanotus	Chestnut Quail-thrush				0			1		1214	1.1	1 0	1.1.0		C : 1	\geq	(-1)	C = 0			0	1216	1000	-		X	X	
achycephalidae	Oreoica gutturalis	Crested Bellbird		5	5		6	5	1	2	2		12.1	1.1	111	1.0	111	1.55	1 - 1		1	10.00			X	X	X		X
	Pachycephala rufiventris	Rufous Whistler		1000	-	A	7	10	1	5	8	1.1	100		1	1.	17.1			1.000				1.00			1.00		1
-	Colluricincla harmonica	Grey Shrike-thrush	1.1	1	1.	1	9	7	1	11.11	2	1111	1, 11	1	1	.cz. 1	100	I	1	11-1	11-1	1.20		1.3	1	100	X		X
Dicruridae	Rhipidura fuliginosa	Grey Fantail		12.0	1	0	1	11.4	1	1.13	1	121	11 30	1.0		00.1			1 1	121	101	12.22		12.30	12.220	1.1.1			1
	Rhipidura leucophrys	Willie Wagtail		1	1.1	2	172	1		15-11	1.1	111	13	1	1	1	1.3		11	11.1	11.1	11-1		1.2	1	1	1.1		
the second second second second second second second second second second second second second second second se	Grallina cyanoleuca	Magpie-lark	1.1.1	6		1	9	12.1				1	100.1	1		100	$\overline{\mathbb{I}} \times \overline{\mathbb{I}}$		i = 1		I Lat	10.00	1	10.2	1 =:				X
Campephagidae	Coracina novaehollandiae	Black-faced Cuckoo-shrike		13	6	9	5	2		1		1	20.0	0	101	C = 1		1.00	[1 = 1]				X	200	12 300	1.700			X
	Coracina maxima	Ground Cuckoo-shrike	101	4	R. 7	1	1775	112.5		12.71		1.1	201	1	1	100		1	1277		104	1100	17-7	1200	1	1	121.		X
	Lalage tricolor	White-winged Triller	1.00	1.1	2	1	1	0.00	-	1.000	10.00		10.007	1			111	-			1.0	1.0.10		1.000	0.000	1	10.00		
Artamidae	Artamus cinereus	Black-faced Woodswallow		1		7	1	11.1		1			1. 11	1	1-1	1111		1		1		1		1.11	1	1	X		
	Artamus cyanopterus	Dusky Woodswallow	1000	3	1.11	0	2	112	10	1.11			11 30	1.1.0		0111		1	1 0	1		00.00	10 11	12.22	1.110	1.23			
	Artamus personatus	Masked Woodswallow	1		1.11	1		111	1	1.11	11 11	1111	ガゴ		$I \equiv 1$	12.1	11	=	1	1		1		10.77	1,77	1.03	12.1		
Cracticidae	Cracticus torquatus	Grey Butcherbird		3	5	1.00	2	7	$\Gamma = 1$	1	1	1.00	12.018	p	121	1.1	E:1		1	-	p 1	1.00			X		$[1,\dots,n]$		X
	Cracticus nigrogularis	Pied Butcherbird	101	9	0.4	2	2	1	1	1.00		1	14.1	1	1.1	1.1	1.1		1	1	1.00	100	(12.24)	X	X	X	120		X
	Cracticus tibicen	Australian Magpie		30	2	4	17.25	14	020	1	I K	1.1	20.0	12.0		C 1	\geq	1	0			0	210	12/20	17.00				X
	Strepera versicolor	Grey Currawong		7	2	7	1	2		1							i i i	1.00				10.00						X	X
Corvidae	Corvus bennetti	Little Crow			1.1	-	10.00		1			1.1.1	1		1	121		· · · · ·				1	(1	· · · · · · · · ·		1		X
Hirundinidae	Hirundo neoxena	Welcome Swallow			4	0		1.1.1	1 10	1.1	11		17 10	0.10		0111			1 0			00000	100	17.20	1.2.0	1.1.1			
	Hirundo nigricans	Tree Martin		4		-	1,	1111	177			1	たば	1	1.22	121	200	1	1	1	1	· · · · · ·		17.22	100	1 1	12.1		
Dicaeidae	Dicaeum hirundinaceum	Mistletoebird			1		2	4	1	1.00	12.3		1 = 1		124	1	111		-	-	p 1	1.00		10.00	1	1			
Passeridae	Taeniopygia guttata	Zebra Finch		10.51	5.1	ī	9	1.1		A	1	1	12		1.1	1.44	2-3				p	1.00	(D	37-3			1.1		
Motacillidae	Anthus australis	Australian Pipit		1		0	121	275	2	0	12 0	1.1	I = 0	110		C = 1			0			0		100	1 310	1.70			X
Myobatrachidae	Neobatrachus sutor	Shoemaker Frog	8	1	1	1.	1	1	174	1200	1	7777	100		100	100		1	1	1	100	104	1777	120	1	1	101		Ē
	Neobatrachus wilsmorei	Wilsmore's Frog	1111	1	1	1	1	12.2			IT I					11.1	1.1			100		1		1.1.1.1	1.22	1			1
	Pseudophryne occidentalis	Western Toadlet	2		1.1	5	11.11	1.1.1	1 111	1.13			11 10	1 0		0.5			1	100	1	0		17.70	1	1.1.1			
Gekkonidae	Diplodactylus assimilis		111	1		1	122.1	1.1.1	1.21	11.11			17 11			1200	1.1	174		1		1		X	1	1	12.2		
	Diplodactylus granariensis		1	2		4					100.00		74	1			62			8	77	76		X	1				
	Diplodactylus maini			3	1.	5	1	1	1.14		1	9	9	1	60			69		1	9	1		X	1				
	Diplodactylus pulcher	-< p-		2	1	\sim	01	2				80	84	12			87	100	8	123	53				120	1.20			X
	Nephurus milii		111	1.77	1277	2		5		1000	1	2	16	10	18	22	22	10	31	100	11	28		100	1	-	1000		
	Nephrurus laevissimus				1							1			1.	1			1						a second				
	Oedura reticulata		11	1	124	1	1	1.1	1.1.1			1	1		11.1	1.1.1	1.2	4	-		11.	110		1.1	11.77	11.77			Ē
	Rhynchoedura ornata			12.1	1		10.10	100	3 20			41	5	1110		23	20	106	3	1 = 1	4	9	1 2	12.2		1111	100		Γ
	Strophurus assimilis			1	11.31	11	-	1.1.1	1.71	10.11	1.1		1	1 - 1	7	19		111	1	1	44	112	1		11 11	11.11			
	Strophurus elderi			1	3			-	-			-		-	-	-	1	-		1	1	1	1-	1-	1	1	1	\rightarrow	<u> </u>

Family	Species	Common name	W.	A. Mu	iseur	n Su	(1992		enzie	and I	Hall			The	mps	on u	npub	lishee	l data	a set				Cha	pmai	1 et al	. (199	1b)	
			-									1							sm			A							T
			Qpv	Qqs	Qas	As	Agb	Qqz	Qps	rs	Tg	Crossroads	Davyhurst	Floodplains	Gimlet	Golden	Palace	Rose	Salmon Gums	Security	Spinifex	Wendy Gully	KNR#1	KNR #2	KNR #3	KNR #4	KNR #5	KNR #6	and the second
	Gehyra purpurascens		0	0	0	×.	~	0	0	-	T	6	1	-	1	1	9	<u>×</u>	1	S	1	>	×	×	X	¥	¥	×	t
	Gehyra variegata		-	3	1	2	3	6	1.0	1			38	1	37			37	14	39	23	12	1	x	-		-	-	+
	Heteronotia binoei		2	_	1	_	_		1	-			16	-	9			13				8		-			\mathbf{r}		
	Underwoodisaurus milli		- Ĩ		-	-			-		1				-							-		X	-				t
ygopodidae	Delma australis				1	1 -	1		-		-		4	-	3	2	9	2	1	-	8	5	+	-					t
(A-P-I-I-I-I-I-I-I-I-I-I-I-I-I-I-I-I-I-I-	Delma butleri		1.1	1	h.,		1		1	1000	12.21	2			-	-			-		4	2		100.0					t
	Delma fraseri		1000	100	3.6		1 = 1	10	100		12.5	1	0	1		0.1		1		100	1	e .		100	1.00	1.00	100	-	t
	Delma nasuta		100	1101	1.000	1	1		4	1000	1	a series of	10		1.11		111					1.00	-	100	· · · · ·	1	100		T
	Lialis burtonis			1	2	1	1	1			11 11	1.2.2	- 1				1.12	-			5	3	1.000		1	1			t
	Pygopus lepidopodus		10.00	12220	-	0.00	177.12		1 70	1.1		127	2	100	1	100		1	3	1	2	1		12.30	1 2 0	1.00	12.2		t
cincidae	Cryptoblepharus plagiocephalus			1	4	1	1,000	1	1.00		12 13	121	10		12	1	5	7	3	3	1	1.200	12.22	10.0	1.001	1	1		T
	Ctenotus atlas				6		1	2	12	6	(1 - 0)	1	-		100	1.00	1	100 million	1	1	16	104			1	X	1		T
	Ctenotus leonhardii		24 2.1	1001	i and	T	1	1	1	-	11		1.1		1.2.2	1	1-1		1		i	i.		200	1	1.1.1	1.00		T
	Ctenotus schomburgkii			100	1	0	1 CHC	6	100	1	11 2		10.0		10	Ċ., 1			1.4.0	2	2	1		3 20 0	11.00	X	1000		T
	Ctenotus uber		100	7			2	1.11	1.55		16.11	27	29	13	48	5	3	6	44	46	25	1.00		1.1	1.1				Т
	Cyclodomorphus branchialis					1	1	12.2		100	100	1.11	1.00							p	p	100		X			1000		T
	Cyclodomorphus melanops elongatus			1	1	÷	Contract	112	3	1.00	1	12.1	1	1	2	6	2	1	i	1	24	1		1.11	1	1	10.1		T
	Egernia depressa			1.21	1.1		X	4	3 30	1.1		121	57	111	68	2	2	3		27	15	1		12.3	0.000	1.20			1
	Egernia formosa		11111	1	11.11	11	1	3		1.1		1	8				1	14	4	8	1	17.5		110	1	1	1		
	Egernia inornata		1	1	1			1	1.24	24.3	1: 1	1.11		1.21	10.2		8	71	4	2	1	2	(1 = 1)		1	1	1.11	1000	
	Egernia striata							100	10		$ 1 \leq 1 $	1.1.54	7,11	111	10	C			2	9	120	1		1.00	1 20	1.70	100	1	1
	Eremiascincus richardsonii		1	11.41	10	1		1.1.1	1	100	1	2	5	111	4	4	1.1		6	6	3	1	1.00	120		1	101	-	
	Hemiergis initialis initialis			t < 2 t		1	11.000		1	$[1,2,\ldots,2]$	10.00	$\gamma \to 0 \to 0^+$	4		5	1.00	$0, \cdots, 0$	1.00	1	1	12	4			a	J			
	Lerista muelleri			3	2	2	1000	1	1	1.11	12.23		22	1	4	3	6	6	15	1	5	2	1.1	1. 11	1	1	12.1		
	Lerista picturata			2	_	1	11 H	1	8.30				18	1.0	17	-	5	5	20	1.5	14	20	1 2 2	12.2	1.20	1.20			
	Menetia greyii		24		1	1	1		1.27	1.1	11-11	4	19	1	3	6	23	18	3	17	6	1		15.23	1	1 - 1			10
	Morethia adelaidensis		1.00	1	1.000	11	1		1.000	1.000	$\{1,\dots,n\}$	1.000	1000		1	Figure 9	100	1000		1.000	r = 1	1.00		1.000	1				
	Morethia butleri		-41.1	1	1.4	2	1	1	1	1.00	1		14		1	1.11	6	17	7	4	4	1.00		1		-	1.00		
	Tiliqua occipitalis		- 01 00 0	(1120)	-	G	1	96	1		3	_	1	- 0	1.0	2	1		1	3	5	4			0	100	100		12
	Tiliqua rugosa			2	3	7	Locality.	5	2	1.00	2	1	3	1	1		1.1	1		2	2	1			1.00	1	_		12
Agamidae	Caimanops amphiboluroides				1. 11	1.1	1	1	1.0	1	11 11	1	-					1		7		-	-	1.1	-		_	-	1
	Ctenophorus cristatus			3	111	-	11.1	4		-	11.2	1	3		5	1	10	4	1 10	-	1	-	-				-	X	1
	Ctenophorus femoralis										1		-		-		1.2			1	-		-	-		-	-	-	+
	Ctenophorus fordi				4	-	1	4	5	4	1	-			-				-	-	1	-	+		-	X	_	-	÷
	Ctenophorus isolepis citrimus			1 Page 1	1.0	-			-		1.0		-	-	-					-		-	+	-	-	-	-	-	÷
	Ctenophorus maculatus		-	-	-	-	-	-	-			-	-	-	-		1.1	-		-	-		+	-	-	-	-	<u> </u>	+
	Ctenophorus nuchalis		-			-	-		-				-		-	-		-	-	-	-	-	+-	-	-	-	-	-	+
	Ctenophorus ornatus Ctenophorus reticulatus		-	5	3	-	7	8	-		4	6	4	-	11	10		18	3	29	-	3	+	-	-	-	-	<u> </u>	+
	Ctenophorus reliculatus Ctenophorus salinarum		-	2	2	-	1	0	-		4	0	4	-	11	10		10	2	29	-	2	+	-	-	-	-	-	÷
	Ctenophorus scutulatus			-	8	-		9	-			-	2	- 1	1	3	1	-	-	3	-	12	+	-	-		-	-	÷
			-	-	0	-	-	-	1	3	2		-	-	1	2	1		-	3		1		-	-	-	-	<u> </u>	+
	Moloch horridus Pogona minor			-	1	1	1	2	4	3	2		5	2	3	14	3	2	2	14	13	17		-	-	-	-	-	+
	Tympanocryptis cephala		-	1	-	1	1	4	-	1	.4	21	11	2	7	14	2	.4	2	14	15	1	+		-	-	-	-	÷
/aranidae	Varanus caudolineatus			-	1	1	3	4	1		1	9	10		15	1		1	11	17	1	9	+	-	-	1		-	+
arannar.	Varanus gouldii		100	2	1	-	-	1		1	1	_	10		9	9	3	7	8	1	5	,	+	1.0	1.1.1	1		-	+
	Varanus goulan Varanus tristis			4	1		1	1	1	1	1	4	5	1	1	7	-	/	3	1	3		+		1	1-	+	\vdash	+
Typhlopidae	Ramphotyphlops australis		-				-		1		1. 1	7	8		14	1.00	7	2	7	-	14	6	+	-	1	1	\vdash	-	+
Thurbuac	Ramphotyphlops bicolor			-	-	-	-		1			'	0	-	1	-	1	4	/	-	14	1	+	-	-		1	-	+
	rumphoryphilops or otor		and the second	1 manual			1		1	1.00	1.000		1.1		1		10.1	1	-		1	1 1		1		1	1	<u> </u>	1

Family	Species	Common name	W.	A. M	iseun		veys (1992		nzie a	nd Ha	n	~	Т	homp	son u	input	olishe	d data	i set				Cha	pman	i et al	. (1991	.b)	
			Qpv	Qqs	Qas	As	Agb	Qqz	Qps	[s	Prossroads	Davvhurst	floodplains	Gimlet	Golden	Palace	Rose	Salmon Gums	Security	Spinifex	Wendy Gully	KNR#1	KNR #2	KNR #3	KNR #4	KNR #5	KNR #6	KNR #7
	Ramphotyphlops bituberculatus			1	1.00					- 1	1.1	2		2	2	2	1		1	1						1.1		
	Ramphotyphlops hamatus	1			1.000	5 - I	0.00	111	1.22	111	1	3 1)	24	18	7	6	10	2	9	9		1.1	1	1			
Elapidae	Brachyurophis semifasciata	Southern shovel-nosed snake	- 1000	- 22.30	12.22	00	110 12	1.1.1	1.000	100	14	6	2	6	5	2	1000	7	1	9	0.0.003		12.0	0.00	0.00	0.15		-
	Demansia psammophis psammophis	Yellow-faced whipsnake	1.1	1-2	1000		1	12.2	1.22	. 11	11	1	0	4	1.00	1	1	1	1	1	3		1.1	1-1	1 1	1		-
T	Parasuta monachus	Monk snake	1		1.000		1	1	127	1.1	2	9	2	4	3	11	3	7	4	2	6			1.000	1	1000	-	
	Pseudechis australis	Mulga snake		10.21	1000	T	1	1.1.1	1	1.	1	2	S	1 400	1	1.0	1	1	1	a			100	1.2.7		Sec. 4		
	Pseudonaia modesta	Ringed brown snake		1	000	a	121	2	100	1	30	1	D		2		2	1770	100.00	1	1	200	1 1 = 10	12.330	3 310	100	100	23
	Pseudonaja muchalis	Gwardar	111	100	1711	X	1000	1.00	101	11	10		1	1 1 1 1	1.001	1	1.000	1		1	1.772	1000	100	n m	1000	1010		
	Simoselaps bertholdi	Jan's banded snake			1		1.		1		2123					2.12	1	1	-	1.1	1			1	1	1.000		-
	Suta fasciata	Rosen's snake	10.0	122.00	1.77	0.000	111 11	1.1.2	1 330 1	100	1.0	12	0 (11)	3	0.000	1.2.2.2	1000	2	1	17.7	0.111	12 22	12.2	1771	122	10.3	111	
	Suta gouldii		1	1	1.11	1	100.01	1111	1.22	111	1111	10	11	1 1 1	12.1	1.1	1	177	1001	11.1	100.0	1.1.1.1	17.21	11	1	11	1.00	
Fachyglossidae	Tachyglossus aculeatus	Echidna			1.000		1	1	1-101		110				1.00	T = 0		1		$p \to 0$	1.000 million			2nd	2nd	1.000		
Dasyuridae	Antechinomys laniger	Kultarr	11	1001	Card.	· · · · ·	1000	11.2	10.1		11	21	3	1 1.00	i and	1.1	1	1	1	1.00	12.1	1	221	1	1.27	100		
	Ningaui ridei	Wongai Ningaui	- C 0 3	1000	1000		1001	1	11		12	X	20	1	X		X	X	0.000	X	X		201				1.00	24
	Ningaui yvonneae	Southern Ningaui		1.5.1	111	1	1.1	111	1111	11	111	X		1.00	X	1.1	X	X	100	Х	X		1	h 11	10.11	111		
	Pseudantechimus woolleyae	Woolley's Pseudantechinus	4	1.000	1000		1	100	C	1.1			1	1.0	4.000			(1	1	7 Section	-	1	1	P	1000		
	Sminthopsis crassicaudata	Fat-tailed Dunnart	2	5	1	1	1	2	1		2	6	108				28	5	4	2	24		10.00	2	1	12-1		
	Sminthopsis dolichura	Little Long-tailed Dunnart	1	3	7	4	4	8	2	1 (5 1	1 4	7 2	15	25	36	28	34	46	63	32		12.20	100	0.000			
Macropodidae	Macropus fuliginosus	Western Grey Kangaroo	1101	2	8	6	1	7	1.11		11	11	1	1	1.00	1		1000	177.7	17.3			1.57	11	1.01	1.1	101	X
1. Aug. 1. Contraction of the second s	Macropus robustus	Common Wallaroo, Euro		1.111	5.00	2	4	104	1.2.2	11	1.1	1	111 =	i in i	10.1	1:1	1		1 - 1	1.1	1.000	12.223	=	1 = 1	1	1.1	1.1.1	Х
	Macropus rufus	Red Kangaroo	1	15	10.1	8	1000	3	10	200	973	35	0 20	0.000	C.35		1.50	1.0	1	1.77	0.2	100	1400	1.20	3.710	100	100	R
Burramyidae	Cercartetus concinnus	Western Pygmy-possum		8	2	1	1000		121	- 1 I I I I I I I I I I I I I I I I I I	1	7 3	1	62	32	20	22	15	8	23	16	2	100	P-122	1	1010	1000	11
Vespertilionidae	Chalinolobus morio	Chocolate Wattled Bat	1	3	1.01	-	A regime p	3	(11		1	100	1.1	1.1.2	1.77	1		10.0	1			1				
	Nyctophilus geoffroyi	Lesser Long-eared Bat	1	2			11	1			1.11		1	1	1-1	1.2	1	1	1		1	1	1. 11	1	1	1		
	Nyctophilus gouldi	Gould's Long-eared Bat	10	42	1.11	3	1.12	4	3				00000		D. 1		1	1 10	0		01	0.00	12.30	1.20	1.210	1.1		
	Scotorepens balstoni	Inland Broad-nosed Bat	2	11		1	1,22,21				112	11.5	1	1.00	100	12.1	1	1	1	1	11.1	12 = 1	17, 27	11	1 = 1		1	
	Vespadelus regulus	Southern Forest Bat	1	5	1.000		-		1.101						1	$\overline{f} > \overline{g}$		1 1		$p \to 0$	1.00		10.000	1				
Molossidae	Mormopterus planiceps	Southern Freetail-bat	11	8	Course of	1		-1.4	1		1		1	1.00	1.1.1	1.1			1	1.1	104		1			1.11		24
	Tadarida australis	White-striped Freetail-bat	5	17		1	101	6	1_0	2 3		1	.0 D	2 201	C1	1	1	0	1	1	011	ET IIK	100	1.00	1	1000		24
Muridae	Mus musculus	House Mouse		13	1	4	8	11	8	4	1	8 1	31	25	2	24	22	6	10	26	13		1.1		1			
	Notomys alexis	Alexis Hopping-mouse				1	1		1	14	1.1		1		1.1		1			1.1			1. 1.	: II.	1	-		
	Notomys mitchellii	Mitchell's Hopping-mouse	- 1911, 11		1.18	11		2	3	7	-	1		0	12.2	2.3	1.77	1.0	1	1.7	07,27		12 20	1 20	100	1		
	Pseudomys bolami	Bolam's Mouse	2		9		1001	271			5						24	30	1	9	5	1	17.2	1 - 1	1 1	1	-	
	Pseudomys hermannsburgensis	Sandy Inland Mouse		-		-	1	2	6	2 3	2 2	9	2	5	3	4	14	9		8	5	1	1	1	b 1			
Canidae	Vulpes vulpes	Red Fox		1000		1	11	1			21.	1.		1 10.0		1000	· · · · ·	1		10.5	1	1	-			$i = i_1$	100	

Appendix B(7). Vertebrate fauna recorded in biological surveys in the region

Family	Species	Common Name	-	-		-	1-1	1	4		-			-	-	-	B		1	С
															Ť		Ĩ			
Casuariidae	Dromaius novaehollandiae	Emu	x		x				_	x	x			_			x y	-	-	x
Megapodiidae	Leipoa ocellata	Malleefowl	A	-	^	-			-	^	X		-		-	7	<u>~</u> /	- T	-	~
Anatidae	Anas gracilis	Grey Teal			1.1	-	-		-		-		-		+	+	-	+	+	-
Allalluac		Black Swan	_	-		-		+ +	-		-		-		+	T	-	+	+-	-
	Cygnus atratus Tadorna tadornoides	Australian Shelduck			1.1	-		-	-	++			-		+	T	-	+-	+-	v
	Chenonetta jubata	Maned Dusck			-	-		-	-		100		-	-	+	<i>T</i>			+	~
	Anas superciliosa	Pacific Black Duck			00			-					-		τ	-		+	+-	-
	Anas rhynchotis	Australiasian Shoveler	-	-	20	-		-				1.000 au	-		+	-	-	+-	+	\square
	Malacorhynchus menbranaceus	Pink-eared Duck		-	1	-		-	-		100		_		÷	-		+-	+	
Dadiainadidaa		Hoary-headed Grebe	-	-	-	-		-	-						+	-	-	+-	+	\vdash
Podicipedidae Phalacrocoracidae	Poliocephalus poliocephalus Phalacrocorax sulcirostris	Little Black Cormorant				-		+ +			-		-		+	+		+		+
r nataciocoracidae	Phalacrocorax sulcirostris Phalacrocorax melanleucos	Little Black Cormorant				x	+	-	x				-		+	+	-	+		+
Ardeidae	Ardea pacifica	White-necked Heron		-		~			A		-		-		-	+	-	+-	+	1-1
Aldeidae		White-faced Heron	_	-	-	-		-	-		-		-		++	-		+	+-	\vdash
Thrackingnithidan	Ardea novaehollandiae	Yellow-billed Spoonbill	-	-	-	-		-			10.0	-	-		+	-		+	+	H
Threskiornithidae	Platalea flavipes Elamus caeruleus	Black-shouldered Kite				-		-			-	-	_		+	-		-	+	
Accipitridae			-	-		-			v				-	-	-	-	+ +	+	+	
	Hamirostra isura	Square-tailed Kite		-		-		-	X				-		-	-	+ +	_	+	37
	Haliastur sphemurus	Whistling Kite		-		-		+ +	x			-	-		-	-	+ +		+	X
	Accipiter fasciatus	Brown Goshawk		-	37	-	1	+ +	X	x				-	-	-	+ +		+	X
	Accipiter cirrhocephalus	Collared Sparrowhawk			X	-		-					-		-	-	+ +		+	X
	Aquila audax	Wedge-tailed Eagle	x		X		0	-	-	XX			-		-	-	+ +	+	-	X
Patra alda a	Aquila morphnoides	Little Eagle	X	-	A	v		-	-	_	5 m 1		-		-	-	+ +	+	+	
Falconidae	Falco berigora	Brown Falcon	_	-	-	х		-	1	х	-			_	-	-	+ +		+	X
	Falco cenchroides	Australian Kestrel				-		-			-		-		-	-	+ +	+	+	x
	Falco longipennis	Australian Hobby		-	-	-		-	-				-	-	-	-	+ +	+	+	\vdash
	Falco hypoleucos	Grey Falcon		-	A	-	1	-				100	-	ter a ter a	-	-		+	-	-
	Falco peregrimus	Peregrine Falcon	-+-+-	-		-		-	-	\vdash	-		-	-	-	-	+ +	X	+	Х
	Falco subniger	Black Falcon	_	_		-		-	-		1		-		-	-	+ +	+	+	\vdash
Rallidae	Gallinula ventralis	Black-tailed Naitve Hen		-		-		-				-	-		+	-		_		
	Fulica atra	Eurasian Coot				-		-			-	-	_		÷	-	-	+	-	
Scolopacidae	Limosa limosa	Bar-tailed Godwit	_		-	-		-	-		-		-		+	-	-	-	-	
0.111	Tringa nebularia	Common Greenshank		-		-		+ +	-		-		-	_	+	-		+-	+	
Otididae	Ardeotis australis	Australian Bustard	1.000		den er an er senter	-	1000	-	-					-	-	-	+ +	+	+	+
Burhinidae	Burhimus grallarius	Bush Stone-curlew Black-winged Stilt		-	-	-	++	+ +	-		-		-	-				+	+	\square
Recurvirostridae	Himantopus himantopus	0		-	1	-		-	-		-		-		+ +	+		+	+	V
	Cladorhynchus leucocephalus	Banded Stilt		-		-		-	-		-		-		+	÷	-	+	+	X
Chan dell'des	Recurvirostra novaehollandiae	Red-necked Avocet				-		-		-	1 20	-				+		+-	+	X
Charadriidae	Charadrius ruficapillus	Red-capped Plover	-	-	-	-		-			-		-	-	+	÷	-	+-	+	A
	Charadrius rubricollis	Hooded Plover		-	17	-					-		-		+	+	-	+-	+	
n a change	Vanellus tricolor	Banded Lapwing		-	X	-	++	+	-		-		-		-	-	-	+		
Laridae	Sterna nilotica	Gull-billed Tern		-		-		+			+				+	Ť	-	+	+	$ \vdash $
Calumbiday	Sterna hybrida	Whiskered Tern		-	17	+	++	-	17	\vdash	-		-	-	+	+		+	-	V
Columbidae	Phaps chalcoptera	Common Bronzewing	X	-	X				X				-		-	-	+	+	+	X
	Ocyphaps lophotes	Crested Pigeon			-	-		-				\vdash				-	+	+		Х
Psittacidae	Cacatua roseicapilla	Galah		-		-		-	-				_	-	+	+	÷	+	-	\square
	Cacatua leadbeateri	Major Mitchell's Cockatoo			1.1.1	-			-		-		_		-	\rightarrow	-	+	+	
	Nymphicus hollandicus	Cockatiel		-	1.1		1.1.1	11.1	-	1-1-	1	C				-	-	+		

Family	Species	Common Name	-	r	r			1	-	1	A	T		1	1	T	-	1	+	П	B	Т	Т	
	Glossopsitta porphyrocephala	Purple-crowned Lorikeet	-	x		x		x	x		1			2	x		-		-		+	3	K +	+
	Polytelis alexandrae	Princess Parrot	- 1. II. I	111	11.4	1.1	121	14	121	1	1	11.4	1		10.1									
	Polytelis anthopeplus	Regent Parrot		Х	Х	X		X		1.1		Х	1								111	+	+	÷
	Barnardius zonarius semitorquatus Platycercus icterotis xanthogenys	Australian Ringneck Western Rosella			x	X	X	X	XX	(X	x	2	ζ 3	X					+	ХХ	(+	÷
	Platycercus varius	Mulga Parrot	11.1	1.11					x	31		1.2	-	1.3		11			11111		1.1	Ŧ	-	
	Neophema splendida	Scarlet-chested Parrot				13		Ť	-									1213	19100			+	- +	+
	Melopsittacus undulatus	Budgerigar	1.11	1121	1100	1.21	-		-		1		112	12				12:11	11 12 2	11111	1221	+	-	
Cuculidae	Cuculus pallidus	Pallid Cuckoo	- 1 H											-							x	+	- +	+
	Chrysococcyx osculans	Black-eared Cuckoo		111				+														+	-	
	Chrysococcyx basalis	Horsfield's Bronze Cuckoo	- 1111	11.11			1.3	1					1272								+	+	-1	1.5
Strigidae	Ninox novaeseelandiae	Boobook Owl		10.0									Х					100	1.1	1.000	+	+	+	÷
Tytonidae	Tyto alba	Barn Owl	11.11	1.1			1							100							+	+	- +	t
Podargidae	Podargus strigoides	Tawny Frogmouth					1	X								0		CC: C	C C C C		÷	+	- +	÷
Caprimulgidae	Eurostopodus argus	Spotted Nightjar	1.11		112		100	1		1	1.11	173	Х	C	12	12	0	111		1011	ŧ	+	- 11	15
Aegothelidae	Aegotheles cristatus	Australian Owlet-nightjar				1	11.1		11.1.1		1.1		х	2	X			Sec. 1			ŧ	+	-	
	Todiramphus pyrrhopygia	Red-backed Kingfisher	1.011		11-1						11	1	1	1								+	- 1	123
	Todiramphus sanctus	Sacred Kingfisher		111				1		1			Х					$C \equiv 0$				111		T ₂
Meropidae	Merops ornatus	Rainbow Bee-eater	11111	1111		1.73	X	X	2	2	X	х	12	Х	1	X		111	11	1.1	÷	+	- 1	
Neosittidae	Daphoenositta chrysoptera	Varied Sittella		1000	1.	0.01	(-, 0)			1		1	÷.,				-	1 - 1		1 1	-	+	- +	+ .
Climacteridae	Climacteris rufa	Rufous Treecreeper	1111	hell.		1.5	-			1.0	115			1.1	1.1	X		6.2.6	14.1	1.1.1	X	X	ζ +	+
Maluridae	Malurus lamberti	Variegated Fairy-wren	х	101	х	$ \leq $		X	≥ 2	1210	X	124	1	1	11	Q. 13		1 < 2, 1	11.14	110	+	+ +	+	+
	Mahurus leucopterus	White-winged Fairy-wren		11.1	1.00	$[0,\infty)$	1.00		1.1	-			1.1		1.1		-	i = 1 - 1		+	-	÷		-
	Malurus pulcherrimus	Blue-breasted Fairy-wren		1.4	i	1				-			1			-	-	-					\rightarrow	
	Mahurus splendens	Splendid Fairy-wren	- 0,000	-	-			-	-		-	-			-	-	_				+	+	+	÷
Pardalotidae	Pardalotus striatus	Striated Pardalote		Х	х				XX	C X				2	X	-	_			_	_	XX	(+	÷
Acanthizidae	Acanthiza apicalis	Inland Thornbill	X	X	-	X		X	-	-		-	X	-	2	<u> </u>	-		-		X	X +	+	+
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill		-	-		X	X	-	-	X	-	X			-	-		-		+ X		+	-
	Acanthiza uropygialis	Chestnut-rumped Thornbill	-	-	-			+	-	-	-	-	-	2	()	-	-		-		X	X +	+	-
	Calamanthus fuliginosus	Striated Fieldwren	-	-	-	-	-	-	-	-	+-	-			-	-	-		-	+	-	F	\pm	-
	Gerygone fusca Hylacola cauta whitlocki	Western Gerygone Shy Heathwren	-		1		-	+	-	-	-	-	-		-	-	-	-	-	-	-	-+		-
	Pyrrholaemus brunneus	Redthroat	x	-	x	v	1	+	-	-	-	-			3	-	-		-		+	+	-	+
	Smicrornis brevirostris	Weebill		x	X			x	-	x	X	x		1	x 5		-				x	X +	- +	+
Meliphagidae	Lichmera indistincta	Brown Honeyeater	11.1	**	-		XX		x		X	1	12	-	<u> </u>	-			1		+	4	- 4	+
	Certhionyx niger	Black Honeyeater					-	-	~		-					00		CC C	di ce		-	Ê	+	+
-	Certhionyx variegates	Pied Honeyeater	100	100	100				-	-			11	200			-		1.1		11111		+	+
	Lichenostomus cratitius	Purple-gaped Honeyeater		1.000	х			x			X	+		100			-	1011						
	Lichenostomus virescens	Singing Honeyeater		11.1.1	11	1.2	12.21		12.2	-	X		1.1	- 1				14.1		1.21	x	X +	- +	+
	Lichenostomus ornatus	Yellow-plumed Honeyeater		1111	1	1 11	2	X	111		1			3	()	X		100		1	+	X	C +	+
	Lichenostomus leucotis	White-eared Honeyeater		х		Х		X			X		Х		X			1.0.0		1.00		Х	_	
	Melithreptus brevirostris	Brown-headed Honeyeater	1111	11.11	1.5	х	1.20		100		2.5	1	100	2	C I	12		1.11	312-3		ŧ.≦	X	C +	+
	Phylidonyris albifrons	White-fronted Honeyeater	1012								X			2	K C	3 C		CC-C	1 E		X	XX	Δ Τ	+
	Manorina flavigula	Yellow-throated Miner	1.1	11.1	112		1		7-17		1		\mathbb{C}^{\times}	1	1	1.			1,51			X +	- +	
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater			1.0			X	2	2				2	X	X		1.00			X	_	_	
	Anthochaera carunculata	Red Wattlebird						X	X		11		1	2	X D	X					X	Х	2	
	Epthiamura albifrons	White-fronted Chat	111						111		X									+	[1]	+ II		
	Epthiamıra tricolor	Crimson Chat	1111			1.1			12		10									+	1	+ X	2	
Pomatostomidae	Pomatostomus superciliosus	White-browed Babbler	1.1	1.1		X		_	_		-	X								-		+	-	
Petroicidae	Drymodes brunneopygius	Southern Scrub-robin		1.000	X	х	1.0			1.	1.0	X	1	175		41,12		G21, C		11.1	100	1	+	÷

Family	Species	Common Name	-	-	-	-	-	-	-	1	A		-	-1	1	1	1. 1	-	-	I	5		_
	Eopsaltria griseogularis	Western Yellow Robin	-	-			2	x				1					-		1			1.1	1
	Microeca fascinans	Jacky Winter	1.111.		1	1.27	121		121			Х	1.1	Х	(1	1 111	111				X	
	Petroica cucullata	Hooded Robin				0.2	1.24		111			1.000		12				000	11 11		ŀ	+	ī
	Petroica goodenovii	Red-capped Robin	1111	11-11			X	Х	1.13	X	6,223	112	1277	12	X	1	1.111	100	11.127	X	ŀ	+ +	t
Cinclosomatidae	Cinclosoma castanotus	Chestnut Quail-thrush		10-0	1	0.01		1.1	1.00			Х	1000		1 5-	X	$\{ 1, 2, 3, 4, 5, 5, 1, 2, 3, 3, 4, 5, 5, 1, 2, 3, 3, 4, 5, 5, 5, 1, 2, 3, 4, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5,$	$1 \ll 1 \leq 1$	-		·	+ +	÷
Pachycephalidae	Oreoica gutturalis	Crested Bellbird	X	101	1.5	1		X	X	X	11.1	Х	1	X	X	X	122	121	11 11 1	х		X	ī
	Pachycephala rufiventris	Rufous Whistler		111				1	200	12 10 1		10.25	10	111	1		0.00	CC C	0100	+	- F	+ +	F
	Pachycephala inornata	Gilbert's Whistler	1.11	1121	1	P	100		100			1225	1	12,00	12 1 1	100	2 712	124	1111			+	F
	Colluricincla harmonica	Grey Shrike-thrush	X		х		X	X	121			х	1	X	(X	1 11 1	111	1.	X		X +	÷
Dicruridae	Myiagra inquieta	Restless Flycatcher	100	111		0.24			111	2 23		Х		12	100		1.1	0.00	11 11			inter a	1
	Rhipidura fuliginosa	Grey Fantail		11.11		17.1	1.7	1.11	1773	100	1	2.2				1	1 1 1 1	1.01	11 111	+	ŀ	+ +	F
	Rhipidura leucophrys	Willie Wagtail		11.1		1	х		1.00			X	X	X		1	1.1.1	1.11.1		X		X	-
	Grallina cyanoleuca	Magpie-lark	11.11	1.11					2.23			1	1.1		10	10.0		1.1	21 124	+	+ .	+	-
Campephagidae	Coracina novaehollandiae	Black-faced Cuckoo-shrike		100	Х	a ca	34		X	12 21	1.1	Х	1	C C E	X	X	0.00	COR	0100	х		X +	F
	Coracina maxima	Ground Cuckoo-shrike	1.101	11.1		1			1000			10.00		10	2.17		2 112	100	1111			X	-
	Lalage tricolor	White-winged Triller				1.00	1.1	1. The	10.11		1	1.11		1.0	1.0	· · · · · · · · · · · · · · · · · · ·	4 100	100	11111		- F	+	-
Artamidae	Artamus cinereus	Black-faced Woodswallow			1	1.21	111	1	121			x			11	1.000		101		+	X ·	+	-
	Artamus cyanopterus	Dusky Woodswallow		111		1.2	1	X	112		1.1	1		12	110	X		1111	11 11	1.000		1111	1
	Artamus personatus	Masked Woodswallow	1111	1111		1 1	x		1.1.1		1.00	1271	1.1	11	11	-		1.000	1 1 1 1	x	x ·	+	ī
Cracticidae	Cracticus torquatus	Grey Butcherbird		11.1				x	1.00			1000		X	7			1000		X	1	X +	F
	Cracticus nigrogularis	Pied Butcherbird	111111	1.11					1.00			12.2	1			x		1211	1	+		+ +	F
	Cracticus tibicen	Australian Magpie		1111		201			100	-			1	1						+		+ +	F
a service of the serv	Strepera versicolor	Grey Currawong	x	x		x	X	x	x		x		1.1	X	X					+		+ +	F
Corvidae	Corvus bennetti	Little Crow			x			X	1.1			100	x	X					1.11	х	+ -	+ +	F
	Corvus coronoides	Australian Rayen					-	-	111		-	x		X						X	+ .	+ +	F
	Corvus orru	Torresian Crow		11.11		1.1			1.11	-								1000				1.1	-
Hirundinidae	Cheramoeca leucosterna	White-backed Swallow		1.1							-						1	1000	+	x	+		-
	Hirundo neoxena	Welcome Swallow		1			-		1.00			1	1	11	11			12.11	1 ¥1	+	+	+	T
	Hirundo nigricans	Tree Martin	1000			3.24	x		1			12.5		100				1211		+		+	ī
	Hirundo ariel	Fairy Martin	1111	111		10			1		100	1997	1		11		11 111	Inti Li		+		+	-
		,				1	-		10.1														-
Dicaeidae	Dicaeum hirundinaceum	Mistletoebird		111					111	-	1			-				111		+		+ +	F
Passeridae	Taeniopygia guttata	Zebra Finch		1.1.1		1	-			-	1											+	-
Motacillidae	Anthus australis	Australian Pipit					x		-		1		X	x						+			-
Zosteropidae	Zosterops lateralis	Silvereye		1.11			-		-					-	11		1	1.0.1	1.0	-		+	+
Sylviidae	Cincloramphus mathewsi	Rufous Songlark																100		\square		+	1
yivildae	Cincloramphus crurualis	Brown Songlark				-	-	-	-	-	1				1	-		1.0		+		+	-
Myobatrachidae	Neobatrachus kunapalari	Kunapalari Frog	-			-	-	-	-		-				-					х		X +	-
any obaliacindae	Neobatrachus pelobatoides	Humming Frog					-		12.2		-							1		X		4	-
	Neobatrachus sutor	Shoemaker Frog	-			-	-			-	-				-					~		X +	Ē
	Pseudophryne occidentalis	Western Toadlet	-	-			-	x	-		-				-				-	+	x	+	-
Gekkonidae	Crenadactylus ocellatus	western roadiet		-		-	-	~	-	-	-	100	1	-	-		-		-	+	~		-
outromoto	Diplodactylus assimilis			-			-	x		-	-		\vdash	-	-	-	-		+	+	\vdash	-	Ŧ
	Diplodactylus assimitis		_			-	-	~		-	-		\vdash	-	-	-	-		,	+		+	-
	Diplodactylus granariensis		-				+	-	x	-	-								+	+	+	+ +	+
	Diplodactylus granariensis		1.0	x	x		+		x x	7				Х			1			+		X +	-
	Diplodactylus multi Diplodactylus pulcher			~	~		-	t			+		\vdash	_			-		-		_	+ +	-
	Nephrurus laevissimus		-				-			-	1			- 1		1	-	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-	x	1	- T	r
	Tehning inevisioning					C			10.00	1	1.0	1.00	1000			1	1000	1.00		1	-	-	-
	Nephrurus levis			1				1												+ 1	1	A DOMESTIC AND A DESCRIPTION OF A DESCRI	

Family	Species	Common Name		1	1		-	-	-	A		-	-		-				В	-		I
			11	1									1	1.00					1		1	
	C dans mense	_		-	-		-	-	_	-	_	-	-	-				-	_	-	+	
	Gehyra purpurascens		T	ĸ	-	-		-	,	-		-	-		-	x	+		0 0	+	+	
	Gehyra variegata Heteronotia binoei		- 2	<u> </u>		-		- 1	(x		-	-		1.000	•	_		X X X X		+	
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ygopodidae	Delma australis			-	-	-	+	-				-				^		+	-	+	+-	
ygopoundae	Delma butleri							-	-	1	-	1	1						x	1	+	
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	Morethia butleri		_	_		-		_		-		_	-				_		_	+	+	-
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	Ctenophorus salinarum									1.1					10001			+)	x x			1
	Ctenophorus scutulatus				X				X			211						T			100	Ť
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	Pogona minor				14 14	1	х			1		1	121					. 3	X +	+	+	
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	Varanus eremius	-			-	1.1									-				100	+		Ι
	Varanus gouldii					1			1		1.5	1	2.5	1.11	Х	1.411		÷ 14	÷ +	+	+	

Family	Species	Common Name	-		1	-	-		-	A	-			-	1 1		-	B			(
									1							Ĩ					
	Varanus panoptes		-	-			-		-							-	+	+	+ +	+ +	
	Varamus tristis					1		100		X			11	1				1.22.1	-	+	
yphlopidae	Ramphotyphlops australis																100		4	+ +	X
<i>A</i> - 1	Ramphotyphlops bituberculatus	1	1111	10.00			1.000		-	1	1				1		1.1.1.1	1	-	+ +	X
loidae	Aspidites ramsayi	Woma												_	1		a search	1	-	+ +	Ť
	Morelia spilota imbricata	Carpet python	1			-	1.1		1 1 1	X	1.1	1.1	11111		1	111	1111		-	+ +	
lapidae	Acanthophis pyrrhus	Desert death-adder				1	1	1					-				1100	+	+ 4	+ +	
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	Demansia psammophis psammophis	Yellow-faced whipsnake	-			-	1000		-				-	-				+	+ +	+ +	x
	Echiopsis curtis	A CHOW HICCO WILLPSHARC			+	-	1			++			-	1	++					+	f
	Furina ornata	Moon snake	-			-			-		-		-	1	++		1.000			+ +	+
	Parasuta gouldii	Gould's snake	-		+	-					-								-	+	x
	Parasuta monachus	Monk snake				-	-		-	1.1	1	1.1	-	-	-				-	-	x
	Pseudechis australis	Mulga snake			+	-	-				-	x	-	-		-	1.000	-			ŕ
	Pseudonaja modesta	Ringed brown snake	-		+	-	-		-		-	~		-			1.000	1		+ +	+
	Pseudonaja nuchalis	Gwardar			-	-			-				-	-		-	1	+	_	+ +	x
		and the second se			-	-	-	-	-	-	-	-	-	-			-	Ŧ	T 7	- T	
	Simoselaps bertholdi	Jan's banded snake	_	x	-	-	-		-		-	+	-	-			1			-	- 1
	Vermicella bertholdi		_	X	-	-			-				-	-		-		-		+ +	-
	Vermicella fasciolata		-	-	+	-	-	1	-		-	-	-	-			1.0		+	+ +	+-
	Vermicella semifasciatus	-	_		-	-	-				-		-						-	+ +	
Fachyglossidae	Tachyglossus aculeatus	Echidna			-	-	10.5	10.0		1		х		2nd	1.000	1.1	100	hing (_	+ +	X
Dasyuridae	Dasyurus geoffroii	Chuditch			-	-	1			1.1	4	1.1							-	+ +	1
the second second second second second second second second second second second second second second second s	Ningaui ridei	Wongai Ningaui			-	-			1	1.1	-						1.000			+	-
	Ningaui yvonneae	Southern Ningaui			-				-		-	+	-	-		-4-1	1997	Х	2	X	X
	Sminthopsis crassicaudata	Fat-tailed Dunnart	1.11	11.1	-		100							0	(C = (C		+	+	+ +	+ +	X
	Sminthopsis dolichura	Little Long-tailed Dunnart	1	2	- L.	1	100	1	2	1.1	1			-		11, 111	1004	X	4	+ +	X
facropodidae	Macropus fuliginosus	Western Grey Kangaroo		11.11		1.1	111	111		X			14		1.00		1.000	1.00	1.00	+	X
	Macropus robustus	Common Wallaroo, Euro	1111	1.211	1			1 million (1990)		X	1	1.1	13 22	1		의 군관	+	+	+ +	F +	X
-	Macropus rufus	Red Kangaroo		0.010		(1)		1.1	100	1.1	1.1		2300	C	CIERC		+	+	+ +	+ +	X
Burramyidae	Cercartetus concinnus	Western Pygmy-possum		htt h	11	1		5		111	1.1		1312	1	1111	13 2-1	Pres 1	X	1	+	X
/espertilionidae	Chalinolobus gouldii	Gould's Wattled Bat	() [] []		- 11					1.11	1					1.1	÷	+	+ +	+ +	1.1
	Chalinolobus morio	Chocolate Wattled Bat		CTT CT										1	100.00		+	+	+ +	+ +	
	Nyctophilus geoffroyi	Lesser Long-eared Bat			11	1.17		121		127.14			21/2	1			+	+	+ +	+ +	1111
	Nyctophilus timoriensis	Greater Long-eared Bat													1					+ +	
-	Scotorepens balstoni	Inland Broad-nosed Bat	1164	hitti h		1.	1			121	1.1.1	12.2		1	1 12 11 12			in the second second		+	5112
	Vespadelus regulus	Southern Forest Bat	1 1 1 1			< 0.4	28	200	1	1222	100			12000	100110	1001	101	+	+ +	+ +	1117
folossidae	Mormopterus planiceps	Southern Freetail-bat		1111			122	1000	1	1000	3, 23	100	111		1. 1244. 13	11	+	+	+ +	+ +	111
	Tadarida australis	White-striped Freetail-bat		11.61	- 11	1.00	10.0			1000			11		1,000,000	1.1	+	+		+ +	11.11
Iuridae	Mus musculus	House Mouse						1		3	1.18		1		E		÷	x	X	X +	
	Notomys mitchellii	Mitchell's Hopping-mouse	1	8 2	1	1					1		1	1		HI HI	H			+	
	Pseudomys bolami	Bolam's Mouse															+	1.000		+	X
	Pseudomys hermannsburgensis	Sandy Inland Mouse	11111								1						1	+	-	F.1	X
eporidae	Oryctolagus cuniculus	Rabbit			+				1					1			+	x	+)	X +	f
Bovidae	Capra hircus	Goat		1.00			1000							1				+	_	+ +	+
Canidae	Vulpes vulpes	Red Fox	_			-								1			+	+		X +	+
Felidae	Felis catus	Cat			+	-	1		-		-	+	-		1	-	+	+	_	+ +	+

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

Vertebrate Fauna Assessment – Eundynie Project Area

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.

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

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).

¹ The definition of flora includes algae, fungi and lichens

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

EX Extinct species

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

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

EW Extinct in the wild species

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

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

Specially Protected Species

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

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

MI Migratory birds protected under an international agreement

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

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

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

CD Species of special conservation interest (conservation dependant fauna)

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

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

OS Other specially protected species

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

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

P Priority species

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

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

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

P1 Priority 1: Poorly-known species

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

P2 Priority 2: Poorly-known species

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

P3 Priority 3: Poorly-known species

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

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

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

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

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

Appendix D Fauna habitat assessment results

Vertebrate Fauna Assessment – Eundynie Project Area