Basic Vertebrate Fauna Survey and Risk Assessment

Devon Gold Project

Prepared for: Matsa Gold

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EXECUTIVE SUMMARY

Matsa Gold Pty Ltd is proposing to recommence mining at the Devon gold project, which is currently in care and maintenance and is approximately 72km south of Laverton on the Yundamindra pastoral lease. The project area is near the western edge of Lake Carey and in the northern part of the Linden goldfield.

This Basic vertebrate fauna survey and risk assessment provides an indicate of the vertebrate species potentially in the project area and surrounds, and indicates the potential impacts and consequences of recommencing operations on this mine.

There are five broad fauna habitats in the entire project area:

- salt lake largely devoid of vegetation;
- samphire;
- chenopod shrubland;
- open mulga woodland; and
- eucalypt woodland.

In addition, there are areas almost devoid of fauna habitat due to historical mining and disturbance.

The density of the shrubs varied appreciably across the project area, but there was little leaf litter and a vast amount of bare ground.

The fauna habitats in the project area are like that in adjacent areas and the surrounds of Lake Carey, with the consequence that a loss of this habitat is unlikely to have a significant impact on the vertebrate fauna in a bioregional context.

Recommendations to mitigate the potential impact of reopening and developing the Devon gold mine on the vertebrate fauna are:

- an induction program that includes a component on managing fauna is a mandatory component of working on the Devon Gold project;
- pets are not permitted on site;
- all waste and rubbish be contained in bins and regularly removed from site or buried so it is unavailable to pest species; and
- feeding of native fauna should be actively discouraged.

1. INTRODUCTION

1.1 BACKGROUND

Matsa Gold Pty Ltd (Matsa) is proposing to recommence operations on the Devon gold project which is currently in care and maintenance. The project is approximately 72km south of Laverton on the Yundamindra pastoral lease and near the western edge of Lake Carey and in the northern part of the Linden goldfield (Figure 1).

The project area assessed in this report comprised a total area of 285.3ha (i.e. project area; Figure 2) and includes an existing historical pit, waste dump and infrastructure developed during historical mining operations.

Terrestrial Ecosystems was commissioned by Matsa Gold Ltd to undertake a Basic vertebrate fauna survey and risk assessment for the proposed Devon gold project area. The purpose of this survey and assessment was to provide information to the Department of Mines, Industry Regulation and Safety (DMIRS) and 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; 2020) *Technical Guidance Terrestrial Fauna Surveys* and the *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2016).

1.2 SCOPE OF WORKS AND PROJECT OBJECTIVES

A Basic fauna survey and risk assessment involves undertaking a desktop review and site visit. The objectives of this survey and 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, in particular, 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:

- searched the Department of Biodiversity, Conservation and Attractions' (DBCA) NatureMap database for threatened and priority species near the project area;
- searched the Commonwealth Governments database of fauna of national environmental significance to identify species potentially occurring within the area that are protected under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* or international migratory bird agreements (JAMBA/CAMBA);
- reviewed Terrestrial Ecosystems' database (includes Atlas of Living Australia and DBCA records that were available via NatureMap) to identify potential vertebrate fauna within the area;
- reviewed previous fauna surveys conducted near the project area;
- undertook a one-day site investigation to identify available fauna habitat types and the possible presence of conservation significant species (e.g. Malleefowl);

- discussed the likelihood of species listed under the *EPBC Act 1999* and *Biodiversity Conservation Act 2016 (BC Act 2016)* 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 THE PROJECT AREA

The project area is in the Murchison 1 (MUR1 – East Murchison subregion) IBRA bioregion on the western edge of Lake Carey. The project area is an existing mining operation that is in care and maintenance, and includes a pit that is partially filled with water, a waste dump, haul road and other tracks.

Cowan (2003) described the East Murchison IBRA subregion as internally draining, with extensive areas of elevated red desert sandplains with minimal dune development. Broad plains with red-brown soils and breakaway complexes as well as red sandplains. Vegetation is dominated by Mulga woodlands often with ephemerals, hummock grasslands, saltbush shrublands and halosarcia shrublands.

Threatening processes for conservation significant fauna were listed by Cowan (2003) as foxes and cats. In addition, cattle grazing and mining activity over many years have significantly degraded small parcels of land dotted throughout the landscape.

2.2 LAND USE HISTORY

The dominant land uses for the bioregion are native pasture to support grazing and unallocated crown land, and to a much lesser extent mining (Cowan 2003).

2.3 CLIMATE

The project area is characterised as semi-arid. Laverton, which is 73km to the north, has an annual rainfall of approximately 233mm, although this varies considerably from year-to-year. The highest mean maximum and minimum temperatures in Laverton are in January with an average of 35.8°C and 20.5°C, respectively (Bureau of Meteorology, 2020). The lowest mean daily maximum and minimum temperatures occur in July (Chart 1). Average monthly rainfall is heaviest in January - March.

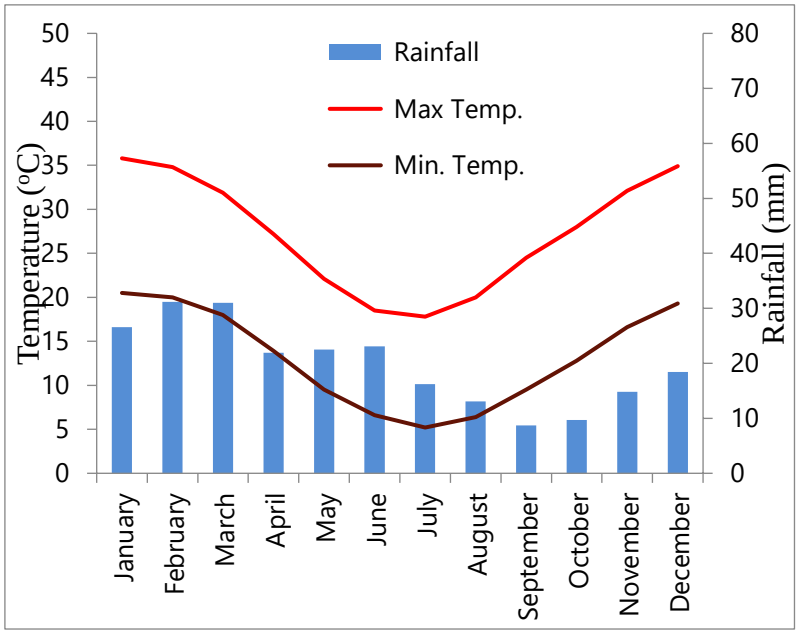

Chart 1. Climatic averages for Laverton

(http://www.bom.gov.au/climate/averages/tables/cw_012045.shtml downloaded in December 20207)

2.4 REGIONAL BIOLOGICAL FAUNA CONTEXT OF PROJECT AREA

Numerous vertebrate fauna surveys have been undertaken near the project area. These include:

- Bell, D.T. et al. (2007) Winter bird assemblages across an arid gradient in south-west Western Australia. *Journal of the Royal Society of Western Australia,* 90, 219-227.
- Cowan, M. and How, R.A. (2004). Comparisons of ground vertebrate assemblages in arid Western Australia in different seasons and decades. *Records of the Western Australian Museum* 22, 91-100.
- Dell, J. and How, R.A. (1988) Vertebrate Fauna. *Records of the Australian Museum*, Supplement No 31, 38-75.
- Dunlop, J.N. and Payne, W. (1999b) *A vertebrate fauna survey of the North Lake Carey region including the Hillside Prospect, Wallaby Prospect, Just In Time / Just In Case and the Teatree Dam Area*. Unpublished report for Placer (Granny Smith) and Homestake, Perth.
- Ecologia Environment (2007) *Jump Up Dam Fauna Assessment*. Perth.
- Hart Simpson and Associates Pty Ltd. (2000) *Anaconda Nickel Limited Cawse Expansion Project - Fauna survey*. Perth.
- McKenzie, N.L., Rolfe, J.K. and Youngson, W.K. (1992b) Vertebrate fauna In: The Biological Survey of the Eastern Goldfields of Western Australia; In The Biological Survey of the Eastern Goldfields of Western Australia; Part 8; Kurnalpi - Kalgoorlie Study Area. *Records of the Western Australian Museum*, Supplement 41, 37-65.
- Ninox Wildlife Consulting (1998) *A Vertebrate Fauna Survey of the Murrin Expansion Project*. Perth.
- Stantec (2020) Mt Weld Rare Earth Project Level 2 and Targeted Terrestrial Fauna Survey. Perth.
- Terrestrial Ecosystems (2010a) *Level 2 Fauna Risk Assessment for Granny Deeps Project Area*. Perth.
- Thompson, S. A. (2004) *Mine site rehabilitation index using reptile assemblage as a bio-indicator*. PhD thesis. Edith Cowan University, Perth.

In addition, there are a couple of Level 1 fauna assessments for other projects in the vicinity of the project area including Rapallo's (2007) assessment of NiWest Laterite deposit at Hepi, Harewood's (2011) Level 1 assessment of Crescent Gold's deposit at West Laverton, Terrestrial Ecosystems (2011b, 2012a, b, 2014, 2015, 2016, 2017b, a, 2018, 2020, 2021a, c, b) assessments at Red Dog, Fortitude, Mt Celia and Granny Smith. Mattiske Consulting and Ninox Wildlife Consulting (2000) also undertook a review of the terrestrial fauna literature to assess potential impacts on vertebrate fauna for a rare earths mining project at Mount Weld.

There are individual records for fauna contained in the Atlas of Living Australia, Western Australian Museum collection and in NatureMap's records that have also been accessed.

Fauna assessments of most value are the ones undertaken by, Ninox Wildlife Consulting (1998) for the Murrin Murrin project, Dell and How (1988) for the Western Australian Museum survey of the Edjudina-Menzies area, the McKenzie et al. (1992b) report for the Western Australian Museum survey of the Kurnalpi-Kalgoorlie area and the Level 2 fauna assessment for the Granny Smith deeps project area (Terrestrial Ecosystems 2011a).

2.4.1 Fauna species at risk

Cowan (2003) reported the fauna species at risk in the East Murchison subregion as Bilby (*Macrotis lagotis*), Marsupial Mole (*Notoryctes typhlops*), Mulgara (*Dasycercus cristicauda*), Malleefowl (*Leipoa ocellata*), Princess Parrot (*Polytelis alexandrae*), Slender-billed Thornbill (*Acanthiza iredalei iredalei*), Giant Desert Skink (*Liopholis kintorei*) and Peregrine Falcon (*Falco peregrinus*). Since this very dated report, the Night Parrot has been added to the list of species of conservation interest. This report assesses the potential for these species to be found in the project area and the potential impact that the proposed development might have on these species, and other conservation significant fauna.

3. METHODOLOGY

3.1 DATABASE SEARCHES

A search of the *EPBC Act 1999* online list of threatened species was undertaken to identify species of conservation interest to the Commonwealth Government under the *EPBC Act 1999*. The search circle had a radius of 50km around a centre point coordinate of -29.27855ºS,122.44186ºE (Appendix A). In addition, a desktop search of the Terrestrial Ecosystems' fauna survey database was searched to develop an appreciation of the vertebrate fauna assemblages near the project area. The Department of Biodiversity, Conservation and Attractions' (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, 1999a, 2002) and Thompson and Thompson (2010) 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 and adjacent areas. 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. Vagrants can be recorded almost anywhere. 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. Consequently, 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 WA Museum (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. These databases also contain historical records and therefore include species that are no longer present in the area (e.g. *Myrmecobius fasciatus*, *Bettongia lesueur* and *Macrotis lagotis*).

Because the project area is adjacent to Lake Carey, a large ephemeral salt lake, large numbers of water birds are likely to be present in database searches. These species have been dealt with as a group as the potential impacts will be very similar.

3.2 RECONNAISSANCE SURVEY

The project area was searched on foot and by UTV for conservation significant fauna on 9 September 2021. The reconnaissance survey was also used to record fauna habitat types in the project area.

3.3 FAUNA HABITAT ASSESSMENT

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

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

The fauna habitat assessors 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 recorded at each location as part of the habitat assessment:

Observer's name
Coordinates of the location as UTM (WGS 84)
Fire history – options

> 5 years
1-5 years
< 1 year

Landform – options

Beach
Clay plain
Cliff
Creek line
Dam
Drainage line
Dune crest
Dune slope
Dune swale
Escarpment
Flat
Gorge
Gully
Intertidal / mangrove
Lake / lake edge
Lower slope
Mid slope
Ridge
River
Rocky outcrop / breakaway
Salt lake
Sand dune
Sand plain
Stony plain
Swamp
Undulating
Upper slope
Wetland
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, fragmentation, weeds) and generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be minimally affected by disturbance.
- *Good fauna habitat* – These areas showed signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by disturbance.

- *Disturbed fauna habitat*– These areas showed signs of significant disturbance. Many of the trees, shrubs and undergrowth are cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, containing weeds or have been damaged by vehicle or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.
- *Highly degraded fauna habitat* – These areas often have a significant loss of vegetation, an abundance of weeds, and a large number of vehicle tracks or are completely cleared. Limited or no fauna habitat connectivity. Fauna assemblages in these areas are likely to be significantly different to what might have been in the area pre-disturbance.

Habitat structure - options

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 woodland
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 shrubs
Scattered tall shrubs	Open shrubland
Closed heath	Scattered shrubs

Lower stratum

Closed hummock grassland	Closed tussock grassland / sedgeland / herbland
Mid-dense hummock grassland	Tussock grass land / sedgeland / herbland
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 – options Sand Loamy sand Clayey sand Sandy loam Loam Silty loam Sandy clay loam	 Clay loam Silty clay loam Clay Rock Peat / organic Stony
Soil Colour –options Black Brown Grey Orange	 Red White Yellow
Surface stones - options	

None Pebbles (0-50mm) Cobbles (51-250mm)	Boulders (>250mm) Rocks
Potential for conservation significant species to be found in the area Yes No	
Impact of clearing on conservation significant species – options Low Low - moderate Moderate	 Moderate - high High Extreme
Translocation of conservation significant fauna required: No Yes	

3.4 SURVEY AND REPORTING STAFF

Ray Turnbull and Will Purser undertook the site investigation and fauna habitat assessment on 9 September 2021. Dr Graham Thompson prepared the report and Dr Scott Thompson reviewed the report before it was sent to the client. Both senior scientists have appropriate relevant post-graduate qualifications, extensive experience in conducting fauna assessments in the Goldfields, have published research articles on biodiversity, fauna assemblages, conservation significant species, trapping techniques and temporal variations in trapped fauna assemblages based on Goldfields surveys and are therefore appropriately trained and experienced for the task of preparing this assessment. Flora and vegetation mapping provided by Western Botanical {, 2022 #14557}.

3.5 LIMITATIONS

This Basic vertebrate fauna risk assessment is based on information contained in the Commonwealth Government online EPBC matters of national environmental significance (MNES) 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 (2020) *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment* suggested that fauna surveys may be limited by many variables. Limitations associated with each of these variables are assessed in Table 1.

Table 1. Fauna survey limitations and constraints

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

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

4. RESULTS

4.1 FAUNA HABITAT

There are five broad fauna habitats in the entire project area:

- salt lake largely devoid of vegetation (Plates 1 and 2);
- samphire (Plates 3 and 4);
- chenopod shrubland (Plates 5 and 6);
- open mulga woodland (Plates 7-16);
- eucalypt woodland (Plates 17 and 18); and
- mined, exploration and cleared areas (Plates 19-22).

The density of the shrubs varied appreciably across the project area.

Plate 1. Salt lake largely devoid of vegetation

Plate 2. Salt lake largely devoid of vegetation

Plate 3. Samphire

Plate 4. Samphire

Plate 5. Chenopod shrubland

Plate 6. Chenopod shrubland

Plate 7. Open mulga woodland

Plate 8. Open mulga woodland

Plate 9. Open mulga woodland

Plate 10. Open mulga woodland

Plate 11. Open mulga woodland

Plate 12. Open mulga woodland

Plate 13. Open mulga woodland

Plate 14. Open mulga woodland

Plate 15. Open mulga woodland on a rocky outcrop

Plate 16. Open mulga woodland on a rocky outcrop

Plate 17. Eucalypt woodland

Plate 18. Eucalypt woodland

Plate 19. Mined, exploration and cleared areas

Plate 20. Mined, exploration and cleared areas

Plate 21. Mined, exploration and cleared areas

Plate 22. Mined, exploration and cleared areas

The results of the rapid habitat assessment are provided in Appendix D. Images of the habitat at each of these assessment points provides a more comprehensive overview of the habitats in the project area and along the infrastructure corridor.

4.2 MALLEEFOWL

The project area was searched for Malleefowl mounds and tracks. Malleefowl are predominantly a ground dwelling species and walk a considerable distance each day foraging for insects and seeds. Their tracks are distinctive, and in areas of soft sand or on sand tracks their presence is often easily detected. No Malleefowl mounds or tracks were observed during the site visit, and there was no habitat in the project area suitable for Malleefowl.

4.3 BIOREGIONAL VERTEBRATE FAUNA

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 often deployed 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.

Table 2. Birds potentially found near the project area

Family	Species	Common Name	Family	Species	Common Name
Casuariidae	*Dromaius novaehollandiae*	Emu	Otididae	*Ardeotis australis*	Australian Bustard
Megapodiidae	*Leipoa ocellata*	Malleefowl	Anhingidae	*Anhinga melanogaster*	Australasian Darter
Phasianidae	*Coturnix pectoralis*	Stubble Quail	Ardeidae	*Ardea pacifica*	White-necked Heron
Anatidae	*Biziura lobata*	Musk Duck		*Egretta novaehollandiae*	White-faced Heron
	Stictonetta naevosa	Freckled Duck		*Ardea alba*	Great Egret
	Cygnus atratus	Black Swan	Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill
	Tadorna tadornoides	Australian Shelduck	Accipitridae	*Elanus axillaris*	Black-shouldered Kite
	Chenonetta jubata	Australian Wood Duck		*Lophoictinia isura*	Square-tailed Kite
	Malacorhynchus membranaceus	Pink-eared Duck		*Haliaeetus albicilla*	White-bellied Sea-eagle
	Anas gracilis	Grey Teal		*Haliastur sphenurus*	Whistling Kite
	Anas superciliosa	Pacific Black Duck		*Accipiter fasciatus*	Brown Goshawk
	Aythya australis	Hardhead		*Accipiter cirrocephalus*	Collared Sparrowhawk
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe		*Circus assimilis*	Spotted Harrier
Columbidae	*Phaps chalcoptera*	Common Bronzewing		*Aquila audax*	Wedge-tailed Eagle
	Ocyphaps lophotes	Crested Pigeon		*Hieraaetus morphnoides*	Little Eagle
	Geopelia cuneata	Diamond Dove	Falconidae	*Falco cenchroides*	Nankeen Kestrel
Podargidae	*Podargus strigoides*	Tawny Frogmouth		*Falco berigora*	Brown Falcon
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar		*Falco longipennis*	Australian Hobby
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar		*Falco peregrinus*	Peregrine Falcon
Apodidae	*Apus pacificus*	Fork-tailed Swift	Rallidae	*Tribonyx ventralis*	Black-tailed Native-hen

Family	Species	Common Name
	Fulica atra	Eurasian Coot
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt
	Recurvirostra novaehollandiae	Red-necked Avocet
	Cladorhynchus leucocephalus	Banded Stilt
Charadriidae	*Charadrius ruficapillus*	Red-capped Plover
	Elseyornis melanops	Black-fronted Dotterel
	Erythrogonys cinctus	Red-kneed Dotterel
	Vanellus tricolor	Banded Lapwing
Scolopacidae	*Tringa nebularia*	Common Greenshank
Turnicidae	*Turnix velox*	Little Button-quail
Laridae	*Chlidonias hybridus*	Whiskered Tern
	Chroicocephalus novaehollandiae	Silver Gull
Cacatuidae	*Eolophus roseicapillus*	Galah
	Nymphicus hollandicus	Cockatiel
Psittacidae	*Glossopsitta porphyrocephala*	Purple-crowned Lorikeet
	Polytelis anthopeplus	Regent Parrot
	Platycercus icterotis	Western Rosella
	Barnardius zonarius	Australian Ringneck
	Psephotus varius	Mulga Parrot
	Melopsittacus undulatus	Budgerigar
	Neopsephotus bourkii	Bourke's Parrot
	Neophema splendida	Scarlet-chested Parrot
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-cuckoo
	Chalcites osculans	Black-eared Cuckoo
	Cacomantis pallidus	Pallid Cuckoo
Strigidae	*Ninox novaeseelandiae*	Southern Boobook
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra
	Todiramphus pyrrhopygius	Red-backed Kingfisher
Meropidae	*Merops ornatus*	Rainbow Bee-eater
Climacteridae	*Climacteris affinis*	White-browed Treecreeper
	Climacteris rufa	Rufous Treecreeper
Ptilonorhynchidae	*Ptilonorhynchus maculatus*	Spotted Bowerbird
	Ptilonorhynchus guttatus	Western Bowerbird
Maluridae	*Malurus splendens*	Splendid Fairy-wren
	Malurus leucopterus	White-winged Fairy-wren
	Malurus lamberti	Variegated Fairy-wren
	Malurus pulcherrimus	Blue-breasted Fairy-wren
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat
	Smicrornis brevirostris	Weebill
	Gerygone fusca	Western Gerygone
	Acanthiza robustirostris	Slaty-backed Thornbill
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill
	Acanthiza uropygialis	Chestnut-rumped Thornbill
	Acanthiza iredalei	Slender-billed Thornbill
	Acanthiza apicalis	Inland Thornbill
	Aphelocephala leucopsis	Southern Whiteface
Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote
	Pardalotus rubricatus	Red-browed Pardalote
	Pardalotus striatus	Striated Pardalote
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater
	Lichenostomus virescens	Singing Honeyeater
	Lichenostomus leucotis	White-eared Honeyeater
	Lichenostomus ornatus	Yellow-plumed Honeyeater
	Lichenostomus plumulus	Grey-fronted Honeyeater
	Lichenostomus penicillatus	White-plumed Honeyeater
	Purnella albifrons	White-fronted Honeyeater
	Manorina flavigula	Yellow-throated Miner
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater
	Anthochaera carunculata	Red Wattlebird
	Conopophila whitei	Grey Honeyeater
	Epthianura tricolor	Crimson Chat
	Epthianura albifrons	White-fronted Chat

Family	Species	Common Name
	Sugomel niger	Black Honeyeater
	Lichmera indistincta	Brown Honeyeater
	Phylidonyris niger	White-cheeked Honeyeater
	Melithreptus brevirostris	Brown-headed Honeyeater
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler
Psophodidae	*Cinclosoma castanotum*	Chestnut Quail-thrush
	Cinclosoma castaneothorax	Chestnut-breasted Quail-thrush
	Psophodes occidentalis	Chiming Wedgebill
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella
Campephagidae	*Coracina maxima*	Ground Cuckoo-shrike
	Coracina novaehollandiae	Black-faced Cuckoo-shrike
	Lalage sueurii	White-winged Triller
Pachycephalidae	*Pachycephala inornata*	Gilbert's Whistler
	Pachycephala pectoralis	Golden Whistler
	Pachycephala rufiventris	Rufous Whistler
	Colluricincla harmonica	Grey Shrike-thrush
	Oreoica gutturalis	Crested Bellbird
Artamidae	*Artamus personatus*	Masked Woodswallow
	Artamus superciliosus	White-browed Woodswallow
	Artamus cinereus	Black-faced Woodswallow
	Artamus cyanopterus	Dusky Woodswallow
	Artamus minor	Little Woodswallow
	Cracticus torquatus	Grey Butcherbird
	Cracticus nigrogularis	Pied Butcherbird
	Cracticus tibicen	Australian Magpie
	Strepera versicolor	Grey Currawong
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail
	Rhipidura leucophrys	Willie Wagtail
Corvidae	*Corvus coronoides*	Australian Raven
	Corvus bennetti	Little Crow
	Corvus orru	Torresian Crow
Monarchidae	*Grallina cyanoleuca*	Magpie-lark
Petroicidae	*Microeca fascinans*	Jacky Winter
	Petroica goodenovii	Red-capped Robin
	Melanodryas cucullata	Hooded Robin
	Drymodes brunneopygia	Southern Scrub-robin
Megaluridae	*Cincloramphus mathewsi*	Rufous Songlark
	Cincloramphus cruralis	Brown Songlark
Timaliidae	*Zosterops lateralis*	Silvereye
Hirundinidae	*Cheramoeca leucosterna*	White-backed Swallow
	Hirundo rustica	Barn Swallow
	Hirundo neoxena	Welcome Swallow
	Petrochelidon ariel	Fairy Martin
	Hirundo nigricans	Tree Martin
Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird
Estrildidae	*Taeniopygia guttata*	Zebra Finch
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit

Table 3. Amphibians potentially found near the project area

Family	Species	Common Name
Hylidae	*Cyclorana maini*	Sheep Frog
	Cyclorana platycephala	Water-holding Frog
	Litoria cyclorhyncha	Spotted-thighed Frog
	Litoria moorei	Motorbike Frog
Limnodynastidae	*Neobatrachus kunapalari*	Kunapalari Frog
	Neobatrachus sudelli	Sudell's Frog
	Neobatrachus sutor	Shoemaker Frog
	Neobatrachus wilsmorei	Goldfields Bullfrog

Family	Species	Common Name
	Platyplectrum spenceri	Spencer's Burrowing Frog
Myobatrachidae	*Crinia georgiana*	Quacking Frog

Family	Species	Common Name
	Pseudophryne occidentalis	Orange-crowned Toadlet

Table 4. Mammals potentially found near the project area

Family	Species	Common Name
Bovidae	*Bos taurus*	Cow
	Capra hircus	Goat
	Ovis aries	Sheep
Camelidae	*Camelus dromedarius*	Dromedary
Suidae	*Sus scrofa*	Pig
Canidae	*Canis lupus*	Dog
	Canis lupus	Dingo
	Vulpes vulpes	Red Fox
Felidae	*Felis catus*	House Cat
Emballonuridae	*Taphozous hilli*	Hill's Sheath-tail Bat
Molossidae	*Austronomus australis*	White-striped Free-tail Bat
	Mormopterus planiceps	Southern Free-tail Bat
	Mormopterus species 4	South-western Free-tail Bat
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat
	Chalinolobus morio	Chocolate Wattled Bat
	Nyctophilus geoffroyi	Lesser Long-eared Bat
	Nyctophilus gouldi	Gould's Long-eared Bat
	Nyctophilus major	Greater Long-eared Bat
	Nyctophilus sp.	Long-eared Bat sp..
	Scotorepens balstoni	Inland Broad-nosed Bat
	Vespadelus baverstocki	Inland Forest Bat
	Vespadelus regulus	Southern Forest Bat
Dasyuridae	*Antechinomys laniger*	Kultarr
	Ningaui ridei	Wongai Ningaui
	Ningaui yvonneae	Mallee Ningaui
	Pseudantechinus woolleyae	Woolley's False Antechinus
	Sminthopsis crassicaudata	Fat-tailed Dunnart
	Sminthopsis dolichura	Little Long-tailed Dunnart
	Sminthopsis gilberti	Gilbert's Dunnart
	Sminthopsis hirtipes	Hairy-footed Dunnart
	Sminthopsis longicaudata	Long-tailed Dunnart
	Sminthopsis macroura	Stripe-faced Dunnart
	Sminthopsis ooldea	Ooldea Dunnart
Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo
	Osphranter robustus	Euro
	Osphranter rufus	Red Kangaroo
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum
Leporidae	*Oryctolagus cuniculus*	European Rabbit
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna
	Macrotis lagotis	Bilby
Equidae	*Equus asinus*	Donkey
	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

Table 5. Reptiles potentially found near the project area

Family	Species	Common Name
Agamidae	*Ctenophorus caudicinctus*	Ring-tailed Dragon
	Ctenophorus cristatus	Crested Dragon
	Ctenophorus fordi	Mallee Dragon
	Ctenophorus inermis	Military Dragon
	Ctenophorus isolepis	Crested Dragon
	Ctenophorus maculatus	Spotted Dragon
	Ctenophorus nuchalis	Central Netted Dragon
	Ctenophorus ornatus	Ornate Crevice Dragon
	Ctenophorus pictus	Painted Dragon
	Ctenophorus reticulatus	Western Netted Dragon
	Ctenophorus salinarum	Saltpan Dragon
	Ctenophorus scutulatus	Lozenge-marked Dragon
	Diporiphora amphiboluroides	Mulga Dragon
	Moloch horridus	Thorny Devil
	Pogona minor	Dwarf Bearded Dragon
	Tympanocryptis cephalus	Pebble Dragon
Boidae	*Antaresia stimsoni*	Stimson's Python
Carphodactylidae	*Nephrurus laevissimus*	Smooth Knob-tail
	Nephrurus vertebralis	Midline Knob-tail
	Nephrurus wheeleri	Banded Knob-tail
	Underwoodisaurus milii	Barking Gecko
Diplodactylidae	*Amalosia reticulata*	Reticulated Velvet Gecko
	Diplodactylus conspicillatus	Fat-tailed Diplodactylus
	Diplodactylus granariensis	Wheat-belt Stone Gecko
	Diplodactylus pulcher	Fine-faced Gecko
	Hesperoedura reticulata	Reticulated Velvet Gecko
	Lucasium damaeum	Beaded Gecko
	Lucasium maini	Main's Ground Gecko
	Lucasium squarrosum	Mottled Ground Gecko
	Strophurus assimilis	Goldfields Spiny-tailed Gecko
	Strophurus ciliaris	Spiny-tailed Gecko
	Strophurus elderi	Jewelled Gecko
	Strophurus intermedius	Southern Spiny-tailed Gecko
	Strophurus strophurus	Western Spiny-tailed Gecko
	Strophurus wellingtonae	Western Shield Spiny-tailed Gecko
Elapidae	*Acanthophis pyrrhus*	Desert Death Adder
	Brachyurophis fasciolata	Narrow-banded Burrowing Snake
	Brachyurophis semifasciata	Half-girdled Snake
	Demansia psammophis	Yellow-faced Whipsnake
	Elapognathus coronatus	Crowned Snake
	Furina ornata	Orange-naped Snake
	Neelaps bimaculatus	Black-naped Burrowing Snake
	Parasuta gouldii	Gould's Snake
	Parasuta monachus	Monk Snake
	Pseudechis australis	Mulga Snake
	Pseudechis butleri	Spotted Mulga Snake
	Pseudonaja mengdeni	Gwardar
	Pseudonaja modesta	Ringed Brown Snake
	Simoselaps bertholdi	Jan's Banded Snake
	Suta fasciata	Rosen's Snake
	Suta suta	Curl Snake
Gekkonidae	*Christinus marmoratus*	Marbled Gecko
	Gehyra punctata	Spotted Dtella
	Gehyra purpurascens	Purplish Dtella
	Gehyra variegata	Tree Dtella
	Gehyra xenopus	Crocodile-faced Dtella
	Heteronotia binoei	Bynoe's Prickly Gecko
	Rhynchoedura ornata	Western Beaked Gecko
Pygopodidae	*Aprasia picturata*	Black-headed Worm-lizard
	Delma australis	Marble-faced Delma
	Delma butleri	Unbanded Delma
	Delma fraseri	Fraser's Delma
	Delma nasuta	Sharp-snouted Delma

Family	Species	Common Name
	Lialis burtonis	Burton's Snake-lizard
	Pygopus lepidopodus	Common Scaly-foot
	Pygopus nigriceps	Western Hooded Scaly-foot
Scincidae	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink
	Ctenotus atlas	Southern Mallee Ctenotus
	Ctenotus brooksi	Wedgsnout Ctenotus
	Ctenotus calurus	Blue-tailed Finesnout Ctenotus
	Ctenotus greeri	Spotted-necked Ctenotus
	Ctenotus hanloni	Nimbel Ctenotus
	Ctenotus helenae	Clay-soil Ctenotus
	Ctenotus leae	Ornage-tailed Finesnout Ctenotus
	Ctenotus leonhardii	Leonhardi's Ctenotus
	Ctenotus pantherinus	Leopard Skink
	Ctenotus quattuordecimlineatus	Fourteen-lined Ctenotus
	Ctenotus schomburgkii	Schomburgk's Ctenotus
	Ctenotus severus	Stern Ctenotus
	Ctenotus uber	Spotted Ctenotus
	Ctenotus xenopleura	Wide-striped Ctenotus
	Cyclodomorphus branchialis	Common Slender Bluetongue
	Cyclodomorphus melanops	Spinifex Slender Bluetongue
	Egernia depressa	Pygmy Spiny-tailed Skink
	Egernia formosa	Goldfields Crevice-skink
	Egernia napoleonis	South-western Crevice-skink
	Eremiascincus richardsonii	Broad-banded Sand Swimmer
	Hemiergis initialis	South-western Earless Skink

Family	Species	Common Name
	Lerista desertorum	Central Desert Robust Slider
	Lerista distinguenda	South-western Orange-tailed Slider
	Lerista kingi	King's Slider
	Lerista lineopunctulata	Dotted-line Robust Slider
	Lerista macropisthopus	Unpatterned Robust Slider
	Lerista picturata	Southern Robust Slider
	Lerista timida	Timid Slider
	Liopholis inornata	Desert Skink
	Liopholis striata	Nocturnal Desert Skink
	Menetia greyii	Common Dwarf Skink
	Morethia adelaidensis	Saltbush Morethia Skink
	Morethia butleri	Woodland Morethia Skink
	Tiliqua multifasciata	Centralian Blue-tongued Lizard
	Tiliqua occipitalis	Western Blue-tongued Lizard
	Tiliqua rugosa	Bobtail
Typhlopidae	*Anilios australis*	Austral Blind Snake
	Anilios bicolor	Dark-spined Blind Snake
	Anilios bituberculatus	Prong-snouted Blind Snake
	Anilios hamatus	Pale-headed Blind Snake
	Anilios waitii	Waite's Blind Snake
Varanidae	*Varanus caudolineatus*	Stripe-tailed Monitor
	Varanus eremius	Pygmy Desert Monitor
	Varanus giganteus	Perentie
	Varanus gouldii	Gould's Goanna
	Varanus panoptes	Yellow-spotted Monitor
	Varanus tristis	Black-headed Monitor

4.4 CONSERVATION SIGNIFICANT FAUNA

Conservation significant fauna are protected by the Commonwealth *EPBC Act 1999*, and this list includes species covered by international treaties such as the Japan-Australia Migratory Bird Agreement (JAMBA) and China-Australia Migratory Bird Agreement (CAMBA) and the Western Australia (WA) *Biodiversity Conservation Act 2016*. The WA *Biodiversity Conservation Act 2016* (*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 *Biodiversity Conservation 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 WA *BC Act* are provided in Appendix C.

No threatened species of fauna and a very low possibility that two migratory species of birds identified under the *EPBC Act 1999* potentially occur in the project area or surrounds. There is one species listed under the WA *BC Act 2016* as specially protected and one species listed on the DBCA's 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. Species that are waders, shore birds or marine migratory have not been included in the list, as there is no suitable habitat for these species in the project area but are commented on at the end of the next section.

Table 6. Assessment of the potential impact on conservation significant fauna that could occur in the bioregion

Species	DBCA Schedule / Priority	Status under EPBC Act	Comment on the potential impact on species
Night Parrot *Pezoporus occidentalis*	Critically Endangered	Endangered	Highly unlikely to be in the project area, due a lack of suitable habitat, so the potential for impact on this species is low.
Malleefowl *Leipoa ocellata*	Vulnerable	Vulnerable	Not present in the project area, so there will be no impact on this species.
Chuditch *Dasyurus geoffroii*	Vulnerable	Vulnerable	Not present in the project area, so there will be no impact on this species.
Grey Falcon *Falco hypoleucos*	Vulnerable	Vulnerable	Highly unlikely to be in the project area
Giant Desert Skink *Liopholis kintorei*	Vulnerable	Vulnerable	Highly unlikely to be in the project area, due a lack of suitable habitat, so the potential for impact on this species is low.
Princess Parrot *Polytelis alexandrae*	Priority 4	Vulnerable	May infrequently be seen in the area; however, clearing vegetation is unlikely to impact on this species.
Mulgara *Dasycercus blythi*	Priority 4	Vulnerable	Highly unlikely to be in the project area, due a lack of suitable habitat, so the potential for impact on this species is low.
Oriental Plover *Charadrius veredus*	Migratory	Migratory	May infrequently be seen in the area; however, clearing vegetation is unlikely to impact on this species.
Fork-tailed Swift *Apus pacificus*	Migratory	Migratory	May infrequently be seen in the area; however, clearing vegetation is unlikely to impact on this species.
Grey Wagtail *Motacilla cinerea*	Migratory	Migratory	Highly unlikely to be seen in the project area, so the potential for impact on this species is low.

Species	DBCA Schedule / Priority	Status under EPBC Act	Comment on the potential impact on species
Yellow Wagtail *Motacilla flava*	Migratory	Migratory	Highly unlikely to be seen in the project area, so the potential for impact on this species is low.
Peregrine Falcon *Falco peregrinus*	Other speciually protected		May infrequently be seen in the area; however, clearing vegetation is unlikely to impact on this species.
Long-tailed Dunnart *Sminthopsis longicaudata*	P4		Could potentially be present in the rocky out-crop ridge.
Migratory wetland avifauna species	Migratory	Migratory	Highly unlikely to be impacted by the proposed development

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

The Night Parrot was probably originally distributed over much of the semi-arid and arid Australia (Garnett et al. 2011, Threatened Species Scientific Committee 2016). Sightings in north-west Queensland in the early 1990s were in a broad cross section of the habitats available (Garnett et al. 1993). 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, Palaszxzuk and Miles 2017), Pilbara in 2017 (Jones 2017) and near Lake Eyre in 2017 (McCarthy 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. More recent information indicates its preferred habitat appears to be in *Triodia* grasslands, chenopod shrub lands, shrubby samphire and floristically diverse habitats dominated by large-seeded species (Threatened Species Scientific Committee 2016, McCarthy 2017, Murphy et al. 2017b). It nests under *Triodia* and has a runway and a tunnel entrance with an apron of dead *Triodia* sp. leaves, and 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, but it is thought that breeding generally occurs between April and October (Murphy et al. 2017a).

As there are no recent Night Parrot records near the project area, and the habitat in the project area is not suitable for Night Parrots, it is highly unlikely that they are present in the project area.

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

Malleefowl have been found in mallee regions of southern Australia from approximately the 26th parallel of latitude southwards. Malleefowl are now only found throughout these regions in fragmented patches of dense vegetation due to clearing of habitat for agriculture, increased fire frequency, competition with exotic herbivores (sheep, rabbits, cattle, goats) and kangaroos, predation by foxes and cats, inbreeding because of fragmentation and possibly hunting for food.

There are no Malleefowl mounds or tracks in the project area, and the habitat is unsuitable for Malleefowl, so it is highly unlikely that they are in the project area.

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

The Chuditch is the largest extant carnivorous marsupial in WA. It is usually active from dusk to dawn. Formally known from over 70% of Australia, the Chuditch now has a patchy distribution throughout the Jarrah forest and mixed Karri/Marri/Jarrah forest of 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).

None of the fauna surveys in the project or adjacent areas have recorded the presence of Chuditch, the habitat is not suitable, and the abundance of feral predators indicates that it is highly unlikely to be present in the project area.

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

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

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

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

Liopholis kintorei is a large skink that is found in the sandy desert regions of Western Australia, Northern Territory and South Australia. It is found on sand-flats and clay-based or loamy soils vegetated with spinifex. It lives in a multi-entranced communal burrow system and uses shared defecation sites. Storr *et al*. (1999b) recorded them as being in the Wanjarri area and the Great Victoria Desert, and the Atlas of Living Australia and Pianka's database recorded them east of Laverton in the 1960s.

Terrestrial Ecosystems' assessment is that *L. kintorei* is unlikely be found in the project area due to a lack of recent records near the project area and the lack of suitable habitat (i.e. spinifex).

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

Very little is known about the Princess Parrot, even the exact extent of its geographical distribution. The species is found mostly in the inland arid areas of Australia, and in Western Australia in the Gibson, Little Sandy and Great Victoria Deserts (Johnstone and Storr 1998a, Pavey et al. 2014). However, they occasionally occurred in lightly wooded areas adjacent to the sandy deserts (e.g. see Moriarty 1972). It is thought to be nomadic within the central desert regions of Australia, occupying arid shrub lands, particularly those dominated by Mulga, Desert Oak and spinifex. Due to the paucity of information on the species, accurate estimates of its population size are difficult, however, this species is probably threatened by habitat loss to agricultural practices and changes in fire regimes.

Dr S. Thompson sighted a single specimen of this parrot in a survey near the Wanjarri Nature Reserve in 2006 and Moriarty (1972) also reported it in the same area, so it may occasionally be seen in the general area. However, the proposed vegetation clearing is unlikely to significantly impact on this species as it will readily move away to other areas if it is disturbed.

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. This plover has not been recorded in the general area in any of the other regional surveys.

Terrestrial Ecosystems' assessment is that the Oriental Plover is unlikely to be seen in the project area, 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 earth, usually only for breeding. It is common in the Kimberley, uncommon to moderately common near northwest, west and southeast coasts and rare to scarce elsewhere. It is rarely seen in the Goldfields.

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, and it is an almost exclusively aerial species.

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 suitable habitat.

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

This bird breeds in far eastern Siberia and on Commander and Kurile Islands and winters from Myanmar and the Philippines south to northern Australia. It is a vagrant in southern Australia. It has a preference for damp short-grass flats, edges of swamps, bore overflows, grazed and mowed grass and irrigated areas (Johnstone and Storr 2004).

It is highly unlikely that this bird is present in the project area due to a lack of suitable habitat and the rarity of its presence in southern Australia.

Peregrine Falcon (*Falco peregrinus*) – Other specially protected under the *BC Act 2016*

The Peregrine Falcon is uncommon, although widespread throughout much of Australia excluding the extremely dry areas and has a wide and patchy distribution. It shows habitat preference for areas near cliffs along coastlines, rivers and ranges and within woodlands along watercourses and around lakes. Nesting sites include ledges along cliffs, granite outcrops and quarries, hollow trees near wetlands and old nests of other large bird species. There is no evidence to suggest any change in status in the last 50 years. The Peregrine Falcon has been seen in the Wanjarri Nature Reserve (Moriarty 1972, Ninox Wildlife Consulting 1994), at Honeymoon Well (Ninox Wildlife Consulting 1994), at Murrin Murrin (Ninox Wildlife Consulting 1998), at Cawse (Hart Simpson and Associates 2000) and at Mileura (Tingay 1977), so they could infrequently be seen in the general area.

Terrestrial Ecosystems' assessment is that the Peregrine Falcon may infrequently be seen in the project area. However, the proposed developments are unlikely to significantly impact on this species as it will move away to other areas if it is disturbed.

Brush-tailed Mulgara (*Dasycercus blythi*) - Vulnerable species under the *EPBC Act 1999* and Priority 4 with the DBCA

Woolley (2005) has recently recognised two species of 'Mulgara'; *Dasycercus blythi* and *D. cristicauda*. *Dasycercus blythi* has a non-crested tail, two upper premolars and six nipples; *D. cristicauda* has a crested tail,

three upper premolars and eight nipples. Both species potentially have overlapping distributions in arid Australia. Woolley (2005) suggested the common names for these two species be Brush-tailed Mulgara for *D. blythi* and Crest-tailed Mulgara for *D. cristicauda*. These two species can be sympatric in places, but probably utilise different parts of the habitat on a local scale when they are recorded in the same area. Currently, there are insufficient data to separate the spatial ecology, burrows and reproductive biology of these two species. Information that follows is based on what is known for 'Mulgara' without distinguishing between the species.

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

It is Terrestrial Ecosystems' view that Mulgara is unlikely of be found in the project area due to a lack of suitable habitat.

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

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

Long-tailed Dunnarts have been caught at Mt Ida, Bottle Creek, Granny Smith (Terrestrial Ecosystems 2011b), Murrin Murrin, Mt Mason (DBCA threatened species database search) and Mt Forrest (Harewood 2014). The low rocky outcrops in the project area are small and isolated, so the possibility that they support Long-tailed Dunnarts is very low.

Migratory wetland species

The EPBC online database search indicated the following species listed as 'marine migratory' could potentially be in the project area. These species are listed because of the nearby Lake Carey.

- *Calidris acuminata* (Sharp-tailed Sandpiper)
- *Calidris ferruginea* (Curlew Sandpiper)
- *Calidris melanotos* (Pectoral Sandpiper)
- *Tringa nebularia* (Common Greenshank)
- *Actitis hypoleucos* (Common Sandpiper)
- *Calidris acuminata* (Sharp-tailed Sandpiper)
- *Thinornis rubricollis* (Hooded Plover)

These species are only likely to be present when Lake Carey contains water, and only likely to be present near the project area when the lake is almost full. These wetland and shore birds will readily move if disturbed, so any potential impacts will be not significant.

4.5 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.

The assessment contained in Table 9 is supported by more detailed discussion in sections above and the management recommendations below.

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. These criteria do not fit all circumstances (e.g. adequacy of fauna survey data); however, they are useful in providing the reader with an appreciation of the level of likelihood and consequences of an event. 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.

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

Table 8. Levels of acceptable risk

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

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

			Before management				**With management**		
	Potential impacts		Inherent risk			Risk controls	Residual risk		
Factor			Likelihood	Consequence	Significance		Likelihood	Consequence	Significance
Fauna survey data	Inadequate survey data to adequately assess the risks	Unknown loss of fauna, fauna of conservation significance, and fauna assemblages, and an incomplete fauna assessment.	B	2	Low				
	Inadequacy of comparative data	Limits on the availability of comparative data reduced the capacity to assess the uniqueness of the fauna assemblages in the project area.	B	2	Low				
Clearing vegetation	Loss of fauna habitat – local scale	Loss of terrestrial fauna in the project area.	E	2	Mod	Where possible, reduce the extent of clearing and leave large Eucalypt trees.	E	2	Mod
	Loss of fauna habitat – landscape scale	Loss of some fauna during vegetation clearing.	B	1	Low				
	Loss of fauna habitat – regional scale	Small loss of some fauna from the region.	B	1	Low				
	Loss of a threatened ecological fauna community	Loss of an undetected threatened ecological fauna community.	A	3	Low				
	Habitat fragmentation	Fauna movement restricted resulting in the death of fauna and a loss of biodiversity.	A	2	Low				
Death or loss of conservation significant fauna	Loss of a unique terrestrial fauna ecosystem	Loss of an ecosystem containing fauna with high species richness, high abundance and numerous top of the food chain predators.	A	2	Low				

			Before management				With management		
	Oriental Plover	Loss of a Oriental Plover or small population of Oriental Plover	A	2	Low				
	Fork-tailed Swift	Loss of a Fork-tailed Swift or small population of Fork-tailed Swift	A	2	Low				
	Peregrine Falcon	Loss of a Peregrine Falcon or small population of Peregrine Falcon	A	2	Low				
	Long-tailed Dunnarts	Loss of a Long-tailed Dunnart or small population of Long-tailed Dunnarts	B	2	Low				
Human impacts	Increase or spread of weeds	Changed vegetation and a resulting loss of fauna habitat.	E	2	Mod	Implementation of a weed management plan.	D	2	Low
	Road kills	Animals being killed by vehicles as they cross roads	E	1	Low	Limiting speeds	E	1	Low
	Increase in feral fauna; specifically the fox, wild dog and cat	Increased predation on the native fauna	C	3	Mod	Implementation of a feral animal control program(s)	C	2	Low
	Dust	Increased potential for dust	E	2	Mod	Implementation of a dust management plan.	C	2	Low

5. DISCUSSION

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

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

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

Fauna assessments by Ninox Wildlife Consulting (1998) for the Murrin Murrin project, Dell and How (1988) for the Western Australian Museum survey of the Edjudina-Menzies area, McKenzie et al. (1992b) for the Western Australian Museum survey of the Kurnalpi-Kalgoorlie area and the Level 2 fauna assessment for the Granny Smith deeps project area (Terrestrial Ecosystems 2011a) together provide a comprehensive list of the vertebrate fauna species potentially found in the project area.

An addition generic survey of the project area is unlikely to provide additional information that would alter an assessment by government regulators and is therefore not required.

5.1.1 Amphibians

Frogs are normally only detected immediately after rainfall or around semi-permanent pools. The project area shows no sign of long-term pooling of surface freshwater water, other than in the old mine pit and turkeys nest that is present in the project area. Frogs were not present in either of these areas. There are no conservation significant amphibians near the project area.

5.1.2 Reptiles

Typically, between 25 and 35 species of reptiles are caught in open mulga woodland (Thompson et al. 2003, Cowan and How 2004, ATA Environmental 2007, Coffey Environments 2008, Terrestrial Ecosystems 2010b) in this part of the goldfields. The spareness of the vegetation and lack of leaf litter for much of the project area would mean there is a lower abundance and probably fewer species than in the more vegetated areas. None of the species likely to be in the project area are of conservation significance.

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.

5.1.3 Birds

The number of birds and bird species in the northern Goldfields fluctuates based on seasons and recent rainfall (Craig and Chapman 2003). The project area is likely to support a similar assemblage to that present in the adjacent areas. Birds of conservation significance potentially found in the area include the Peregrine Falcon, and the Princess Parrot. The Princess Parrot is nomadic and moves around the arid interior often in search of water and resources, however, a lack of freshwater and the sparseness of trees would suggest it would be recorded very infrequently in the project area, if ever. 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. All birds will readily shift to other areas when there is a disturbance.

It is Terrestrial Ecosystems' view that the proposed additional vegetation clearing for the redevelopment of a mine and associated infrastructure is unlikely to significantly impact on the avian fauna of the bioregion.

5.1.4 Mammals

The number of small terrestrial mammals potentially caught in the project area would be low due the sparsely vegetated habitat. Although, records of Burrowing Bettongs (*Bettongia lesueur*) and Bilbies (*Macrotis lagotis*) are shown in the Atlas of Living Australia and the Western Australian Museum records (Appendix B), they are no longer present in this area, having been predated on by foxes, cats and wild dogs many years ago. The project area contains small, low rocky outcrops, but they are not considered suitable habitat for the Priority 4 Long-tailed Dunnart as these areas are small and isolated.

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

Vertebrate species potentially in the project area are wide-ranging and have been recorded in various other fauna surveys in the bioregion (Appendix B). There is likely to be a relatively low abundance of reptiles and mammals in the project area because of the sparseness of the vegetation and lack of leaf litter on-the-ground in many areas. A substantial section of the project area has been mined, explored and the disturbance that results from that mining and exploration is evident at multiple locations.

5.2.2 Maintenance of threatened ecological communities

No threatened ecological communities were identified in or near the project area.

5.2.3 Condition of fauna habitat

A section of the project area has been cleared and disturbed for previous mining and exploration drilling activity, there are two pits, waste dumps, haul roads and tracks in the project area. These impacts on the vertebrate fauna are negligible in a bioregional context.

Over a long period, introduced predators are likely to have been one of the most significant impacts on the vertebrate fauna in the project area. The uncleared fauna habitat of the project area is similar to that in the many square kilometres of adjacent habitat; therefore, clearing of the vegetation is 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 terrestrial fauna movement corridor.

5.2.5 Abundance and distribution of similar habitat in the adjacent areas

The fauna assemblage in the project area is like that in the many square kilometres of similar habitat in adjacent areas and the bioregion, particularly along the surrounds of Lake Carey, so the loss of vegetation and the local vertebrate is unlikely to have a significant impact. However, there is a slowly growing cumulative impact when cattle grazing, mining and exploration activity are considered in the bioregion.

6. POTENTIAL IMPACTS

6.1 POTENTIAL IMPACTS ON FAUNA

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 a bioregional context in the longer 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.

The project area contains small, low rocky outcrops, but these hills are low and isolated and therefore unlikely to support a population of Long-tailed Dunnarts.

6.2 DIRECT IMPACTS

6.2.1 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 mining activity 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.

6.2.2 Reduction or loss of activity areas and closure of burrows

Clearing vegetation and associated mining activities are likely to destroy reptile and mammal burrows or foraging habitat that are currently in use or could be used again. Clearing vegetation in areas that form 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.

6.3 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. The very substantial quantity of bare ground in the project area would indicate that clearing of vegetation is unlikely to result in significant edge effects.

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.

6.3.1 Habitat fragmentation

In addition to vegetation clearing, infrastructure including tracks, has the potential to fragment habitat. Cleared vegetation that fragments fauna habitats and partition existing fauna activity areas can isolate sections of established faunal 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 vegetation clearing 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.

6.3.2 Introduced fauna and weeds

An increase in human activity is often associated with an increase in the abundance of introduced species such as the house mouse (*Mus musculus*), foxes (*Vulpes vulpes*), cat (*Felis catus*) and wild dogs (*Canis lupus*). This increase may be due to a decline in habitat health, increased road kills, poor 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.

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.

6.3.3 Road fauna deaths

An increase in road fauna deaths is likely to occur where new roads 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.

6.3.4 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.

Fires are unlikely to be a significant threat to native fauna species near the project area due to the sparseness of the vegetation.

6.3.5 Anthropogenic activity

Unnatural noises, vibrations, artificial light sources, and vehicle and human movement in an area may be sufficient to force individuals or fauna species to move from adjacent areas or alter their activity periods. This

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

6.3.6 Dust

Dust generated from shifting topsoil 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.

6.4 NATIVE VEGETATION CLEARING PRINCIPLES

The *Environmental Protection Act (1986)* provides criteria to judge the potential impact of a development on clearing native vegetation on flora and fauna. These criteria have been listed below with a response to indicate how clearing of the vegetation in the project area might be judged against these principles as they relate to fauna and fauna assemblages (Table 10). Where possible, native vegetation should not be cleared if any of the following principles are compromised.

Table 10. Assessment of impact on fauna and fauna assemblages using the native vegetation clearing principles

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 community.
It is significant as a remnant of native vegetation in an area that has been extensively cleared.	The area is not a remnant and the vegetation clearing will not create a remnant.
It is growing in, or in association with, an environment associated with a watercourses or wetland.	The proposed vegetation clearing and mine are not in a water course or 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

6.5 REFERRAL UNDER THE EPBC ACT

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

7. SUMMARY

The Devon Gold project area assessed was 285.3ha and is on the western edge of Lake Carey approximately 72km south of Laverton in the northern Goldfields. This Basic vertebrate fauna risk assessment provides an indication of the vertebrate species potentially in the project area and surrounds, and indicates the potential impacts and consequences of the re-opening of this mine.

There are five broad fauna habitats in the entire project area:

- salt lake largely devoid of vegetation;
- samphire;
- chenopod shrubland;
- open mulga woodland; and
- eucalypt woodland.

In addition, there are areas almost devoid of fauna habitat due to historical mining and disturbance. The density of the shrubs varies appreciably across the project area, but there is little leaf litter and a vast amount of bare ground.

The fauna habitat in the project area is like that in adjacent areas and the surrounds of Lake Carey, with the consequence that a loss of this habitat is unlikely to have a significant impact on the vertebrate fauna in a bioregional context.

The project area contains some low rocky outcrops, but they are small and isolated, so it is unlikely that they support the Priority 4 Long-tailed Dunnart.

There is no requirement for an *EPBC Act* referral as the reopening and development of a mine will not significantly impact on conservation significant species.

8. MANAGEMENT STRATEGIES

8.1 INDUCTION AND AWARENESS

All contractors and people involved in exploration or mining activities 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 Devon Gold project.

8.2 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 2: Pets are not permitted on site.

Recommendation 3: All waste and rubbish be contained in bins and regularly removed from site or buried so it is unavailable to pest species.

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

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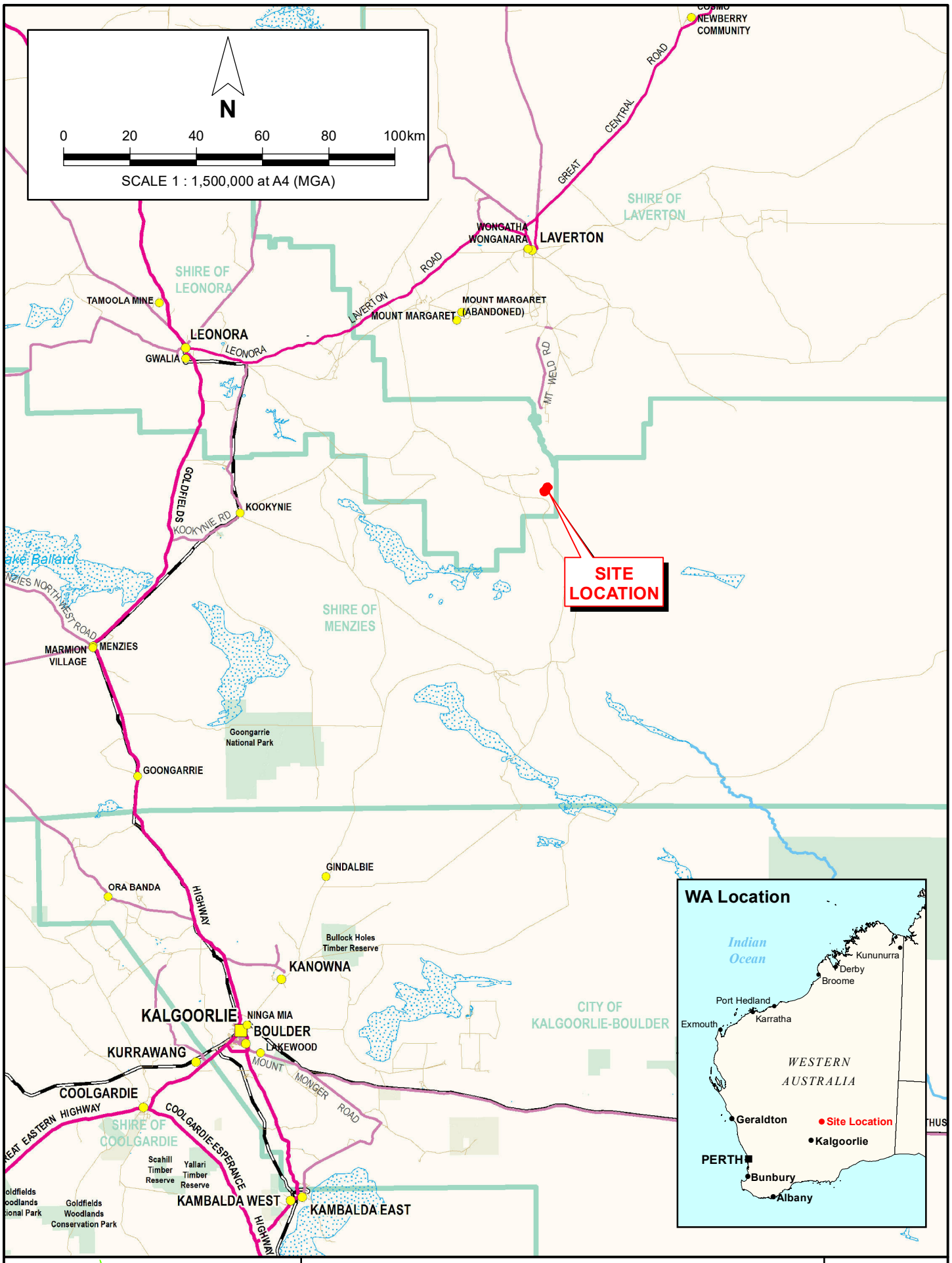
Figures

Basic Vertebrate Fauna Survey and Risk Assessment
Devon Gold Project



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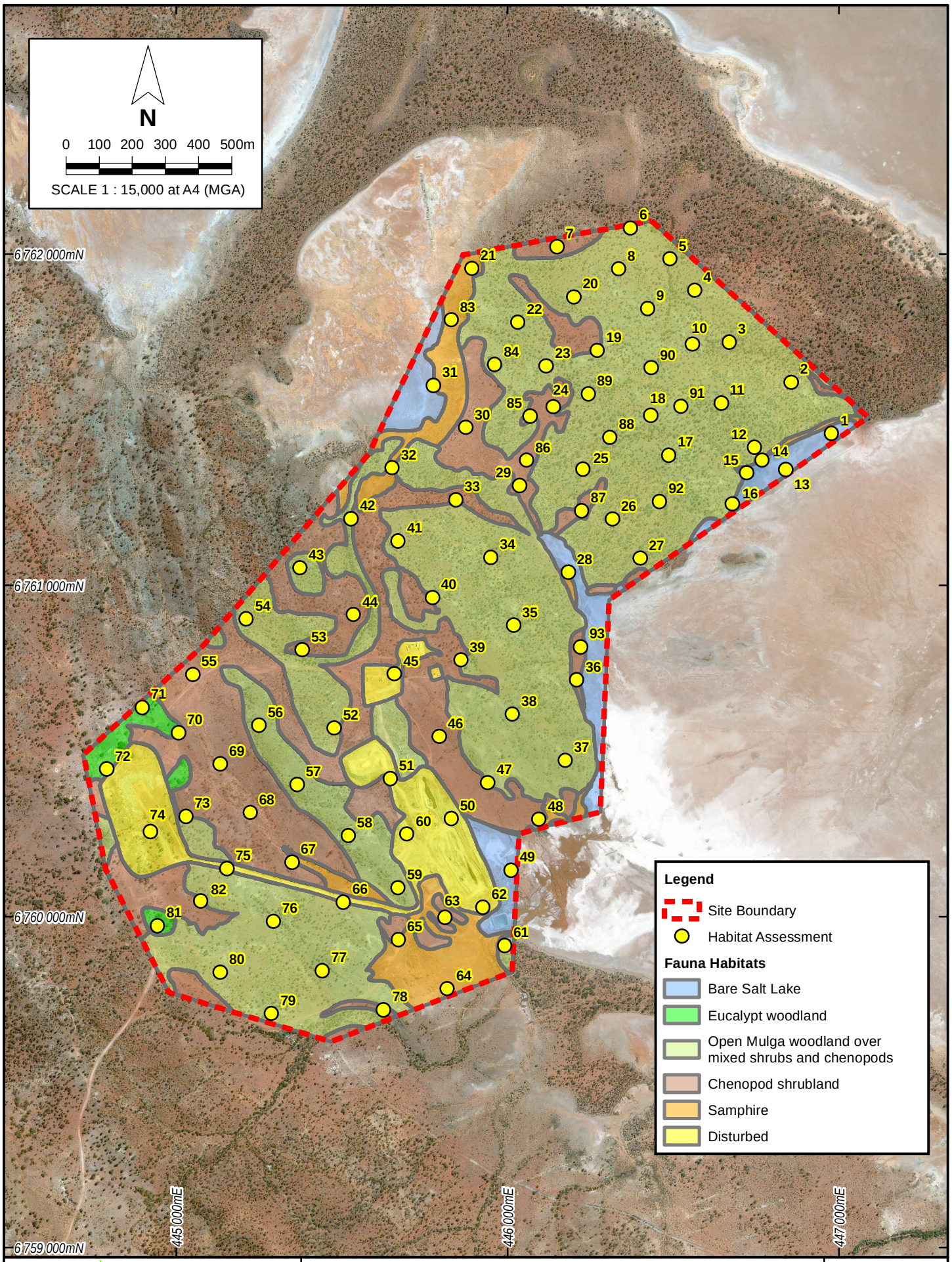
TERRESTRIAL ECOSYSTEMS

Matsa Gold Pty Ltd
BASIC VERTEBRATE FAUNA SURVEY AND RISK ASSESSMENT
DEVON GOLD PROJECT

Figure 1

REGIONAL LOCATION

Drawn: S. Thompson | Date: 20 Apr 2022 | Job: 2021-0109



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TERRESTRIAL ECOSYSTEMS

Matsa Gold Pty Ltd
BASIC VERTEBRATE FAUNA SURVEY AND RISK ASSESSMENT
DEVON GOLD PROJECT

Figure 2

FAUNA HABITAT TYPES

Drawn: S. Thompson | Date: 28 Apr 2022 | Job: 2021-0109

Appendix A.

Results of the *EPBC Act* Protected Matters Search

Basic Vertebrate Fauna Survey and Risk Assessment
Devon Gold Project

Australian Government

Department of Agriculture, Water and the Environment

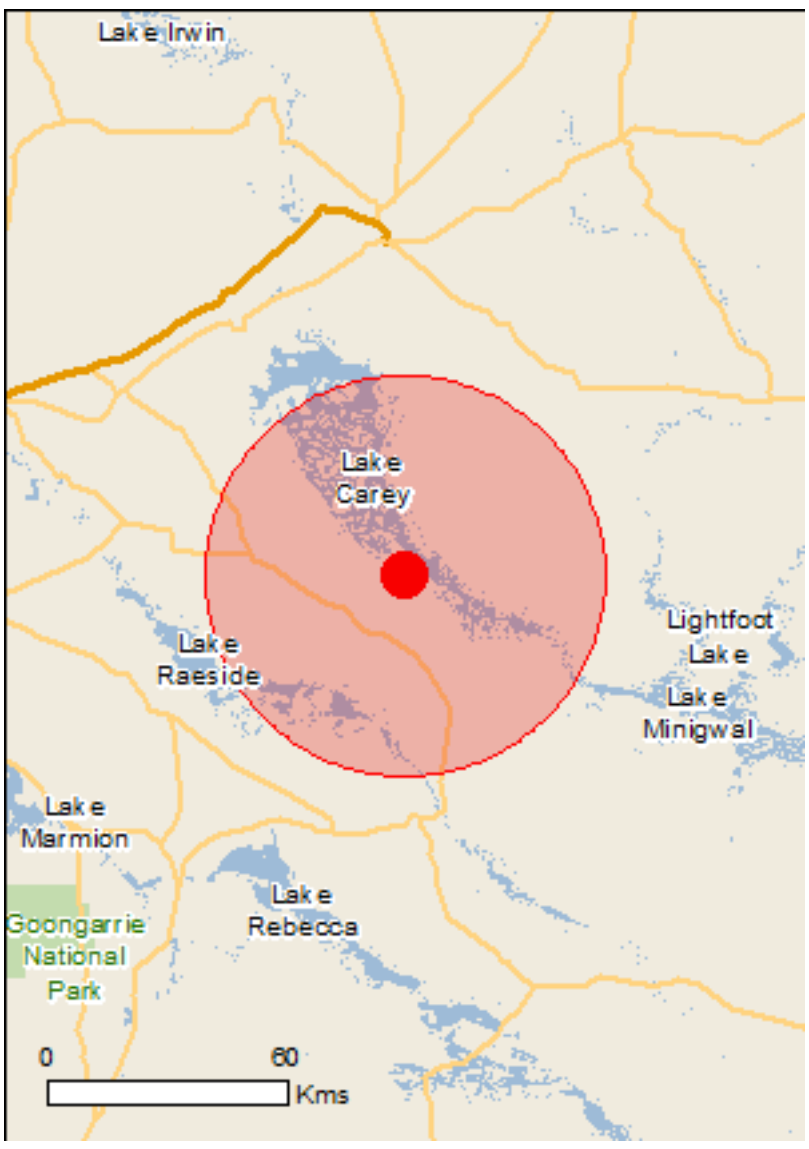
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 16/09/21 17:36:59



Coordinates

Buffer: 50.0Km

Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	6
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	12
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat known to occur within area
Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Thinornis rubricollis		
Hooded Plover [59510]		Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Columba livia		
Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Mammals		
Camelus dromedarius		
Dromedary, Camel [7]		Species or species habitat likely to occur within area
Canis lupus familiaris		
Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus		
Goat [2]		Species or species habitat likely to occur within area
Equus asinus		
Donkey, Ass [4]		Species or species habitat likely to occur within area
Equus caballus		
Horse [5]		Species or species habitat likely to occur within area
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus		
House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus		
Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Plants		
Carrichtera annua Ward's Weed [9511]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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

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

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-29.27855 122.44186

Acknowledgements

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

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

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

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

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Appendix B.

Vertebrate Fauna Recorded in Biological Surveys in the Region

Basic Vertebrate Fauna Survey and Risk Assessment
Devon Gold Project

B.1 VERTEBRATE FAUNA ASSESSMENTS

		Surveys	A	B	C	D										E																
Family	Species	Common Name			Unknown	Opportunistic	MME1	MME2	MME3	MME5	MME7	MME8	MME9	MME6	MME4	Site 10	Site 9	Site 2	Site 11	Site 3	Site 12	Site 13	Site 4	Site 5	Site 1	Site 8	Site 6	Site 7	Opportunistic	GD birds
Amphibians																																
Hylidae	*Cyclorana maini*	Sheep Frog	X	30	6	1										5	11	1	1													
	Cyclorana platycephala	Water-holding Frog	X	445	97											2	5	1		1	1	1										
Limnodynastidae	*Neobatrachus kunapalari*	Kunapalari Frog	X	73	19												1															
	Neobatrachus sudelli	Sudell's Frog	X	30	6																											
	Neobatrachus sutor	Shoemaker Frog	X	70	18		1	1								2	13	2		5	1		3	1	8	1							
	Neobatrachus wilsmorei	Goldfields Bullfrog	X	46	12																											
	Platyplectrum spenceri	Spencer's Burrowing Frog	X	18	18																											
Myobatrachidae	*Crinia georgiana*	Quacking Frog	X																													
	Pseudophryne occidentalis	Orange-crowned Toadlet	X	22	22																											
Reptiles																																
Agamidae	*Ctenophorus caudicinctus infans*	Ring-tailed Dragon	X	155	39																											
	Ctenophorus cristatus	Crested Dragon	X	83	20																											
	Ctenophorus fordi	Mallee Dragon	X	494	115																											
	Ctenophorus isolepis	Crested Dragon	X	130	31		1																									
	Ctenophorus nuchalis	Central Netted Dragon	X	90	19																											
	Ctenophorus ornatus	Ornate Crevice Dragon	X																													
	Ctenophorus pictus	Painted Dragon	X																													
	Ctenophorus reticulatus	Western Netted Dragon	X	301	73	1		1	1	1	3	1																				
	Ctenophorus salinarum	Saltpan Dragon	X	47	16																											
	Ctenophorus scutulatus	Lozenge-marked Dragon	X	296	70																											
	Diporiphora amphiboluroides	Mulga Dragon	X	31	7																		2	1			1					
	Moloch horridus	Thorny Devil	X	53	14																											
	Pogona minor	Dwarf Bearded Dragon		35	41								1																			
	Tympanocryptis cephalus	Pebble Dragon	X	13																			2	3		1	1					
Boidae	*Antaresia stimsoni*	Stimson's Python	X	5	1																											
Carphodactylidae	*Nephrurus laevissimus*	Smooth Knob-tail	X	205	45																											
	Nephrurus vertebralis	Midline Knob-tail	X	36	8																											
	Nephrurus wheeleri	Banded Knob-tail	X	10	2																											
	Underwoodisaurus milii	Barking Gecko	X	154	45									2																		
Diplodactylidae	*Amalosia reticulata*	Reticulated Velvet Gecko		2	2																											
	Diplodactylus conspicillatus	Fat-tailed Diplodactylus	X																													
	Diplodactylus granariensis	Wheat-belt Stone Gecko	X	94	31											1																
	Diplodactylus pulcher	Fine-faced Gecko	X	219	48									1		2			1			1	1	4	2		3	1				
	Hesperoedura reticulata	Reticulated Velvet Gecko	X																													
	Lucasium damaeum	Beaded Gecko	X																													
	Lucasium maini	Main's Ground Gecko	X	103	34																											
	Lucasium squarrosum	Mottled Ground Gecko	X		18																											
	Strophurus assimilis	Goldfields Spiny-tailed Gecko	X	14	16																											
	Strophurus elderi	Jewelled Gecko	X	5	5																											

		Surveys	A	B	C	D										E															
Family	Species	Common Name			Unknown	Opportunistic	MME1	MME2	MME3	MME5	MME7	MME8	MME9	MME6	MME4	Site 10	Site 9	Site 2	Site 11	Site 3	Site 12	Site 13	Site 4	Site 5	Site 1	Site 8	Site 6	Site 7	Opportunistic	GD birds
	Strophurus strophurus	Western Spiny-tailed Gecko	X	8	10																				1	1				
	Strophurus wellingtonae	Western Shield Spiny-tailed Gecko	X	18	21			1										2				1			4					
Elapidae	*Acanthophis pyrrhus*	Desert Death Adder	X	10	2																									
	Brachyurophis fasciolata	Narrow-banded Burrowing Snake	X	10	2																									
	Brachyurophis semifasciata	Half-girdled Snake	X	6	2																									
	Demansia psammophis	Yellow-faced Whipsnake	X	10	3																									
	Elapognathus coronatus	Crowned Snake	X																											
	Furina ornata	Orange-naped Snake	X	10	2																									
	Neelaps bimaculatus	Black-naped Burrowing Snake	X	5	1																									
	Parasuta gouldii	Gould's Snake	X	1	1																									
	Parasuta monachus	Monk Snake	X	25	28	1																			1	1				
	Pseudechis australis	Mulga Snake	X	6	6																									
	Pseudechis butleri	Spotted Mulga Snake	X	3	4	1																								
	Pseudonaja mengdeni	Gwardar	X	13	14																									
	Pseudonaja modesta	Ringed Brown Snake	X	26	33																									
	Simoselaps bertholdi	Jan's Banded Snake	X	6	6																									
	Suta fasciata	Rosen's Snake	X	9	11																									
	Suta suta	Curl Snake	X																											
Gekkonidae	*Christinus marmoratus*	Marbled Gecko	X																											
	Gehyra punctata	Spotted Dtella	X																											
	Gehyra purpurascens	Purplish Dtella	X	23	8																									
	Gehyra variegata	Tree Dtella	X	589	136	1	3	9	3	3	2		3	9	16	2		3	1	2	2		4			3	1			
	Heteronotia binoei	Bynoe's Prickly Gecko	X	658	165	1		3							1	1			2		1	5		1	2					
	Rhynchoedura ornata	Western Beaked Gecko	X	50	48												1								3		2			
Pygopodidae	*Aprasia picturata*	Black-headed Worm-lizard	X	10	2																									
	Delma australis	Marble-faced Delma	X	19	5																									
	Delma butleri	Unbanded Delma	X	38	10																									
	Delma nasuta	Sharp-snouted Delma	X	5	1																									
	Lialis burtonis	Burton's Snake-lizard	X	31	7																									
	Pygopus nigriceps	Western Hooded Scaly-foot	X	14	17																									
Scincidae	*Cryptoblepharus australis*	Inland Snake-eyed Skink	X	42																										
	Cryptoblepharus buchananii	Buchanan's Snake-eyed Skink	X	45	25	1		2																						
	Ctenotus atlas	Southern Mallee Ctenotus	X	140	34																									
	Ctenotus brooksi	Wedgsnout Ctenotus	X	120	28																									
	Ctenotus calurus	Blue-tailed Finesnout Ctenotus	X		1																									
	Ctenotus greeri	Spotted-necked Ctenotus	X	50	11																									
	Ctenotus hanloni	Nimbel Ctenotus	X	5	1																									
	Ctenotus helenae	Clay-soil Ctenotus	X	20	5																									
	Ctenotus leae	Ornage-tailed Finesnout Ctenotus	X	10	3																									
	Ctenotus leonhardii	Leonhardi's Ctenotus	X	173	42				1							9	5	2	7		16	27			2			1		
	Ctenotus pantherinus	Leopard Skink	X	25	6																									
	Ctenotus quattuordecimlineatus	Fourteen-lined Ctenotus	X	45	10																									
	Ctenotus schomburgkii	Schomburgk's Ctenotus	X	335	71	1	1						2																	
	Ctenotus severus	Stern Ctenotus	X	65	15																									

		Surveys	A	B	C	D									E														
Family	Species	Common Name			Unknown	Opportunistic	MME1	MME2	MME3	MME5	MME7	MME8	MME9	MME6	MME4	Site 10	Site 9	Site 2	Site 11	Site 3	Site 12	Site 13	Site 4	Site 5	Site 1	Site 8	Site 6	Site 7	Opportunistic	GD birds
	Ctenotus uber	Spotted Ctenotus	X	168	45									1		1		1		1			2	2		6	3	9		
	Ctenotus xenopleura	Wide-striped Ctenotus	X	5	1																								
	Cyclodomorphus melanops	Spinifex Slender Bluetongue	X	32	9																								
	Egernia depressa	Pygmy Spiny-tailed Skink	X	124	35																								
	Egernia formosa	Goldfields Crevice-skink	X	77	25																								
	Egernia napoleonis	South-western Crevice-skink	X																										
	Eremiascincus richardsonii	Broad-banded Sand Swimmer	X	23	8																	1	2						
	Hemiergis initialis	South-western Earless Skink	X	11	3																								
	Lerista desertorum	Central Desert Robust Slider	X	130	34	1							1	1								2							
	Lerista kingi	King's Slider	X	26																									
	Lerista macropisthopus	Unpatterned Robust Slider	X	55	13																								
	Lerista macropisthopus remota	Unpatterned Robust Slider	X																										
	Lerista muelleri	Wood Mulch-slider	X		60																								
	Lerista picturata	Southern Robust Slider	X	50	16																								
	Lerista sp.					1							1	2															
	Lerista timida	Timid Slider	X																										
	Liopholis inornata	Desert Skink	X	125	28																								
	Liopholis striata	Nocturnal Desert Skink	X	17	4																								
	Menetia greyii	Common Dwarf Skink	X	139	37	1	4						1						1										
	Morethia adelaidensis	Saltbush Morethia Skink	X	6	6																								
	Morethia butleri	Woodland Morethia Skink	X	247	58	1		2		2	1	1	1	3	4	1	6	1			3		1				2			
	Saiphos equalis	Three-toed Skink	X																										
	Tiliqua multifasciata	Centralian Blue-tongued Lizard																						1					
	Tiliqua occipitalis	Western Blue-tongued Lizard	X	5	5																								
	Tiliqua rugosa	Bobtail	X	7	8																								
Typhlopidae	*Anilios australis*	Austral Blind Snake	X	9	8												1								1				
	Anilios bicolor	Dark-spined Blind Snake		7	7															1									
	Anilios bituberculatus	Prong-snouted Blind Snake		19	18																								
	Anilios hamatus	Pale-headed Blind Snake		9	5																								
	Anilios sp.	Anilios Cape Range Pop																											
	Anilios waitii	Waite's Blind Snake		8	7																								
Varanidae	*Varanus caudolineatus*	Stripe-tailed Monitor	X	31	37			1						1		1		2			2		1	3			1	1		
	Varanus eremius	Pygmy Desert Monitor	X	1	1																								
	Varanus giganteus	Perentie	X	2	2																								
	Varanus gouldii	Gould's Goanna	X	14	14																								
	Varanus panoptes	Yellow-spotted Monitor	X	4	4	1							1	1		4			2	7		6		3	4		2	2		
	Varanus tristis	Black-headed Monitor	X	7	7																								
Birds																													
Casuariidae	*Dromaius novaehollandiae*	Emu				1	1	1				1	1	1														3	1
Megapodiidae	*Leipoa ocellata*	Malleefowl				1																							
Phasianidae	*Coturnix pectoralis*	Stubble Quail		5																									
Anatidae	*Biziura lobata*	Musk Duck																										2	
	Stictonetta naevosa	Freckled Duck		5																									
	Cygnus atratus	Black Swan				1																							

		Surveys	A	B	C	D									E															
Family	Species	Common Name			Unknown	Opportunistic	MME1	MME2	MME3	MME5	MME7	MME8	MME9	MME6	MME4	Site 10	Site 9	Site 2	Site 11	Site 3	Site 12	Site 13	Site 4	Site 5	Site 1	Site 8	Site 6	Site 7	Opportunistic	GD birds
	Tadorna tadornoides	Australian Shelduck				1																							
	Chenonetta jubata	Australian Wood Duck																										7	7
	Malacorhynchus membranaceus	Pink-eared Duck				1																						5	
	Anas gracilis	Grey Teal				1																						7	4
	Anas superciliosa	Pacific Black Duck				1																						1	3
	Aythya australis	Hardhead																										2	
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe		1																								3	0
Columbidae	*Phaps chalcoptera*	Common Bronzewing				1																							6
	Ocyphaps lophotes	Crested Pigeon				1	2						3	2															2	1
	Geopelia cuneata	Diamond Dove																											
Podargidae	*Podargus strigoides*	Tawny Frogmouth		1									2																
Anhingidae	*Anhinga melanogaster*	Australasian Darter		5																									
Ardeidae	*Ardea pacifica*	White-necked Heron				1																							
	Egretta novaehollandiae	White-faced Heron				1																						2	
Accipitridae	*Haliaeetus albicilla albicilla*	White-bellied Sea-eagle				1	1		2	1		1		1	1														
	Aquila audax	Wedge-tailed Eagle		5																								2	
	Hieraaetus morphnoides	Little Eagle						1																					
Falconidae	*Falco cenchroides*	Nankeen Kestrel		5									1															2	
	Falco berigora	Brown Falcon											1															1	
	Falco longipennis	Australian Hobby							1				1																
	Falco peregrinus	Peregrine Falcon						1																					
Rallidae	*Tribonyx ventralis*	Black-tailed Native-hen				1																							
	Fulica atra	Eurasian Coot		1																								2	1
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt				1																						5	
	Recurvirostra novaehollandiae	Red-necked Avocet		1		1																							
	Cladorhynchus leucocephalus	Banded Stilt		520																								1	4
Charadriidae	*Charadrius ruficapillus*	Red-capped Plover				1																							
	Elseyornis melanops	Black-fronted Dotterel				1																						1	
	Vanellus tricolor	Banded Lapwing		1																									
Laridae	*Chlidonias hybridus*	Whiskered Tern		2																									
Cacatuidae	*Eolophus roseicapillus*	Galah		20		1				15																			
Psittacidae	*Platycercus icterotis*	Western Rosella		2																									
	Barnardius zonarius	Australian Ringneck				1		1		4	2		2	3															6
	Psephotus varius	Mulga Parrot		2		1			1		5			5														8	1	2
	Neopsephotus bourkii	Bourke's Parrot		5		1																							
	Neophema splendida	Scarlet-chested Parrot		5																									
Cuculidae	*Chalcites osculans*	Black-eared Cuckoo		5																									
	Cacomantis pallidus	Pallid Cuckoo				1																						2	
Halcyonidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher																											1
Climacteridae	*Climacteris affinis*	White-browed Treecreeper	X			1					2																		
	Climacteris rufa	Rufous Treecreeper	X	5																									
Ptilonorhynchidae	*Ptilonorhynchus maculatus*	Spotted Bowerbird		1																									
	Ptilonorhynchus guttatus	Western Bowerbird	X																									2	5
Maluridae	*Malurus splendens*	Splendid Fairy-wren	X	10		1					9																		1	2

		Surveys	A	B	C	D										E															
Family	Species	Common Name			Unknown	Opportunistic	MME1	MME2	MME3	MME5	MME7	MME8	MME9	MME6	MME4	Site 10	Site 9	Site 2	Site 11	Site 3	Site 12	Site 13	Site 4	Site 5	Site 1	Site 8	Site 6	Site 7	Opportunistic	GD birds
	Malurus leucopterus	White-winged Fairy-wren	X				3						8															1	3
	Malurus lamberti	Variegated Fairy-wren	X																										
	Malurus pulcherrimus	Blue-breasted Fairy-wren	X																										
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat	X			1									1														
	Smicrornis brevirostris	Weebill	X			1				10																			
	Gerygone fusca	Western Gerygone	X																										
	Acanthiza robustirostris	Slaty-backed Thornbill	X	10		1					2																		68
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill		5		1	5	6		17	4			2	6														1
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill	X																										
	Acanthiza uropygialis	Chestnut-rumped Thornbill	X	5		1	8	30	2	14	50			15	10														
	Acanthiza iredalei	Slender-billed Thornbill	X																										
	Acanthiza apicalis	Inland Thornbill	X	10		1	2				6			2															12
	Aphelocephala leucopsis	Southern Whiteface	X	35		1					20			6	4														13
Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote	X																										
	Pardalotus rubricatus	Red-browed Pardalote	X																										
	Pardalotus striatus	Striated Pardalote	X	6		1				3																			1
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater	X																										2
	Lichenostomus virescens	Singing Honeyeater	X	15		1		4	2	1	1	1	1	1															68
	Lichenostomus leucotis	White-eared Honeyeater	X																										
	Lichenostomus ornatus	Yellow-plumed Honeyeater	X																										
	Lichenostomus plumulus	Grey-fronted Honeyeater								7																			
	Lichenostomus penicillatus	White-plumed Honeyeater	X																										
	Purnella albifrons	White-fronted Honeyeater	X			1	80	100	12	8	10	6	6	1	40														
	Manorina flavigula	Yellow-throated Miner	X	25		1	10	5	7	2		2	2	10														3	38
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater	X	20		1	25	20		6	1	1	2	2	1														44
	Anthochaera carunculata	Red Wattlebird	X																										
	Epthianura tricolor	Crimson Chat	X																										4
	Epthianura albifrons	White-fronted Chat	X																										
	Sugomel niger	Black Honeyeater	X																										
	Lichmera indistincta	Brown Honeyeater	X																										
	Melithreptus brevirostris	Brown-headed Honeyeater	X	5																									
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler	X			1																							14
Psophodidae	*Cinclosoma castanotum*	Chestnut Quail-thrush		61																									
	Cinclosoma castaneothorax	Chestnut-breasted Quail-thrush	X	25																									
	Psophodes occidentalis	Chiming Wedgebill	X																										
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	X																										
Campephagidae	*Coracina maxima*	Ground Cuckoo-shrike	X	10																								2	7
	Coracina novaehollandiae	Black-faced Cuckoo-shrike	X	5		1		2							1														7
	Lalage sueurii	White-winged Triller	X																									4	4
Pachycephalidae	*Pachycephala inornata*	Gilbert's Whistler	X																										
	Pachycephala pectoralis	Golden Whistler	X																										
	Pachycephala rufiventris	Rufous Whistler	X	1		1				1	1	1		1															22
	Colluricincla harmonica	Grey Shrike-thrush	X			1					2			1															3
	Oreoica gutturalis	Crested Bellbird	X	3		1	1	3	1	1	2			1	2													1	45

		Surveys	A	B	C	D										E																
Family	Species	Common Name			Unknown	Opportunistic	MME1	MME2	MME3	MME5	MME7	MME8	MME9	MME6	MME4	Site 10	Site 9	Site 2	Site 11	Site 3	Site 12	Site 13	Site 4	Site 5	Site 1	Site 8	Site 6	Site 7	Opportunistic	GD birds
Artamidae	*Artamus personatus*	Masked Woodswallow	X																									4	2 3
	Artamus superciliosus	White-browed Woodswallow				1			4	1				1															
	Artamus cinereus	Black-faced Woodswallow	X																										6
	Artamus cyanopterus	Dusky Woodswallow	X																										
	Artamus minor	Little Woodswallow	X																										2
	Cracticus torquatus	Grey Butcherbird	X	5		1	1	1	1	2	1		2	1														4	5
	Cracticus nigrogularis	Pied Butcherbird	X	5		1	2	1	1				1															2	3
	Cracticus tibicen	Australian Magpie	X	1 2 0		1	3						3															1	
	Strepera versicolor	Grey Currawong	X						1																				
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail	X	2							1																		
	Rhipidura leucophrys	Willie Wagtail	X			1	1																					5	5
Corvidae	*Corvus coronoides*	Australian Raven	X																										
	Corvus bennetti	Little Crow	X	5		1		2		6	1																	4	1
	Corvus orru	Torresian Crow	X			1		1	2	1		2		1															2
Monarchidae	*Grallina cyanoleuca*	Magpie-lark	X			1		1	2				2	2														6	1 1
Petroicidae	*Microeca fascinans*	Jacky Winter	X																										
	Petroica goodenovii	Red-capped Robin	X	1		1	1	2			6			2	1														1 0
	Melanodryas cucullata	Hooded Robin	X			1			3																				7
	Drymodes brunneopygia	Southern Scrub-robin	X																										
Megaluridae	*Cincloramphus mathewsi*	Rufous Songlark	X																										
	Cincloramphus cruralis	Brown Songlark	X																										
Hirundinidae	*Cheramoeca leucosterna*	White-backed Swallow	X			1			2																			4	2
	Hirundo rustica	Barn Swallow												5															
	Hirundo neoxena	Welcome Swallow	X																									2	4
	Petrochelidon ariel	Fairy Martin	X																										
	Hirundo nigricans	Tree Martin	X																									1	9
Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird	X																									2	2
Estrildidae	*Taeniopygia guttata*	Zebra Finch	X			1																						2	
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit	X			1			4																			6	2
Mammals																													
Bovidae	*Capra hircus*	Goat				1																							
Camelidae	*Camelus dromedarius*	Dromedary		5	1																								
Suidae	*Sus scrofa*	Pig		1	1																								
Canidae	*Canis lupus*	Dingo				1																							
	Vulpes vulpes	Red Fox				1																							
Molossidae	*Austronomus australis*	White-striped Free-tail Bat		1 2	1 4																								
	Mormopterus planiceps	Southern Free-tail Bat		4 6	2 2																								
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat		1 6 2	4 3																								
	Chalinolobus morio	Chocolate Wattled Bat		2 2	6																								
	Nyctophilus geoffroyi	Lesser Long-eared Bat		2 6	2 9																								
	Nyctophilus major	Greater Long-eared Bat		1																									
	Scotorepens balstoni	Inland Broad-nosed Bat		1 6	1 8																								
	Vespadelus baverstocki	Inland Forest Bat		2	3																								
	Vespadelus regulus	Southern Forest Bat		6	6																								

		Surveys	A	B	C	D										E																
Family	Species	Common Name			Unknown	Opportunistic	MME1	MME2	MME3	MME5	MME7	MME8	MME9	MME6	MME4	Site 10	Site 9	Site 2	Site 11	Site 3	Site 12	Site 13	Site 4	Site 5	Site 1	Site 8	Site 6	Site 7	Opportunistic	GD birds
Dasyuridae	*Antechinomys laniger*	Kultarr		6	1											2		1				1		3	2	2	3	3		
	Ningaui ridei	Wongai Ningaui		155	34																									
	Ningaui yvonneae	Mallee Ningaui		6	4																									
	Pseudantechinus woolleyae	Woolley's False Antechinus		2	1																									
	Sminthopsis crassicaudata	Fat-tailed Dunnart		69	67		1		1																					
	Sminthopsis dolichura	Little Long-tailed Dunnart		45	44											3	5	1		3	1	1	7	5	1	3	4	13		
	Sminthopsis gilberti	Gilbert's Dunnart		3																										
	Sminthopsis hirtipes	Hairy-footed Dunnart		2	1																		1							
	Sminthopsis longicaudata	Long-tailed Dunnart																				1		1			1			
	Sminthopsis macroura	Stripe-faced Dunnart														5	1	3	5		3	2	2	1	2	1	1	1		
	Sminthopsis ooldea	Ooldea Dunnart		1	1																									
Myrmecobiidae	*Myrmecobius fasciatus*	Numbat			1																									
Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum		37																										
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo		20	4	1																								
	Osphranter robustus	Euro		15	4	1									1															
	Osphranter rufus	Red Kangaroo		5	1	1			5				6																	
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum		1	1																									
Potoroidae	*Bettongia lesueur*	Burrowing Bettong		5																										
Leporidae	*Oryctolagus cuniculus*	European Rabbit		2	2	1									1															
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna		1	1	1		1																						
Thylacomyidae	*Macrotis lagotis*	Bilby			2																									
Equidae	*Equus asinus*	Donkey				1																								
	Equus caballus	Domestic Horse		5	1																									
Muridae	*Mus musculus*	House Mouse		240	75		1	2	2	2				2	1				5							1			
Muridae	*Notomys alexis*	Spinifex Hopping Mouse		17	20		7				2													3					
	Notomys mitchellii	Mitchell's Hopping Mouse		1	2																									
	Pseudomys albocinereus	Ash-grey Mouse		2	1																									
	Pseudomys bolami	Bolam's Mouse		41	38																									
	Pseudomys hermannsburgensis	Sandy Inland Mouse		76	75								4	1		2	1	1	2	1	5	6	3		1					

A Atlas of Living Australia

B NatureMap

C Western Australian Museum

D Nixon Wildlife Consulting (1998) *A Vertebrate Fauna Survey of the Murrin Murrin Expansion Project*, Unpublished report for Anaconda Nickel Ltd, Perth.

E Terrestrial Ecosystems (2011a) *Level 2 Fauna Risk Assessment for the Granny Deeps Project Area*, Unpublished report for Barrick Gold Corporation, Perth.

Appendix B(2). Vertebrate fauna assessment – Devon mining project

		Survey	A																					B									
Family	Species	Common Name	Spinifex	Golden Arrow Trans	Rose Trans	Salmon Gums	Gimlet South Trans	Palace Rehab	Davyhurst	Gimlet South Undist	Golden Arrow Undist	Palace Undist	Security	Crossroads	Gimlet South Rehab	Golden Arrow Rehab	Palace Trans	Rose Rehab	Rose Undist	Wendy Gully Rehab	Wendy Gully Trans	Wendy Gully Undist	Floodplains	GG26	GG27	GG29	GG28	GS28	GS29	GS26	GS27	GS30	GG30
Frogs																																	
Limnodynastidae	*Neobatrachus kunapalari*	Kunapalari Frog	1	1																													
	Neobatrachus sp.																							1									
	Neobatrachus sutor	Shoemaker Frog	9	6	5	3	6	5	10	30	19	25	22	12	7	2	2	1	9														
	Neobatrachus wilsmorei	Goldfields Bullfrog																							3	2							
Myobatrachidae	*Pseudophryne occidentalis*	Orange-crowned Toadlet		5		1	147	1	1	84	1	95		4	158		2		2	2													
Reptiles																																	
Agamidae	*Ctenophorus cristatus*	Crested Dragon	1		3	1			3	5	1	10	1	1			1	2	4		1						5	1	1				
	Ctenophorus fordi	Mallee Dragon																						22	42	2	15	2	2	6	9		
	Ctenophorus reticulatus	Western Netted Dragon			2	3	1	3	4	13	19		30	6				12	18	1	1	3										1	2
	Ctenophorus scutulatus	Lozenge-marked Dragon							2	2	3	2	5						2		1	13			3	7	3		8			3	1
	Diporiphora amphiboluroides	Mulga Dragon											7																				
	Moloch horridus	Thorny Devil		1					5											1	1	17			1				1	1	2		1
	Pogona minor	Dwarf Bearded Dragon	13	9	2	2	4	20	11	3	14	3	14	21	12	10	8	18	2	14	4	24	2	1	1	1	1		3	1	1		3
	Tympanocryptis cephalus	Pebble Dragon					1			7					2			1				1											
Carphodactylidae	*Nephrurus laevissimus*	Smooth Knob-tail			1																			18	18		2	1	1	12	9		
	Underwoodisaurus milii	Barking Gecko	11	75	68	31	231	20	16	18	22	22		2	83	97	47	98	10	37	33	28	10									9	
Diplodactylidae	*Amalosia reticulata*	Reticulated Velvet Gecko							1										4														
	Diplodactylus granariensis	Wheat-belt Stone Gecko	77	6	36	18	8	2	74	71	13	62	8	29	22	2	2	34	68	33	38	76	1			2	1	5	8	4	8	4	
	Diplodactylus pulcher	Fine-faced Gecko	53	2	3	8	1	1	86	21	78	88	123	80		6	3	4	100	1	3	46	12						1			2	1
	Lucasium maini	Main's Ground Gecko	9	1		346		1	9	60	6	39	1	9	2				69		1	1	1			1	2	2					
	Strophurus assimilis	Goldfields Spiny-tailed Gecko	44	4		1	3		1	7	19	1			3	8	1	1		14	15	112								3			
Elapidae	*Brachyurophis fasciolata*	Narrow-banded Burrowing Snake																													1		
	Brachyurophis semifasciata	Half-girdlerd Snake	9			7			6	6	5	2	1																	1		1	
	Demansia psammophis	Yellow-faced Whipsnake	1			1			1	4		2	1				1	1				3					2						
	Parasuta monachus	Monk Snake	2		2	7		3	9	4	3	11	4	2		1	3	1	3		1	6					1						
	Pseudechis australis	Mulga Snake			2	1		2	2		1		1		1				1	1													
	Pseudonaja mengdeni	Gwardar	1													1					1	1											
	Pseudonaja modesta	Ringed Brown Snake	1						1		2								2			1			1		3						
	Simoselaps bertholdi	Jan's Banded Snake				4			8	2		2		1					1			2							1				
	Suta fasciata	Rosen's Snake				2				3			1								1												
Gekkonidae	*Gehyra purpurascens*	Purplish Dtella	1			1			1	1	1	9		6					6								2						
	Gehyra variegata	Tree Dtella	23		13	14	27	2	38	37	28	45	39	6	18	1	1	3	37	3	1	12	2	1	1		3	4	6		2	3	1
	Heteronotia binoei	Bynoe's Prickly Gecko	24	53	27	10	21	19	16	9	12	28	25	1	29	43	42	34	13	42	27	8											2
	Rhynchoedura ornata	Western Beaked Gecko	4			3			5		23	20		41				1	106			9			2	1	2	2	3	1			
Pygopodidae	*Delma australis*	Marble-faced Delma	8		1				4	3	2	9				1			2			6											
	Delma butleri	Unbanded Delma	4											2								2		1			1						
	Delma fraseri	Fraser's Delma	1											1																			
	Lialis burtonis	Burton's Snake-lizard	5		2																	3											
	Pygopus lepidopodus	Common Scaly-foot	2			3			2	2												1											

		Survey	A																						B									
Family	Species	Common Name	Spinifex	Golden Arrow Trans	Rose Trans	Salmon Gums	Gimlet South Trans	Palace Rehab	Davyhurst	Gimlet South Undist	Golden Arrow Undist	Palace Undist	Security	Crossroads	Gimlet South Rehab	Golden Arrow Rehab	Palace Trans	Rose Rehab	Rose Undist	Wendy Gully Rehab	Wendy Gully Trans	Wendy Gully Undist	Floodplains	GG26	GG27	GG29	GG28	GS28	GS29	GS26	GS27	GS30	GG30
	Pygopus nigriceps	Western Hooded Scaly-foot																								1								
Scincidae	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink				3			10	12	1	5	3				1		7							1	3				1		3
	Ctenotus atlas	Southern Mallee Ctenotus	16									1	1								2	104		4	3	1	4	3	2	2	3		
	Ctenotus brooksi	Wedgsnout Ctenotus																						17						3			
	Ctenotus schomburgkii	Schomburgk's Ctenotus	2																			2		4	9	3	5	5	1		1		
	Ctenotus uber	Spotted Ctenotus	46	2		6			29	13	48	5	44	27		1			3	2	1	25				1						1	6
	Cyclodomorphus melanops	Spinifex Slender Bluetongue	24		2		1		1	2	6	2								2	2	24				10	2		2			2	
	Egernia depressa	Pygmy Spiny-tailed Skink	15		1		3	1	57	68	2	3	27		3		2	2	3														
	Egernia formosa	Goldfields Crevice-skink	1			4			8			2	8	1					14														5
	Eremiascincus richardsonii	Broad-banded Sand Swimmer	3			6	2	1	5	4	4		6	2	1					1		1											
	Hemiergis initialis	South-western Earless Skink	12			1			4	5					1																		
	Lerista macropisthopus	Unpatterned Robust Slider																									1			2			
	Lerista picturata	Southern Robust Slider	14			20			18	18	17	5		1					5			20											
	Lerista sp.		5	1	3	15		1	23	4	3	6							6			2				1	1			2		2	1
	Liopholis inornata	Desert Skink				4						8	2						71			2		3	2	1		2		2	4		
	Liopholis striata	Nocturnal Desert Skink				2							9									1											
	Menetia greyii	Common Dwarf Skink	6		11	3		4	19	3	6	23	17	4	2		4	12	18			1		1	2	1	1	1	1		1		1
	Morethia butleri	Woodland Morethia Skink	4		4	7	3		14	1		6	4						17		1												2
	Tiliqua occipitalis	Western Blue-tongued Lizard	5						1		2		3									4			1						1		
	Tiliqua rugosa	Bobtail	2	3	1				3	1			2	1		1		3	2			1	1										
Typhlopidae	*Anilios australis*	Austral Blind Snake	14			7		2	8	14		7		7	1		3	1	2		1	6							2	1			
	Anilios bicolor	Dark-spined Blind Snake	1							1												1											
	Anilios bituberculatus	Prong-snouted Blind Snake	1	2					2	2	2	2	1		1				1		1							1					
	Anilios hamatus	Pale-headed Blind Snake	9	5	2	10	2	2	10	24	18	7	2	13		4	1		6	1	1	9							1				
	Anilios sp.	Anilios Cape Range Pop				1																											
Varanidae	*Varanus caudolineatus*	Stripe-tailed Monitor	1			11			11	15	1		17	9				2	1			9											
	Varanus gouldii	Gould's Goanna	6	2	3	8	1	3	10	9	9	3	2	2	1	4	1	3	7	2	1		1			2		1					
	Varanus tristis	Black-headed Monitor	3		1	3			5	1																					1		
Birds																																	
Acanthizidae	*Smicrornis brevirostris*	Weebill																1															
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit	1				1	4															4										
Mammals																																	
Vespertilionidae	*Nyctophilus major*	Greater Long-eared Bat				1																											
Dasyuridae	*Antechinomys laniger*	Kultarr			1	1														1													
	Ningaui ridei	Wongai Ningaui	1																			2		1				4	3	5			
	Ningaui sp.	Ningaui sp.	35	3		2			2		22					1			4		2	17											
	Ningaui yvonneae	Mallee Ningaui	1																														
	Pseudantechinus woolleyae	Woolley's False Antechinus																					1										
	Sminthopsis crassicaudata	Fat-tailed Dunnart	2	11	63	5	14	67		2	15	12	4	26	32	27	57	143	28	121	100	24	108	1					1				
	Sminthopsis dolichura	Little Long-tailed Dunnart	63	16	5	34	4	2	47	15	25	36	46	11	2	17	4	2	28	7	4	32	2	1	1	1	1		1	2	2	12	
	Sminthopsis sp.	Dunnart sp.										2																					

		Survey	A																					B									
Family	Species	Common Name	Spinifex	Golden Arrow Trans	Rose Trans	Salmon Gums	Gimlet South Trans	Palace Rehab	Davyhurst	Gimlet South Undist	Golden Arrow Undist	Palace Undist	Security	Crossroads	Gimlet South Rehab	Golden Arrow Rehab	Palace Trans	Rose Rehab	Rose Undist	Wendy Gully Rehab	Wendy Gully Trans	Wendy Gully Undist	Floodplains	GG26	GG27	GG29	GG28	GS28	GS29	GS26	GS27	GS30	GG30
Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum	23	11	11	15	23	9	37	62	32	20	8	17	27	3	8	20	22	9	6	16												
Leporidae	*Oryctolagus cuniculus*	European Rabbit						1		1			1				1																	
Muridae	*Mus musculus*	House Mouse	26	36	33	6	62	49	19	25	2	24	10	18	128	24	47	56	22	181	88	13	31					1		2	4			
	Notomys alexis	Spinifex Hopping Mouse																						9	3	1	1		2					
	Notomys mitchellii	Mitchell's Hopping Mouse							1						1									1										
	Pseudomys albocinereus	Ash-grey Mouse																			1													
	Pseudomys bolami	Bolam's Mouse	9	39	19	30	11		49	13	3	13	1	8	20	35	4	25	24			5	4											
	Pseudomys hermannsburgensis	Sandy Inland Mouse	8	9		9	3		9	5	3	4		2	5	7			14	2	1	5	2		2				4	1			

A Scott Thompson's PhD data for Ora Banda (2004)

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

Appendix B(3). Vertebrate fauna assessment – Devon mining project

		Surveys	A								B																												
Family	Species	Common Name	KK53	KK4	KK1	KK54	KK2	KK51	KK55	KK11	Site 13	Site 3	Site 9	Site 9a	Site 12	Site 21	Site 14a	Site 5a	Site 1a	Site 22	Site 17a	Site 14	Site 15	Site 20a	Site 21a	Site 11	Site 11a	Site 8	Site 19	Freshwater	Salt Lake	Site 14b	Site 12a							
Frogs																																							
Limnodynastidae	*Neobatrachus sutor*	Shoemaker Frog	1	1	8	1					3	1	5	10																									
	Neobatrachus wilsmorei	Goldfields Bullfrog		1							1		11		2	2																						
	Platyplectrum spenceri	Spencer's Burrowing Frog															8																					
Myobatrachidae	*Pseudophryne occidentalis*	Orange-crowned Toadlet			2													2																				
Reptiles																																							
Agamidae	*Ctenophorus caudicinctus*	Ring-tailed Dragon																	12																				
	Ctenophorus cristatus	Crested Dragon					3	4												5																			
	Ctenophorus fordi	Mallee Dragon	1	4		1		4	4		43	26				2				16																			
	Ctenophorus inermis	Military Dragon																			1																		
	Ctenophorus reticulatus	Western Netted Dragon	7	3		4	5	8					2	1			1	13			2	2	4	4	4													
	Ctenophorus salinarum	Saltpan Dragon																1								5	1	2										
	Ctenophorus scutulatus	Lozenge-marked Dragon		8				9																															
	Ctenophorus vadnappa	Red-barred Dragon									3		2	1		7				3			1	1	2														
	Diporiphora amphiboluroides	Mulga Dragon						1	1																														
	Moloch horridus	Thorny Devil		1		2		2	3		1			1	2			1					1																
	Pogona minor	Dwarf Bearded Dragon	1			2		2	1	1	1	1	2		4	2				1		1	3		1	2	1	2	2									
	Tympanocryptis cephalus	Pebble Dragon																									1										
Carphodactylidae	*Nephrurus laevissimus*	Smooth Knob-tail									18	18			1					2																		
	Nephrurus vertebralis	Midline Knob-tail		1																						1		2										
	Underwoodisaurus milii	Barking Gecko						5		2								2			9																		
Diplodactylidae	*Amalosia reticulata*	Reticulated Velvet Gecko					1																															
	Diplodactylus granariensis	Wheat-belt Stone Gecko			1		2			4					1	2				1					1													
	Diplodactylus pulcher	Fine-faced Gecko		1			2	2									4	3			3		1						1									
	Lucasium maini	Main's Ground Gecko					3			5					3	1				2																		
	Lucasium squarrosum	Mottled Ground Gecko															1				3			2		1	3										
	Strophurus assimilis	Goldfields Spiny-tailed Gecko																																				
	Strophurus ciliaris	Spiny-tailed Gecko															2	2			1			1														
	Strophurus elderi	Jewelled Gecko		3																																		
	Strophurus intermedius	Southern Spiny-tailed Gecko													2																							
	Strophurus strophurus	Western Spiny-tailed Gecko																										7										
Elapidae	*Brachyurophis fasciolata*	Narrow-banded Burrowing Snake																						1														
	Demansia psammophis	Yellow-faced Whipsnake																		2																		
	Parasuta monachus	Monk Snake			1			1									1			1	3																	
	Pseudonaja mengdeni	Gwardar								1					1																							
	Pseudonaja modesta	Ringed Brown Snake					1	2	1		1									3																		
	Simoselaps bertholdi	Jan's Banded Snake		1																									1								
	Suta fasciata	Rosen's Snake																2																				
Gekkonidae	*Gehyra purpurascens*	Purplish Dtella																		2																		
	Gehyra variegata	Tree Dtella	3	1			3	6	1	2	1	1			2			15	1	4	15		1	1	2			1	1								
	Heteronotia binoei	Bynoe's Prickly Gecko	3	1	2		6			6								7			34		2		2												
	Rhynchoedura ornata	Western Beaked Gecko		1							2		1		7	1				2								2									
Pygopodidae	*Delma australis*	Marble-faced Delma								1																												

		Surveys	A								B																											
Family	Species	Common Name	KK53	KK4	KK1	KK54	KK2	KK51	KK55	KK11	Site 13	Site 3	Site 9	Site 9a	Site 12	Site 21	Site 14a	Site 5a	Site 1a	Site 22	Site 17a	Site 14	Site 15	Site 20a	Site 21a	Site 11	Site 11a	Site 8	Site 19	Freshwater	Salt Lake	Site 14b	Site 12a
	Delma nasuta	Sharp-snouted Delma				1						1								1													
	Lialis burtonis	Burton's Snake-lizard		2				1							1																		
	Pygopus nigriceps	Western Hooded Scaly-foot													1	1					1			1									
Scincidae	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink		4				1								1	1			3			4		1								
	Ctenotus atlas	Southern Mallee Ctenotus		6				2	6		3	4								1			4										
	Ctenotus brooksi	Wedgsnout Ctenotus										24																					
	Ctenotus calurus	Blue-tailed Finesnout Ctenotus																											1				
	Ctenotus greeri	Spotted-necked Ctenotus																											12				
	Ctenotus helenae	Clay-soil Ctenotus																											1				
	Ctenotus leonhardii	Leonhardi's Ctenotus	1										5	9												5	4	2					
	Ctenotus pantherinus	Leopard Skink																											4				
	Ctenotus quattuordecimlineatus	Fourteen-lined Ctenotus																											11				
	Ctenotus schomburgkii	Schomburgk's Ctenotus		1				6	1		9	4	1			3				5				2		3		15	11				
	Ctenotus severus	Stern Ctenotus																	1		6												
	Ctenotus uber	Spotted Ctenotus	2				7									1	3				2		6	6	1								
	Cyclodomorphus branchialis	Common Slender Bluetongue													1					2													
	Cyclodomorphus melanops	Spinifex Slender Bluetongue		1		1																											
	Egernia depressa	Pygmy Spiny-tailed Skink	1					4								2				1			10	4									
	Egernia formosa	Goldfields Crevice-skink	1				1	3										3					5										
	Eremiascincus richardsonii	Broad-banded Sand Swimmer															1				1												
	Lerista desertorum	Central Desert Robust Slider																			6			2					6				
	Lerista macropisthopus	Unpatterned Robust Slider																2		1													
	Lerista picturata	Southern Robust Slider					2			1								2															
	Lerista sp.			2			3	1		2						1				1	9		2					5	1				
	Liopholis inornata	Desert Skink		1	1		1	1			1	3			1	1							1		1								
	Liopholis striata	Nocturnal Desert Skink																						2									
	Menetia greyii	Common Dwarf Skink								1	2	1	1			1		4		2			1										
	Morethia adelaidensis	Saltbush Morethia Skink					1																										
	Morethia butleri	Woodland Morethia Skink				1		1		2								4			6	2	2		2								
	Tiliqua occipitalis	Western Blue-tongued Lizard				3					1				1																		
Typhlopidae	*Anilios hamatus*	Pale-headed Blind Snake															1											1					
	Anilios waitii	Waite's Blind Snake															2											1					
Varanidae	*Varanus caudolineatus*	Stripe-tailed Monitor	3	1				4					1				1	2						6									
	Varanus giganteus	Perentie																1															
	Varanus gouldii	Gould's Goanna		1		1	2	1	1				1	1		2		1			1				2								
	Varanus panoptes	Yellow-spotted Monitor															2							1		1							
	Varanus tristis	Black-headed Monitor															1								3								
Birds																																	
Casuariidae	*Dromaius novaehollandiae*	Emu		14		23	11				8	2	1				1	2		3			4		1		2		2	1	1	5	
Megapodiidae	*Leipoa ocellata*	Malleefowl				1			1																								
Phasianidae	*Coturnix pectoralis*	Stubble Quail																														1	
Anatidae	*Tadorna tadornoides*	Australian Shelduck																											1				
	Chenonetta jubata	Australian Wood Duck																											1				
	Anas gracilis	Grey Teal					10																						1				
	Anas superciliosa	Pacific Black Duck																											1				

		Surveys	A								B																												
Family	Species	Common Name	KK53	KK4	KK1	KK54	KK2	KK51	KK55	KK11	Site 13	Site 3	Site 9	Site 9a	Site 12	Site 21	Site 14a	Site 5a	Site 1a	Site 22	Site 17a	Site 14	Site 15	Site 20a	Site 21a	Site 11	Site 11a	Site 8	Site 19	Freshwater	Salt Lake	Site 14b	Site 12a
Columbidae	*Phaps chalcoptera*	Common Bronzewing	1			1	4	2		3										2					1			1		1	1		1
	Ocyphaps lophotes	Crested Pigeon					2					2	6				5	6			11	1		7				9		1	1	2	
	Geopelia cuneata	Diamond Dove											1																				
Podargidae	*Podargus strigoides*	Tawny Frogmouth	3	1																1				1									
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar																2	2												1		
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar						1									3			3		3						1				2	
Apodidae	*Apus pacificus*	Fork-tailed Swift																															
Otididae	*Ardeotis australis*	Australian Bustard															4										1						
Ardeidae	*Ardea pacifica*	White-necked Heron																												1			
	Egretta novaehollandiae	White-faced Heron																												1			
Accipitridae	*Haliastur sphenurus*	Whistling Kite	2																														
	Accipiter fasciatus	Brown Goshawk																					1					3		1			
	Accipiter cirrocephalus	Collared Sparrowhawk																												1			
	Circus assimilis	Spotted Harrier						1								1																1	
	Aquila audax	Wedge-tailed Eagle								2							2				2	6						3					
	Hieraaetus morphnoides	Little Eagle										1								2				1					3				
Falconidae	*Falco cenchroides*	Nankeen Kestrel	1														5	4			2							2	3				
	Falco berigora	Brown Falcon	1				1	2	1			2					3			2	2		2	3				3	5			1	
	Falco longipennis	Australian Hobby																		1								1					
Rallidae	*Tribonyx ventralis*	Black-tailed Native-hen																												1			
Recurvirostridae	*Recurvirostra novaehollandiae*	Red-necked Avocet																												1			
	Cladorhynchus leucocephalus	Banded Stilt																													1		
Charadriidae	*Charadrius ruficapillus*	Red-capped Plover																												1			
	Elseyornis melanops	Black-fronted Dotterel																												1			
	Vanellus tricolor	Banded Lapwing																1			4					9						4	
Turnicidae	*Turnix velox*	Little Button-quail									13	3												2								5	
Cacatuidae	*Eolophus roseicapillus*	Galah	24				10	1	1								908	7		4	2	44	5	7	62		1	4	5	1	1	8	
	Nymphicus hollandicus	Cockatiel	1				15										2			11					4		6	35	3	1	1	4	
Psittacidae	*Glossopsitta porphyrocephala*	Purple-crowned Lorikeet	7				3	7		6																							
	Barnardius zonarius	Australian Ringneck	6	11		3	63	7		16			10			3	31	1				25	8	3				9	16	1		36	
	Psephotus varius	Mulga Parrot	16	7		4	1		4		4	4	3			2							4	14					2			11	
	Melopsittacus undulatus	Budgerigar				4			2		1	6				38	9			27	2	11	1	17			20	170	29	1	1	15	
	Neopsephotus bourkii	Bourke's Parrot																						4						1	1		
	Neophema splendida	Scarlet-chested Parrot																					2										
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-cuckoo	3	1		5	2	4	1	1	6		1							2			3		2		3	1	3		1		
	Chalcites osculans	Black-eared Cuckoo						2			3	4								6			2	2					1				
	Cacomantis pallidus	Pallid Cuckoo	1	1			4			1						4						2		1				1	1				
Strigidae	*Ninox novaeseelandiae*	Southern Boobook								1																							
Halcyonidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher								2											6			1						1		1	
Meropidae	*Merops ornatus*	Rainbow Bee-eater				6	19	6	12	10	3	1								5				3					3				
Climacteridae	*Climacteris affinis*	White-browed Treecreeper						1								1								4	1								
	Climacteris rufa	Rufous Treecreeper					4																										
Maluridae	*Malurus splendens*	Splendid Fairy-wren									24												34										
	Malurus leucopterus	White-winged Fairy-wren					10						17				1									3	76	40		1	1	2	
	Malurus lamberti	Variegated Fairy-wren	45			20			1																								

		Surveys	A								B																										
Family	Species	Common Name	KK53	KK4	KK1	KK54	KK2	KK51	KK55	KK11	Site 13	Site 3	Site 9	Site 9a	Site 12	Site 21	Site 14a	Site 5a	Site 1a	Site 22	Site 17a	Site 14	Site 15	Site 20a	Site 21a	Site 11	Site 11a	Site 8	Site 19	Freshwater	Salt Lake	Site 14b	Site 12a
	Malurus pulcherrimus	Blue-breasted Fairy-wren									15	9																									
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat	14	2		7		6		1	16	8				2							4		1			2				2				
	Smicrornis brevirostris	Weebill	15	12		40	155	137	55	77	50	36				2				269				7	2				98							
	Acanthiza robustirostris	Slaty-backed Thornbill	2																					6					3							
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill	47							4	2		4							1			48	8				9	4							
	Acanthiza uropygialis	Chestnut-rumped Thornbill	67	33		12	2	42	3	25	23	3	27				3	3		46			86	126	10			53	88		1	5	2			
	Acanthiza apicalis	Inland Thornbill	22			14		14	4	14	32	38				1				15			18	2	2				3				2			
	Aphelocephala leucopsis	Southern Whiteface	18			2																	153	52	12			4	5			8				
Pardalotidae	*Pardalotus striatus*	Striated Pardalote	1				56	5	7	9		1								2									2			1				
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater									2											2	3				2				1				
	Lichenostomus virescens	Singing Honeyeater	10	9					1	15	2		4					1		1	2	11	2	3			3	8	2	1	1	3				
	Lichenostomus leucotis	White-eared Honeyeater				1	3	7	1		4																									
	Lichenostomus ornatus	Yellow-plumed Honeyeater				1	30			8										230																
	Lichenostomus plumulus	Grey-fronted Honeyeater							2											12		56		2					3		1					
	Purnella albifrons	White-fronted Honeyeater	4	17			11	15	15	19	69	125	16			7				144		3	12		6		1	2	4		1	1	4			
	Manorina flavigula	Yellow-throated Miner		52		1	86	2	1	36			109			3	15			74	1	10		41				21	13			98				
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater	21	20		22	10	13	12	14	18	23	7			6	2	2		52	5	11	30	10	4			9	8	1	1	2				
	Anthochaera carunculata	Red Wattlebird					31						1							5				3					2							
	Conopophila whitei	Grey Honeyeater									2		1												17						1	18			
	Epthianura tricolor	Crimson Chat															24				6	154		29			18	75							
	Epthianura aurifrons	Orange Chat																									5								
	Epthianura albifrons	White-fronted Chat																												1					
	Sugomel niger	Black Honeyeater									7	4											3												
	Lichmera indistincta	Brown Honeyeater	2			2				30																									
	Phylidonyris niger	White-cheeked Honeyeater						7																											
	Melithreptus brevirostris	Brown-headed Honeyeater						17		5										6															
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler	23	1		18	5		3	28	1							2					4		3							3			
Psophodidae	*Cinclosoma castanotum*	Chestnut Quail-thrush																		3			1												
	Cinclosoma castaneothorax	Chestnut-breasted Quail-thrush																						3			2								
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella					15				2																		6			2			
Campephagidae	*Coracina maxima*	Ground Cuckoo-shrike					4										31			6	3						4					2			
	Coracina novaehollandiae	Black-faced Cuckoo-shrike	5	6			13	2	1	9		11	3				5			12	1	4	15	10				7	9			6				
	Lalage sueurii	White-winged Triller	1	2							2		2				3			14			3	34	6			39			1	9				
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler	7			8		10	5			2								32			13		1				8		1				
	Colluricincla harmonica	Grey Shrike-thrush	9			2	1	7		1	6	16								17			5		1				5						
	Oreoica gutturalis	Crested Bellbird	6	5		2	5	5	2		11	6	2				5		2	15		14	18	10	2		3	6	15			1	1			
Artamidae	*Artamus personatus*	Masked Woodswallow									1	1								18		2		72			2		2		1	31			
	Artamus superciliosus	White-browed Woodswallow																						3											
	Artamus cinereus	Black-faced Woodswallow					1			7							25				11	55		1	1		7	12			1	6			
	Artamus cyanopterus	Dusky Woodswallow	2				3																												
	Cracticus torquatus	Grey Butcherbird	2	5		1	3	7	1		2	2	1				4			8		2		8				4	8		1	7			
	Cracticus nigrogularis	Pied Butcherbird	2				9	1		2	3	2	14				23	4	1	5		6	1		2			13	4			1			
	Cracticus tibicen	Australian Magpie					30	14		4			5				3			2	9			1											
	Strepera versicolor	Grey Currawong	1	2			7	2	1	7			4				2			1			1		1				2			3			
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail	1																	13															

		Surveys	A							B																									
Family	Species	Common Name	KK53	KK4	KK1	KK54	KK2	KK51	KK55	KK11	Site 13	Site 3	Site 9	Site 9a	Site 12	Site 21	Site 14a	Site 5a	Site 1a	Site 22	Site 17a	Site 14	Site 15	Site 20a	Site 21a	Site 11	Site 11a	Site 8	Site 19	Freshwater	Salt Lake	Site 14b	Site 12a
	Rhipidura leucophrys	Willie Wagtail					1			2			1				2			5	1							12		1	1	2	
Corvidae	*Corvus bennetti*	Little Crow											149				50	7		7	12	29	10	6			11	36	24	1		21	
	Corvus orru	Torresian Crow																		2							2					2	
Monarchidae	*Grallina cyanoleuca*	Magpie-lark	9				6										12				2							3		1		7	
Petroicidae	*Microeca fascinans*	Jacky Winter		1			11	8		6							1			28				1					22		1		
	Petroica goodenovii	Red-capped Robin	187	5		7	5	14	5	6	8		4				5	3	3	20	1	1	106	47	4			3	29		1	3	
	Melanodryas cucullata	Hooded Robin					1					2					1			32		2	13	1	1		1	2			1		
Megaluridae	*Cincloramphus mathewsi*	Rufous Songlark																							2							3	
	Cincloramphus cruralis	Brown Songlark															7				8	3		1		7	7						
Hirundinidae	*Cheramoeca leucosterna*	White-backed Swallow																			2									1			
	Hirundo neoxena	Welcome Swallow		4							2	1																		1	1		
	Petrochelidon ariel	Fairy Martin										5																					
	Hirundo nigricans	Tree Martin					4					7																		1			
Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird	2					4			3	1	4			1				5								5				4	
Estrildidae	*Taeniopygia guttata castanotis*	Zebra Finch	9									4								2		12	2				9	36	5	1		4	
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit					1						2				16			4	36					7	18			1	1	1	
Mammals																																		
Bovidae	*Capra hircus*	Goat															1	1				1							1				
	Ovis aries	Sheep											1	1		1	1							1					1				
Camelidae	*Camelus dromedarius*	Dromedary																		1						1							
Canidae	*Canis lupus*	Dog									1									1						1							
	Vulpes vulpes	Red Fox						1		1	1	1						1					1	1	1				1				
Felidae	*Felis catus*	House Cat										1														1							
Molossidae	*Austronomus australis*	White-striped Free-tail Bat			5	3	17	6	2	1								1		1													
	Mormopterus planiceps	Southern Free-tail Bat			11		8											1															
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat															1	3															
	Chalinolobus morio	Chocolate Wattled Bat			1		3	3																									
	Nyctophilus geoffroyi	Lesser Long-eared Bat			1		2	1									4	3			9												
	Nyctophilus gouldi	Gould's Long-eared Bat			10		42	4																									
	Scotorepens balstoni	Inland Broad-nosed Bat			2		11										6	1															
	Vespadelus regulus	Southern Forest Bat			1		5																										
Dasyuridae	*Ningaui ridei*	Wongai Ningaui						1			1	3																	5				
	Sminthopsis crassicaudata	Fat-tailed Dunnart	1	1	2	1	5	2		1		1		1				1						7		5							
	Sminthopsis dolichura	Little Long-tailed Dunnart	4	7	1	6	3	8	1	4	3					1	2	1		1				1		1		2	1				
Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum		2			8			1																							
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo	1	8			2	7		6								1										1					
	Osphranter robustus	Euro	4							2						1		1			1			1				1	1				
	Osphranter rufus	Red Kangaroo			1		15	3		8							1	1			1	1		1		1	1	1					
Leporidae	*Oryctolagus cuniculus*	European Rabbit										1						2			1					1		1					
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna						1															1										
Muridae	*Mus musculus*	House Mouse	8	1			13	11	4	4	4	2						2			1					2			3				
	Notomys alexis	Spinifex Hopping Mouse									2	9				2				1			1					1					
	Notomys mitchellii	Mitchell's Hopping Mouse						2	7			3				1																	
	Pseudomys bolami	Bolam's Mouse		9	2																				3								
	Pseudomys hermannsburgensis	Sandy Inland Mouse	1			2		2	2		2	1					1							2		1		1	7				

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Appendix B(4). Vertebrate fauna assessment – Devon mining project

		Survey	A										B											C	D
Family	Species	Common Name	JS2	TM1	WM2	WS2	WM1	WS1	JS3	JS1	JS4	HB1	Site 10	Site 3	Site 5	Site 7	Site 9	Site 4	Site 1	Site 6	Site 8	Opportunistic	Site 2	Jump Up Dam	Goongarrie
Frogs																									
Limnodynastidae	*Neobatrachus wilsmorei*	Goldfields Bullfrog	1	3																					
Reptiles																									
Agamidae	*Ctenophorus cristatus*	Crested Dragon											1												
	Ctenophorus fordi	Mallee Dragon												7	11										
	Ctenophorus inermis	Military Dragon			1																				
	Ctenophorus maculatus	Spotted Dragon				2																			
	Ctenophorus reticulatus	Western Netted Dragon					1									1	1							1	
	Ctenophorus salinarum	Saltpan Dragon				2		1																	
	Diporiphora amphiboluroides	Mulga Dragon																						1	
	Moloch horridus	Thorny Devil												1											
	Pogona minor	Dwarf Bearded Dragon															2		1	6					
Carphodactylidae	*Underwoodisaurus milii*	Barking Gecko																	1		1			1	
Diplodactylidae	*Amalosia reticulata*	Reticulated Velvet Gecko												1				2	1						
	Diplodactylus granariensis	Wheat-belt Stone Gecko											14	1	1	1	3	5	4		1				
	Diplodactylus pulcher	Fine-faced Gecko														1	2		1	4					
	Lucasium maini	Main's Ground Gecko												6		1		6	1						
	Lucasium squarrosum	Mottled Ground Gecko	1	2	5	2	1					2													
	Strophurus assimilis	Goldfields Spiny-tailed Gecko												5											
	Strophurus elderi	Jewelled Gecko	1						1	2					1										
Elapidae	*Brachyurophis semifasciata*	Half-girdlerd Snake													1			1	1					1	
	Demansia psammophis	Yellow-faced Whipsnake												1						1	1				
	Pseudonaja mengdeni	Gwardar																1							
	Simoselaps bertholdi	Jan's Banded Snake		1													1				1				
Gekkonidae	*Gehyra purpurascens*	Purplish Dtella																	1		2				
	Gehyra variegata	Tree Dtella																						1	
	Gehyra xenopus	Crocodile-faced Dtella	1				1			1	1														
	Heteronotia binoei	Bynoe's Prickly Gecko		1			2				2	3	2											1	
	Rhynchoedura ornata	Western Beaked Gecko																						1	
Pygopodidae	*Delma australis*	Marble-faced Delma											1								1				
	Delma nasuta	Sharp-snouted Delma									1														
	Lialis burtonis	Burton's Snake-lizard									1		1												
	Pygopus nigriceps	Western Hooded Scaly-foot									1														
Scincidae	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink											2						1		1				
	Ctenotus atlas	Southern Mallee Ctenotus												7											
	Ctenotus brooksi	Wedgsnout Ctenotus													11										
	Ctenotus helenae	Clay-soil Ctenotus	2						2	1															
	Ctenotus leonhardii	Leonhardi's Ctenotus	3	6	3	6	7				2	4								1					
	Ctenotus schomburgkii	Schomburgk's Ctenotus												1			7	1							
	Ctenotus uber	Spotted Ctenotus														2	1								
	Egernia depressa	Pygmy Spiny-tailed Skink											1				1							1	
	Egernia formosa	Goldfields Crevice-skink											1											1	

		Survey	A										B											C	D
Family	Species	Common Name	JS2	TM1	WM2	WS2	WM1	WS1	JS3	JS1	JS4	HB1	Site 10	Site 3	Site 5	Site 7	Site 9	Site 4	Site 1	Site 6	Site 8	Opportunistic	Site 2	Jump Up Dam	Goongarrie
	Eremiascincus richardsonii	Broad-banded Sand Swimmer																			1				
	Lerista desertorum	Central Desert Robust Slider	1	4	1				1	2	1														
	Lerista kingi	King's Slider					1																		
	Lerista lineopunctulata	Dotted-line Robust Slider													2					4					
	Lerista macropisthopus	Unpatterned Robust Slider																							
	Lerista sp.												6	1		4	4		3	1	4				
	Liopholis inornata	Desert Skink												1	1	2	1				1				
	Menetia greyii	Common Dwarf Skink				1	1											1							
	Morethia butleri	Woodland Morethia Skink											1												
	Tiliqua occipitalis	Western Blue-tongued Lizard																4							
	Tiliqua rugosa	Bobtail															3	3			1				
Typhlopidae	*Anilios hamatus*	Pale-headed Blind Snake					1				1					1									
Varanidae	*Varanus caudolineatus*	Stripe-tailed Monitor			1																1				
	Varanus gouldii	Gould's Goanna					1		1					1		2	1								
	Varanus panoptes	Yellow-spotted Monitor																						1	
Birds																									
Casuariidae	*Dromaius novaehollandiae*	Emu																				1		1	
Megapodiidae	*Leipoa ocellata*	Malleefowl																						1	
Anatidae	*Cygnus atratus*	Black Swan																				1			
	Tadorna tadornoides	Australian Shelduck																				1			
	Chenonetta jubata	Australian Wood Duck																				1			
	Anas gracilis	Grey Teal																				1			
	Anas superciliosa	Pacific Black Duck																				1			
	Aythya australis	Hardhead																				1			
Columbidae	*Phaps chalcoptera*	Common Bronzewing																				1		1	
	Ocyphaps lophotes	Crested Pigeon																				1		1	
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar																						1	
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar																				1		1	
Apodidae	*Apus pacificus*	Fork-tailed Swift																						1	
Otididae	*Ardeotis australis*	Australian Bustard																						1	
Ardeidae	*Ardea pacifica*	White-necked Heron																				1			
	Egretta novaehollandiae	White-faced Heron																				1			
	Ardea alba	Great Egret																				1			
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill																				1			
Accipitridae	*Elanus axillaris*	Black-shouldered Kite																				1			
	Lophoictinia isura	Square-tailed Kite																				1			
	Accipiter fasciatus	Brown Goshawk																				1			
	Accipiter cirrocephalus	Collared Sparrowhawk																				1		1	
	Aquila audax	Wedge-tailed Eagle																				1			
	Hieraaetus morphnoides	Little Eagle																				1			
Falconidae	*Falco cenchroides*	Nankeen Kestrel																				1			
	Falco berigora	Brown Falcon																				1		1	
	Falco longipennis	Australian Hobby																				1		1	

		Survey	A										B											C	D
Family	Species	Common Name	JS2	TM1	WM2	WS2	WM1	WS1	JS3	JS1	JS4	HB1	Site 10	Site 3	Site 5	Site 7	Site 9	Site 4	Site 1	Site 6	Site 8	Opportunistic	Site 2	Jump Up Dam	Goongarrie
	Falco peregrinus	Peregrine Falcon																				1			
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt																				1			
	Recurvirostra novaehollandiae	Red-necked Avocet																				1			
	Cladorhynchus leucocephalus	Banded Stilt																				1			
Charadriidae	*Erythrogonys cinctus*	Red-kneed Dotterel																				1			
Scolopacidae	*Tringa nebularia*	Common Greenshank																				1			
Turnicidae	*Turnix velox*	Little Button-quail																						1	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull																				1			
Cacatuidae	*Eolophus roseicapillus*	Galah																				1		1	
	Nymphicus hollandicus	Cockatiel																						1	
Psittacidae	*Barnardius zonarius*	Australian Ringneck																				1		1	1
	Psephotus varius	Mulga Parrot																				1		1	
	Melopsittacus undulatus	Budgerigar																						1	
	Neopsephotus bourkii	Bourke's Parrot																						1	
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-cuckoo																				1		1	
	Chalcites osculans	Black-eared Cuckoo																						1	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra																							1
	Todiramphus pyrrhopygius	Red-backed Kingfisher																				1			
Meropidae	*Merops ornatus*	Rainbow Bee-eater																				1		1	
Climacteridae	*Climacteris affinis*	White-browed Treecreeper																						1	
Ptilonorhynchidae	*Ptilonorhynchus guttatus*	Western Bowerbird																						1	
Maluridae	*Malurus splendens*	Splendid Fairy-wren																				1		1	1
	Malurus leucopterus	White-winged Fairy-wren																				1		1	
	Malurus pulcherrimus	Blue-breasted Fairy-wren																				1			
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat																				1		1	1
	Smicrornis brevirostris	Weebill																				1		1	
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill																				1		1	
	Acanthiza uropygialis	Chestnut-rumped Thornbill																				1		1	1
	Acanthiza iredalei	Slender-billed Thornbill																							1
	Acanthiza apicalis	Inland Thornbill																				1		1	1
	Aphelocephala leucopsis	Southern Whiteface																				1		1	
Pardalotidae	*Pardalotus striatus*	Striated Pardalote																				1		1	1
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater																				1		1	1
	Lichenostomus leucotis	White-eared Honeyeater																				1			1
	Lichenostomus ornatus	Yellow-plumed Honeyeater																				1			
	Purnella albifrons	White-fronted Honeyeater																				1		1	
	Manorina flavigula	Yellow-throated Miner																				1		1	1
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater																				1		1	1
	Anthochaera carunculata	Red Wattlebird																				1		1	1
	Epthianura tricolor	Crimson Chat																						1	
	Epthianura albifrons	White-fronted Chat																				1			
	Lichmera indistincta	Brown Honeyeater																				1		1	
	Melithreptus brevirostris	Brown-headed Honeyeater																				1			1

		Survey	A										B											C	D
Family	Species	Common Name	JS2	TM1	WM2	WS2	WM1	WS1	JS3	JS1	JS4	HB1	Site 10	Site 3	Site 5	Site 7	Site 9	Site 4	Site 1	Site 6	Site 8	Opportunistic	Site 2	Jump Up Dam	Goongarrie
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler																				1		1	1
Psophodidae	*Cinclosoma castaneothorax*	Chestnut-breasted Quail-thrush																						1	1
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella																							1
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike																				1		1	1
	Lalage sueurii	White-winged Triller																						1	
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler																				1		1	1
	Colluricincla harmonica	Grey Shrike-thrush																				1		1	1
	Oreoica gutturalis	Crested Bellbird																				1		1	1
Artamidae	*Artamus personatus*	Masked Woodswallow																						1	
	Artamus cinereus	Black-faced Woodswallow																				1			
	Cracticus torquatus	Grey Butcherbird																				1			1
	Cracticus nigrogularis	Pied Butcherbird																				1		1	1
	Cracticus tibicen	Australian Magpie																				1		1	
	Strepera versicolor	Grey Currawong																				1		1	1
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail																				1			1
	Rhipidura leucophrys	Willie Wagtail																				1		1	1
Corvidae	*Corvus coronoides*	Australian Raven																				1			
	Corvus bennetti	Little Crow																				1		1	1
	Corvus orru	Torresian Crow																				1			
Monarchidae	*Grallina cyanoleuca*	Magpie-lark																				1			
Petroicidae	*Microeca fascinans*	Jacky Winter																				1			
	Petroica goodenovii	Red-capped Robin																				1		1	1
	Melanodryas cucullata	Hooded Robin																							1
Megaluridae	*Cincloramphus mathewsi*	Rufous Songlark																				1			
Timaliidae	*Zosterops lateralis*	Silvereye																				1			
Hirundinidae	*Cheramoeca leucosterna*	White-backed Swallow																				1			
	Hirundo neoxena	Welcome Swallow																				1			
	Petrochelidon ariel	Fairy Martin																				1			
	Hirundo nigricans	Tree Martin																				1			
Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird																				1		1	1
Estrildidae	*Taeniopygia guttata castanotis*	Zebra Finch																				1		1	
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit																				1		1	
Mammals																									
Bovidae	*Bos taurus*	Cow																						1	
	Capra hircus	Goat																						1	
Canidae	*Vulpes vulpes*	Red Fox																						1	
Felidae	*Felis catus*	House Cat																						1	
Molossidae	*Mormopterus* species 4	South-western Free-tail Bat																						1	
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat																						1	
	Chalinolobus morio	Chocolate Wattled Bat																						1	
	Nyctophilus sp.	Long-eared Bat sp.																						1	
	Scotorepens balstoni	Inland Broad-nosed Bat																						1	
Dasyuridae	*Ningaui ridei*	Wongai Ningaui							1					2											

		Survey	A										B											C	D
Family	Species	Common Name	JS2	TM1	WM2	WS2	WM1	WS1	JS3	JS1	JS4	HB1	Site 10	Site 3	Site 5	Site 7	Site 9	Site 4	Site 1	Site 6	Site 8	Opportunistic	Site 2	Jump Up Dam	Goongarrie
	Sminthopsis crassicaudata	Fat-tailed Dunnart																		1	1				
	Sminthopsis dolichura	Little Long-tailed Dunnart													2			2	2		2				
Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum											1				3		1		1				
Macropodidae	*Osphranter robustus*	Euro																						1	
	Osphranter rufus	Red Kangaroo																						1	
Leporidae	*Oryctolagus cuniculus*	European Rabbit																						1	
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna													1	1							1	1	
Muridae	*Mus musculus*	House Mouse																					4		
	Notomys alexis	Spinifex Hopping Mouse							1																
	Pseudomys bolami	Bolam's Mouse											1	1	3										
	Pseudomys hermannsburgensis	Sandy Inland Mouse												1											

A Dunlop, J.N., and Paynes, W. (1999a) *A vertebrate Fauna Survey of the North Lake Carey Region including Hillside Prospect, Wallaby Prospect and Just in Time / Just in Case and the Teatree Dam Area*, Unpublished report for Placer (Granny Smith) and Homestake, Perth.

B Hart Simpson and Associates (2000) *Anaconda Nickel Ltd, Cawse Expansion Project, Fauna Survey*, Unpublished report for Anaconda Nickel Ltd, Perth.

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

Appendix C.

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

Basic Vertebrate Fauna Survey and Risk Assessment
Devon Gold Project

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

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

T Threatened Species

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

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

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

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

CR Critically endangered species

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

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

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

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

EN Endangered species

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

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

VU Vulnerable species

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

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

Extinct Species

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

EX Extinct species

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

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

EW Extinct in the wild species

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

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

Specially Protected Species

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

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

MI Migratory birds protected under an international agreement

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

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

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

CD Species of special conservation interest (conservation dependant fauna)

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

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

OS Other specially protected species

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

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

P Priority species

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

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

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

P1 Priority 1: Poorly-known species

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

P2 Priority 2: Poorly-known species

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

P3 Priority 3: Poorly-known species

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

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

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

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

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

Appendix D.
Rapid habitat assessment

Basic Vertebrate Fauna Survey and Risk Assessment
Devon Gold Project

Date: 9/09/2021 Habitat Assessment #: 1 Observer: RT and WP

Zone: 51 Easting: 446979 mE Northing: 6761458 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Salt Lake

Habitat Quality: Very good Soil Type: Clay Surface: Clay

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 2 Observer: RT and WP

Zone: 51 Easting: 446857 mE Northing: 6761612 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 3 Observer: RT and WP

Zone: 51 Easting: 446670 mE Northing: 6761734 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 4 Observer: RT and WP

Zone: 51 Easting: 446566 mE Northing: 6761890 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 5 Observer: RT and WP

Zone: 51 Easting: 446491 mE Northing: 6761985 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 6 Observer: RT and WP

Zone: 51 Easting: 446372 mE Northing: 6762078 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 7 Observer: RT and WP

Zone: 51 Easting: 446150 mE Northing: 6762022 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 8 Observer: RT and WP

Zone: 51 Easting: 446336 mE Northing: 6761955 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 9 Observer: RT and WP

Zone: 51 Easting: 446424 mE Northing: 6761835 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 10 Observer: RT and WP

Zone: 51 Easting: 446559 mE Northing: 6761727 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 11 Observer: RT and WP

Zone: 51 Easting: 446646 mE Northing: 6761550 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 12 Observer: RT and WP

Zone: 51 Easting: 446747 mE Northing: 6761416 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 13 Observer: RT and WP

Zone: 51 Easting: 446840 mE Northing: 6761349 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Salt Lake

Habitat Quality: Excellent Soil Type: Clay Surface: Clay

Date: 9/09/2021 Habitat Assessment #: 14 Observer: RT and WP

Zone: 51 Easting: 446769 mE Northing: 6761377 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Rock Surface: Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 15 Observer: RT and WP

Zone: 51 Easting: 446723 mE Northing: 6761339 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Mixed shrubland

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 16 Observer: RT and WP

Zone: 51 Easting: 446680 mE Northing: 6761245 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Rock Surface: Stones

TERRESTRIAL ECOSYSTEMS

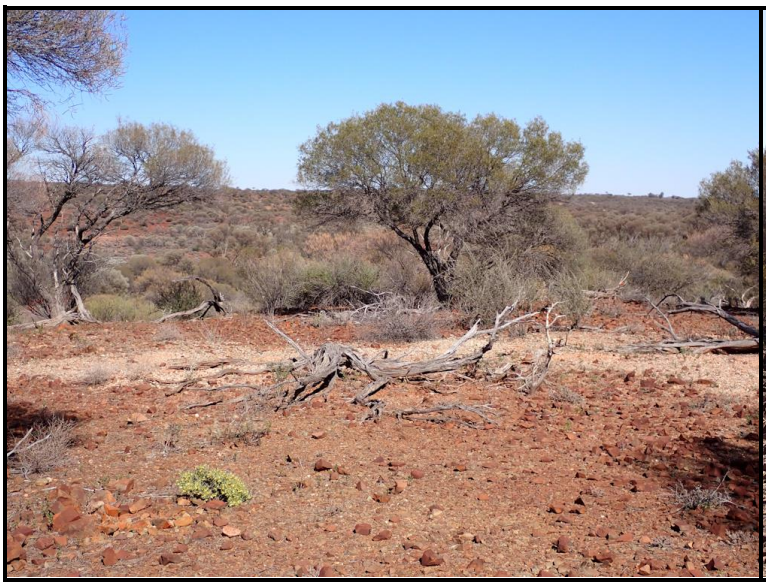
Date: 9/09/2021 Habitat Assessment #: 17 Observer: RT and WP

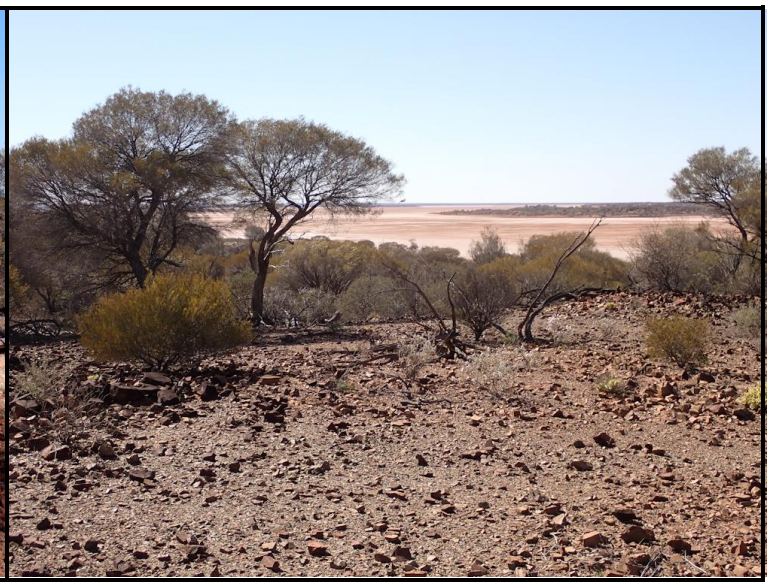
Zone: 51 Easting: 446488 mE Northing: 6761393 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles





TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 18 Observer: RT and WP

Zone: 51 Easting: 446433 mE Northing: 6761513 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Sheoak woodland and shrubs

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 19 Observer: RT and WP

Zone: 51 Easting: 446272 mE Northing: 6761709 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 20 Observer: RT and WP

Zone: 51 Easting: 446201 mE Northing: 6761870 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 21 Observer: RT and WP

Zone: 51 Easting: 445893 mE Northing: 6761956 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 22 Observer: RT and WP

Zone: 51 Easting: 446032 mE Northing: 6761793 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 23 Observer: RT and WP

Zone: 51 Easting: 446117 mE Northing: 6761661 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 24 Observer: RT and WP

Zone: 51 Easting: 446139 mE Northing: 6761539 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 25 Observer: RT and WP

Zone: 51 Easting: 446229 mE Northing: 6761350 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 26 Observer: RT and WP

Zone: 51 Easting: 446317 mE Northing: 6761199 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 27 Observer: RT and WP

Zone: 51 Easting: 446401 mE Northing: 6761081 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 28 Observer: RT and WP

Zone: 51 Easting: 446184 mE Northing: 6761039 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 29 Observer: RT and WP

Zone: 51 Easting: 446037 mE Northing: 6761301 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 30 Observer: RT and WP

Zone: 51 Easting: 445875 mE Northing: 6761476 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 31 Observer: RT and WP

Zone: 51 Easting: 445777 mE Northing: 6761603 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Samphire

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

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 32 Observer: RT and WP

Zone: 51 Easting: 445653 mE Northing: 6761354 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Pebbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 33 Observer: RT and WP

Zone: 51 Easting: 445845 mE Northing: 6761258 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Clay

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 34 Observer: RT and WP

Zone: 51 Easting: 445951 mE Northing: 6761084 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 35 Observer: RT and WP

Zone: 51 Easting: 446019 mE Northing: 6760879 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles, Rocks

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 36 Observer: RT and WP

Zone: 51 Easting: 446210 mE Northing: 6760714 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Pebbles, Rocks

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 37 Observer: RT and WP

Zone: 51 Easting: 446175 mE Northing: 6760471 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Pebbles, Cobbles, Rocks

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 38 Observer: RT and WP

Zone: 51 Easting: 446016 mE Northing: 6760610 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Pebbles, Cobbles, Rocks

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 39 Observer: RT and WP

Zone: 51 Easting: 445860 mE Northing: 6760774 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Pebbles, Cobbles, Rocks

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 40 Observer: RT and WP

Zone: 51 Easting: 445774 mE Northing: 6760962 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 41 Observer: RT and WP

Zone: 51 Easting: 445670 mE Northing: 6761133 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 42 Observer: RT and WP

Zone: 51 Easting: 445528 mE Northing: 6761201 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 43 Observer: RT and WP

Zone: 51 Easting: 445374 mE Northing: 6761052 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 44 Observer: RT and WP

Zone: 51 Easting: 445536 mE Northing: 6760911 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sand Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 45 Observer: RT and WP

Zone: 51 Easting: 445659 mE Northing: 6760732 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Disturbed

Habitat Quality: Completely degraded Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 46 Observer: RT and WP

Zone: 51 Easting: 445794 mE Northing: 6760543 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 47 Observer: RT and WP

Zone: 51 Easting: 445941 mE Northing: 6760404 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 48 Observer: RT and WP

Zone: 51 Easting: 446096 mE Northing: 6760293 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 49 Observer: RT and WP

Zone: 51 Easting: 446011 mE Northing: 6760140 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

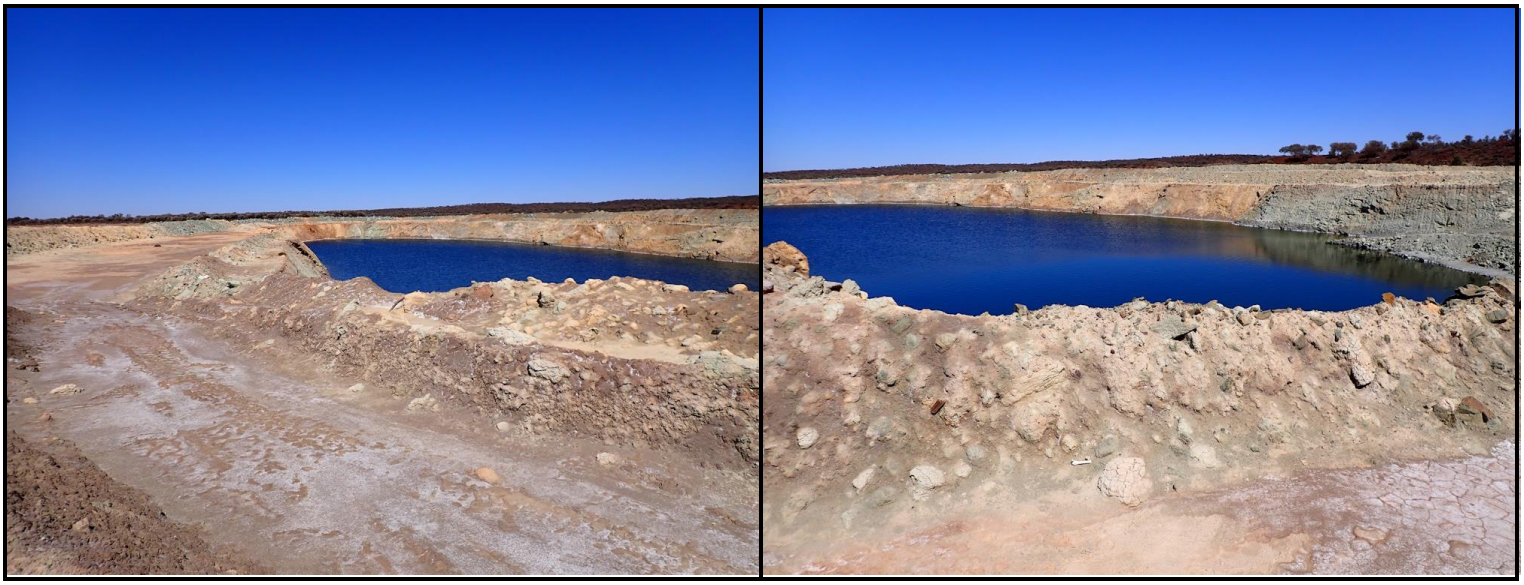
Date: 9/09/2021 Habitat Assessment #: 50 Observer: RT and WP

Zone: 51 Easting: 445831 mE Northing: 6760295 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Disturbed

Habitat Quality: Completely degraded Soil Type: n/a Surface: n/a



TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 51 Observer: RT and WP

Zone: 51 Easting: 445647 mE Northing: 6760416 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Disturbed

Habitat Quality: Completely degraded Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 52 Observer: RT and WP

Zone: 51 Easting: 445477 mE Northing: 6760569 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 53 Observer: RT and WP

Zone: 51 Easting: 445381 mE Northing: 6760804 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 54 Observer: RT and WP

Zone: 51 Easting: 445212 mE Northing: 6760898 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 55 Observer: RT and WP

Zone: 51 Easting: 445050 mE Northing: 6760730 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 56 Observer: RT and WP

Zone: 51 Easting: 445250 mE Northing: 6760577 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 57 Observer: RT and WP

Zone: 51 Easting: 445365 mE Northing: 6760398 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 58 Observer: RT and WP

Zone: 51 Easting: 445520 mE Northing: 6760243 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 59 Observer: RT and WP

Zone: 51 Easting: 445670 mE Northing: 6760086 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 60 Observer: RT and WP

Zone: 51 Easting: 445697 mE Northing: 6760248 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Disturbed

Habitat Quality: Completely degraded Soil Type: Sandy Clay Surface: Sand, Pebbles

Date: 9/09/2021 Habitat Assessment #: 61 Observer: RT and WP

Zone: 51 Easting: 445992 mE Northing: 6759912 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Pebbles

TERRESTRIAL ECOSYSTEMS

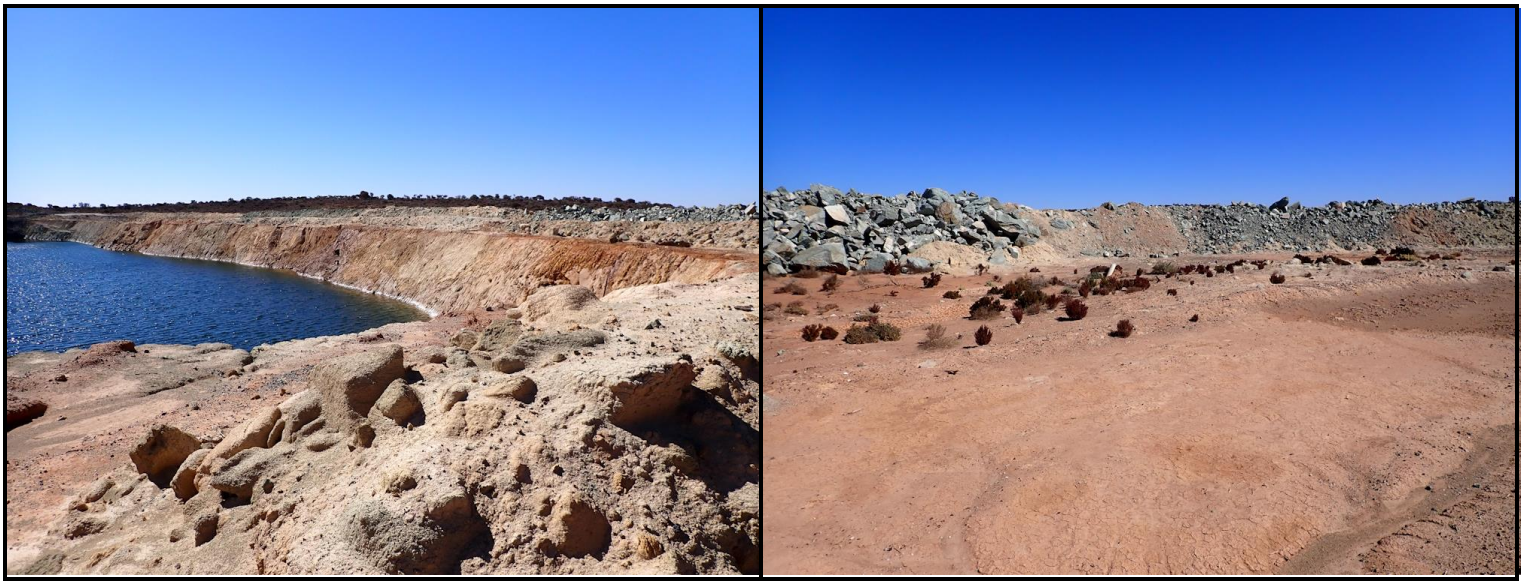
Date: 9/09/2021 Habitat Assessment #: 62 Observer: RT and WP

Zone: 51 Easting: 445926 mE Northing: 6760028 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Disturbed

Habitat Quality: Completely degraded Soil Type: n/a Surface: n/a



Date: 9/09/2021 Habitat Assessment #: 63 Observer: RT and WP

Zone: 51 Easting: 445812 mE Northing: 6759997 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Disturbed

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Pebbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 64 Observer: RT and WP

Zone: 51 Easting: 445819 mE Northing: 6759782 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Samphire

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Pebbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 65 Observer: RT and WP

Zone: 51 Easting: 445671 mE Northing: 6759930 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 66 Observer: RT and WP

Zone: 51 Easting: 445505 mE Northing: 6760043 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Disturbed

Habitat Quality: Completely degraded Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 67 Observer: RT and WP

Zone: 51 Easting: 445350 mE Northing: 6760164 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Pebbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 68 Observer: RT and WP

Zone: 51 Easting: 445224 mE Northing: 6760313 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 69 Observer: RT and WP

Zone: 51 Easting: 445133 mE Northing: 6760460 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 70 Observer: RT and WP

Zone: 51 Easting: 445007 mE Northing: 6760554 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 71 Observer: RT and WP

Zone: 51 Easting: 444898 mE Northing: 6760631 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Sheoak woodland and shrubs

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 72 Observer: RT and WP

Zone: 51 Easting: 444790 mE Northing: 6760445 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Disturbed

Habitat Quality: Completely degraded Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 73 Observer: RT and WP

Zone: 51 Easting: 445030 mE Northing: 6760302 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Disturbed

Habitat Quality: Completely degraded Soil Type: Sandy Clay Surface: Sand, Pebbles

Date: 9/09/2021 Habitat Assessment #: 74 Observer: RT and WP

Zone: 51 Easting: 444922 mE Northing: 6760256 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Disturbed

Habitat Quality: Completely degraded Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 75 Observer: RT and WP

Zone: 51 Easting: 445153 mE Northing: 6760144 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Disturbed

Habitat Quality: Completely degraded Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 76 Observer: RT and WP

Zone: 51 Easting: 445294 mE Northing: 6759985 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 77 Observer: RT and WP

Zone: 51 Easting: 445442 mE Northing: 6759836 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 78 Observer: RT and WP

Zone: 51 Easting: 445626 mE Northing: 6759718 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 79 Observer: RT and WP

Zone: 51 Easting: 445288 mE Northing: 6759706 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 80 Observer: RT and WP

Zone: 51 Easting: 445133 mE Northing: 6759831 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 81 Observer: RT and WP

Zone: 51 Easting: 444944 mE Northing: 6759972 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Eucalypt woodland

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 82 Observer: RT and WP

Zone: 51 Easting: 445075 mE Northing: 6760047 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 83 Observer: RT and WP

Zone: 51 Easting: 445831 mE Northing: 6761801 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Good Soil Type: Sandy Clay Surface: Sand, Pebbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 84 Observer: RT and WP

Zone: 51 Easting: 445962 mE Northing: 6761666 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Pebbles

TERRESTRIAL ECOSYSTEMS

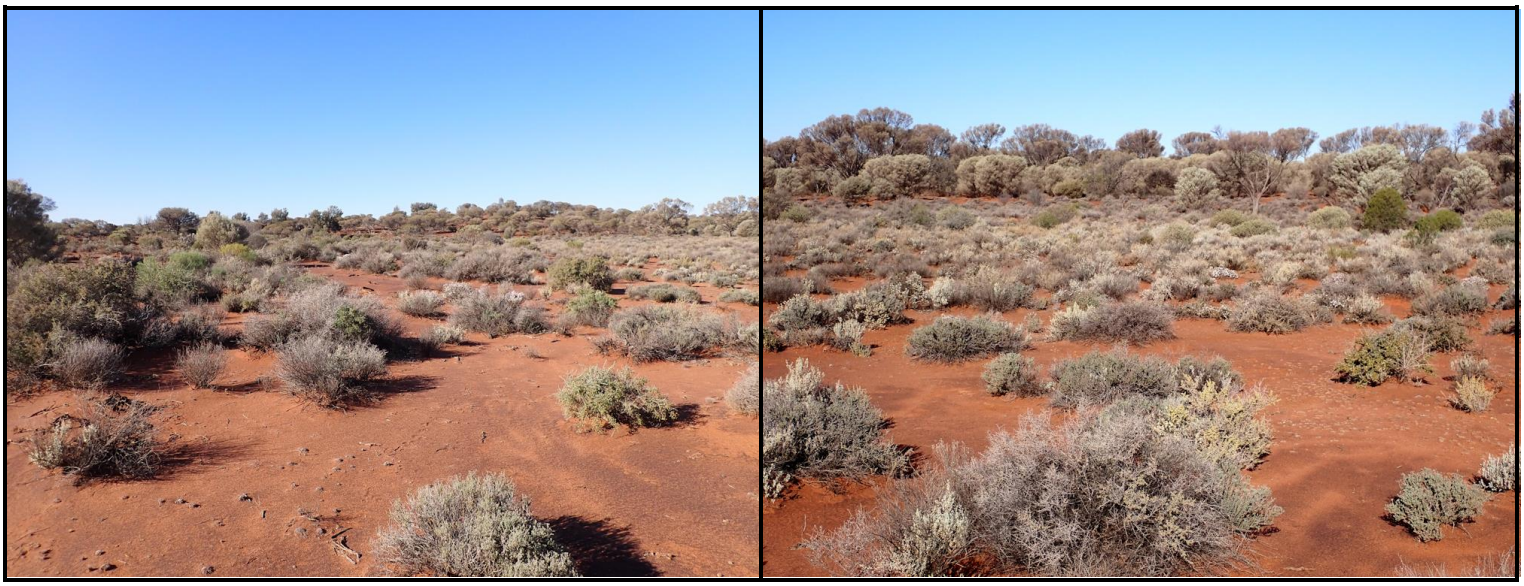
Date: 9/09/2021 Habitat Assessment #: 85 Observer: RT and WP

Zone: 51 Easting: 446069 mE Northing: 6761511 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

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



TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 86 Observer: RT and WP

Zone: 51 Easting: 446058 mE Northing: 6761377 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 87 Observer: RT and WP

Zone: 51 Easting: 446225 mE Northing: 6761225 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Chenopod shrubland

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 88 Observer: RT and WP

Zone: 51 Easting: 446310 mE Northing: 6761446 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 89 Observer: RT and WP

Zone: 51 Easting: 446245 mE Northing: 6761578 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Very good Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 90 Observer: RT and WP

Zone: 51 Easting: 446435 mE Northing: 6761656 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Clay, Pebbles, Stones

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 91 Observer: RT and WP

Zone: 51 Easting: 446524 mE Northing: 6761540 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 92 Observer: RT and WP

Zone: 51 Easting: 446460 mE Northing: 6761253 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand

TERRESTRIAL ECOSYSTEMS

Date: 9/09/2021 Habitat Assessment #: 93 Observer: RT and WP

Zone: 51 Easting: 446221 mE Northing: 6760814 mN

Fire History: >5 years Landform: Flat/undulating plain

Habitat Structure: Open Mulga woodland over mixed shrubs and chenopods

Habitat Quality: Excellent Soil Type: Sandy Clay Surface: Sand, Pebbles, Cobbles

TERRESTRIAL ECOSYSTEMS