Vertebrate Fauna Assessment

Medcalf Vanadium Mining Project
Proposed Haul Road

Audalia Resources Limited

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Version 5

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Acronyms/Abbreviations:

ALA: Atlas of Living Australia www.ala.org.au

BA: Birdlife Australia (Formerly RAOU, Birds Australia).

BC Act: Biodiversity Conservation Act 2016. WA Government.

°C: Degrees Celsius.

CALM: Department of Conservation and Land Management (now DBCA), WA Government.

CAMBA: China Australia Migratory Bird Agreement 1998.

CBD: Central Business District.

DAWE: Department of Agriculture, Water and the Environment, Australian Government (formerly SEWPaC, DWEHA, DEH, DotE & DotEE).

DBCA: Department of Biodiversity, Conservation and Attractions (formerly DPaW, DEC, CALM, DoE), WA Government

DBH: Diametre at Breast Height – tree measurement.

DEC: Department of Environment and Conservation (now DBCA), WA Government.

DEH: Department of Environment and Heritage (now DAWE), Australian Government.

DEP: Department of Environment Protection (now DWER), WA Government.

DER: Department of Environment Regulation (now DWER), WA Government.

DEWHA: Department of the Environment, Water, Heritage and the Arts (now DAWE), Australian Government.

DMIRS: Department of Mines, Industry Regulation and Safety (formerly DMP and DoIR), WA Government.

DMP: Department of Mines and Petroleum (Now DMIRS, formerly DoIR), WA Government.

DoE: Department of Environment (now DWER/DBCA), WA Government.

DoP: Department of Planning, WA Government.

DotE: Department of the Environment (now DAWE), Australian Government.

DotEE: Department of the Environment and Energy (Now DAWE, formerly SEWPaC, DWEHA, DEH & DotE), Australian Government.

DoIR: Department of Industry and Resources (now DMIRS), WA Government.

DoW: Department of Water (now DWER), WA Government.

DPaW: Department of Parks and Wildlife (now DBCA), WA Government.

DWER: Department of Water and Environmental Regulation (formed by the amalgamation of OEPA, DoW and DER), WA Government.

EP Act: *Environmental Protection Act 1986*, WA Government.

EPA: Environmental Protection Authority, WA Government.

EPBC Act: *Environment Protection and Biodiversity Conservation Act 1999,* Australian Government.

ha: Hectare (10,000 square metres).

IBRA: Interim Biogeographic Regionalisation for Australia.

IUCN: International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union.

JAMBA: Japan Australia Migratory Bird Agreement 1981.

km: Kilometre.

m: Metre.

mm: Millimetre.

P: Priority - DBCA fauna conservation ranking.

RAOU: Royal Australia Ornithologist Union.

ROKAMBA: Republic of Korea-Australia Migratory Bird Agreement 2007.

S: Schedule - Western Australian *Wildlife Conservation Act (1950)* Threatened Fauna Category.

SEWPaC: Department of Sustainability, Environment, Water, Population and Communities (now DAWE), Australian Government.**SSC**: Species Survival Commission, International.

WA: Western Australia.

WAM: Western Australian Museum, WA Government.

SUMMARY

This report details the results of a fauna assessment of Audalia Resources Limited (Audalia) Medcalf Vanadium Mining Project's proposed haul road (referred to as the 'survey area'). The survey area is located approximately 50km south-west of Norseman, and extends approximately 73km west from the Coolgardie-Esperance Highway to the proposed mine site. The survey area covers about 17,480 ha (Figures 1 and 2) and includes the likely haul road alignment (and associated borrow pits) and a one km buffer either side.

The assessment was undertaken for the purposes of delineating and characterising the fauna habitats and faunal assemblages present in the survey area and to identify potential impacts. The assessment has included a field reconnaissance survey and a literature review carried out to comply with relevant EPA guidance statements.

The broad scale terrestrial fauna habitats within the survey area presented below are based primarily on landforms identified by Botanica (2017) with further often subtle subdivisions possible using vegetation structure. The extent of the identified broad scale fauna habitats within the survey area are shown in Figure 4.

- Closed Depressions - Low samphire shrubland over low open forbland on playa/bare playa. Total Area = ~209 ha (~0.6%).
- Clay-Loam Plains - Eucalypt woodlands or Mallee woodlands over shrublands. Total Area = ~13,599 ha (~77.8%).
- Granite Outcrops - Heathland over sparse tussock grassland on granite outcrops. Total Area = ~265 ha (~1.5%).
- Hillslopes - Eucalypt woodlands or Mallee woodlands over shrublands or shrublands. Total Area = ~349ha (~2.0%).
- Sand-Loam Plains - Eucalypt woodlands or shrublands. Total Area = ~3,058 ha (~17.5%).

Vertebrate fauna observations (including bats identified from recordings and camera trap results) are listed in Appendix B. A total of 51 native fauna species were observed (or positively identified from foraging evidence, scats, tracks, skeletons, calls or photographs) within the survey area during the field reconnaissance survey (or on camera traps between April and September 2017). Four introduced species were also recorded.

With respect to native vertebrate fauna, 27 mammals (including nine bat species), 119 bird, 65 reptile and twelve frog species have previously been recorded in the general area, some of which have the potential to occur in or utilise at times, the survey area.

One listed threatened and one priority vertebrate fauna species were recorded during the field reconnaissance survey carried out in April 2017, these being the malleefowl (*Leipoa ocellata*) (listed as Vulnerable under the *BC Act* and *EPBC Act*) and the central long-eared bat (*Nyctophilus major tor*) (listed as Priority 3 by DBCA).

Based on habitat preferences, previous survey results from nearby areas and currently documented distributions it has been concluded that one additional specially protected vertebrate fauna species (the peregrine falcon) may at times be present. One common migratory species (rainbow bee-eater) is also considered likely to occur during seasonal migration periods. Three DBCA priority species may also occur or utilise sections of the survey area at times (i.e. Lake Cronin snake, western rosella (inland ssp.) and the western brush wallaby), given the existence of some areas of apparently suitable habitat.

Using information currently available it would appear that impacts would be unlikely to alter the status of any one species in the general area despite the potential localised loss of some habitat. A review of the possible impacts on fauna, in particular those of conservation significance in addition to the possible need for further, more detailed survey work to determine the actual status of some species (e.g. malleefowl) in actual impact areas (i.e. clearing footprint) should be undertaken when planning has progressed to a point where more informed decisions and comments can be made.

A series of generalised fauna management recommendations aimed at minimising potential impacts are provided for guidance during future development planning and if considered reasonable and practical should be made a priority for implementation during site development and operation.

1. INTRODUCTION

This report details the results of a fauna assessment of Audalia Resources Limited (Audalia) Medcalf Vanadium Mining Project's proposed haul road (referred to as the 'survey area'). The survey area is located approximately 50km south-west of Norseman, and extends approximately 73km west from the Coolgardie-Esperance Highway to the proposed mine site. The survey area covers about 17,480 ha and includes the likely haul road alignment (and associated borrow pits) and a one km buffer either side (Figures 1 and 2).

Information obtained as part of this fauna assessment report will be used in conjunction with other environmental investigations to guide project planning. It is anticipated that the information presented will also be used by regulatory authorities to assess the potential impact of the proposal on fauna and fauna habitats at the site during the project evaluation and approval process.

2. SCOPE OF WORKS

The scope of works was defined as:

1. Carry out a Level 1 Fauna Survey (in compliance with EPA Guidance statement 56 (EPA 2016c);

2. Identify fauna of conservation significance (particularly state and federally listed threatened, migratory and priority fauna species) present or potentially present within the survey area; and

3. Identify potential development constraints relating to impacts on fauna and fauna habitats.

3. METHODS

3.1 SITE SURVEYS

Daytime reconnaissance surveys of the haul road survey area were carried out on the 19 to 21 April 2017 inclusive by Greg Harewood (Zoologist). Observations made by the botanical survey team (Botanica Consulting) have also been incorporated into the assessment. A supplementary targeted malleefowl survey was carried out between the 9 and 12 June 2021 (Botanica 2021), the results of which are also presented. A map of all GPS tracks traversed in relation to the fauna habitats identified is provided in Figure 5.

3.1.1 General Fauna Habitat Assessment

Vegetation and landform units identified during the flora and vegetation survey, carried out by Botanica Consulting (2017) have been used to define broad fauna habitat types across the survey area. This information has been supplemented with observations made during the daytime reconnaissance surveys.

The main aim of the habitat assessment was to determine if it was likely that any species of conservation significance would be utilising the areas that maybe impacted as a consequence of the proposal proceeding. The habitat information obtained was also used to aid in finalising the overall potential fauna list.

As part of the literature review, available information on the habitat requirements of the species of conservation significance listed as possibly occurring in the area was researched. During the field survey the habitats within the survey area were assessed and specific elements identified, if present, to determine the likelihood of listed threatened species utilising the area and its significance to them.

It should be noted that prior to the field surveys some sections of the survey area had recently been subject to fire, which would have impacted on the nature of the fauna habitats present. The assessment of the likelihood of listed threatened species utilising the area and its significance to them has taken this into account and pre-fire habitat extent and quality has been used, not post fire conditions.

3.1.2 Fauna Observations

Opportunistic observations of fauna species were made during the field survey work which involved a series of transects across/along the defined survey areas while searching microhabitats such as logs, rocks, leaf litter and observations of bird species with binoculars. Secondary evidence of a species presence such as tracks, scats, skeletal remains, foraging evidence or calls were also noted if observed/heard.

Acoustic bat call recordings were undertaken for one night on the 20 April 2017 using a Wildlife Acoustics SM2+ Bat Detector. Three motion sensing cameras (Ltl Acorn 5210A) were also deployed during the April 2017 survey period and retrieved in September 2017. The bat recording and camera trap locations are shown in Figure 3.

3.2 POTENTIAL VERTEBRATE FAUNA INVENTORY

3.2.1 Database Searches

Searches of the following databases were undertaken to aid in the compilation of a list of vertebrate fauna potentially occurring within the survey area:

- DBCA's NatureMap Database (combined data from DBCA, ALA, WAM, BA and consultant's reports) (DBCA 2020); and
- DotEE's Protected matters search tool (DotEE 2020).

It should be noted that these lists are based on records compiled from a broader area than the survey area and therefore may include species that would only ever occur as vagrants in the area under investigation due to a lack of suitable habitat or the presence of only marginal habitat. The databases also often included very old records and in some cases the species in question have become locally or regionally extinct.

Information from these sources should therefore be taken as indicative only and local knowledge and information needs also to be taken into consideration when determining what actual species may be present within the specific area being investigated.

3.2.2 Previous Fauna Surveys in the Area

Fauna surveys, assessments and reviews have been undertaken in nearby areas in the past, though not all are publicly available and could not be referenced. The most significant of those available have been used as the primary reference material for compiling the potential fauna assemblage for the general area. Those reports referred to included, but were not limited to:

- Biota Environmental Sciences (Biota) (2006a). Forrestania Fauna Survey – Fauna and Fauna Assemblages Report. Unpublished report for Western Areas NL.
- Biota Environmental Sciences (Biota) (2006b). Forrestania Water Disposal Pipeline Survey – Fauna and Faunal Assemblages Report. Unpublished report for Western Areas NL.
- Biota Environmental Sciences (Biota) (2007a). Forrestania Monitoring Survey, Flying Fox Phases III and IV. Unpublished report for Western Areas NL.
- Biota Environmental Sciences (Biota) (2007b). Diggers South Fauna Survey – Phase I. Unpublished report for Western Areas NL.
- Biota Environmental Sciences (Biota) (2010). Spotted Quoll Haul Road Single Phase Fauna Survey. Unpublished report for Western Areas N.L. May 2010.

- Brearley, D.R., Dunlop, J.N., and Osborne, J.M. (1998). Biological survey and environmental assessment of the Emily-Ann Project area. Unpublished report for Lionore Pty Ltd.

- Duncan, S. Traill, B.J. & Watson, C. (2006). Vertebrate Fauna of the Honman Ridge - Bremer Range district, Great Western Woodlands, Western Australia. Unpublished report for the Wilderness Society.

- Harewood, G. (2020). Fauna Survey (Level 2) - Phase 1 (October 2020) and Phase 2 (March 2014). Unpublished report for Audalia Resources Ltd. Version 4.

- How, R.A., Newbey, K.R., Dell, J., Muir, B.G., & Hnatiuk, R.J. (1988). The biological survey of the eastern goldfields of Western Australia. Part 4. Lake Johnston-Hyden Study Area. Records of the Western Australian Museum, supplement No. 30. (includes fauna survey results from Lake Cronin, McDermid Rock, Frank Hann NP and Peak Charles).

As with the databases searches some reports refer to species that would not occur in the survey area due to a lack of suitable habitat (extent and/or quality) and this fact was taken into consideration when compiling the potential fauna species list for the survey area. It should also be noted that the NatureMap database is likely to include some records from previous fauna surveys in the area including some of those listed above.

3.2.3 Existing Publications

The following represent the main publications used to identify and refine the potential fauna species list for the survey area:

- Anstis, M. (2013). Tadpoles and Frogs of Australia. New Holland Publishers, Sydney.

- Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). The New Atlas of Australian Birds. Royal Australasian Ornithologists Union, Victoria.

- Bush, B., Maryan, B., Browne-Cooper, R. & Robinson, D. (2007). Reptiles and Frogs in the Bush: Southwestern Australia. UWA Press, Nedlands.

- Churchill, S. (2008). Australian Bats. Second Edition, Allen & Unwin.

- Cogger, H.G. (2014). Reptiles and Amphibians of Australia. 7th Edition. CSIRO Publishing.

- Johnstone, R.E. and Storr, G.M. (1998). Handbook of Western Australian Birds: Volume 1 – Non-passerines (Emu to Dollarbird). Western Australian Museum, Perth Western Australia.

- Johnstone, R.E. and Storr, G.M. (2004). Handbook of Western Australian Birds: Volume 2 – Passerines (Blue-winged Pitta to Goldfinch). Western Australian Museum, Perth Western Australia.

- Menkhorst, P. and Knight, F. (2011). A Field Guide to the Mammals of Australia. Third edition, Oxford University Press, Melbourne.
- Menkhorst, P., Rogers, D,. Clarke, R., Davies, J., Marsack, P. and Franklin, K. (2017). The Australian Bird Guide. First edition, CSIRO Publishing.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1983). Lizards of Western Australia II: Dragons and Monitors. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1990). Lizards of Western Australia III: Geckos and Pygopods. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1999). Lizards of Western Australia I: Skinks. Revised Edition, WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (2002). Snakes of Western Australia. Revised Edition, WA Museum, Perth.
- Thompson, S. & Thompson, G. (2006). Reptiles of the Western Australian Goldfields. Published by the Goldfields Environmental Management Group.
- Tyler M.J. & Doughty P. (2009). Field Guide to Frogs of Western Australia, Fourth Edition, WA Museum, Perth.
- Van Dyck, S., Gynther, I. & Baker, A. Eds (2013). Field Companion to The Mammals of Australia. Queensland Museum.
- Wilson, S. and Swan, G. (2017). A Complete Guide to Reptiles of Australia. Fifth Edition, Reed, New Holland, Sydney.

3.2.4 Fauna of Conservation Significance

The conservation significance of fauna species has been assessed using data from the following sources:

- *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*). Administered by the Australian Government Department of the Environment and Energy (DotEE);
- *Biodiversity Conservation Act 2016 (BC Act).* Administered by the Western Australian DBCA (Govt. of WA 2018). Note: The Wildlife Conservation (Specially Protected Fauna) Notice 2018 has 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 *BC Act*;
- Red List produced by the Species Survival Commission (SSC) of the World Conservation Union (also known as the IUCN Red List - the acronym derived from its former name of the International Union for Conservation of Nature and Natural

Resources). The Red List has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and the

- DBCA Priority Fauna list. A non-legislative list maintained by DBCA for management purposes (DBCA 2019).

The *EPBC Act* also requires the compilation of a list of migratory species that are recognised under international treaties including the:

- Japan Australia Migratory Bird Agreement 1981 (JAMBA);
- China Australia Migratory Bird Agreement 1998 (CAMBA);
- Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA); and
- Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals).

(Note – Some species listed under JAMBA are also protected under Schedule 3 of the *BC Act*.)

Most, but not all migratory bird species listed in the annexes to these bilateral agreements are also protected in Australia as matters of national environmental significance (NES) under the *EPBC Act*.

The conservation status of all vertebrate fauna species listed as occurring or possibly occurring in the vicinity of the survey area has been assessed using the most recent lists published in accordance with the above-mentioned instruments and is indicated as such in the fauna listings of this report. A full listing of conservation codes is provided in Appendix A.

3.2.5 Likelihood of Occurrence – Vertebrate Fauna of Conservation Significance

Fauna of conservation significance identified during the literature review as previously being recorded in the general area were assessed and ranked for their likelihood of occurrence within the survey area itself, if not directly recorded during the survey period. The rankings and criteria used were:

- Would Not Occur: There is no suitable habitat for the species in the survey area and/or there is no documented record of the species in the general area since records have been kept and/or the species is generally accepted as being locally/regionally extinct (supported by a lack of recent records).
    - Locally Extinct: Populations no longer occur within a small part of the species natural range, in this case within 10 or 20km of the survey area. Populations do however persist outside of this area.

  - Regionally Extinct: Populations no longer occur in a large part of the species natural range, in this case within the southern goldfields. Populations do however persist outside of this area.

- Unlikely to Occur: The survey area is outside of the currently documented distribution for the species in question, or no suitable habitat (type, quality and extent) was identified as being present during the field assessment. Individuals of some species may occur occasionally as vagrants/transients especially if suitable habitat is located nearby but the survey area itself would not support individuals or a population the species.

- Possibly Occurs: The survey area is within the known distribution of the species in question and habitat of at least marginal quality was identified as being present during the field assessment, supported in some cases by recent records being documented in literature from within or near the survey area. In some cases, while a species may be classified as possibly being present at times, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

- Known to Occur: The species in question was positively identified as being present (for sedentary species) or as using the survey area as habitat for some other purpose (for non-sedentary/mobile species) during the field survey. This information may have been obtained by direct observation of individuals or by way of secondary evidence (e.g. foraging debris, tracks and scats). In some cases, while a species may be classified as known to occur, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

3.2.6 Taxonomy and Nomenclature

Taxonomy and nomenclature for fauna species used in this report is generally taken from the DBCA's WA Fauna Census Database which is assumed to follow Aplin and Smith (2001) for amphibians and reptiles and Johnstone (2001) for birds. Jackson and Groves (2015) has been used for mammals.

Common names are taken from the WAM recognised primary common name listings when specified, though where common names are not provided, they have been acquired from other publications. Sources include Cogger (2014), Wilson and Swan (2017), Van Dyck & Strahan (2013), Christidis and Boles (2008), Bush *et al.* (2007), Tyler & Doughty (2009), and Glauret (1961). Not all common names are generally accepted.

4. SURVEY CONSTRAINTS

The conclusions presented are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. Also, it should be recognised that site conditions can change with time. No seasonal sampling has been carried out as part of this fauna assessment.

Some fauna species are reported as potentially occurring based on there being suitable habitat (quality and extent) within the survey area or immediately adjacent.

The habitat requirements and ecology of many of the species known to occur in the wider area are often not well understood or documented. It can therefore be difficult to exclude species from the potential list based on a lack of a specific habitat or microhabitat within the survey area. As a consequence of this limitation the potential fauna list produced is most likely an overestimation of those species that actually utilise the survey area for some purpose. Some species may be present in the general area but may only use the survey area itself on rare occasions or as vagrants.

In recognition of survey limitations, a precautionary approach has been adopted for this assessment. Any vertebrate fauna species that would possibly occur within the survey area (or immediately adjacent), as identified through ecological databases, publications, discussions with local experts/residents and the habitat knowledge of the Author, has been assumed to potentially occur in the survey area.

5. RESULTS

5.1 SITE SURVEYS

5.1.1 General Fauna Habitat Assessment

The broad scale terrestrial fauna habitats within the survey area presented below are based primarily on vegetation and associated landforms identified by Botanica (2017). The extents of the identified vegetation communities are shown in Figure 4 with a summary description of each given below. Additional information can be found in the flora and vegetation report for the site (Botanica Consulting 2017).

Table 1: Main Terrestrial Fauna Habitats within the Survey Area

Fauna Habitat	Description	Representative Fauna Habitat Attributes	Conservation Significant Species that possibly occur in habitat	Survey Effort	Example Image
CD-Closed Depression- Low samphire shrubland over low open forbland on playa/bare playa Total Area = ~209 ha (~1.2%)	Low samphire shrubland of *Tecticornia indica* over low open forbland of *Disphyma crassifolium* on playa and bare playa.	• Halopyte vegetation providing potential food source • Limited vegetation strata supporting a lower avifauna assemblage. • Limited leaf litter due to absence of trees • Substrate very well suited to a variety of burrowing small mammals and reptiles.	None	Traverses within habitat- opportunisitc observations/ secondary evidence	
CLP - Clay Loam Plain- Eucalypt Woodland/ Mallee Woodland over shrublands Total Area = ~13,599 ha (~77.8%)	Clay loam plain comprising a mosaic of open Salmon Gum woodland over mixed low shrubs and mallee shrubland over *Melaleuca pauperiflora* and mixed low shrubs.	• Range of vegetation strata suitable to a variety of passerine and nonpasserine birds. • Moderate to high leaf litter in areas of mature woodland. • Relatively dense shrubs providing cover for small fauna. • Ground not especially suited to burrowing species.	Malleefowl *Leipoa ocellata* Peregrine Falcon *Falco peregrinus* Western Rosella (Inland ssp.) *Platycercus icterotis xanthogenys* Carnaby's Black- Cockatoo *Calyptorhynchus latirostris* Chuditch *Dasyurus geoffroii* Lake Cronin Snake *Paroplocephalus atriceps* Western Brush Wallaby *Notamacropus Irma* Central Long-eared Bat *Nyctophilus major tor*	Traverses within habitat- opportunisitc observations/ secondary evidence Two camera trap sites along proposed haul road alignment One acoutstic bat recorder site along proposed haul road alignment Level 2 fauna study within this habitat previously conducted within the western extremity of the current survey area (as part of the mine study)- included target searches/ trapping sites, motion cameras and accoustic bat recorders.	
Granite Outcrops-Heathland over sparse tussock grassland on granite outcrops . Total Area = ~265 ha (~1.5%)	Heathland of *Thryptomene* spp. over sparse tussock grassland of *Neurachne alopecuroidea* on granite outcrop	• Limited vegetation strata supporting a lower avifauna assemblage. • Limited leaf litter due to absence of trees • Limited dense shrubs. • Dominated by granite outcrop limited suitable for burrowing. • Provide potential water source for fauna.	Lake Cronin Snake *Paroplocephalus atriceps*	Traverses within habitat- opportunisitc observations/ secondary evidence	

Fauna Habitat	Description	Representative Fauna Habitat Attributes	Conservation Significant Species that possibly occur in habitat	Survey Effort	Example Image
HS - Hillslope- Eucalypt woodlands or Mallee woodlands over shrublands or shrublands Total Area = ~349ha (~2.0%)	Rocky hillslopes (lateritic/ limonite) comprising a mosaic of regrowth Eucalypt woodland/ mallee woodland to shrubland over mixed Allocasuarina/ Hakea/ Melaleuca shrubland and low shrubland/ tussock grassland or sedges. Located within the western extremity of the survey area only within the proposed mine area.	• Limited exfoliating bark. • Limited leaf litter due to the presence of smaller/ regrowth trees. • Limited vegetation strata due to the presence of smaller/ regrowth trees. • Limited dense shrubs. • Dominated by rocky areas less suitable for burrowing.	Peregrine Falcon *Falco peregrinus* Western Brush Wallaby *Notamacropus irma*	Traverses within habitat- opportunisitc observations/ secondary evidence Level 2 fauna study within this habitat previously conducted within the western extremity of the current survey area (as part of the mine study)- included target searches/ trapping sites, motion cameras and accoustic bat recorders	
SLP - Sand Loam Plain- Eucalypt Woodland or shrubland Total Area = ~3,058 ha (~17.5%)	Sand-loam plains comprising a mosaic of *Eucalyptus salicola* woodland over low open shrubland of Acacia / Grevillea/ and open tussock grassland/ sedges.	• Substrate very well suited to a variety of burrowing small mammals and reptiles. • Less diverse vegetation strata supporting a less diverse avifauna assemblage.	Peregrine Falcon *Falco peregrinus*	Traverses within habitat- opportunisitc observations/ secondary evidence One camera trap site along proposed haul road alignment	

5.1.2 Fauna Observations

Vertebrate fauna observations (including bats identified from recordings and camera trap results) are listed in Appendix B. A total of 51 native fauna species were observed (or positively identified from foraging evidence, scats, tracks, skeletons, calls or photographs) within the survey area during the field reconnaissance survey (or on camera traps between April and September 2017). Four introduced species were also recorded.

One listed threatened and one priority vertebrate fauna species were recorded, these being the malleefowl (*Leipoa ocellata*) (listed as Vulnerable under the *BC Act* and *EPBC Act)* and the central long-eared bat (*Nyctophilus major tor*) (listed as Priority 3 by DBCA).

Apart from one individual malleefowl being observed, malleefowl tracks and an old extinct, malleefowl nest mound were also located during the 2017 survey. An additional two old (>10 years since last used) malleefowl mounds were located during the supplementary 2021 nest mound survey (Botanica 2021). No evidence of recent/ current breeding activity was identified during either survey. The results suggest that the survey area is unlikely to be supporting a resident breeding population of malleefowl though individuals may at times frequent the location while in transit. The locations of the various records are shown in Figure 3.

No evidence of any migratory fauna species utilising the survey area was found.

It should be noted that the western rosella (inland ssp.) (*Platycercus icterotis xanthogenys*) (listed as Priority 4 by DBCA) while not recorded during the 2017 survey reported on here, was observed during the 2013/14 surveys in or near the main project area in the west and therefore are also likely to occur in some sections of the haul road survey area.

5.2 POTENTIAL VERTEBRATE FAUNA INVENTORY

A list of expected vertebrate fauna species likely to occur in the survey area was compiled from information obtained during the literature review and is presented in Appendix B. The results of some previous fauna surveys carried out in the general area are also summarised in this species listing as are the DBCA NatureMap database search results. The raw database search results from NatureMap (DBCA 2020) and the Protected Matters Search Tool (DotEE 2020) are contained within Appendix C.

Table 2 summarises the numbers of potential vertebrate fauna species considered likely to be present in the general vicinity of the survey area based on the detailed list held Appendix B.

Table 2: Summary of Potential Vertebrate Fauna Species (as listed in Appendix B)

Group	Total number of potential species	Potential number of specially protected species	Potential number of migratory species	Potential number of priority species	Number of species observed L1 Field Survey 2017	Number of species observed L2 Field Survey 2013/14
Amphibians	12	0	0	0	0	1
Reptiles	65	0	0	1	1	32
Birds	119	2	0	1	40	68
Non-Volant Mammals	24[6]	0	0	1	6[4]	15[5]
Volant Mammals (Bats)	9	0	0	1	8	8
Total	**229[6]**	**2**	**0**	**4**	**55[4]**	**124[5]**

Superscript = number of introduced species included in total.

Not all species listed in existing databases and publications as potentially occurring within the region (i.e. *EPBC Act's* Threatened Fauna and Migratory species lists, DBCA's NatureMap Fauna Database and various publications) are likely to be present within the survey area. The list of potential fauna takes into consideration that firstly the species in question is not known to be locally extinct and secondly that suitable habitat for each species, as identified during the habitat assessment, is present within the survey area, though compiling an accurate list has limitations (see Section 4 above).

It should be noted that even if some additional species are omitted from the listing for the specific survey area the resulting list would still very likely represent an over estimation of the fauna species utilising the site (either on a regular of infrequent basis) as a result of the precautionary approach adopted for the assessment.

5.2.1 Vertebrate Fauna of Conservation Significance

A review of the *EPBC Act* threatened fauna list, DBCA's threatened fauna database and priority lists, unpublished reports and scientific publications identified a number of specially protected, migratory or priority fauna species as having been previously recorded or as being potentially present in the general vicinity of the survey area.

The current status of some of these species within the survey area is difficult to determine, however, based on the habitats present and, in some cases, direct observations or recent

nearby records, a total of seven species of conservation significance can be regarded as likely to be utilising the survey area for some purpose at times.

Two of the potential vertebrate fauna species of conservation significance were positively identified as utilising the survey area during the survey period, these being:

- Malleefowl *Leipoa ocellata* – Vulnerable (*BC Act*), Vulnerable (*EPBC Act*)
  A malleefowl individual was recorded during the field survey along with some recent tracks (outside the survey area) and three extinct, old/very old nest mounds.

- Central Long-eared Bat *Nyctophilus major tor* – P3 (DBCA Priority Species)
  Recorded during the bat survey undertaken in April 2017 and during the Level 2 Survey within the main project area in 2013/2014 (Harewood 2020).

The current status on site and/or in the general area of some species is difficult to determine, however, based on the habitats present and, in some cases, recent nearby records, several species of conservation significance can be regarded as possibly utilising the survey area for some purpose at times, these being:

- Lake Cronin Snake *Paroplocephalus atriceps* – P4 (DBCA Priority Species)
  Status in the survey area is unknown but possibly occurs given presence of suitable habitat.

- Peregrine Falcon *Falco peregrinus* – OS (*BC Act*)
  The species potentially utilises some sections of the survey area as part of a much larger home range, though records in this area are rare. No potential nest sites in trees observed.

- Western Rosella (Inland ssp) *Platycercus icterotis xanthogenys* – P4 (DBCA Priority Species)
  Recorded during the Level 2 Survey in 2013/2104 within the main project area (Harewood 2020). Less likely further east.

- Western Brush Wallaby *Notamacropus irma* – P4 (DBCA Priority Species)
  The survey area is at the extreme edge of this species documented range. It has not been recorded to date during surveys but may occur, if only occasionally.

Habitat onsite for some of the species listed above, while considered possibly suitable, may be marginal in extent/quality and species listed above may only visit the area for short periods or as rare/uncommon vagrants.

A number of other species of conservation significance, while possibly present in the general area and/or the southern Goldfields region are not listed as potential species due to the survey area being outside of their currently recognised range, a lack of suitable habitat or known/very likely local or regional extinction (and no subsequent recruitment from adjoining areas). The fact that sections of the survey area had been burnt prior to the survey has not been used in this determination (i.e. likely pre-fire habitat extent and quality has been used).

Additional details on these species and others, along with reasons for the omission of some from the potential listing are provided in Table 3 below and in Appendix D.

6. POTENTIAL IMPACTS AND MANAGEMENT

6.1 POTENTIAL IMPACTS

In general, the most significant potential impacts to fauna of any development include:

- Loss of vegetation/fauna habitat that is used for foraging, breeding, roosting, or dispersal (includes loss of hollow bearing trees),
- Fragmentation of vegetation/fauna habitat which may restrict the movement of some fauna species,
- Modifications to surface hydrology, siltation of creek lines,
- Changes to fire regimes,
- Pollution (e.g. oil spills),
- Noise/Light/Dust,
- Spread of plant pathogens (e.g. dieback) and weeds,
- Potential increase in animal strikes by higher frequency of vehicle movements,
- Potential increase in the number of predatory feral species (e.g. foxes, cats), and
- Death or injury of fauna during clearing and construction.

A preliminary assessment of the scale of potential impacts on vertebrate fauna species of conservation significance which may result as a consequence of the proposed construction of the haul road within sections of the survey area is provided in the table below. The assessment is based on the requirement to clear fauna habitat along the haul road route (including borrow pits) thought the exact extent and location of works is yet to be finalised.

The impact on the conservation significant species listed as potentially being present will vary depending on their current degree of utilisation/population densities and preferred habitat requirements (e.g. quantity and quality of potential foraging and breeding habitat that is affected).

Table 3: Vertebrate Fauna Species of Conservation Significance - Likelihood of Occurrence and Possible Impacts

Species	Conservation Status (see Appendix A for codes)			Habitat Present	Likelihood of Occurrence	Maximum Possible Impact
	EPBC Act	*BC Act*	DBCA Priority			
Lake Cronin Snake *Paroplocephalus atriceps*	-	-	P3	Yes/Marginal?	Possibly Occurs	Loss/modification of small areas of potential habitat. No significant impact likely.
Malleefowl *Leipoa ocellata*	VU	VU	-	Yes	Known to Occur	Loss/modification of small areas of potential habitat. No significant impact likely.
Peregrine Falcon *Falco peregrinus*	-	OS	-	Yes	Possibly Occurs	Loss/modification of an area of potential habitat. No significant impact likely.
Migratory Shorebirds and Seabirds	MI	MI	Various	No/Marginal	Unlikely to Occur.	No impact anticipated.
Hooded Plover *Charadrius rubricollis*	-	-	P4	No/Marginal	Would not Occur	No impact anticipated.
Western Rosella (Inland ssp) *Platycercus icterotis xanthogenys*	-	-	P4	Yes	Possibly Occurs	Loss/modification of a small area of potential habitat. No significant impact likely.
Night Parrot *Pezoporus occidentalis*	EN	CR		No/Marginal	Unlikely to Occur	No impact anticipated.
Grey Wagtail *Motacilla cinerea*	MI	MI	-	No	Would not Occur	No impact anticipated.
Fork-tailed Swift *Apus pacificus*	MI	MI	-	Yes	Flyover only.	No impact anticipated.
Chuditch *Dasyurus geoffroii*	VU	VU	-	Yes	Unlikely to Occur	No impact anticipated.
Western Brush Wallaby *Notamacropus irma*	-	-	P4	Yes	Possibly Occurs	Loss/modification of small areas of potential habitat. No significant impact likely.
Central Long-eared Bat *Nyctophilus major tor*	-	-	P3	Yes	Known to Occur.	Loss/modification of a small area of potential habitat. No significant impact likely.

Based on the information available it would appear that impacts would be unlikely to alter the status of any one species in the general area despite the potential localised loss of some habitat. This conclusion will however need to be reviewed once planning has progressed to a point more definitive information on the location, extent and degree of clearing is available.

6.2 MINIMISING IMPACTS

The following proposed generalised management recommendations are provided for guidance during future development planning and if considered reasonable and practical should be made a priority for implementation during site development and operation. This listing is not exhaustive and management plans will need to be finalised after liaison with relevant regulatory authorities if required. It is recommended that:

- Planning for development should aim to minimise as much as reasonable and practical the area of remnant vegetation requiring removal. Existing cleared areas/tracks should be used in preference to clearing additional areas.

- Areas subject to clearing should be examined in detail prior to works commencing for the presence of active malleefowl nest mounds. Active mounds will need to be avoided (~50m buffer) at least until after incubation is completed. The final course of action required for active mounds will need to be discussed with DBCA.

- A malleefowl management plan should be formulated and implemented as part of future operation of the haul road with the main aim of minimising the likelihood of road kills, unnecessary clearing of suitable habitat and the risk of unplanned fires. This should include a register of all opportunistic observations of the species.

- During site works, areas requiring clearing should be clearly marked and access to other areas restricted to prevent accidental clearing of areas to be retained. Unauthorised off-track driving and parking should be prohibited.

- Infrastructure should be positioned to avoid or minimise the disruption to surface and sub-surface hydrology where possible. Levees and drains designed to mimic natural drainage flows should be incorporated in plans where disruptions may occur.

- No dead, standing or fallen timber should be removed unnecessarily. Logs (hollow or not) and other debris resulting from land clearing should be used to enhance fauna habitat in untouched and rehabilitated areas if possible.

- Cleared areas should be rehabilitated as soon as is practicable. Monitoring of rehabilitated areas should be carried out and included weed management.

- A Construction and Operations Fire Management Plan should be prepared to reduce the risk of unplanned fires and provide contingency measures to minimise any associated impacts. The plan will include a contingency and response plan in the event of any bushfires that commence as a result of the works on site.

- All staff working on site should be made aware that native fauna is protected. Personnel working on the project should not be allowed to bring firearms, other weapons or pets onsite. Personnel should be discouraged from feeding native and introduced fauna including appropriate refuse management.

- Native fauna injured during clearing or normal site operations should be taken to a designated veterinary clinic or a DBCA nominated wildlife carer.
- Fuel storage facilities should be bunded.
- Any holes, pits or trenches required for services should be kept open for only as long as necessary and suitable escape ramps (45° batter) and bridging provided if the site is to be left unattended for extended periods. Significant sized holes, pits or trenches should be inspected for fauna immediately prior to filling.
- Site personnel should be provided with information detailing the identification of potential species of conservation significance and required to report all sightings to the project manager or delegated environmental officer.

7. CONCLUSION

The fauna assessment reported on here was undertaken for the purposes of delineating and characterising the fauna habitats and faunal assemblages present in the survey area.

With respect to native vertebrate fauna, 27 mammals (including nine bat species), 119 bird, 65 reptile and twelve frog species have previously been recorded in the general area, some of which have the potential to occur in or utilise at times, the survey area.

One listed threatened and one priority vertebrate fauna species were recorded during the field reconnaissance survey carried out in April 2017, these being the malleefowl (*Leipoa ocellata*) (listed as Vulnerable under the *BC Act* and *EPBC Act*) and the central long-eared bat (*Nyctophilus major tor*) (listed as Priority 3 by DBCA).

Based on habitat preferences, previous survey results from nearby areas and currently documented distributions it has been concluded that one additional specially protected vertebrate fauna species (the peregrine falcon) may at times be present. Three DBCA priority species may also occur or utilise sections of the survey area at times (i.e. Lake Cronin snake, western rosella (inland ssp) and the western brush wallaby) given the existence of some areas of apparently suitable habitat.

Using information currently available it would appear that impacts would be unlikely to alter the status of any one species in the general area despite the potential localised loss of some habitat. A review of the possible impacts on fauna, in particular those of conservation significance in addition to the possible need for further, more detailed survey work to determine the actual status of some species (e.g. malleefowl) in actual impact areas (i.e. clearing footprint) should be undertaken when planning has progressed to a point where more informed decisions and comments can be made.

A series of generalised fauna management recommendations aimed at minimising potential impacts are provided for guidance during future development planning and if considered reasonable and practical should be made a priority for implementation during site development and operation.

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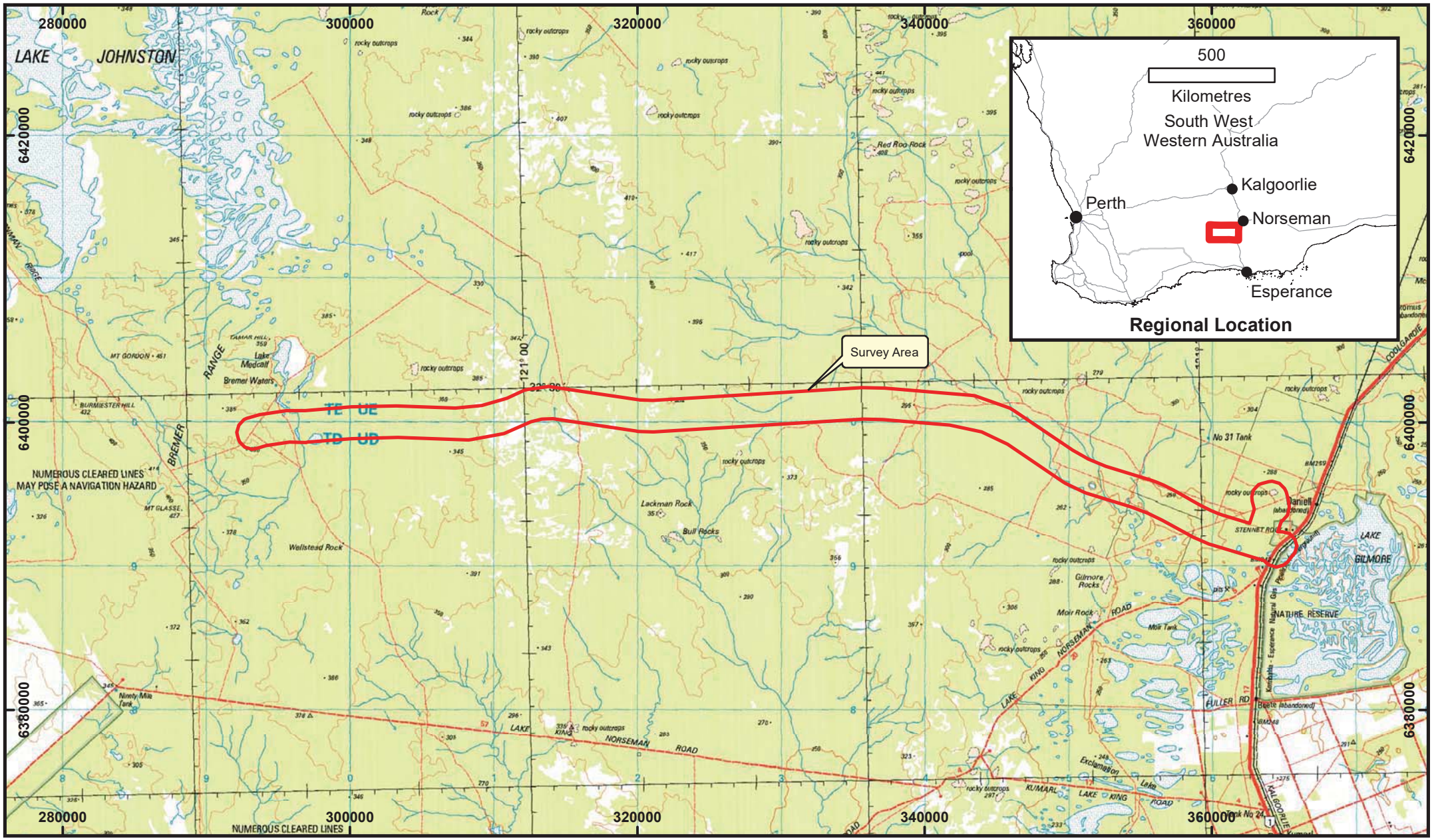
FIGURES



Legend

Survey Area

0 10 20
Kilometres

Fauna Survey

Audalia Resources Ltd
Medcalf Project - Haul Road

Survey Area and Surrounds

Drawn: G Harewood
Date: Sept 2017
Scale: 1:350,000
Projection/Coordinate System: UTM/MGA Zone 51
Figure: 1

Legend

Survey Area

0 5 10 15 20

Kilometres

Fauna Survey

Audalia Resources Ltd

Medcalf Project - Haul Road

Survey Area Air Photo

Drawn: G Harewood

Date: Sept 2017

Scale: 1:275,000

Projection/Coordinate System: UTM/MGA Zone 51

Figure: 2

Legend

- Survey Area
- Bat Recording Site
- Camera Trap Sites

Malleefowl Observations

- Malleefowl
- Malleefowl Tracks
- Old (extinct) Malleefowl Mound

0 4.5 9 13.5 18
Kilometres

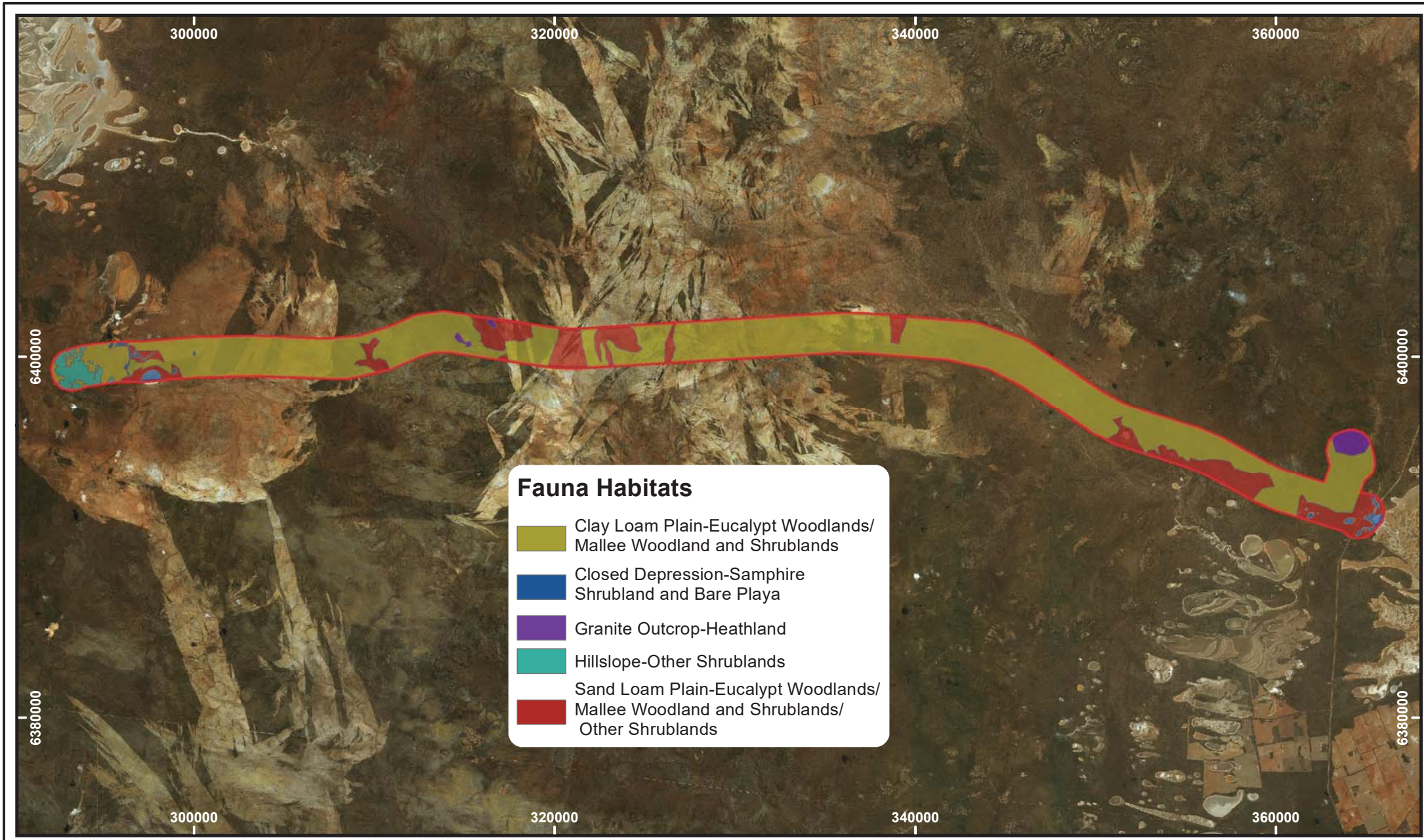
Fauna Survey

Audalia Resources Ltd
Medcalf Project - Haul Road

Recording Sites and Observations

Drawn: G Harewood
Date: Sept 2017
Scale: 1:275,000
Projection/Coordinate System: UTM/MGA Zone 51

Figure: 3



Legend

Survey Area

N

0 5 10 15 20

Kilometres

Fauna Survey

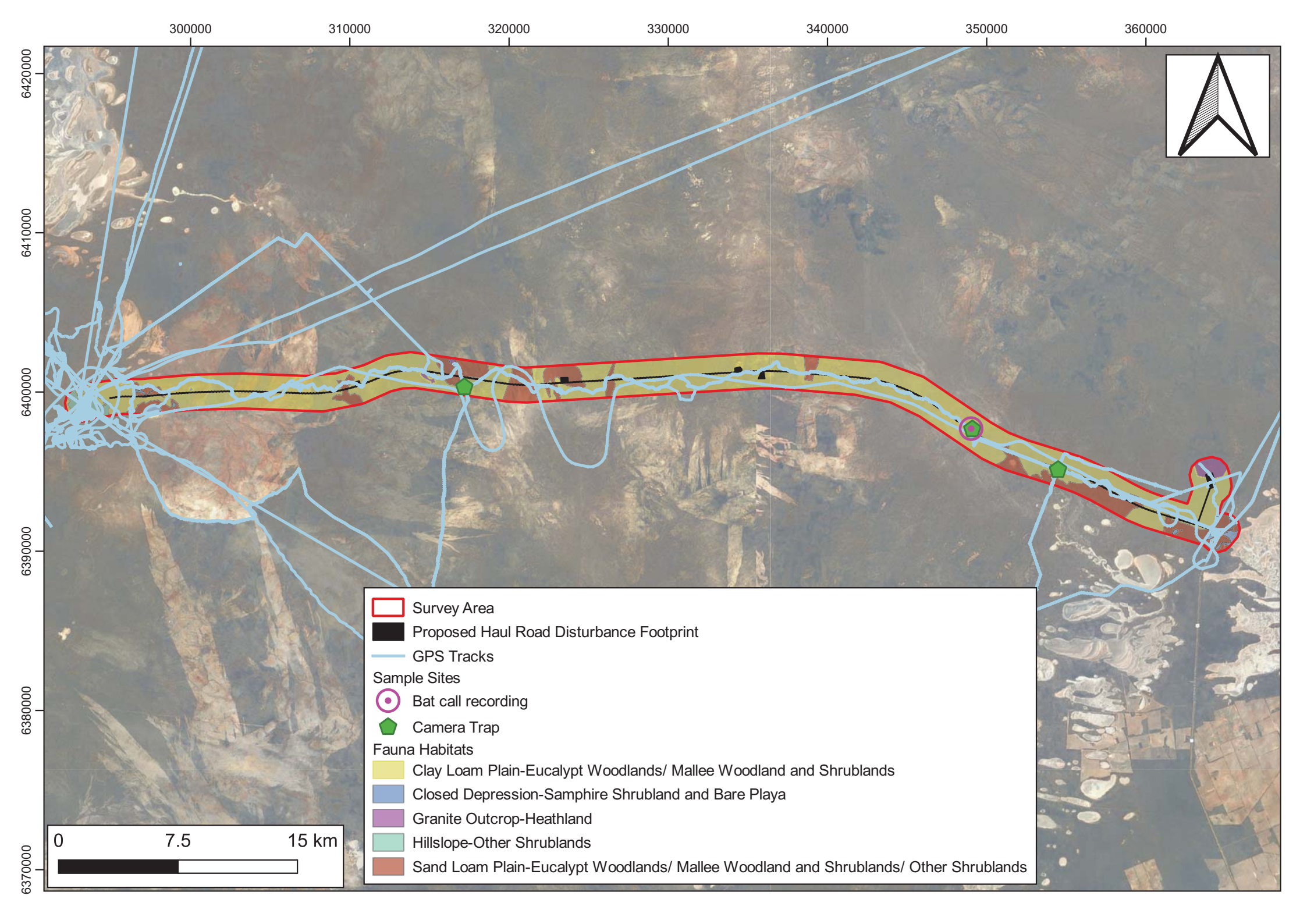
Audalia Resources Ltd
Medcalf Project - Haul Road

Fauna Habitats

(data courtesy Botanica Consulting)

Drawn: G Harewood
Date: Feb 2020
Scale: 1:275,000
Projection/Coordinate System: UTM/MGA Zone 51

Figure: 4


300000
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350000
360000
6420000
6410000
6400000
6390000
6380000
6370000
Survey Area
Proposed Haul Road Disturbance Footprint
GPS Tracks
Sample Sites
Bat call recording
Camera Trap
Fauna Habitats
Clay Loam Plain-Eucalypt Woodlands/ Mallee Woodland and Shrublands
Closed Depression-Samphire Shrubland and Bare Playa
Granite Outcrop-Heathland
Hillslope-Other Shrublands
Sand Loam Plain-Eucalypt Woodlands/ Mallee Woodland and Shrublands/ Other Shrublands
0
7.5
15 km

APPENDIX A

CONSERVATION CATEGORIES

***EPBC Act (1999)* Threatened Fauna Categories**

Threatened fauna may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) in any one of the following categories:

Category	Code	Description
Extinct	E	There is no reasonable doubt that the last member of the species has died.
*Extinct in the wild	EW	A species (a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
*Critically Endangered	CE	A species is facing an extremely high risk of extinction in the wild in the immediate future.
*Endangered	EN	A species: (a) is not critically endangered; and (b) is facing a very high risk of extinction in the wild in the near future.
*Vulnerable	VU	A species (a) is not critically endangered or endangered; and (b) is facing a high risk of extinction in the wild in the medium-term future.
Conservation Dependent	CD	A species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered
*Migratory	Migratory	(a) all migratory species that are: (i) native species; and (ii) from time to time included in the appendices to the Bonn Convention; and (b) all migratory species from time to time included in annexes established under JAMBA, CAMBA and ROKAMBA; and (c) all native species from time to time identified in a list established under, or an instrument made under, an international agreement approved by the Minister.
Marine	Ma	Species in the list established under s248 of the *EPBC Act*

Note: Only species in those categories marked with an asterix are matters of national environmental significance (NES) under the *EPBC Act*.

Wildlife Conservation (Specially Protected Fauna) Notice 2015 Categories

Published as Specially Protected under the *Wildlife Conservation Act 1950*, and listed under Schedules 1 to 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

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.

Category	Code	Description
Schedule 1 Critically Endangered species	CR	Threatened species considered to be facing an extremely high risk of extinction in the wild.
Schedule 2 Endangered species	EN	Threatened species considered to be facing a very high risk of extinction in the wild.
Schedule 3 Vulnerable species	VU	Threatened species considered to be facing a high risk of extinction in the wild.
Schedule 4 Presumed extinct species	EX	Species which have been adequately searched for and there is no reasonable doubt that the last individual has died.
Schedule 5 Migratory birds protected under an international agreement	IA	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 the Bonn Convention, relating to the protection of migratory birds.
Schedule 6 Fauna that is of special conservation need as conservation dependent fauna	CD	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Schedule 7 Other specially protected fauna.	OS	Fauna otherwise in need of special protection to ensure their conservation.

Western Australian DPaW Priority Fauna Categories

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna 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 flora or fauna.

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.

Category	Code	Description
Priority 1 Poorly Known Species.	P1	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.
Priority 2 Poorly Known Species.	P2	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.
Priority 3 Poorly Known Species.	P3	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.
Priority 4 Rare, Near Threatened and other species in need of monitoring.	P4	(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 do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

*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).

***IUCN Red List* Threatened Species Categories**

The *IUCN Red List of Threatened Species*™ is a checklist of taxa that have undergone an extinction risk assessment using the *IUCN Red List Categories and Criteria*.

Categories are summarized below.

Category	Code	Description
Extinct	EX	Taxa for which there is no reasonable doubt that the last individual has died.
Extinct in the Wild	EW	Taxa which is known only to survive in cultivation, in captivity or and as a naturalised population well outside its past range and it has not been recorded in known or expected habitat despite exhaustive survey over a time frame appropriate to its life cycle and form.
Critically Endangered	CR	Taxa facing an extremely high risk of extinction in the wild.
Endangered	EN	Taxa facing a very high risk of extinction in the wild.
Vulnerable	VU	Taxa facing a high risk of extinction in the wild.
Near Threatened	NT	Taxa which has been evaluated but does not qualify for CR, EN or VU now but is close to qualifying or likely to qualify in the near future.
Least Concern	LC	Taxa which has been evaluated but does not qualify for CR, EN, VU, or NT but is likely to qualify for NT in the near future.
Data Deficient	DD	Taxa for which there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.
Not Evaluated	NE	Taxa which has not been evaluated.

A full list of categories and their meanings are available at:

http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria

APPENDIX B

VERTEBRATE FAUNA RECORDED OR POTENTIALLY IN SURVEY AREA

Fauna Observed or Potentially in Survey Area

Compiled by Greg Harewood - February 2020

Medcalf Project Haul Road - Audalia Resources Ltd

Approximate centroid 32.515120°S 120.188320°E

Recorded (Captured/Sighted/Heard/Signs) = X

A = Harewood, G. (2020). Fauna Survey (Level 1), Proposed Haul Road, Medcalf Vanadium Mining Project. Unpubished report for Audalia Resources Ltd. V3

B = Harewood, G. (2020). Fauna Survey (Level 2), Phase 1 and 2, Medcalf Vanadium Mining Project. Unpubished report for Audalia Resources Ltd. V3

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C = Lake Cronin results.

D = McDermid Rock results.

E = Frank Hann National Park results.

F = Peak Charles results.

G = Brearley, D.R., Dunlop, J.N., and Osborne, J.M. (1998) Biological survey and environmental assessment of the Emily-Ann Project area. Unpublished report for Lionore Pty Ltd.

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Amphibia												
Myobatrachidae Ground or Burrowing Frogs												
Crinia pseudinsignifera	Bleating Froglet	LC									X	
Heleioporus albopunctatus	Western Spotted Frog	LC			X		X				X	
Limnodynastes dorsalis	Western Banjo Frog	LC			X		X	X				
Myobatrachus gouldii	Turtle Frog	LC					X	X				

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Neobatrachus albipes	White-footed Trilling Frog	LC										
Neobatrachus centralis	Trilling Frog	LC			X	X						
Neobatrachus kunapalari	Kunapalari Frog	LC										
Neobatrachus pelobatoides	Humming Frog	LC			X	X						
Neobatrachus sp.	Unidentified Burrowing Frog						X	X	X			
Neobatrachus sutor	Shoemaker Frog	LC			X							
Pseudophryne guentheri	Crawling Toadlet	LC					X					
Pseudophryne occidentalis	Western Toadlet	LC		X	X	X		X	X		X	X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Reptilia												
Diplodactylidae Geckoes												
Crenadactylus ocellatus	Clawless Gecko			X	X	X	X	X	X	X	X	X
Diplodactylus granariensis granariensis	Wheatbelt Stone Gecko			X	X	X	X	X	X	X	X	
Diplodactylus pulcher	Western Saddled Ground Gecko					X					X	
Lucasium maini	Main's Ground Gecko			X	X	X	X	X	X	X	X	X
Oedura reticulata	Reticulated Velvet Gecko			X	X	X	X	X	X	X	X	
Strophurus intermedius	Southern Spiny-tailed Gecko					X						
Strophurus spinigerus inornatus	Orange-eyed Southwestern Spiny-tailed Gecko			X	X		X				X	
Gekkonidae Geckoes												
Christinus marmoratus	Marbled Gecko			X		X	X		X	X		X
Gehyra variegata	Variegated Dtella			X	X	X	X	X	X	X	X	X
Heteronotia binoei	Bynoe's Gecko			X	X				X	X		X
Underwoodisaurus milii	Barking Gecko			X	X	X			X		X	X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Pygopodidae Legless Lizards												
Delma australis	Marble-faced Delma			X							X	X
Delma butleri	Unbanded Delma								X			
Delma fraseri	Fraser's Legless Lizard			X	X	X			X		X	X
Lialis burtonis	Burton's Legless Lizard			X	X			X	X		X	X
Pygopus lepidopodus	Common Scaly Foot					X		X	X		X	

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Agamidae Dragon Lizards												
Ctenophorus cristatus	Crested Bicycle Dragon			X	X	X	X	X	X	X	X	X
Ctenophorus isolepis	Goldfields Military Sand Dragon					X						
Ctenophorus maculatus	Spotted Military Dragon				X	X	X	X			X	
Ctenophorus ornatus	Ornate Crevice Dragon					X	X	X				
Ctenophorus salinarum	Salt Pan Dragon			X	X	X	X	X	X			X
Moloch horridus	Thorny Devil			X	X	X		X	X	X	X	X
Pogona minor minor	Western Bearded Dragon			X	X	X	X	X	X	X	X	
Rankinia adelaidensis chapmani	Eastern Heath Dragon			X	X		X			X	X	
Varanidae Monitor's or Goanna's												
Varanus gouldii	Gould's Sand Monitor			X	X	X		X	X	X	X	X
Varanus rosenbergi	Heath Monitor						X	X	X		X	
Varanus tristis	Black-headed Monitor											

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Scincidae Skinks												
Cryptoblepharus buchananii	Buchanan's Snake-eyed Skink			X	X	X	X	X	X	X	X	X
Ctenotus atlas	Southern Malle Ctenotus				X	X			X	X		
Ctenotus impar	Odd-striped Ctenotus				X		X	X			X	
Ctenotus schomburgkii	Barred Wedge-snout Ctenotus			X	X	X	X	X	X	X	X	X
Ctenotus xenopleura	Wide-striped Sandplain Ctenotus					X						
Cyclodomorphus melanops elongatus	Eastern Slender Blue-tongue				X	X			X			
Egernia formosa	Goldfields Crevise Skink								X			
Egernia inornata	Desert Skink					X			X			
Egernia richardi	Woodland Crevice Skink			X	X	X	X			X	X	X
Eremiascincus richardsonii	Broad-banded Sand Swimmer											
Hemiergis initialis initialis	Sth Five-toed Mulch Skink			X		X		X	X	X	X	
Hemiergis peronii peronii	Four-toed Earless Skink						X	X		X		

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Lerista distinguenda	SW Four-toed Lerista			X	X		X	X	X		X	X
Lerista dorsalis	Southern Four-toed Lerista										X	
Lerista kingi	King's Three-toed Slider											
Lerista picturata	Goldfields Robust Lerista					X			X	X	X	
Lerista timida	Dwarf Three-toed Slider			X		X			X			X
Liopholis multiscutata	Bull Skink				X	X					X	
Menetia greyii	Dwarf Skink		X	X	X	X	X	X	X		X	X
Morethia butleri	Woodland Dark-flecked Morethia			X	X	X	X		X	X		X
Morethia obscura	Shrubland Pale-flecked Morethia			X	X	X	X	X	X	X	X	X
Tiliqua occipitalis	Western Bluetongue				X		X		X	X	X	
Tiliqua rugosa	Bobtail					X	X		X		X	

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Typhlopidae Blind Snakes												
Ramphotyphlops australis	Southern Blind Snake			X	X			X	X	X	X	
Ramphotyphlops bicolor	Dark-spined Blind Snake			X								
Ramphotyphlops bituberculatus	Prong-snouted Blind Snake											
Ramphotyphlops hamatus	Northern Hook-snouted Blind Snake								X			
Boidae Pythons, Boas												
Morelia spilota imbricata	Southern Carpet Python							X	X	X		

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Elapidae Elapid Snakes												
Brachyurophis semifasciata	Southern Shovel-nosed Snake					X			X			
Echiopsis curta	Bardick			X			X	X			X	X
Neelaps bimaculatus	Black-naped Snake				X					X		
Parasuta gouldii	Gould's Hooded Snake				X				X	X	X	
Parasuta nigriceps	Black-backed Snake			X					X		X	X
Paroplocephalus atriceps	Lake Cronin Snake	P3			X				X		X	
Pseudechis australis	Mulga Snake				X				X			
Pseudonaja affinis	Dugite			X	X	X	X	X	X		X	X
Pseudonaja modesta	Ringed Brown Snake					X						
Simoselaps bertholdi	Jan's Banded Snake					X	X				X	

Aves

Casuariidae Emus, Cassowarries												
Dromaius novaehollandiae	Emu	LC	X	X	X	X	X	X	X	X	X	X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Megapodiidae Moundbuilders												
Leipoa ocellata	Malleefowl	S3 VU VU	X		X	X		X		X	X	X
Phasianidae Quails, Pheasants												
Coturnix pectoralis	Stubble Quail	LC		X								X
Accipitridae Kites, Goshawks, Eagles, Harriers												
Accipiter cirrocephalus	Collared Sparrowhawk	LC			X	X		X	X	X	X	
Accipiter fasciatus	Brown Goshawk	LC				X						
Aquila audax	Wedge-tailed Eagle	LC	X	X				X	X	X	X	X
Aquila morphnoides	Little Eagle	LC			X	X	X	X		X	X	
Circus assimilis	Spotted Harrier	LC										
Elanus caeruleus	Black-shouldered Kite	LC										
Haliastur sphenurus	Whistling Kite	LC										
Hamirostra isura	Square-tailed Kite	LC		X	X	X	X	X		X	X	X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Falconidae Falcons												
Falco berigora	Brown Falcon	LC	X	X	X	X	X	X	X	X	X	X
Falco cenchroides	Australian Kestrel	LC		X	X		X	X	X		X	X
Falco longipennis	Australian Hobby	LC			X			X	X	X		
Falco peregrinus	Peregrine Falcon	S7 LC						X		X	X	
Otididae Bustards												
Ardeotis australis	Australian Bustard		X	X	X		X					X
Turnicidae Button-quails												
Turnix velox	Little Button-quail	LC		X							X	X
Charadriidae Lapwings, Plovers, Dotterels												
Vanellus tricolor	Banded Lapwing	LC										

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Columbidae Pigeons, Doves												
Ocyphaps lophotes	Crested Pigeon	LC					X		X			
Phaps chalcoptera	Common Bronzewing	LC	X	X	X	X	X	X	X	X	X	X
Phaps elegans	Brush Bronzewing	LC		X			X	X			X	X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Psittacidae Parrots												
Cacatua roseicapilla	Galah	LC			X						X	
Glossopsitta porphyrocephala	Purple-crowned Lorikeet	LC	X	X	X	X	X		X	X	X	
Melopsittacus undulatus	Budgerigar	LC		X								X
Neophema elegans	Elegant Parrot	LC	X		X		X				X	
Nymphicus hollandicus	Cockatiel	LC		X								X
Platycercus icterotis xanthogenys	Western Rosella (inland ssp)	P4		X	X		X	X	X		X	
Platycercus varius	Mulga Parrot	LC				X	X				X	
Platycercus zonarius	Australian Ringneck	LC	X	X	X	X	X	X	X	X	X	X
Polytelis anthopeplus	Regent Parrot	LC			X		X	X	X	X	X	

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Cuculidae Parasitic Cuckoos												
Cacomantis flabelliformis	Fan-tailed Cuckoo	LC	X	X	X	X	X	X			X	X
Chrysococcyx basalis	Horsfield's Bronze Cuckoo	LC		X	X		X	X		X		X
Chrysococcyx lucidus	Shining Bronze Cuckoo	LC									X	
Chrysococcyx osculans	Black-eared Cuckoo	LC					X	X				
Cuculus pallidus	Pallid Cuckoo	LC		X	X		X	X	X		X	
Strigidae Hawk Owls												
Ninox novaeseelandiae	Boobook Owl	LC	X		X	X	X	X	X	X		
Tytonidae Barn Owls												
Tyto alba	Barn Owl	LC										
Podargidae Frogmouths												
Podargus strigoides	Tawny Frogmouth	LC	X	X	X	X	X	X	X	X	X	X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Caprimulgidae Nightjars												
Eurostopodus argus	Spotted Nightjar	LC			X		X		X		X	
Aegothelidae Owlet-nightjars												
Aegotheles cristatus	Australian Owlet-nightjar	LC	X	X	X	X		X	X	X	X	X
Halcyonidae Tree Kingfishers												
Todiramphus pyrrhopygia	Red-backed Kingfisher	LC							X			
Todiramphus sanctus	Sacred Kingfisher	LC							X	X		
Meropidae Bee-eaters												
Merops ornatus	Rainbow Bee-eater	JA LC		X	X	X		X	X	X	X	X
Climacteridae Treecreepers												
Climacteris rufa	Rufous Treecreeper	LC	X	X	X	X	X		X	X	X	

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Maluridae Fairy Wrens, GrassWrens												
Malurus leucopterus	White-winged Fairy-wren	LC								X		
Malurus pulcherrimus	Blue-breasted Fairy-wren	LC		X	X	X		X			X	X
Malurus splendens	Splendid Fairy-wren	LC	X									
Stipiturus malachurus	Southern Emu-wren	LC									X	

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Acanthizidae Thornbills, Geryones, Fieldwrens & Whitefaces												
Acanthiza apicalis	Broad-tailed Thornbill	LC	X	X	X	X	X	X	X	X	X	X
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	LC		X	X	X	X	X		X	X	X
Acanthiza uropygialis	Chestnut-rumped Thornbill	LC			X	X	X			X	X	
Aphelocephala leucopsis	Southern Whiteface	LC						X				
Calamanthus campestris	Rufous Fieldwren	LC			X	X	X				X	
Gerygone fusca	Western Gerygone	LC		X	X				X		X	X
Hylacola cauta whitlocki	Shy Heath-wren (western)		X	X	X		X	X		X	X	
Pyrrholaemus brunneus	Redthroat	LC	X	X	X	X	X		X	X	X	X
Sericornis frontalis	White-browed Scrubwren	LC			X			X				
Smicrornis brevirostris	Weebill	LC	X	X	X	X	X	X	X	X	X	X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Pardalotidae Pardalotes												
Pardalotus punctatus	Spotted Pardalote	LC	X	X	X	X	X				X	X
Pardalotus striatus	Striated Pardalote	LC	X	X	X	X	X	X	X	X	X	X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Meliphagidae Honeyeaters, Chats												
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	LC	X	X		X		X	X	X	X	X
Anthochaera carunculata	Red Wattlebird	LC	X	X	X	X	X	X	X	X	X	X
Certhionyx niger	Black Honeyeater	LC										
Certhionyx variegatus	Pied Honeyeater	LC		X								X
Epthianura albifrons	White-fronted Chat	LC		X	X	X						X
Epthianura tricolor	Crimson Chat	LC							X			
Lichenostomus cratitius	Purple-gaped Honeyeater	LC		X	X	X	X	X	X	X	X	X
Lichenostomus leucotis	White-eared Honeyeater	LC	X	X	X	X	X	X	X	X	X	X
Lichenostomus ornatus	Yellow-plumed Honeyeater	LC	X	X	X	X	X	X	X	X	X	
Lichenostomus plumulus	Grey-fronted Honeyeater	LC									X	
Lichenostomus virescens	Singing Honeyeater	LC	X	X		X	X	X		X	X	
Lichmera indistincta	Brown Honeyeater	LC		X	X	X	X	X	X	X	X	X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Manorina flavigula	Yellow-throated Miner	LC		X	X	X	X	X		X	X	X
Melithreptus brevirostris	Brown-headed Honeyeater	LC		X	X	X	X	X	X	X	X	X
Phylidonyris albifrons	White-fronted Honeyeater	LC	X	X	X	X		X	X	X	X	
Phylidonyris melanops	Tawny-crowned Honeyeater	LC		X	X	X	X	X		X	X	
Phylidonyris nigra	White-cheeked Honeyeater	LC						X	X		X	
Phylidonyris novaehollandiae	New Holland Honeyeater	LC						X			X	
Petroicidae Australian Robins												
Drymodes brunneopygia	Southern Scrub-robin	LC	X		X	X	X	X		X	X	
Eopsaltria griseogularis	Western Yellow Robin	LC		X	X	X	X			X	X	
Microeca fascinans	Jacky Winter	LC	X		X	X	X			X	X	
Petroica cucullata	Hooded Robin	LC	X		X	X	X				X	
Petroica goodenovii	Red-capped Robin	LC		X	X	X	X	X	X	X	X	X

BC Act Status - S1 to S7, EPBC Act Status - CR - Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Pomatostomidae Babblers												
Pomatostomus superciliosus	White-browed Babbler	LC	X		X	X		X		X	X	
Cinclosomatidae Whipbirds, Wedgebills, Quail Thrushes												
Cinclosoma castanotus	Chestnut Quail-thrush	LC		X	X	X		X	X	X	X	
Neosittidae Sitellas												
Daphoenositta chrysoptera	Varied Sittella	LC		X	X	X		X		X	X	X
Pachycephalidae Crested Shrike-tit, Crested Bellbird, Shrike Thrushes, Whistlers												
Colluricincla harmonica	Grey Shrike-thrush	LC	X	X	X	X	X	X	X	X	X	X
Falcunculus frontatus	Crested Shrike-tit											
Oreoica gutturalis	Crested Bellbird	LC	X	X	X	X	X	X		X	X	X
Pachycephala inornata	Gilbert's Whistler	LC								X		
Pachycephala pectoralis	Golden Whistler	LC		X	X	X	X	X		X	X	
Pachycephala rufiventris	Rufous Whistler	LC	X			X	X		X		X	

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Dicruridae Monarchs, Magpie Lark, Flycatchers, Fantails, Drongo												
Grallina cyanoleuca	Magpie-lark	LC								X	X	
Myiagra inquieta	Restless Flycatcher	LC										
Rhipidura fuliginosa	Grey Fantail	LC			X		X				X	
Rhipidura leucophrys	Willie Wagtail	LC		X	X	X	X	X	X	X	X	X
Campephagidae Cuckoo-shrikes, Trillers												
Coracina novaehollandiae	Black-faced Cuckoo-shrike	LC	X	X	X	X	X	X	X	X	X	X
Lalage tricolor	White-winged Triller	LC		X	X						X	X
Artamidae Woodswallows, Butcherbirds, Currawongs												
Artamus cinereus	Black-faced Woodswallow	LC		X	X						X	X
Artamus cyanopterus	Dusky Woodswallow	LC	X	X	X	X	X	X	X	X	X	X
Artamus personatus	Masked Woodswallow	LC		X				X				X
Artamus superciliosus	White-browed Woodswallow	LC		X								X

BC Act Status - S1 to S7, EPBC Act Status - CR - Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Cracticidae Currawongs, Magpies & Butcherbirds												
Cracticus nigrogularis	Pied Butcherbird	LC				X			X	X	X	
Cracticus tibicen	Australian Magpie	LC		X			X	X		X	X	X
Cracticus torquatus	Grey Butcherbird	LC	X	X	X	X	X	X	X	X	X	X
Strepera versicolor	Grey Currawong	LC	X	X		X	X	X	X	X	X	X
Corvidae Ravens, Crows												
Corvus bennetti	Little Crow	LC				X	X					
Corvus coronoides	Australian Raven	LC	X	X		X	X		X	X	X	X
Corvus sp.	Unidentified corvid							X				
Motacillidae Old World Pipits, Wagtails												
Anthus australis	Australian Pipit	LC		X	X	X	X	X	X	X	X	X
Estrilidae Grass Finches & Mannikins												
Taeniopygia guttata	Zebra Finch	LC		X								X

BC Act Status - S1 to S7, EPBC Act Status - CR - Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Dicaeidae Flowerpeckers												
Dicaeum hirundinaceum	Mistletoebird	LC		X	X	X		X				X
Hirundinidae Swallows, Martins												
Cheramoeca leucosternus	White-backed Swallow	LC										
Hirundo ariel	Fairy Martin	LC				X						
Hirundo neoxena	Welcome Swallow	LC										
Hirundo nigricans	Tree Martin	LC	X	X	X	X	X	X	X	X	X	
Sylviidae Old World Warblers												
Cincloramphus cruralis	Brown Songlark	LC					X					
Cincloramphus mathewsi	Rufous Songlark	LC		X								
Zosteropidae White-eyes												
Zosterops lateralis	Silvereye	LC		X	X	X	X	X		X	X	X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Mammalia												
Tachyglossidae Echidnas												
Tachyglossus aculeatus	Echidna	LC			X	X	X		X	X	X	
Dasyuridae Carnivorous Marsupials												
Antechinomys laniger	Kultarr	DD										
Ningaui yvonneae	Southern Ningaui	LC		X	X	X						
Sminthopsis crassicaudata	Fat-tailed Dunnart	LC				X					X	
Sminthopsis dolichura	Little long-tailed Dunnart	LC				X				X		
Sminthopsis gilberti	Gilbert's Dunnart	LC			X		X				X	
Sminthopsis granulipes	White-tailed Dunnart	LC		X	X		X	X			X	X
Sminthopsis griseoventer	Grey-bellied Dunnart	LC		X							X	X
Sminthopsis ooldea	Ooldea Dunnart	LC		X								X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Burramyidae Pygmy Possums												
Cercartetus concinnus	Western Pygmy-possum	LC		X	X	X	X	X	X	X	X	X
Tarsipedidae Honey Possum												
Tarsipes rostratus	Honey Possum	LC					X	X			X	
Macropodidae Kangaroos, Wallabies												
Macropus fuliginosus	Western Grey Kangaroo	LC	X	X	X	X	X	X	X	X	X	X
Macropus robustus	Euro	LC			X				X			
Notamacropus irma	Western Brush Wallaby	P4 LC					X			X	X	
Molossidae Freetail Bats												
Austronomus australis	White-striped Freetail-bat	LC	X	X	X	X	X	X	X	X	X	
Ozimops kitcheneri	South-western Free-tailed Bat	LC	X	X	X	X	X				X	

BC Act Status - S1 to S7, EPBC Act Status - CR - Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Vespertilionidae Ordinary Bats												
Chalinolobus gouldii	Gould's Wattled Bat	LC	X	X	X	X	X		X		X	X
Chalinolobus morio	Chocolate Wattled Bat	LC	X	X			X		X		X	X
Nyctophilus geoffroyi	Lesser Long-eared Bat	LC	X	X	X	X			X		X	X
Nyctophilus major tor	Central Long-eared Bat	P4	X	X		X			X			
Scotorepens balstoni	Inland Broad-nosed Bat	LC	X	X		X						X
Vespadelus baverstocki	Inland Forest Bat	LC										
Vespadelus regulus	Southern Forest Bat	LC	X	X	X	X	X	X	X		X	X
Muridae Rats, Mice												
Mus musculus	House Mouse	Introduced		X	X	X	X	X	X	X	X	X
Notomys mitchellii	Mitchell's Hopping-mouse	LC		X	X	X	X	X			X	X
Pseudomys albocinereus	Ash-grey Mouse	LC		X	X	X	X	X	X		X	X
Pseudomys bolami	Bolam's Mouse	LC		X	X	X			X			X

BC Act Status - S1 to S7, EPBC Act Status - CR - Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Canidae Dogs, Foxes												
Canis lupus	Dingo/Dog	LC/Introduced	X	X	X	X			X	X	X	
Vulpes vulpes	Red Fox	Introduced	X	X	X	X			X	X	X	X
Felidae Cats												
Felis catus	Cat	Introduced	X	X		X		X	X	X	X	X
Equidae Horses												
Equus caballus	Horse	Introduced	X									
Camelidae Camels												
Camelus dromedarius	Camel	Introduced	X	X								X
Leporidae Rabbits, Hares												
Oryctolagus cuniculus	Rabbit	Introduced		X	X	X		X	X	X	X	X

BC Act Status - S1 to S7, EPBC Act Status - CR - Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

APPENDIX C

DBCA NATUREMAP & EPBC ACT DATABASE SEARCH RESULTS

NatureMap
Mapping Western Australia's biodiversity

NatureMap - Haul Road

Created By Greg Harewood on 12/02/2020

Kingdom	Animalia
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Line'
Vertices	32° 30' 40" S,120° 47' 49" E 32° 31' 56" S,121° 28' 50" E 32° 34' 54" S,121° 34' 11" E
Group By	Species Group

Species Group	Species	Records
Amphibian	1	6
Bird	61	690
Mammal	19	168
Reptile	28	589
TOTAL	**109**	**1453**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Amphibian					
1.	25434	*Pseudophryne occidentalis (Western Toadlet)*			
Bird					
2.	24559	*Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*			
3.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
4.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
5.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
6.	24312	*Anas gracilis (Grey Teal)*			
7.	24561	*Anthochaera carunculata (Red Wattlebird)*			
8.	25670	*Anthus australis (Australian Pipit)*			
9.	24285	*Aquila audax (Wedge-tailed Eagle)*			
10.	24610	*Ardeotis australis (Australian Bustard)*			
11.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
12.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
13.	24356	*Artamus personatus (Masked Woodswallow)*			
14.	24357	*Artamus superciliosus (White-browed Woodswallow)*			
15.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
16.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
17.	24564	*Certhionyx variegatus (Pied Honeyeater)*			
18.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
19.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
20.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
21.	25592	*Corvus coronoides (Australian Raven)*			
22.	24671	*Coturnix pectoralis (Stubble Quail)*			
23.	25595	*Cracticus tibicen (Australian Magpie)*			
24.	25596	*Cracticus torquatus (Grey Butcherbird)*			
25.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
26.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
27.	24470	*Dromaius novaehollandiae (Emu)*			
28.	25692	*Eopsaltria australis (Yellow Robin)*			
29.	24567	*Epthianura albifrons (White-fronted Chat)*			
30.	25621	*Falco berigora (Brown Falcon)*			
31.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
32.	25530	*Gerygone fusca (Western Gerygone)*			
33.	24296	*Hamirostra isura (Square-tailed Kite)*			
34.	34001	*Hylacola cauta subsp. whitlocki (Shy Groundwren)*			
35.	24367	*Lalage tricolor (White-winged Triller)*			
36.	24557	*Leipoa ocellata (Malleefowl)*		T	
37.	24573	*Lichenostomus cratitius (Purple-gaped Honeyeater)*			
38.	25659	*Lichenostomus leucotis (White-eared Honeyeater)*			
39.	25661	*Lichmera indistincta (Brown Honeyeater)*			
40.	24551	*Malurus pulcherrimus (Blue-breasted Fairy-wren)*			

	Name	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
41.	24583	*Manorina flavigula (Yellow-throated Miner)*			
42.	47997	*Melanodryas cucullata (Hooded Robin)*			
43.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
44.	24736	*Melopsittacus undulatus (Budgerigar)*			
45.	24598	*Merops ornatus (Rainbow Bee-eater)*			
46.	24742	*Nymphicus hollandicus (Cockatiel)*			
47.	24618	*Oreoica gutturalis (Crested Bellbird)*			
48.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
49.	25682	*Pardalotus striatus (Striated Pardalote)*			
50.	24659	*Petroica goodenovii (Red-capped Robin)*			
51.	24409	*Phaps chalcoptera (Common Bronzewing)*			
52.	25587	*Phaps elegans (Brush Bronzewing)*			
53.	24746	*Platycercus icterotis subsp. xanthogenys (Western Rosella (inland))*		□4	
54.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
55.	25703	*Podargus strigoides (Tawny Frogmouth)*			
56.	24278	*Pyrrholaemus brunneus (Redthroat)*			
57.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
58.	30948	*Smicrornis brevirostris (Weebill)*			
59.	25597	*Strepera versicolor (Grey Currawong)*			
60.	30870	*Taeniopygia guttata (Zebra Finch)*			
61.	24851	*Turnix velox (Little Button-quail)*			
62.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			
□ammal					
63.	24254	*Camelus dromedarius (Dromedary, Camel)*	□		
64.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
65.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
66.	24187	*Chalinolobus morio (Chocolate Wattled Bat)*			
67.	24041	*Felis catus (Cat)*	□		
68.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
69.	24223	*Mus musculus (House Mouse)*	□		
70.	24229	*Notomys mitchellii (Mitchell's Hopping-mouse)*			
71.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
72.	43367	*Nyctophilus major subsp. tor (Central Long-eared Bat)*		□3	
73.	24085	*Oryctolagus cuniculus (Rabbit)*	□		
74.	24230	*Pseudomys albocinereus (Ash-grey Mouse)*			
75.	24232	*Pseudomys bolami (Bolam's Mouse)*			
76.	24199	*Scotorepens balstoni (Inland Broad-nosed Bat)*			
77.	24112	*Sminthopsis granulipes (White-tailed Dunnart)*			
78.	25515	*Sminthopsis griseoventer (Grey-bellied Dunnart)*			
79.	24117	*Sminthopsis ooldea (Ooldea Dunnart)*			
80.	24206	*Vespadelus regulus (Southern Forest Bat)*			
81.	24040	*Vulpes vulpes (Red Fox)*	□		
□eptile					
82.	24980	*Christinus marmoratus (Marbled Gecko)*			
83.	25456	*Crenadactylus ocellatus (Clawless Gecko)*			
84.	30893	*Cryptoblepharus buchananii*			
85.	24871	*Ctenophorus cristatus (Bicycle Dragon)*			
86.	24888	*Ctenophorus salinarum (Salt Pan Dragon)*			
87.	25074	*Ctenotus schomburgkii*			
88.	24995	*Delma australis*			
89.	25766	*Delma fraseri (Fraser's Legless Lizard)*			
90.	25469	*Diplodactylus granariensis*			
91.	25251	*Echiopsis curta (Bardick)*			
92.	25104	*Egernia richardi*			
93.	24959	*Gehyra variegata*			
94.	25474	*Hemiergis initialis*			
95.	24961	*Heteronotia binoei (Bynoe's Gecko)*			
96.	25131	*Lerista distinguenda*			
97.	42411	*Lerista timida*			
98.	25005	*Lialis burtonis*			
99.	30935	*Lucasium maini*			
100.	25184	*Menetia greyii*			
101.	24904	*Moloch horridus (Thorny Devil)*			
102.	25190	*Morethia butleri*			
103.	25192	*Morethia obscura*			
104.	25255	*Parasuta nigriceps*			
105.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
106.	25511	*Pseudonaja affinis (Dugite)*			
107.	25518	*Strophurus spinigerus*			

	Name	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
108.	24983	*Underwoodisaurus milii (Barking Gecko)*			
109.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			

Conservation Codes
T □□are or li□ely to become e□tinct
□ □□resumed e□tinct
□A □□rotected under international a□reement
□ □□ther specially protected fauna
1 □□riority 1
2 □□riority 2
3 □□riority 3
4 □□riority 4
5 □□riority 5

[1] □or NatureMap□s purposes, species fla□□ed as endemic are those □hose records are □holely contained □ithin the search area. Note that only those records complyin□ □ith the search criterion are included in the calculation. □or e□ample, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the □uery area.

Australian Government
Department of the Environment and Energy

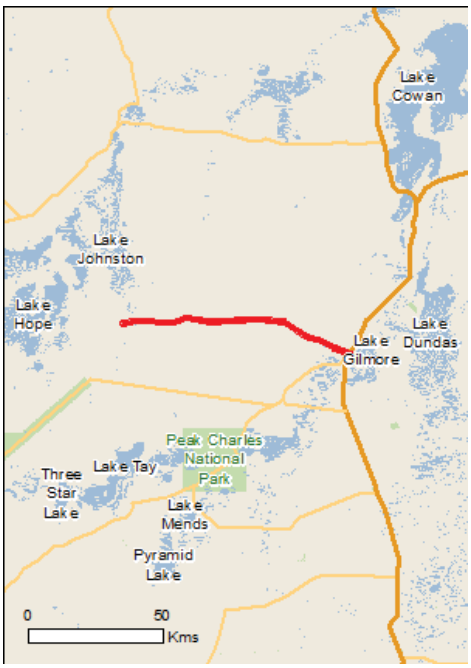
□□BC Act □rotected Matters □eport

This report provides □eneral □uidance on matters of national environmental si□nificance and other matters protected by the □□BC Act in the area you have selected.

□nformation on the covera□e of this report and □ualifications on data supportin□ this report are contained in the caveat at the end of the report.

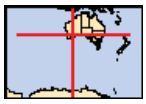
□nformation is available about □nvironment Assessments and the □□BC Act includin□ si□nificance □uidelines, forms and application process details.

□eport created □12□02□20 16□01□13



This map may contain data □hich are □Common□ealth of Australia □□eoscience Australia□ □□□MA 2010

Coordinates
Buffer□1.0□m



□ummary

Matters of National □nvironmental □i□nificance

This part of the report summarises the matters of national environmental si□nificance that may occur in, or may relate to, the area you nominated. □urther information is available in the detail part of the report, □hich can be accessed by scrollin□ or follo□in□ the lin□s belo□. □f you are proposin□ to underta□e an activity that may have a si□nificant impact on one or more matters of national environmental si□nificance then you should consider the Administrative □uidelines on □i□nificance.

World □erita□e □roperties□	None
National □erita□e □laces□	None
Wetlands of □nternational □mportance□	None
□reat Barrier □eef Marine □ar□□	None
Common□ealth Marine Area□	None
□isted Threatened □colo□ical Communities□	None
□isted Threatened □pecies□	6
□isted Mi□ratory □pecies□	7

□ther Matters □rotected by the □□BC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be re□uired for a proposed activity that si□nificantly affects the environment on Common□ealth land, □hen the action is outside the Common□ealth land, or the environment any□here □hen the action is ta□en on Common□ealth land. Approval may also be re□uired for the Common□ealth or Common□ealth a□encies proposin□ to ta□e an action that is li□ely to have a si□nificant impact on the environment any□here.

The □□BC Act protects the environment on Common□ealth land, the environment from the actions ta□en on Common□ealth land, and the environment from actions ta□en by Common□ealth a□encies. As herita□e values of a place are part of the □environment□, these aspects of the □□BC Act protect the Common□ealth □erita□e values of a Common□ealth □erita□e place. □nformation on the ne□ herita□e la□s can be found at http□□□□□.environment.□ov.au□herita□e

A permit may be re□uired for activities in or on a Common□ealth area that may affect a member of a listed threatened species or ecolo□ical community, a member of a listed mi□ratory species, □hales and other cetaceans, or a member of a listed marine species.

Common□ealth □and□	None
Common□ealth □erita□e □laces□	None
□isted Marine □pecies□	12
Whales and □ther Cetaceans□	None
Critical □abitats□	None
Common□ealth □eserves Terrestrial□	None
Australian Marine □ar□s□	None

□□ta □nformation

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

□tate and Territory □eserves□	1
□e□ional □orest A□reements□	None
□nvasive □pecies□	10
Nationally □mportant Wetlands□	None
□ey □colo□ical □eatures □Marine□	None

Details

Matters of National □nvironmental □i□nificance

□isted Threatened □pecies		□□esource □nformation □
Name	□tatus	Type of □resence
Birds		
Calidris ferru□inea Curle□ □andpiper □856□	Critically □ndan□ered	□pecies or species habitat may occur □ithin area
□eipoa ocellata Malleefo□l □934□	□ulnerable	□pecies or species habitat li□ely to occur □ithin area
□e□oporus occidentalis Ni□ht □arrot □59350□	□ndan□ered	□pecies or species habitat may occur □ithin area
Mammals		
Dasyurus □eoffroii Chuditch, Western □uoll □330□	□ulnerable	□pecies or species habitat may occur □ithin area
□lants		
Ban□sia sphaerocarpa var. dolichostyla □oncaps Ban□sia, □oncap Ban□sia □10518□	□ulnerable	□pecies or species habitat may occur □ithin area
□oycea pycnophylloides □altmat □21161□	□ndan□ered	□pecies or species habitat may occur □ithin area

□isted Mi□ratory □pecies		□□esource □nformation □
□□pecies is listed under a different scientific name on the □□BC Act □Threatened □pecies list.		
Name	Threatened	Type of □resence
Mi□ratory Marine Birds		
Apus pacificus □or□□tailed □□ift □678□		□pecies or species habitat li□ely to occur □ithin area
Mi□ratory Terrestrial □pecies		
Motacilla cinerea □rey Wa□tail □642□		□pecies or species habitat may occur □ithin area
Mi□ratory Wetlands □pecies		
Actitis hypoleucos Common □andpiper □59309□		□pecies or species habitat may occur □ithin area
Calidris acuminata □harp□tailed □andpiper □874□		□pecies or species habitat may occur □ithin area

Name	Threatened	Type of □resence
Calidris ferru□inea Curle□ □andpiper □856□	Critically □ndan□ered	□pecies or species habitat may occur □ithin area
Calidris melanotos □ectoral □andpiper □858□		□pecies or species habitat may occur □ithin area
□andion haliaetus □sprey □952□		□pecies or species habitat may occur □ithin area

□ther Matters □rotected by the □□BC Act

□isted Marine □pecies	□□esource □nformation □
□□pecies is listed under a different scientific name on the □□BC Act □Threatened □pecies list.	

Name	Threatened	Type of □resence
Birds		
Actitis hypoleucos Common □andpiper □59309□		□pecies or species habitat may occur □ithin area
Apus pacificus □or□□tailed □□ift □678□		□pecies or species habitat li□ely to occur □ithin area
Ardea alba □reat □□ret, White □□ret □59541□		□pecies or species habitat li□ely to occur □ithin area
Ardea ibis Cattle □□ret □59542□		□pecies or species habitat may occur □ithin area
Calidris acuminata □harp□tailed □andpiper □874□		□pecies or species habitat may occur □ithin area
Calidris ferru□inea Curle□ □andpiper □856□	Critically □ndan□ered	□pecies or species habitat may occur □ithin area
Calidris melanotos □ectoral □andpiper □858□		□pecies or species habitat may occur □ithin area
Chrysococcy□osculans Blac□□eared Cuc□oo □705□		□pecies or species habitat li□ely to occur □ithin area
Merops ornatus □ainbo□ Bee□eater □670□		□pecies or species habitat may occur □ithin area
Motacilla cinerea □rey Wa□tail □642□		□pecies or species habitat may occur □ithin area

Name	Threatened	Type of □resence
□andion haliaetus		
□sprey □952□		□pecies or species habitat may occur □ithin area
Thinornis rubricollis		
□ooded □lover □59510□		□pecies or species habitat may occur □ithin area

□□ta □nformation

□tate and Territory □eserves	□□esource □nformation □
Name	□tate
□nnamed WA42943	WA

□nvasive □pecies	□□esource □nformation □

Weeds reported here are the 20 species of national si□nificance □WoN□□, alon□ □ith other introduced plants that are considered by the □tates and Territories to pose a particularly si□nificant threat to biodiversity. The follo□in□ feral animals are reported□□oat, □ed □o□, Cat, □abbit, □i□, Water Buffalo and Cane Toad. Maps from □andscape □ealth □roject, National □and and Water □esouces Audit, 2001.

Name	□tatus	Type of □resence
Birds		
Columba livia		
□oc□□i□eon, □oc□Dove, Domestic □i□eon □803□		□pecies or species habitat li□ely to occur □ithin area
□treptopelia sene□alensis		
□au□hin□Turtle□dove, □au□hin□Dove □781□		□pecies or species habitat li□ely to occur □ithin area
□turnus vul□aris		
Common □tarlin□ □389□		□pecies or species habitat li□ely to occur □ithin area
Mammals		
Camelus dromedarius		
Dromedary, Camel □7□		□pecies or species habitat li□ely to occur □ithin area
Canis lupus familiaris		
Domestic Do□ □82654□		□pecies or species habitat li□ely to occur □ithin area
□elis catus		
Cat, □ouse Cat, Domestic Cat □19□		□pecies or species habitat li□ely to occur □ithin area
Mus musculus		
□ouse Mouse □120□		□pecies or species habitat li□ely to occur □ithin area
□ryctola□us cuniculus		
□abbit, □uropean □abbit □128□		□pecies or species habitat li□ely to occur □ithin area
□ulpes vulpes		
□ed □o□, □o□□18□		□pecies or species habitat li□ely to occur □ithin area
□lants		

Name	□tatus	Type of □resence
Carrichtera annua Ward□s Weed □9511□		□pecies or species habitat li□ely to occur □ithin area

Caveat

The information presented in this report has been provided by a ran□e of data sources as ac□no□led□ed at the end of the report.

This report is desi□ned to assist in identifyin□ the locations of places □hich may be relevant in determinin□ obli□ations under the □nvironment □rotection and Biodiversity Conservation Act 1999. □t holds mapped locations of World and National □erita□e properties, Wetlands of □nternational and National □mportance, Common□ealth and □tate□Territory reserves, listed threatened, mi□ratory and marine species and listed threatened ecolo□ical communities. Mappin□ of Common□ealth land is not complete at this sta□e. Maps have been collated from a ran□e of sources at various resolutions.

Not all species listed under the □□BC Act have been mapped □see belo□□and therefore a report is a □eneral □uide only. Where available data supports mappin□, the type of presence that can be determined from the data is indicated in □eneral terms. □eople usin□ this information in ma□in□ a referral may need to consider the □ualifications belo□ and may need to see□and consider other information sources.

□or threatened ecolo□ical communities □here the distribution is □ell □no□n, maps are derived from recovery plans, □tate ve□etation maps, remote sensin□ ima□ery and other sources. Where threatened ecolo□ical community distributions are less □ell □no□n, e□istin□ ve□etation maps and point location data are used to produce indicative distribution maps.

Threatened, mi□ratory and marine species distributions have been derived throu□h a variety of methods. Where distributions are □ell □no□n and if time permits, maps are derived usin□ either thematic spatial data □i.e. ve□etation, soils, □eolo□y, elevation, aspect, terrain, etc□to□ether □ith point locations and described habitat□or environmental modellin□ □MA□□NT or B□□C□□M habitat modellin□□usin□ point locations and environmental data layers.

Where very little information is available for species or lar□e number of maps are re□uired in a short time□frame, maps are derived either from 0.04 or 0.02 decimal de□ree cells□by an automated process usin□ poly□on capture techni□ues □static t□o □ilometre □rid cells, alpha□hull and conve□hull□□ or captured manually or by usin□ topo□raphic features □national par□ boundaries, islands, etc□ □n the early sta□es of the distribution mappin□ process □1999□early 2000s□distributions □ere defined by de□ree bloc□s, 100□ or 250□ map sheets to rapidly create distribution maps. More reliable distribution mappin□ methods are used to update these distributions as time permits.

□nly selected species covered by the follo□in□ provisions of the □□BC Act have been mapped□

- □mi□ratory and
- □marine

The follo□in□ species and ecolo□ical communities have not been mapped and do not appear in reports produced from this database□

- □threatened species listed as e□tinct or considered as va□rants
- □some species and ecolo□ical communities that have only recently been listed
- □some terrestrial species that overfly the Common□ealth marine area
- □mi□ratory species that are very □idespread, va□rant, or only occur in small numbers

The follo□in□ □roups have been mapped, but may not cover the complete distribution of the species□

- □non□threatened seabirds □hich have only been mapped for recorded breedin□ sites
- □seals □hich have only been mapped for breedin□ sites near the Australian continent

□uch breedin□ sites may be important for the protection of the Common□ealth Marine environment.

Coordinates

□32.52472 120.79952,□32.51768 120.84528,□32.5212 120.9704,□32.51768 120.98384,□32.50904 121.01136,□32.51896 121.09008,□32.51352 121.25776,□32.52024 121.34032,□32.55928 121.41136,□32.5756 121.46576,□32.59352 121.5048,□32.60888 121.55728

Ac□ro□led□ements

This database has been compiled from a ran□e of data sources. The department ac□no□led□es the follo□in□ custodians □ho have contributed valuable data and advice□

- □□ffice of □nvironment and □erita□e, Ne□ □outh Wales
- □Department of □nvironment and □rimary □ndustries, □ictoria
- □Department of □rimary □ndustries, □ar□s, Water and □nvironment, Tasmania
- □Department of □nvironment, Water and Natural □esources, □outh Australia
- □Department of □and and □esource Mana□ement, Northern Territory
- □Department of □nvironmental and □erita□e □rotection, □ueensland
- □Department of □ar□s and Wildlife, Western Australia
- □□vironment and □lannin□ Directorate, ACT
- □Bidlife Australia
- □Australian Bird and Bat Bandin□ □cheme
- □Australian National Wildlife Collection
- □Natural history museums of Australia
- □Museum □ictoria
- □Australian Museum
- □□uth Australian Museum
- □□ueensland Museum
- □□nline □oolo□ical Collections of Australian Museums
- □□ueensland □erbarium
- □National □erbarium of N□W
- □□oyal Botanic □ardens and National □erbarium of □ictoria
- □Tasmanian □erbarium
- □□ate □erbarium of □outh Australia
- □Northern Territory □erbarium
- □Western Australian □erbarium
- □Australian National □erbarium, Canberra
- □□niversity of Ne□ □n□land
- □□cean Bio□eo□raphic □nformation □ystem
- □Australian □overnment, Department of Defence
- □orestry Corporation, N□W
- □□eoscience Australia
- □C□□□
- □Australian Tropical □erbarium, Cairns
- □eBird Australia
- □Australian □overnment □Australian Antarctic Data Centre
- □Museum and Art □allery of the Northern Territory
- □Australian □overnment National □nvironmental □cience □ro□ram
- □Australian □nstitute of Marine □cience
- □□eef □ife □urvey Australia
- □American Museum of Natural □istory
- □□ueen □ictoria Museum and Art □allery, □nveres□, Tasmania
- □Tasmanian Museum and Art □allery, □obart, Tasmania
- □□ther □roups and individuals

The Department is e□tremely □rateful to the many or□anisations and individuals □ho provided e□pert advice and information on numerous draft distributions.

□lease feel free to provide feedbac□ via the Contact □s pa□e.

□ Common□ealth of Australia
Department of the □nvironment
□□□ Bo□787
Canberra ACT 2601 Australia
□61 2 6274 1111

APPENDIX D

SIGNIFICANT SPECIES PROFILES

□a□e Cronin Sna□e *Paroplocephalus atriceps*

□tatus and Distribution□ □isted as □riority 3 by DBCA. □no□n only from a small number of specimens.

□cattered records from □a□e Cronin south east to □ea□ □lenora □□raser □an□e□□Co□□er 2014, Bush *et al.* 2007, Wilson and □□an 2017□.

□abitat□ □emi□arid □oodlands and roc□y outcrops □Wilson and □□an 2017□.

□i□ely presence in survey area□ □tatus in the survey area is un□no□n but possibly occurs □iven presence of suitable habitat.

□isted as a potential species based on available information.

□otential impact of development□ □oss□modification of small areas of potential habitat. No si□nificant impact considered li□ely.

□allee□o□l *Leipoa ocellata*

□tatus and Distribution□ This species is listed as □chedule 3 under the *BC Act* and as □ulnerable under the *EPBC Act*. □ri□inally common, but no□ □enerally rare to uncommon and patchily distributed.

Current distribution mainly southern arid and semi□arid □ones, north to □har□ Bay, □in□emarra, Col□a Do□ns and □eelirrie, east to □arnest □iles □an□e, □eo □a□e, lo□er □onton Cree□ and to □ucla and □est and south to Coc□leshell □ully, the Won□an □ills, □tirlin□ □an□e, Beaufort □nlet, □atters □ill, Mt □a□□ed and □oint Malcolm □□ohnstone and □torr 1998□.

□abitat□ Mainly scrubs and thic□ets of mallee *Eucalyptus* spp., boree *Melaleuca lanceolata* and bo□□ada *Acacia linophylla*, also dense litter formin□ shrublands.

□i□ely presence in survey area□ A malleefo□l individual □as recorded durin□ the field survey alon□ □ith some recent trac□s □outside the survey area□and three e□tinct, very old□old nest mounds.

□isted as a potential species based on available information.

□otential impact of development□ □oss□modification of small areas of potential habitat. No si□nificant impact considered li□ely.

□ere□rine □alcon *Falco peregrinus*

□tatus and Distribution□ This species is listed as □chedule 7 under the *BC Act*. □ndividuals of this species are uncommon□rare but □ide ran□in□ across Australia. Moderately common at hi□her levels of the □tirlin□ □an□e, uncommon in hilly, north □est □imberley, □amersley and Darlin□ □an□es□rare or scarce else□here □□ohnstone and □torr 1998□.

□abitat□ Diverse from rainforest to arid shrublands, from coastal heath to alpine □Morcombe 2004□. Mainly about cliffs alon□ coasts, rivers and ran□es and about □ooded □atercourses and la□es □□ohnstone and □torr 1998□. The species utilises the led□es, cliff faces and lar□e hollo□s□bro□en spouts of trees for nestin□. □t □ill also occasionally use the abandoned nests of other birds of prey. Also □no□n to utilise decommissioned open cut pit □alls for nestin□.

□i□ely presence in survey area□ The species potentially utilises some sections of the survey area as part of a much lar□er home ran□e, thou□h records in this area are rare. No potential nest sites in trees observed.

□isted as a potential species based on available information.

□otential impact of development□ □oss□modification of small areas of potential habitat. No si□nificant impact considered li□ely.

□ooded □lover *Charadrius rubricollis*

□tatus and Distribution□ The □estern subspecies of the hooded plover is listed as □riority 4 by DBCA. Breeds on south□□est Western Australian coast, from Cape Naturaliste to □yre, and on inland la□es as far north□east as □. Co□an and □. Moore and north□□est to □al□orup □a□es, south of □erth.

□abitat□ Broad sandy ocean beaches and bays, coastal and inland salt la□es □□i□□ey □ □ni□ht 2012□.

□i□ely presence in survey area□ The scattered salt la□es in the □eneral area represent potential habitat for this species ho□ever the proposed haul road does not intersect directly throu□h any □etland areas suitable for this species.

Not listed as a potential species based on available information.

□otential impact of development□ No impact on this species or its preferred habitat □ill occur.

□i□ratory Shorebirds

A number of mi□ratory shorebirds have previously been recorded in the □eneral area. Not all specific species are discussed in detail.

□tatus and Distribution□ Most mi□ratory shorebirds are listed under □chedule 5 of the *BC Act*, as Mi□ratory under the *EPBC Act* and□or under international a□reements to □hich Australia is a si□natory. All species are either □idespread summer mi□rants to Australia or residents. □tate and □ederal conservation status varies bet□een species.

□abitat□ □aries bet□een species but includes beaches and permanent□temporary □etlands varyin□ from billabon□s, s□amps, la□es, floodplains, se□era□e farms, salt□or□ ponds, estuaries, la□oons, mudflats sandbars, pastures, airfields, sports fields and la□ns.

□i□ely presence in survey area□ The scattered salt la□es in the □eneral area represent potential habitat for some of these species if inundated ho□ever the proposed haul road does not intersect directly throu□h any □etland areas suitable for these species.

None listed as a potential species based on available information.

□otential impact of development□ No impact on this species or its preferred habitat □ill occur.

□ estern □osella □nland ssp □*Platycercus icterotis xanthogenys***

□tatus and Distribution□ The inland sub species of the □estern rosella is listed as □riority 4 by DBCA. At present rare to moderately common □ohnstone and □torr 1998□. □ocal e□tinctions have occurred in 25□ of local □overnment authorities, representin□ about 40□ of the total ran□e, mostly in the north and east □aunders and Curry 1990, □aunders and □n□ram 1995, Ma□son and □on□ 1996, Ma□son and □ohnstone 1997□. □till declinin□ in □heatbelt, but stable in □estern □oodland and forest □Ma□son and □ohnstone 1997□. □emiarid southern interior□Won□an □ills □formerly□, □ununoppin, Moorine □oc□, □ar□er □an□e, □ardina □oc□ and Ten Mile □oc□s, □est to Toodyay, the Dale □iver, Mt □addlebac□ and □ojonup, and south to the □tirlin□ □an□e, lo□er □it□erald □iver, □avensthorpe, □ran□ □ann National □ar□ and □ed □a□e□ casual further north □Mt □ac□son, □aralee, □narlbine □oc□□□ohnstone and □torr 1998□.

□abitat□ Mainly eucalypt and casuarina □oodlands and scrubs, especially of □andoo, flooded □um, salmon □um, tall mallees and *Allocasuarina huegeliana*. Attracted to seedin□ *E wandoo*, *A. huegeliana*, *Glischrocaryon flavescens* and *Olearia revoluta* and to flo□erin□ *Melaleuca acuminata* and *Eucalyptus eremophilrx* □ohnstone and □torr 1998□.

□i□ely presence in survey area□ □ecorded durin□ the □evel 2 □urvey in 2013□2104 □ithin the main project area □are□ood 2017□. □ess li□ely further east.

□isted as a potential species based on available information.

□otential impact of development□ □oss□modification of small areas of potential habitat. No si□nificant impact considered li□ely.

Ni□ht □arrot *Pezoporus occidentalis*

□tatus and Distribution□ This species is listed as □chedule 1 under the *BC Act* and as □ndan□ered under the *EPBC Act*. □istorical evidence indicates that ni□ht parrots □ere distributed over much of semi-arid and arid Australia □□arnett and Cro□ley 2000□. □□tremely secretive and hard to flush, in WA there are only five accepted records of ni□ht parrots since 1935, four from the □ilbara re□ion □1979, 1980, 2005 Dot□□ 2017 and 2017 □□are□ood unpublished□□ and several observations near □orna □len station□□a□e Carne□ie south□east of Wiluna □□amilton *et al*. 2017□.

□abitat□ □referred habitat is thou□ht to be spinife□ □rasslands or samphire and chenopod shrublands on claypans, floodplains or the mar□ins of salt la□es, cree□s or other □ater bodies □□ohnstone and □torr 1998□□i□□ins 1999□Dot□□ 2017□.

□i□ely presence in survey area□ □abitat □ith the haul road ali□nment appears lar□ely unsuitable. There are no recent or historical records of this species in the area.

Not listed as a potential species based on available information.

□otential impact of development□ No impact on this species or its preferred habitat considered li□ely.

□or□□tailed S□i□t *Apus pacificus*

□tatus and Distribution□ The for□□tailed s□ift is listed as □chedule 5 under the *BC Act* and as mi□ratory under the *EPBC Act* includin□ international a□reements to □hich Australia is a si□natory. □t is a summer mi□rant □□ct□Apr□to Australia □Morcombe 2004□.

□abitat□ □o□ to very hi□h airspace over varied habitat from rainforest to semi desert □Morcombe 2004□.

□i□ely presence in survey area□ □t is potentially a very infre□uent summer visitor to the survey area but is entirely aerial and lar□ely independent of terrestrial habitats. Wold only occur very occasionally if at all, and then only temporarily.

Not listed as a potential species based on available information.

□otential impact of development□ No impact on this species □ill occur.

□rey □ a□tail *Motacilla cinerea*

□tatus and Distribution□ The □rey □a□tail is listed as □chedule 5 under the *BC Act* and as Mi□ratory under the *EPBC Act* includin□ international a□reements to □hich Australia is a si□natory. A rarely recorded, accidental va□rant that has on a fe□ occasions been recorded on □idely separated parts of the Australian coastline □i□□ey □ □ni□ht 2012□.

□abitat□ In Australia, near runnin□ □ater in disused □uarries, sandy, roc□y streams in escarpments and rainforest, se□era□e ponds, plou□hed fields and airfields □i□□ey □ □ni□ht 2012□.

□i□ely presence in survey area□ This species preferred habitat is absent from the □urvey area and under normal circumstances it □ould not occur in this area.

Not listed as a potential species based on available information.

□otential impact of development□ No impact on this species or its preferred habitat □ill occur.

Chuditch *Dasyurus geoffroii*

□tatus and Distribution□ □isted as □cheduled 3 under the *BC Act* and as □ulnerable under the *EPBC Act.* □ormerly occurred over nearly 70 per cent of Australia. The Chuditch no□ has a patchy distribution throu□hout the □arrah forest and mi□ed □arri□Marri□arrah forest of south□est Western Australia. Also occurs in very lo□ numbers in the Mid□est, Wheatbelt and □outh Coast □e□ions □ith records from Moora to the north, □ello□dine to the east and south to □opetoun.

□abitat□Chuditch are □no□n to have occupied a □ide ran□e of habitats from □oodlands, dry sclerophyll □leafy□ forests, riparian ve□etation, beaches and deserts. □iparian ve□etation appears to support hi□her densities of Chuditch, possibly because food supply is better or more reliable and better cover is offered by dense ve□etation. Chuditch appear to utilise native ve□etation alon□ road sides in the □heatbelt □CA□M 1994□. The estimated home ran□e of a male Chuditch is over 15 □m^2 □hilst that for females is 3□4 □m^2 □□orena and □oder□uist 1995□.

□i□ely presence in survey area□ This species □as subject to t□o tar□eted trappin□ surveys underta□en durin□ the level 2 survey at the main survey area in 2013□2014. No chuditch □ere recorded and □iven there are no other documented records in immediate vicinity the species is considered unli□ely to occur e□cept possibly occasional as transient individuals. The absence of any feral predator control or possible recruitment from adjoinin□ areas means it is unli□ely to be persists in the area under normal circumstances.

Not listed as a potential species based on available information.

□otential impact of development□ No impact on this species or its preferred habitat □ill occur.

□ **estern Brush □ allaby *Notamacropus irma***

□tatus and Distribution□ □isted as □riority 4 by DBCA. The □estern brush □allaby is distributed across the south□□est of Western Australia from north of □albarri to Cape Arid □DBCA information pamphlet□.

□abitat□ The species optimum habitat is open forest or □oodland, particularly favourin□ open, seasonally □et flats □ith lo□ □rasses and open scrubby thic□ets. Also found in some lar□er areas of mallee and heathland in the □heatbelt □□an Dyc□ *et al.* 2013□.

□i□ely presence in survey area□ The survey area is at the e□treme ed□e of this species documented ran□e. It has not been recorded to date durin□ surveys but may occur, if only occasionally.

□isted as a potential species based on available information.

□otential impact of development□ Modification□loss of a very small area of potential habitat. No si□nificant impact anticipated.

Central □on□□eared Bat *Nyctophilus major tor*

□tatus and Distribution□ □isted as □riority 3 by DBCA. □istorical distribution included the Cool□ardie, □ampton and northern Avon Biore□ions in Western Australia, □a□ler Bioregion and western part of the 'Eyre and York Blocks' Bioregion in South Australia. A specimen from □oldea in the □reat □ictoria Desert Biore□ion of □outh Australia. □ne other specimen from a car □rill after a ni□ht□time drive from Marla □□tony □lains Biore□ion of □A□to Alice □prin□s in the Northern Territory via the □tuart □i□h□ay in c.1985. No historical data on abundance.

Currently □no□n from several localities in Western Australia and in □outh Australia. No evidence that ran□e has contracted, but it is apparently rare in □reat □ictoria Desert, Nullarbor and □tony □lains Biore□ions □hile it is locally common in Cool□ardie, □ampton, □a□ler and □estern □yre□□or□ Bloc□ Biore□ions □Duncan *et al* □ed□1999□.

□abitat□ □leans □round, bar□ and folia□e surfaces□fora□es in and a□ainst cluttered airspaces. The species is often netted, and sometimes cau□ht in pit traps, in heavy eucalypt □oodlands and tall □oodlands of the Cool□ardie Biore□ion of Western Australia □ith a tall shrub understorey of *Melaleuca lanceolata, M. pauperiflora, M. quadrifaria, Eremophila spp*. etc. □ess common in open □oodlands. □as been netted at dams in the

Cool□ardie and □ampton Biore□ions of Western Australia □hile in □outh Australia has been associated □ith a ran□e of mallee □*Eucalyptus*□species, *Acacia papyrocarpa*, *A. ramulosa, Casuarina cristata* and found to the frin□es of the treeless Nullarbor □lain □Duncan *et al* □ed□ 1999□. □oosts in tree cavities, in folia□e and under loose bar□ □Churchill 2008□.

□i□ely presence in survey area□ □ecorded durin□ the bat survey underta□en in April 2017 and durin□ the □evel 2 □urvey □ithin the main survey area in 2013□2014 □□are□ood 2017□.

□isted as a potential species based on available information.

□otential impact of development□ □oss□modification of some fora□in□ and potential roostin□ habitat is possible but this is unli□ely to alter the status of the species on a local or re□ional scale.

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