

# Desktop assessment for Short Range Endemic invertebrates for the Dalgarranga Gold Project Gascoyne Resources Ltd, Murchison, Western Australia.



Report by Invertebrate Solutions Pty  
Ltd for Western Ecological Pty Ltd  
on behalf of Gascoyne Resources  
Ltd

March 2020

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Invertebrate Solutions. (2020). Desktop assessment for Short Range Endemic invertebrates for the Dalgarranga Gold Project, Gascoyne Resources, Murchison, Western Australia. Unpublished report to Western Ecological Pty Ltd on behalf of Gascoyne Resources Ltd, March 2020.

Report Number 2020ISJ04\_F01\_20200316

Prepared for: Western Ecological Pty Ltd on behalf of Gascoyne Resources Ltd

Frontispiece: The conservation significant mygalomorph spider *Idiosoma clypeatum* from the Murchison.

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# Executive Summary

Gascoyne Resources Ltd (Gascoyne) commenced mining activities in March 2018 at the Dalgara Gold Project (the Project) located approximately 70 km northwest of Mt Magnet Townsite, in the Murchison region of Western Australia. The Project has a new miscellaneous lease over 73 ha (tenement L59/168) that is planned to be used for an expansion of the recommissioned borefield. Environmental studies are required to support a mining proposal and native vegetation clearing permit application.

Invertebrate Solutions has been requested by Western Ecological Pty Ltd (Western Ecological) on behalf of Gascoyne to undertake a desktop assessment for short range endemic (SRE) invertebrates for the Project in the Murchison region, Western Australia.

The Desktop Study Area contains no recorded SRE species, however this region of Western Australia is poorly surveyed for invertebrates and an absence of previously recorded species does not necessarily indicate an absence of potential SRE species. An assessment of conservation significant invertebrates identified 13 species that occur within the entire Midwest region, however, within the Murchison region only one of these species, the mygalomorph spider *Idiosoma clypeatum* (Priority 3) has potential habitat in the region, with the remaining species found many hundreds of kilometres away in the broader region. The development of the project may impact upon *Idiosoma clypeatum*, if it is present within the Project area.

# 1. Introduction

Gascoyne Resources Ltd (Gascoyne) commenced mining activities in March 2018 at the Dalgara Gold Project (the Project) located approximately 70 km northwest of Mt Magnet Townsite, in the Murchison region of Western Australia. The Project has a new miscellaneous lease over 73 ha (tenement L59/168) that is planned to be used for an expansion of the recommissioned borefield. Environmental studies are required to support a mining proposal and native vegetation clearing permit application.

Invertebrate Solutions has been requested by Western Ecological Pty Ltd (Western Ecological) on behalf of Gascoyne to undertake a desktop assessment for short range endemic (SRE) invertebrates for the Project in the Murchison region, Western Australia.

## 1.1 Purpose of this report

Western Ecological has requested Invertebrate Solutions to undertake the following scope of works for the Project, Western Australia:

- Provide information about the about terrestrial invertebrate species with potentially restricted ranges (short range endemics) and suitable habitats for SRE invertebrates within the Project area (Tenement L59/168) and the immediately adjacent area with regard to EPA Technical Guidance Sampling of short range endemic invertebrate fauna (EPA 2016);
- Identify any other gaps in the information.
- Provide advice on any management and/or mitigation measures that could be implemented if required and any suggested requirements for further work to comply with relevant legislation; and
- Provide a written report containing the above items.

## 1.2 Desktop Study Area

The proposed Project area is located approximately 70 km northwest of Mt Magnet Townsite, in the Murchison region of Western Australia and is shown in Figure 1 and Figure 2. The desktop study area comprised approximately 270,000 ha rectangle of approximately 50 km x 50 km bounded by the north west corner (27.575538°S, 117.023506°E) and the south east corner (28.099382°S, 117.495355°E) centred on Tenement L59/168.

This report has been prepared with regard to the Technical Guidance – Sampling of short range endemic invertebrate fauna (EPA 2016).

Figure 1: Dalgaranga Gold Mine location figure

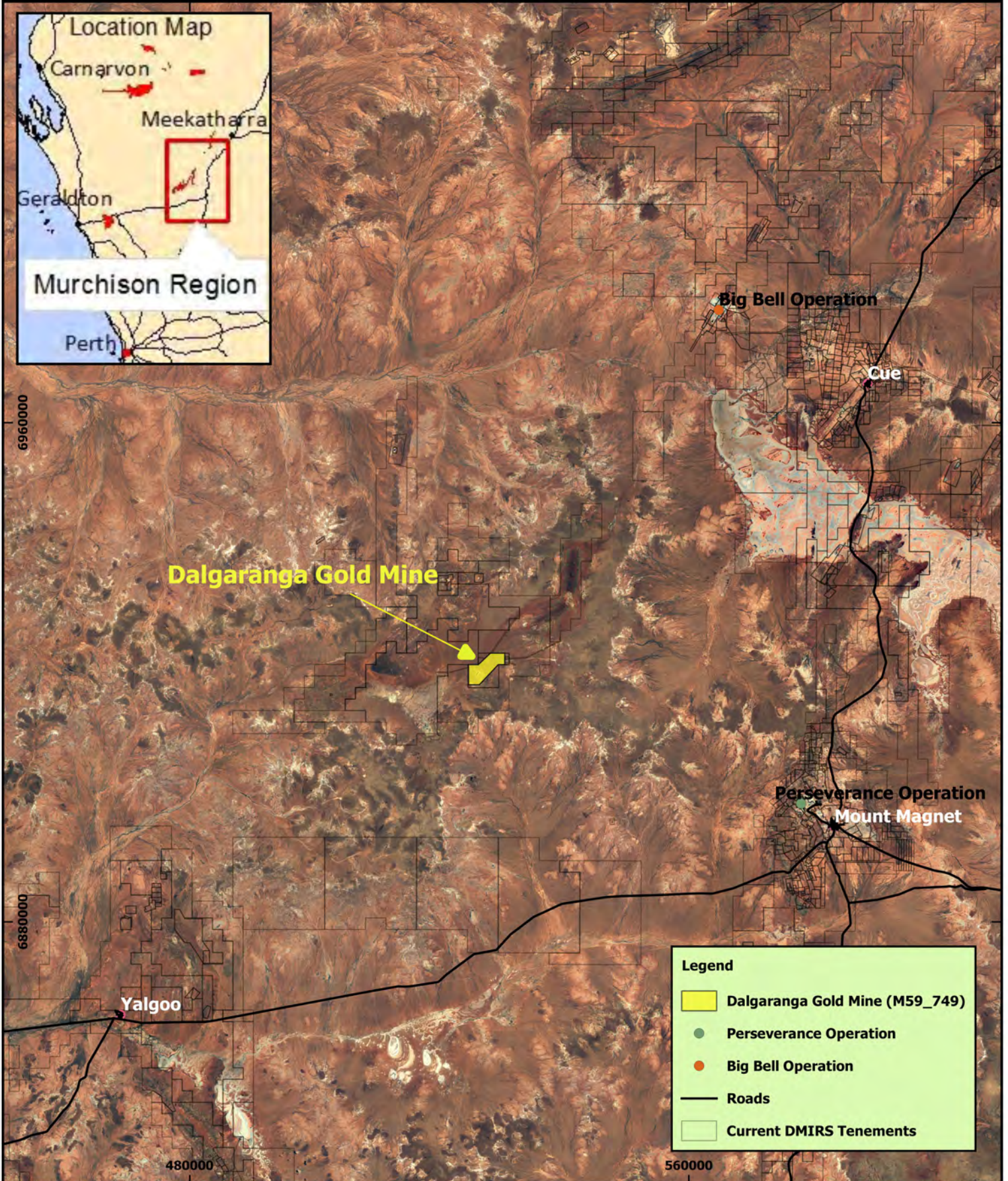
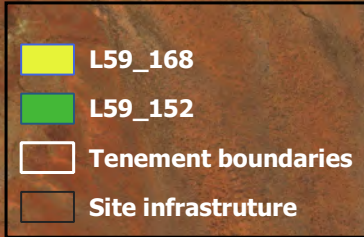


Figure 2: Dalgaranga Gold Project - location of L59/168



L59/168 = 73.3 ha

Area of L59/168 outside of L59/152 = 26.0 ha



### 1.3 Introduction to SRE fauna

Short range endemic (SRE) invertebrates are species with restricted distributions. The isolation of invertebrates in specific habitats or bioregions leads to endemism at various spatial scales. The vast majority of invertebrates are capable of dispersing substantial distances at some phase of their life cycle. Some groups, however, are susceptible to short-range endemism which describes endemic species with restricted ranges, arbitrarily defined in Western Australia as less than 10,000 km<sup>2</sup> (100 km x 100 km) (Harvey, 2002). Taxa that have been more commonly found to contain SRE representatives include:

- Onychophorans (velvet worms);
- Crustaceans (Isopoda);
- Arachnids (mygalomorph spiders, pseudoscorpions, opiliones, scorpions, schizomids);
- Myriapods (millipedes and centipedes);
- Molluscs (land snails); and
- Insects (hemipterans, grasshoppers, butterflies).

SRE invertebrate fauna taxa are generally found in sheltered, relatively mesic environments such as isolated habitats (e.g. boulder piles, isolated hills, dense patches of vegetation, gullies) and can include microhabitats within these environments such as deep leaf litter accumulation, large logs, under bark, cave areas and springs and permanent water bodies.

Many processes contribute to taxa being susceptible to short range endemism. Generally, these factors are related to the isolation of a species which can include the ability and opportunity to disperse, life history, physiology, habitat requirements, and habitat availability. Taxa that exhibit short range endemism generally exhibit poor dispersal, low growth rates, low fecundity and reliance on habitat types that are discontinuous (Harvey, 2002). Taxa that reside within easily isolated habitats surrounded by physical barriers such as islands, mountains, aquifers, lakes and caves are also more susceptible to becoming SRE species often including additional taxa not otherwise generally forming SREs.

Taxa that exhibit short range endemism are particularly vulnerable to disturbance, either natural or anthropogenic, as they are reliant upon specialised and often restricted habitats (often moist) (Framenau, *et al.*, 2008). Short range endemic taxa are unable to disperse to *refugia* when their habitats are threatened or destroyed, thus making them a priority for conservation efforts.

The allocation of short range endemism status can be difficult due to the often incomplete taxonomic framework of many invertebrate groups and the often frequent need for substantial revision to enable accurate identification. Short Range Endemic status is assigned using the categories described in Table 1, based upon the available information from the Western Australian Museum (WAM) database and discussion with appropriate taxonomic authorities for various invertebrate groups. Insufficient information exists for many invertebrate species due to specimens being juvenile, the wrong sex to allow identification, damaged, or inadequate taxonomic frameworks, precluding the assignment of SRE status.

**Table 1 Short Range Endemic Status of Species**

SRE Status	Definition
<b>Confirmed</b>	A confirmed SRE species. A known distribution of < 10,000 km <sup>2</sup> (after Harvey 2002). Taxonomy of the group is well known. The group is well represented in collections, or via comprehensive sampling.
<b>Likely</b>	Likely to be a SRE species based upon knowledge of the family/genus, where other closely related species show evidence of short range endemism. Where habitats containing the specimens show discontinuity within the landscape.
<b>Possible</b>	Based upon existing knowledge of the genus / family there is a possibility that the species may have a restricted range. Where habitats containing the specimens may show discontinuity within the landscape. Possible SRE species may be assigned one of the sub categories below: <ul style="list-style-type: none"> <li>A. Data deficient i.e. new species, lack of distribution, taxonomic or collecting knowledge, juvenile specimens, wrong sex for identification</li> <li>B. Habitat indicators</li> <li>C. Morphology indicators</li> <li>D. Molecular evidence</li> <li>E. Research and expertise of WAM staff/taxonomic specialists</li> </ul>
<b>Widespread</b>	Not a SRE, a wide ranging distribution of > 10,000 km <sup>2</sup>

## 1.4 Conservation Legislation and Guidance Statements

Terrestrial SRE species are protected under state legislation via the newly enacted *Biodiversity Conservation (BC) Act* (2016) which came into force on 1<sup>st</sup> January 2019, replacing the outdated *Wildlife Conservation (WC) Act* (1950). The new BC Act is aligned with the federal *Environment Protection and Biodiversity Conservation (EPBC) Act* (1999). The assessment of SRE fauna for environmental impact assessment (EIA) is undertaken in Western Australia with regard to Technical Guidance – Sampling of short range endemic invertebrate fauna (EPA 2016).

At the State level, the BC Act provides a list of species that have special protection as species listed under Part 2 of BC Act. This notice is updated periodically by the Department of Biodiversity, Conservation and Attractions (DBCA) (formerly the Department of Parks and Wildlife (DPaW)) and the current list (January 2019) includes numerous SRE species from the Goldfields, Wheatbelt, South Coast, Murchison and Pilbara regions. Included in the list are crustaceans, arachnids and myriapods that are considered to be “rare or likely to become extinct, as critically endangered fauna, or are declared to be fauna that is in need of special protection” (DPaW 2015). In addition to the specially protected fauna, DBCA also maintains a list of Priority fauna that are considered to be of conservation significance but do not meet the criteria for formal listing under the BC Act. The Priority fauna list is irregularly updated by DBCA and is now part of the BC Act.

The BC Act now provides the ability for the state government of Western Australia to formally list Threatened Ecological Communities (TECs), along with threatening processes.

The EPBC Act protects both species and ecological communities. The most relevant listing for SRE fauna in Western Australia is the mygalomorph spider *Idiosoma nigrum* that occurs in the Wheatbelt region and is listed as Vulnerable.

## 1.5 Report Limitations and Exclusions

This study was limited to the written scope provided to the client by Invertebrate Solutions (29<sup>th</sup> January 2020) and in Section 1.1. This study was limited to the extent of information made available to Invertebrate Solutions at the time of undertaking the work. Information not made available to this study, or which subsequently becomes available may alter the conclusions made herein. Assessment of potential impacts to SRE fauna was based on proposed development plans provided by the client.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. Invertebrate Solutions has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by Invertebrate Solutions described in this report (this section and throughout this report). Invertebrate Solutions disclaims liability arising from any of the assumptions being incorrect.

Invertebrate Solutions has prepared this report on the basis of information provided by Gascoyne Resources Ltd and others (including Government authorities), which Invertebrate Solutions has not independently verified or checked beyond the agreed scope of work. Invertebrate Solutions does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

## 2. Methods

Invertebrate Solutions undertook the following tasks for the desktop SRE assessment of the Project:

- SRE desktop assessment based upon Western Australian Museum Records;
- An assessment of the likelihood that SRE invertebrate species are present in the habitats located within the Project area.

The desktop assessment was undertaken with regard to the Technical Guidance – Sampling of short range endemic invertebrate fauna (EPA 2016).

### 2.1 SRE Desktop Methodology

A search of the WAM databases for Arachnids, Crustacea and Molluscs was undertaken for potential SRE taxa occurring in the region. In addition, other published reports for the area were examined. The desktop analysis was used to identify any potential SRE species that may occur in the region and target those taxa during any subsequent field survey of the Project area.

#### 2.1.1 Likelihood of SRE invertebrate occurrence

The likelihood of SRE invertebrate species occurring in the Project area was assessed using a combination of regional and local botanical and landform information and database searches including:

- Analysis of published and unpublished reports concerning SRE invertebrate from the region.
- Botanical and vegetation mapping and other information available for the Project areas.
- Results of a Protected Matters Search from the Federal Government’s Department of the Environment and Energy (DEE) website.
- Records of fauna held by the WAM.

Based on the analysis of all available information within the Project Area and from the broader Desktop Study Area each SRE species was assigned a level of likelihood to occur within the Project area of either ‘Very Low’, ‘Low’, ‘Moderate’, ‘High’, or ‘Definite’.

**Table 2 SRE species likelihood of occurrence definitions**

<b>SRE Species Likelihood of occurrence</b>	<b>Definition</b>
<b>Definite</b>	The species is confirmed to occur within the Project area
<b>High</b>	Habitat for the species is known to occur within the Project area and known current records of the species are within 20 km
<b>Moderate</b>	Habitat for the species is known to occur within the Project area and known current records of the species are within 50 km
<b>Low</b>	The species has been recorded from within 50 km, however, no habitat is present for the species within the Project area or the records are historical.
<b>Very low</b>	No habitat exists for the species within the Project area and no records of the species are within 50 km or the distribution of the species is known well enough to exclude its presence within the Project area.

## 2.2 Short Range Endemic Status

Taxonomic groups known to contain SRE representatives were examined in more detail to determine if the records in this study are potentially restricted forms. SRE status was assigned after comparison with other close relatives in the group and current knowledge on their distribution and ecology, where known.

## 3. Results

### 3.1 SRE Invertebrates of the Midwest region

Some of the first systematic surveys for SRE invertebrates in the Mid West were undertaken at Jack Hills and iron ore deposits to the south including Weld Range, Karara, Blue Hills and Koolanooka (Ecologia 2007, 2009a,b, GHD 2012). One of the key SRE species recorded throughout the region was the mygalomorph spider *Idiosoma nigrum* from multiple locations but with a restricted area of occurrence to slopes and upper drainage line within the broader region (GHD 2010). The genus *Idiosoma* has recently been the subject of a comprehensive taxonomic revision (Rix et al. 2018) that has split the previously widespread species into eight distinct species, with the Mid West region containing a single species *Idiosoma clypeatum* inland and *I. aranaceum* along the coast to Shark Bay. The highly conservation significant *I. nigrum* (Vulnerable EPBC Act) is now known to be restricted to the central northern Wheatbelt (Rix et al. 2018). The distribution of *Idiosoma clypeatum* includes the Yalgoo bioregion although no records of this species are known from within the Desktop Study Area.

The first baseline survey of SREs at Jack Hills was undertaken in 2006 – 2007 (Ecologia 2009a) and included wet pitfall trapping over 3 months and active foraging and leaf litter sampling of upper slopes, flat areas at the base of hills, mulga and open plains, alluvial plains, creek beds and drainage lines. SRE invertebrates identified during the survey were *Idiosoma nigrum* (now *I. clypeatum*) and also potentially *Cethegus fugax* and *Eucryptops* sp that were range extensions. The *Cethegus fugax* was identified as a potential new species. Juvenile specimens of the mygalomorph genus *Missulena* could not be identified to species level. It is not known whether these specimens are SREs.

A juvenile specimen of the pseudoscorpion *Synsphyronus* sp. was collected during the survey (Ecologia 2009a). This specimen is likely to be a new species and may potentially be a SRE species. Two species of undescribed scorpion, *Lychas* sp. were also collected during the survey. These specimens represented the first known records of these species and it was not known whether these species are SREs.

GHD undertook a baseline survey at Jack Hills for short range endemic (SRE) invertebrates during July 2012 (GHD 2012). The field survey was undertaken using systematic (pitfall trapping) and opportunistic (foraging) sampling and specifically assessed the south-eastern facing side of the Jack Hills ridge complementing the previous survey by Ecologia (2009a), as well as targeting adjacent areas to determine the local extent of SRE species. Eighteen species from groups known to contain SRE species were recorded. Taxonomic assessment indicated that only a single species (*Idiosoma nigrum*, now *I. clypeatum*) was a confirmed SRE.

Ecologia (2009b) undertook a baseline survey for SRE invertebrates at Weld Range, located approximately 80 km to the north west of the Project using both pitfall trapping and active hand foraging. The survey recorded 45 species from groups known to contain SRE representatives, including 15 species of mygalomorph spiders, 10 species of centipedes, eight species of scorpions, six species of pseudoscorpions, four species of isopods one species of millipede and one species of land snail (Ecologia 2009b).

The species that were either confirmed as, or were likely to represent SRE taxa were the Shield-back Spider *Idiosoma nigrum* (now known to be the mygalomorph spider *I. clypeatum*), *Aurococypta* sp. (Mygalomorph spider), *Cethegus* 'fugax complex' (Mygalomorph spider), *Pleuroxia* sp. (land snail) and *Antichiropus* sp. 'Weld Range' (Millipede).

Ecologia (2007) undertook a baseline survey at Koolanooka for SRE taxa using both trapping and opportunistic foraging recording 117 potential SRE specimens. These individuals represented six classes, 12 families, 17 genera and 21 species of invertebrates. Three species likely to be SRE were recorded, *Idiosoma nigrum* (now *I. clypeatum*), *Synsphyronus* sp. (Pseudoscorpione) and *Spherillo* sp. (slater). It should be noted *Spherillo* sp was not originally identified as a potential SRE species by Ecologia (2007) however, subsequent information indicates that members of this genus are now considered as likely SRE species (GHD 2012).

Outback Ecology (2011) undertook a baseline SRE survey with five species initially identified as occurring within the Toro Uranium project area only. Subsequent investigations showed that only two species, the trapdoor spider *Aname* sp.'MYG176' and the scorpion *Urodacus* sp.'yeelirrie' were likely SRE species.

More recently in 2018 Invertebrate Solutions undertook a baseline SRE survey near Yalgoo for the Yogi Magnetite Project (Invertebrate Solutions 2019). The SRE survey recorded a single Likely SRE species, an Armadillid isopod from the genus *Cubaris* and 12 Possible SRE invertebrate species (mainly olpiid pseudoscorpions) from the Yogi Magnetite Project area. There were two Possible (a mygalomorph spider and an olpiid pseudoscorpion) and one Confirmed SRE species (*Antichiropus* millipede) identified during the desktop assessment that were not recorded during the field survey (Invertebrate Solutions 2019).

There are no publically available SRE surveys in the Dalgaranga Gold Project Area. Habitats within the Yilgarn more widely that are considered prospective for SRE invertebrates include creek and drainage lines, Banded Iron Formation (BIF) ridges, mesas, stony hills and breakaways. The majority of reported SRE species in the Yilgarn comprise of Camaenid land snails, Mygalomorph spiders, *Urodacus* scorpions, and *Antichiropus* and *Atelomastix* millipedes (Bamford 2006; Bamford and Bancroft 2006; Bennelongia 2012, Biota 2009; Biota 2011; Car et al. 2013; GHD 2012; Harewood 2016, Ninnox 2009, Volschenck 2015).

### 3.2 Conservation Significant Fauna in the Desktop Study Area

A list of conservation significant fauna for the Desktop Study Area was compiled from the DBCA Wildlife Conservation (Specially Protected Fauna) Notice 2019 (DBCA 2019) and the DEE's Protected Matters Search Tool (PMST). SRE species that are listed under the BC Act and/or the EPBC Act and are likely to occur or have known habitat within the Desktop Study Area are shown in Table 3 along with their conservation code. The PMST results listed the mygalomorph spider *Idiosoma nigrum* as having the potential for habitat based upon bioclimatic modelling to occur within the Gascoyne Project area, however, the distribution of this species is well known and a recently published generic revision shows that *Idiosoma nigrum* does not occur in Mid West region but only occurs further south in the northern Wheatbelt region (Rix et al. 2018, Plate 1). A full description of the DBCA and

EPBC conservation codes are shown in Appendix 1 and Appendix 2 respectively. The full list of species obtained from the PMST search is shown in Appendix 2.

Whilst 13 species occur within the entire Midwest region, within the Project area only one of these species, the mygalomorph spider *Idiosoma clypeatum* has potential habitat in the region, with the remaining species found many hundreds of kilometres away in the broader region.

**Table 3 Conservation significant terrestrial invertebrates potentially within the Desktop Study area.**

Higher Classification	Genus and Species	DBCA/ BC Status	EPBC status	Habitat/Distribution within Desktop Study Area
Crustacea	<i>Branchinella denticulata</i>	P3	-	Not Present
	<i>Branchinella simplex</i>	P1	-	Not Present
Arachnida	<i>Idiosoma clypeatum</i>	P3	-	High

### 3.3 SRE Habitat in Project area

The vegetation units and condition mapping identified in the flora and vegetation assessment (Native Vegetation Solutions 2016) were used to assess the Project areas for potential SRE habitat. The vegetation condition is largely Good to Very Good, with some areas that are degraded to completely degraded in the vicinity of old mine workings. The vegetation mapping undertaken by Native Vegetation Solutions (2016) show that the Project is situated within broadly Mulga Woodland over various differing understorey that comprise over 80% of the Project area surveyed (Native Vegetation Solutions 2016, Section 3.2.2). This SRE habitat type are not restricted in nature and are laterally extensive within the region.

None of the habitats identified would provide habitat isolates that would be likely to contain SRE taxa within the limited extent of the Project area.

### 3.4 Potential occurrence of SRE Invertebrates within the Desktop Study Area

A search of the DBCA and WAM databases for potential SRE taxa occurring in the Desktop Study Area centred on the Project area was undertaken. The desktop study area comprised approximately 260,000 ha rectangle of approximately 50 km x 50 km bounded by the north west corner (27.575538°S, 117.023506°E) and the south east corner (28.099382°S, 117.495355°E) centred on the Project. The results of these were filtered for groups that potentially contain SRE species as shown in Table 4. Definitions for SRE status are found in Table 1.

The Desktop Study Area contains no known SRE species with all of the species widespread, although the mygalomorph spider *Idiosoma clypeatum* is widespread and not considered to be a SRE species it is of conservation significance (Priority 3). These records held by the WAM are not exhaustive and represent only specimens within the WAM collections. Other species, new to science may and are likely to exist within the broader Desktop Study Area due to the absence of comprehensive invertebrate sampling throughout the majority of Western Australian habitats.



**Table 4 Desktop records from WAM of potential SRE Invertebrates in the Project area**

Higher Order	Genus and species	SRE Status and notes	Likelihood of occurrence
<b>Arachnida: Mygalomorphae</b>			
<b>Idiopidae</b>	<i>Idiosoma clypeatum</i>	Widespread/ Priority 3	High
<b>Arachnida: Scorpiones</b>			
<b>Urodacidae</b>	<i>Urodacus hoplurus</i>	Widespread	High
<b>Myriapoda: Chilopoda:</b>			
<b>Scolopendridae</b>	<i>Cormocephalus turneri</i>	Widespread	High

## 4. Discussion

### 4.1 SRE Invertebrate Assessment

The Desktop Study Area contains no SRE species and one trapdoor spider that is conservation significant. The remainder of the species were found to be widespread. The conservation significant mygalomorph spider species that may potentially occur within the Project areas is discussed in further detail below.

#### *Idiosoma clypeatum* (Priority 3)

*Idiosoma clypeatum* was previously known by the WAM identification code ‘MYG018’ and prior to the taxonomic revision of Rix et al. 2018 was often incorporated into *Idiosoma nigrum* that is now known to only occur in the northern Wheatbelt region of Western Australia (Rix et al. 2018).

*Idiosoma clypeatum* has a widespread distribution in the Yalgoo and Murchison bioregions of Western Australia’s inland arid zone strongly correlated with annual rainfall of less than 250 mm (Plate 1). Like many *Idiosoma* species from the *I. nigrum* complex the burrows are adorned with a moustache like arrangement of twigs (Plate 2). Males have been collected wandering in search of females in late autumn, winter and spring, with a peak of activity in winter (Invertebrate Solutions 2017, Rix et al. 2018).

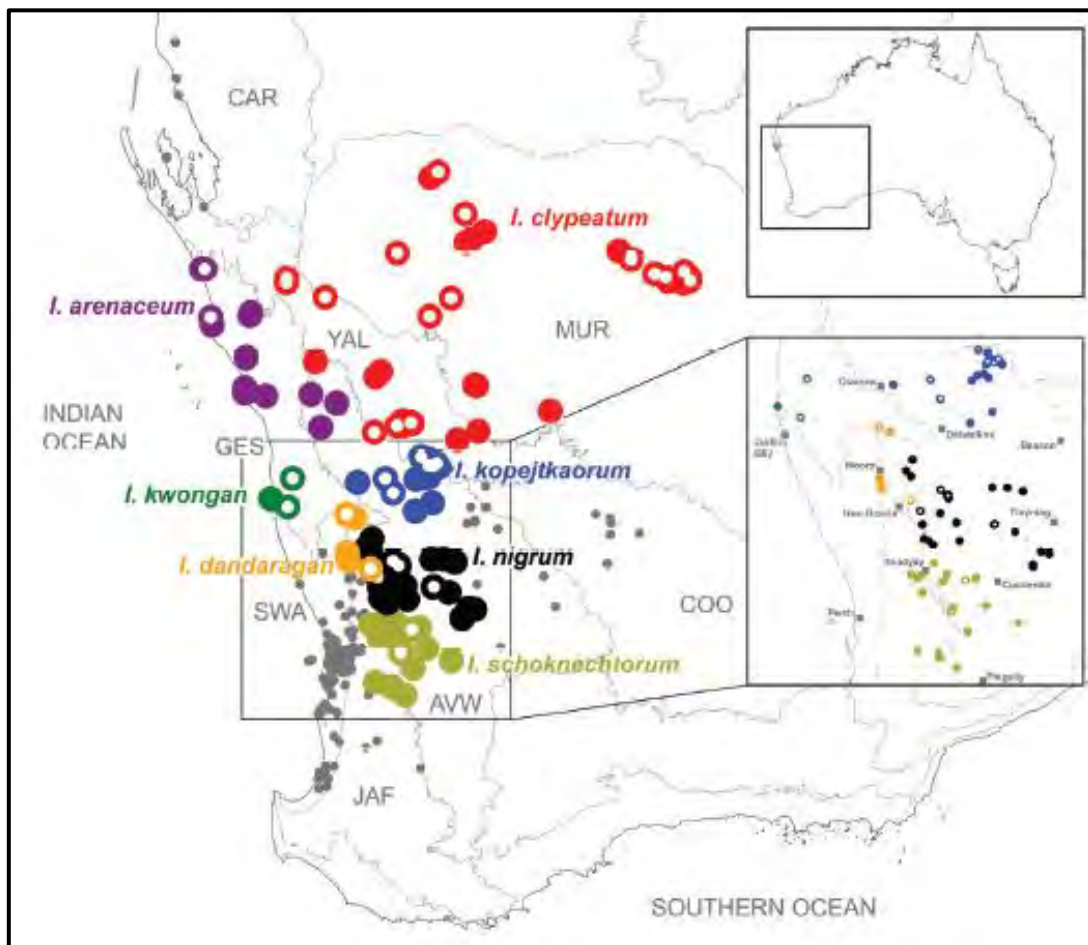


Plate 1 Distribution of *Idiosoma clypeatum* (in red). After Rix et al. 2018, Figure 374.

In 2017, *Idiosoma clypeatum* was formally assessed as Priority 3 fauna by DBCA; this assessment incorporated the latest taxonomic, geographic, and genetic data summarised by Rix et al. 2018. The species has a known extent of occurrence of over 120,000 km<sup>2</sup>, and thus is not considered to be a short range endemic species by the definition of Harvey 2002, it does largely occur within areas prospective for mining and mineral resource development.

*Idiosoma* mygalomorph spiders use vegetation including Acacia and Eucalyptus for habitat that is present within the Project area and thus habitat for *Idiosoma clypeatum* is present and it is considered to have a High likelihood of occurrence.



**Plate 2** Burrow of *Idiosoma clypeatum* from the Murchison bioregion showing the characteristic moustache twig arrangement at the entrance (Invertebrate Solutions 2017)

## 5. Conclusions

The Desktop Study Area contains no recorded SRE species, however this region of Western Australia is poorly surveyed for invertebrates and an absence of previously recorded species does not necessarily indicate an absence of potential SRE species.

A single widespread conservation significant mygalomorph spider, *Idiosoma clypeatum* (Priority 3) has a High likelihood of occurring within the Project area.

The development of the project may impact upon the conservation significant mygalomorph spider, *Idiosoma clypeatum*, if it is present within the Project area.

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# Appendix 1

DBCA Conservation Categories



# CONSERVATION CODES

## For Western Australian Flora and Fauna

Specially protected fauna or flora are species\* which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such.

Categories of specially protected fauna and flora are:

### **T Threatened species**

Published as Specially Protected under the *Wildlife Conservation Act 1950*, and listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).

**Threatened fauna** is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the Wildlife Conservation Act.

**Threatened flora** is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the Wildlife Conservation Act.

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

### **CR Critically endangered species**

Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

### **EN Endangered species**

Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

### **VU Vulnerable species**

Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

### **EX Presumed extinct species**

Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.

### **IA Migratory birds protected under an international agreement**

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. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.



## **CD Conservation dependent fauna**

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.

## **OS Other specially protected fauna**

Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

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## **P Priority species**

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

### **1 Priority 1: Poorly-known species**

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

### **2 Priority 2: Poorly-known species**

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

### **3 Priority 3: Poorly-known species**

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

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

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

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

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

\*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).

# Appendix 2

## Protected Matters Search Tool Results



# EPBC Act Protected Matters Report

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

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

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 19/02/20 14:59:22

[Summary](#)

[Details](#)

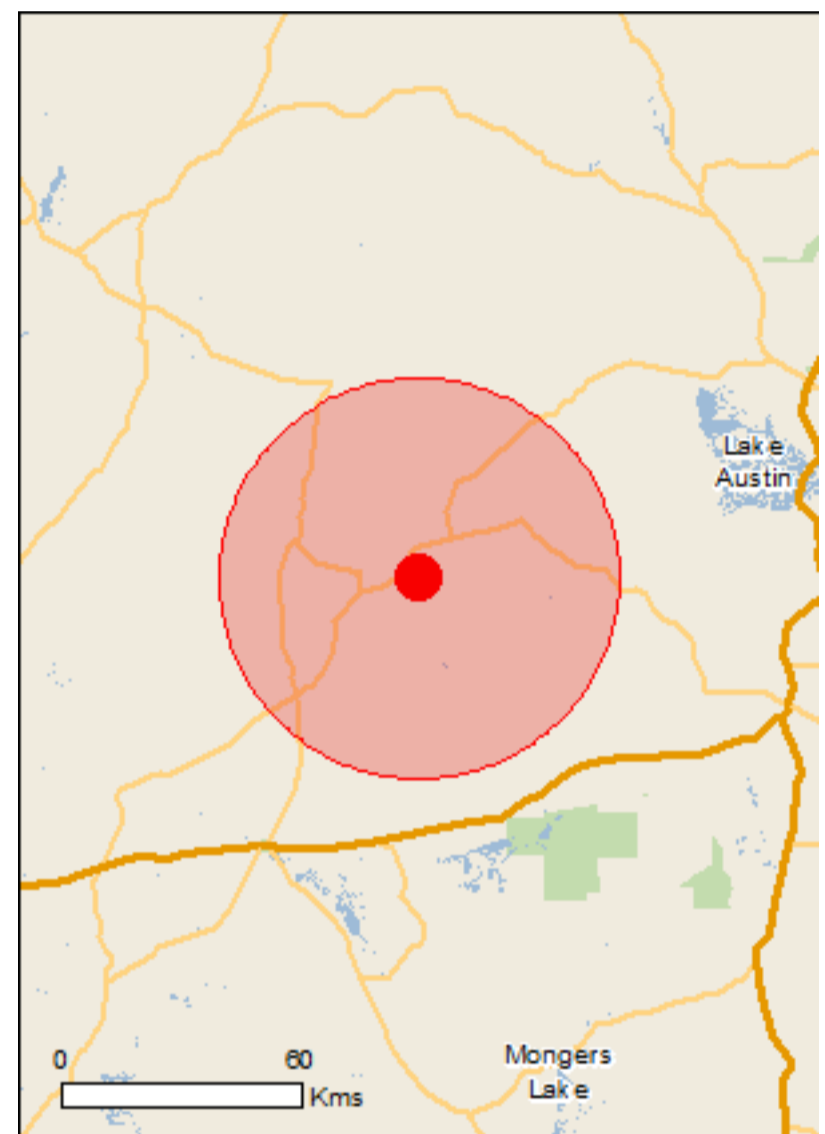
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 50.0Km



# Summary

## Matters of National Environmental Significance

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

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	None
<a href="#">Listed Threatened Species:</a>	7
<a href="#">Listed Migratory Species:</a>	6

## Other Matters Protected by the EPBC Act

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

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

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

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	11
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	2
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	10
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

### Listed Threatened Species [\[ Resource Information \]](#)

Name	Status	Type of Presence
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#### Birds

<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
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<a href="#">Pezoporus occidentalis</a> Night Parrot [59350]	Endangered	Species or species habitat may occur within area
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<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
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#### Other

<a href="#">Idiosoma nigrum</a> Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat known to occur within area
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#### Plants

<a href="#">Ricinocarpos brevis</a> [82879]	Endangered	Species or species habitat may occur within area
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#### Reptiles

<a href="#">Egernia stokesii badia</a> Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat known to occur within area
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### Listed Migratory Species [\[ Resource Information \]](#)

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
------	------------	------------------

#### Migratory Marine Birds

<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
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#### Migratory Terrestrial Species

<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
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#### Migratory Wetlands Species

<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within
--	--	---

Name	Threatened	Type of Presence area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area

## Other Matters Protected by the EPBC Act

### Listed Marine Species [\[ Resource Information \]](#)

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Chrysococcyx osculans</a> Black-eared Cuckoo [705]		Species or species habitat known to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

## Extra Information

### State and Territory Reserves [\[ Resource Information \]](#)

Name	State
Dalgaranga and Noongal Pastoral Leases	WA
Lakeside Pastoral Lease	WA

### Invasive Species [\[ Resource Information \]](#)

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

Name	Status	Type of Presence
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#### Birds

Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area

#### Mammals

Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area

#### Plants

Name	Status	Type of Presence
Cenchrus ciliaris		
Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area



# Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

# Coordinates

-27.81473 117.02119

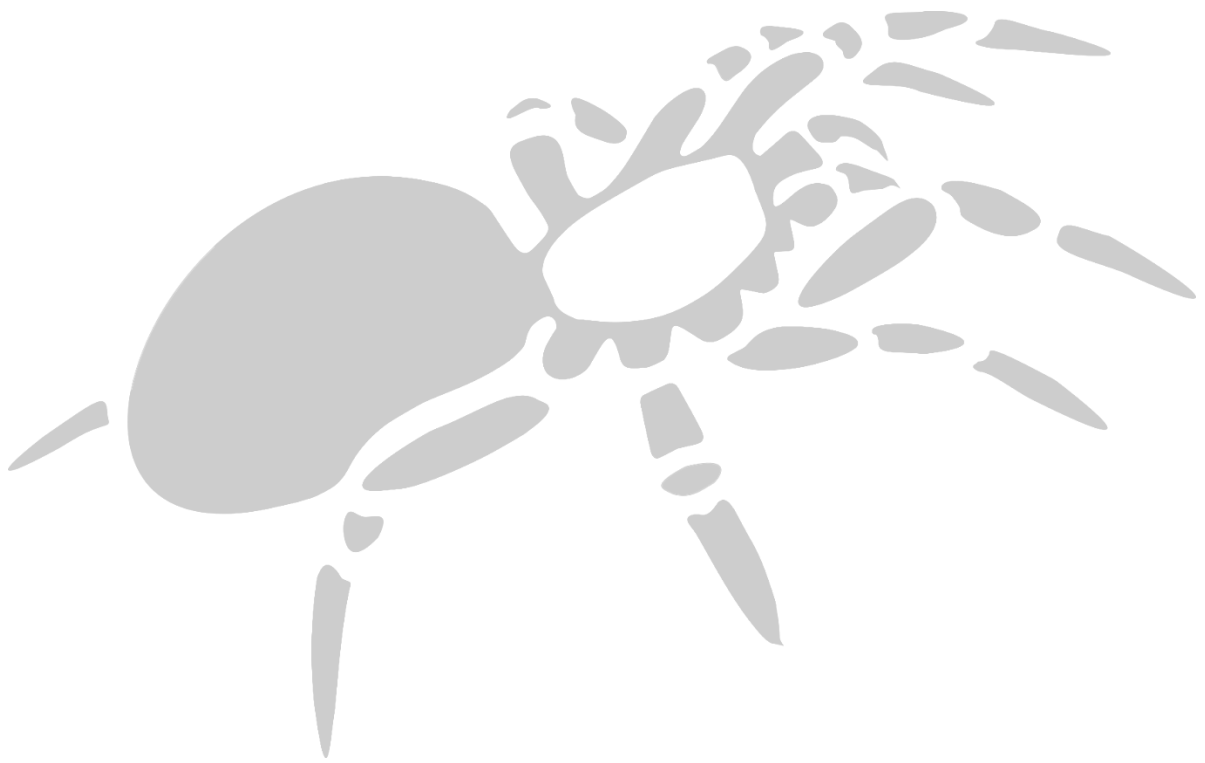
# Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact Us](#) page.



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